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In Memory of Edward Cheng 1946 - 2015

Disclaimer

Neither the authors nor the United Kingdom Atomic Energy Authority accept responsibility for consequences arising from any errors either in the present documentation or the FISPACT-II code, or for reliance upon the information contained in the data or its completeness or accuracy.

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Executive Summary

This report focuses on use of astrophysical temperature-dependent integral Maxwellian cross sections to probe the microscopic capture cross sections up to a few hundred keV. This provides a set of integral measurements for incident-neutron nuclear data which robustly validates the data or identifies weaknesses within some combination of resolved and/or average resonance parameters, data formats, physical formalisms and systematic normalisations.

Maxwellian-averaged cross sections provide a rare source of high-quality information in the keV energy region which for many nuclides lack any differential information. For many applications that have to account for neutrons as incident particles this is wholly insufficient and spurious nuclear data may result in unphysical simulations. The energy range from eV to a few hundred keV is precisely where, for most of the nuclei, R-matrix theory is required to be connect with equilibrium Hauser-Feshbach and then pre-equilibrium models. The results of this coupling, from both a physical and nuclear data perspective, can have significant effects on simulated quantities of interests: microscopic and astrophysical Maxwellian cross section integrals, absorption, gas production, *etc.*

The TENDL-2014, ENDF/B-VII.1 and JENDL-4.0u nuclear data libraries are used to calculate Maxwellian-averaged, integral neutron capture cross sections from the microscopic evaluated cross sections. Values for a range of astrophysical temperatures from kT=1 keV to 100 keV have been compared with the Karlsruhe Astrophysical Database of Nucleosynthesis in Stars (KADoNiS). The comparisons provide many recommendations for re-analysis of the resonance regions.

Contents

1 Introduction

Knowledge of the origin of heavy elements above iron was not well understood until the 1950s, with the seminal B^2FH paper [1] establishing what is now known as stellar nucleosynthesis. Observations of technetium, of which ^{98}Tc has the longest half-life at 4 million years, within stars known to be several billion years old made it clear that some process other than fusion was responsible for the formation of heavy elements within stars. The ability to spectroscopically quantify the chemical composition of stars, coupled with models of stellar structure and nuclear reaction theory, has produced an active area of research into the processes which yield the nuclide inventories of the observable universe.

Stellar nucleosynthesis involves a variety of nuclear reactions, of which neutron capture plays a central role in the production of heavy nuclides. The combination of neutron capture and beta decay of neutron-rich nuclides allows stellar inventories to reach above iron. The two general regimes for neutron capture are defined by the relationship between beta decay and neutron capture rates; the *slow* *s*-process and *rapid* *r*-process. The *s*-process occurs when a relatively low neutron density results in a reaction rate less than the beta decay rate. As a result, *s*-process products lie along the valley of stability, tracing out paths with sequential capture and decay events. In contrast, the *r*-process occurs with tremendous reaction rates which out-pace the decays and allow many successive capture events to produce nuclides which are too neutron-rich to lie within the s-process path. A special case occurs when the capture reaction rate and decay rates are reasonably similar, allowing multiple branches in the s-process path where in some cases a nuclide undergoes multiple captures and in other cases a beta decay interrupts. These pathways are summarised in Figure 1.

Observations of the chemical composition of the observable universe provide us with peaked elemental distributions, schematically shown in the top-left subfigure of Figure 1. As nuclides experience multiple capture events and trace out the s-process path, they pass through the magic neutron numbers where capture cross sections drop off substantially. This results in build-up of whatever nuclides lie on the path at N =50, 80 and 126, and a peak in the nuclide concentration at those lines. Combined with the r-process paths and their associated build-up points, models of stellar nucleosynthesis have this global universal inventory to fit with the best available microscopic data for nuclear interactions.

The effort to collect experimental information on the neutron capture cross sections of nuclei has been primarily guided by the applications of nuclear industries. Power generation, medical, security and other terrestrial pursuits are concerned with a limited subset of all possible nuclides and only for specific energies and precision required for their applications. While capture reactions may seem intuitively important, the measurement of many non-threshold resonances for exotic nuclides is non-trivial and often unjustifiable. For many applications only integral quantities in a few characteristic environments are deemed important and these rarely have much overlap with plasma neutron spectra. As a result, the detailed microscopic cross sections, particularly within the resolved resonance ranges, of most s-process nuclides have limited experimental information with evaluated and processed resonance parameters. Moreover, for many s-process nuclides, no nuclear data evaluation has even been made for the well-known legacy libraries.

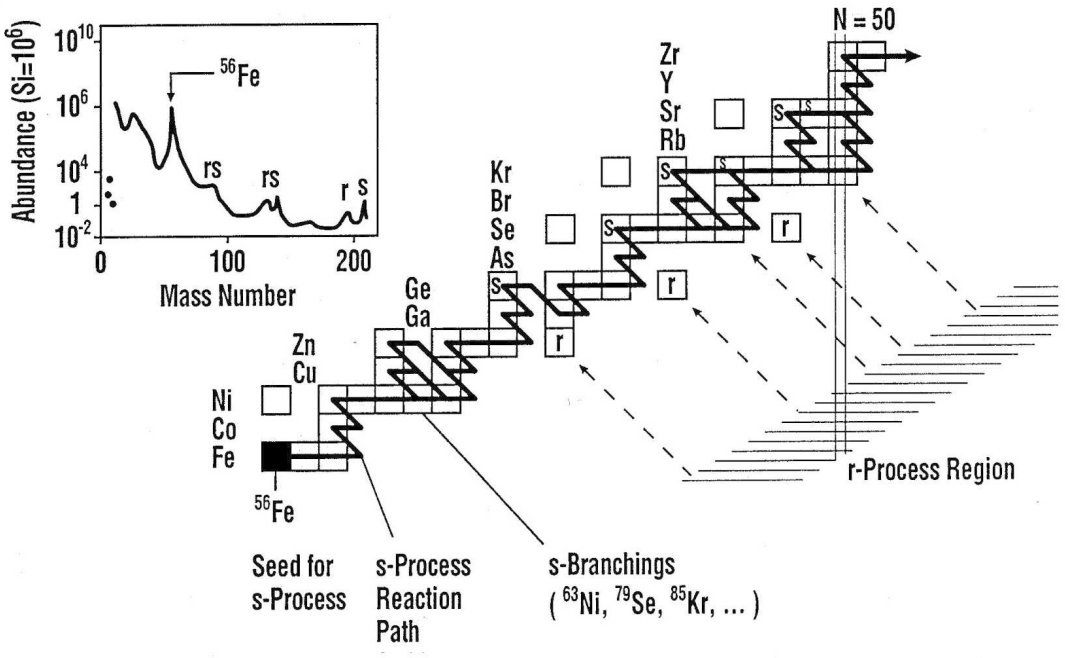


Figure 1: Schematic of the s-process nuclide path with r-process nuclides labelled by s and r, respectively. The sketch of solar abundance distribution shows characteristic bumps where the reactions encounter magic neutron numbers. Reproduced from [2].

2 Reference database

The persistence and dedication of a community of astrophysicists, experimental nuclear physicists and nuclear reaction theorists has resulted in a relatively complete Karlsruhe Astrophysical Database of Nucleosynthesis in Stars (KADoNiS) [3]. KADoNiS contains data for 357 nuclides over 11 temperatures from 5 keV (58 million K) to 100 keV (1.2 billion K). This database has benefited from many earlier datasets, largely drawing from them with the addition of more modern measurements. These are based on numerous experimental systems employing Van de Graaff, Pelletron and linear electron accelerators, as well as thermal reactors, fast fission piles and Sb-Be photoneutron sources. Neutron spectra are also measured in numerous methods, ranging from simple activation techniques to full time-of-flight characterisation. The main source used by the authors of this report to verify the data sources used in KADoNiS was Bao *et al* [4], which includes an impressive catalogue of experimental and theoretical sources. While investigation of the hundreds of experimental references is beyond the scope of this report, a set of references [5, 6, 7, 8][1] were drawn upon for theoretically-derived cross sections without any direct experimental measurements. While several of those nuclides without experimental information have been updated with new measurements reflected in KADoNiS v0.3, **80 integral capture cross sections (22%) are still taken from these statistical model results.**

[1]These provide large datasets for many nuclides, but several other sources were drawn upon for specific subsets, such as [9], which focuses in-depth on tungsten and rhenium. The end results are a mix of multiple theoretical models drawn from many sources and with weighting averaging all requiring expert knowledge of the data.

For nuclides with sufficient level density and for which direct capture plays a relatively limited role, neutron capture cross sections are typically calculated using the Hauser-Feshbach method, which involves statistical sampling of compound nuclei formation and their decay channels. The applicability of the model depends on the validity of the assumptions, which have been demonstrated to be reasonably valid for the temperatures required for stellar nucleosynthesis on a subset of the required nuclides [10].

While the 80 nuclides with theoretical MACS in the KADoNiS database are included in the following analysis, they are always identified and the reader should remain cautious when comparing with the results from the collapse of nuclear data files. Note that final recommended values in KADoNiS, for both the experimentally-derived and theoretical cross sections, are necessarily some weighted average of multiple data sources. In many cases, discrepancies between the various data prohibit the selection of a recommended value which lies within the uncertainty bands of the inputs. When comparing the results in this report, the reader should bear in mind the evaluated nature of KADoNiS and potentially interrogate the original experimental data.

3 Codes and libraries

In order to calculate Maxwellian-averaged cross sections from nuclear data files, a combination of energy-dependent neutron capture cross sections and codes which can broaden and collapse these data with the corresponding neutron spectra are required. Three different neutron-induced nuclear data libraries are used:

- **TENDL-2014** [11, 12] General-purpose library containing 2632 target nuclides including all of the KADoNiS nuclides.
- **ENDF/B-VII.1** [13] American library containing 423 target nuclides which cover 292 of the 357 (82%) KADoNiS nuclides.
- **JENDL-4.0** [14] Japanese library containing 406 target nuclides which cover 289 of the 357 (81%) KADoNiS nuclides.

This report benefits tremendously from the completeness of TENDL-2014, which does not miss any of the s-process nuclides within the KADoNiS database, allowing temperature-dependent comparisons between simulation and experiments. The low-Z nuclides ^{1,2,3}H, ^{3,4}He, ^{6,7}Li, ^{9}Be, ^{10,11}B, ^{nat}C, ^{14,15}N, ^{16}O and ^{19}F are not generated by the TALYS code suite, but taken directly from the ENDF/B-VII.1 libraries, except natural carbon which is taken from JENDL-4.0. Since the carbon file is given as the naturally occurring element rather than by individual nuclides, the ^{12}C analysis is performed with slight contamination from the 1% ^{13}C contribution. The ^{13}C and ^{14}C files are however pure TENDL, as is the ^{18}O, for which no ENDF/B-VII.1 or JENDL-4.0 files exist.

All evaluated nuclear data files are processed using the most recent PREPRO-2015 [15] to linearise at 0K, Doppler broaden (using the 'URR broaden' feature) and calculate 660-group averages when required. To collapse the capture cross sections with Maxwellian spectra, three different codes are used throughout the report to collapse all data for all nuclides:

- **maxwav** [16] A Fortran code developed by the Japanese Atomic Energy Research Institute to perform resonance region integration with high temperature Maxwellian spectra. Used for the calculations in [17].
- **inter** [18] The ENDF Utility Code which is a standard in the field of nuclear data. This code extracts many quantities from the processed pointwise files including differential and integral, effective cross sections in a variety of neutron spectra. The built-in Maxwellian spectra can be set at arbitrary temperatures and various astrophysics-relevant temperatures are selected.
- **FISPACT-II** [19] A multi-purpose nuclear observables simulation code designed to accommodate sophisticated and extended nuclear data forms. Astrophysical Maxwellian collapses are performed using broadened group-wise nuclear data with full variance-covariance processing and arbitrary temperature-dependent Maxwellian spectra.

While the FISPACT-II calculations use group-wise data, it is stored in a fine 660 group structure below 30 MeV. While the collapse of this more processed data introduces its own inherent and subtle differences, the FISPACT-II simulation benefits from the full uncertainty quantification and propagation from the Total Monte-Carlo covariance data within the TENDL-2014 files. While at present this does not contain uncertainty derived from the `MF=32` resonance covariance file and underestimates the uncertainty in the resolved resonance range, it is anticipated that this data will be available in future TENDL releases which will offer a unique capability in nuclear data uncertainty. For other regions of the files, the current analysis still provides valuable uncertainty information.

4 Simulation methodologies

The Maxwellian-averaged cross section for a given temperature kT is defined as:

$$\sigma_{MACS}(kT) = \frac{\langle \sigma V \rangle}{v_T}, \tag{1}$$

where $\langle \sigma V \rangle$ is the velocity averaged cross section and v_T is the average velocity,

$$v_t = \sqrt{\frac{2kT}{\mu}}, \tag{2}$$

using the reduced neutron-target mass μ. For the Maxwellian distribution, this averaged cross section is given by

$$\sigma_{MACS}(kT) = \frac{2}{(kT)^2\sqrt{\pi}} \int_0^\infty dE \sigma(E) E e^{\frac{-E}{kT}}. \tag{3}$$

The original nuclear data files used in this report are provided in an unprocessed form which is appropriate for resting target nuclei. To make these files relevant for the various

applications where the target material is at some non-zero kelvin temperature, a Doppler broadening of the cross sections is performed. While this process is quite straightforward for relatively low temperatures, such as 'room temperature' or those temperatures experienced within a fission reactor (<2400 K), temperatures experienced within the plasma of a star require more extreme broadening which will mostly (except for high-energy and/or large width resonances) remove all of the complex resonance structures found in low temperature cross sections. The two methods employed are to correct for the relative energy between neutron and target directly through integration using the pointwise, or to broaden the pointwise file and perform a spectral collapse with the output. The former method is employed by the `maxwav` code [16, 17], by taking

$$\sigma_{MACS}(kT) = \frac{2a^2}{(kT)^2\sqrt{\pi}} \int_0^\infty dE_n^L \sigma(E_n^L) E_n^L e^{\frac{-E_n^L}{kT}}, \tag{4}$$

where the constant a is defined as the ratio between the relative neutron-target energy E and the lab-frame neutron energy E_n^L

$$E = aE_n^L \equiv \frac{m_{target}}{m_n + m_{target}} E_n^L. \tag{5}$$

The alternative method considered requires computationally-expensive Doppler broadening of the point-wise files to temperatures between 5-100keV. In these circumstances the resonance structure is 'washed away' as the target motion broadens out the resonances. Boundaries between different data regimes, particularly between the resolved and unresolved resonance ranges, as well as the end of the unresolved, can introduce non-physical discontinuities (already present in the evaluation if the evaluator has not matched this boundary) if the processing codes are not thoughtfully utilised, as can be seen in Figure 2. One solution for this specific problem is to use the PREPRO-2015 unresolved broadening feature within SIGMA1 [15]. This overrides the standard treatment of the boundary and forces a continuous overlap. The resulting broadened files can then be collapsed with the FISPACT-II code, using multi-group data and Maxwellian neutron spectra partitioned into the 660 group structure below 30 MeV.

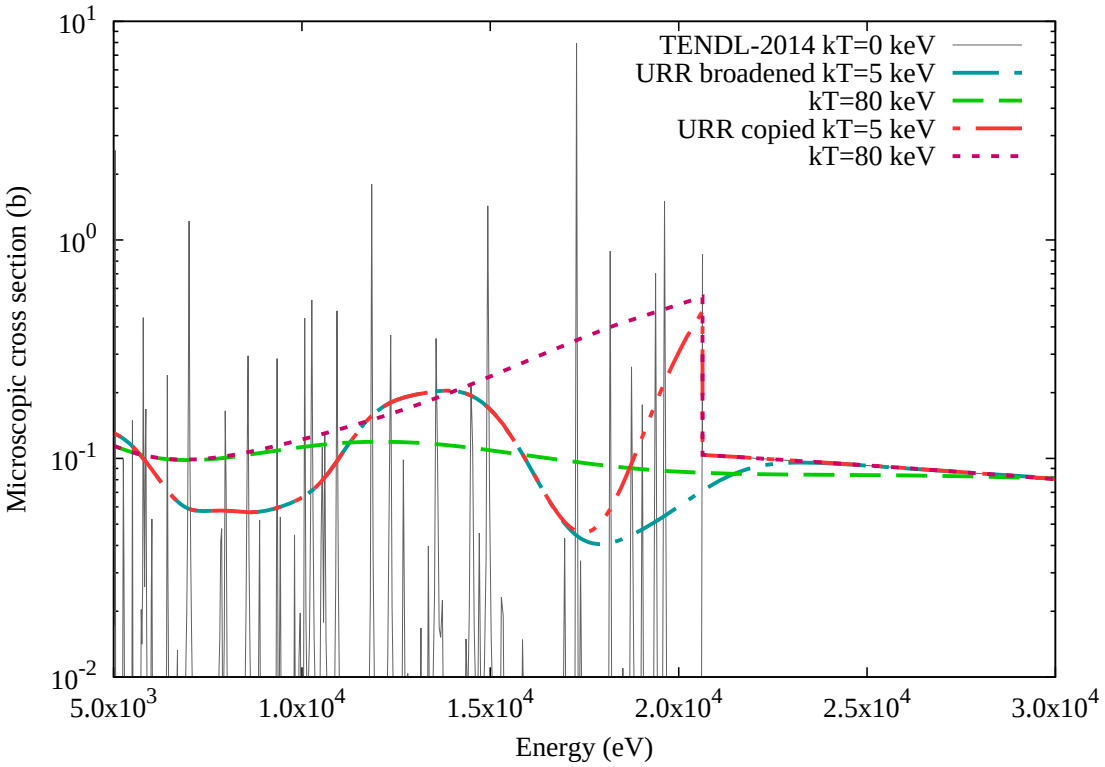


Figure 2: TENDL-2014 broadening with PREPRO-2015, showing the 0, 5 and 80 keV broadened data for neutron capture of Ba137. The two broadening methods either 'copy the URR' or broaden the URR, producing data which precisely agrees outside an energy region around the RRR/URR boundary. Without URR broadening, the processing produces unphysical results around the boundary.

The NJOY processing software [20] possesses a similar broadening capability using the `BROADR` module, but which does not offer a choice for naïve URR broadening. The result is a RRR which matches precisely with the PREPRO data below the boundary, but a discontinuity at the RRR/URR boundary where the cross section 'jumps' to the `MF=3` URR value set by the evaluator, as can be seen in the groupwise data of Figure 3. Differences between these two methods above 20% are common for the groups overlapping and immediately after the RRR/URR boundary, which will often cover a large fraction of the energy-dependent reaction rate for several astrophysical temperatures of interest. While temperature-specific effects in the URR could be accounted for in a more sophisticated method and the discontinuity may be artificial, for this report the broadened data is used for reaction rate collapse calculations and therefore the PREPRO result is used.

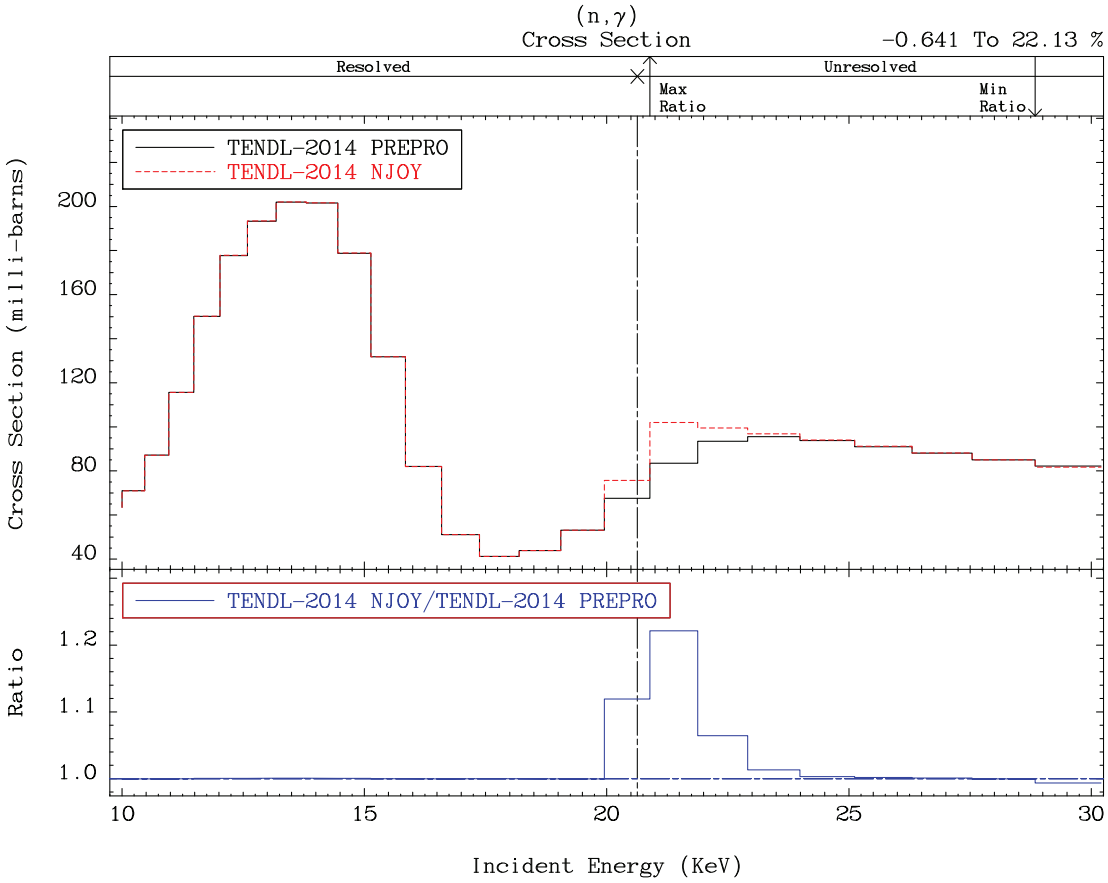


Figure 3: TENDL-2014 broadening with PREPRO-2015 and NJOY-2012, showing the 5 keV broadened data for neutron capture of Ba137. The two broadening methods agree below the RRR/URR boundary, but disagree in the URR where PREPRO offers an URR broadening functionality.

An alternative method for probing the temperature-dependent unresolved resonance range could be performed with the extension of the resolved range using statistically generated resonances with the CALENDF code [21]. This has the pleasing quality of allowing a consistent and uniform broadening method over the whole resonance range, but requires an individual sampling of resonances which is not as robust as the full probability table based upon many samplings. Nonetheless, this remains in some ways superior to the simple processing of an `MF=3` file and can allow for the survival of remaining structure which may non-negligibly affect the average cross section of some astrophysical temperatures. One such extended URR is shown in Figure 4 for ^{166}Er. The TENDL-2014 0 K and 5 keV data is shown for comparison.

The structure which remains in this one sampling from CALENDF results in temperature-specific differences in the averaged cross sections, particularly in the temperature range of 5-20 keV, where the original TENDL-2014 data under-predicted the experimental results as shown in Figure 5. While this example may appear suggestive, in general the methods employed to produce TENDL High-Fidelity Resonance (HFR) data [22] and those employed by the CALENDF extension to the upper URR boundary have been performed sequentially and any improvement in experimental agreement will most likely be due to subtle reasons. It would have been more robust and physically consistent to perform the HFR extension from the original RRR/URR boundary up to the end of the

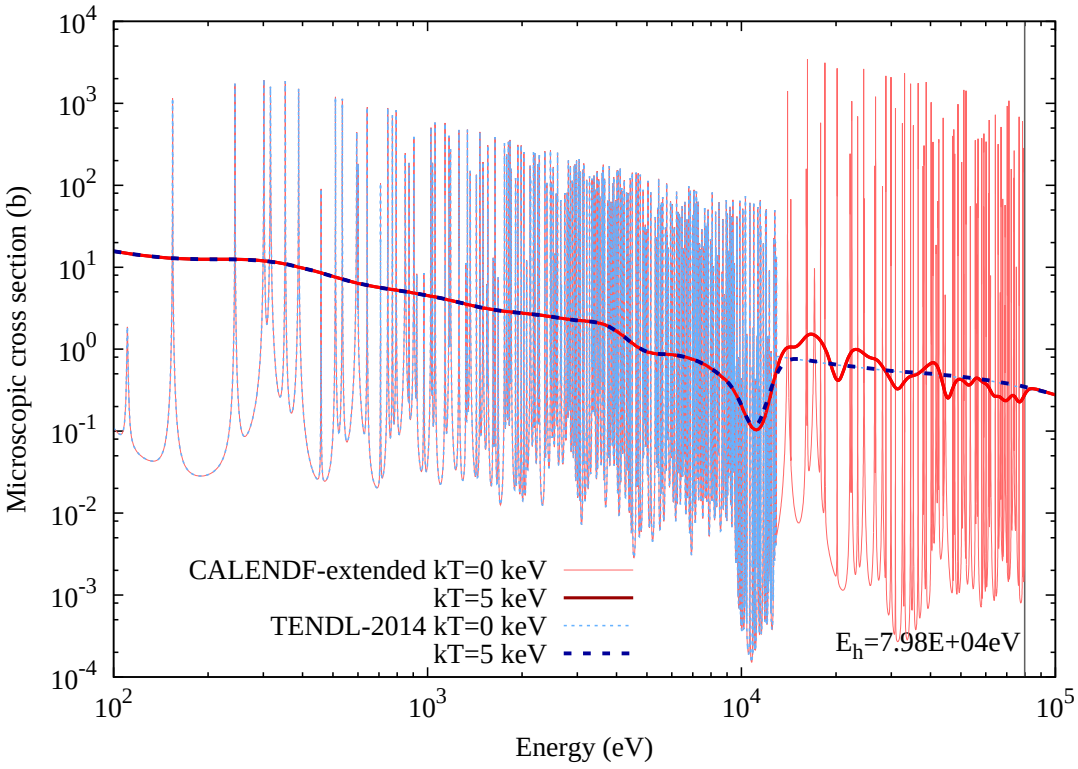


Figure 4: TENDL-2014 and CALENDF-extended data for Er166, showing both the 0 K and 5 keV broadened data for neutron capture.

URR. Moreover, the purpose of this report is to perform nuclear data validation and use experimental evidence to lead improvement of data libraries, so the results which appear in this report are based exclusively upon the standard nuclear data library distributions with some bespoke processing and data extraction.

5 Comparison of results

The KADoNiS database contains 357 nuclides and for the majority of these several integral quantities are provided. No individual integral quantity can tell us which resonance or region of resonances may be responsible for discrepancies with experiment, and indeed agreement may be due to compensating errors! However, each averaged cross section affords another collapsed quantity and the collection of multiple temperature-dependent averaged cross sections gives information which, although not truly differential, allows us to probe different energy regions and identify issues in average resonance parameters. In order to probe the full energy region of KADoNiS, a range of temperatures are simulated with the three different methodologies outlined in the previous section:

- Calculation using `maxwav` and 0 Kelvin pointwise data in 25 T-dependent Maxwellians between 1 keV and 251 keV, using 10 equal log energies per decade.
- Calculation using the utility code `inter` and 0 Kelvin pointwise data in 25 T-dependent Maxwellians between 1 keV and 251 keV, using 10 equal log energies per decade.

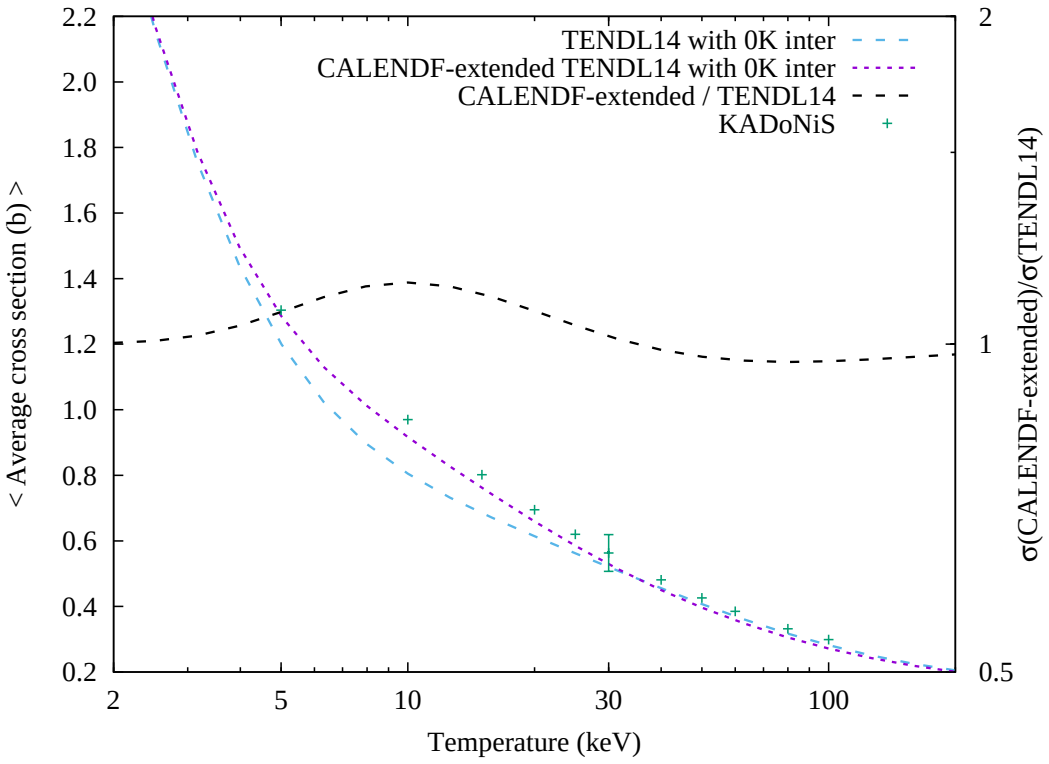


Figure 5: TENDL-2014 and CALENDF-extended data for Er166, showing the temperature-dependent Maxwellian-averaged cross sections derived from 0 K files collapsed using inter.

- FISPACT-II collapse of 660 group files generated using URR broadening with PREPRO-2015 on Maxwellians with temperatures 5, 10, 30 and 80 keV.

All of these calculations are performed with TENDL-2014, while the ENDF/B-VII.1 and JENDL-4.0 libraries are similarly used with the `maxwav` code. Whenever possible[2] all five of these simulations are presented together with the KADoNiS values, including the FISPACT-II uncertainties and KADoNiS 30 keV uncertainty, in the lower plot of each page. In the upper plot, the 0 K pointwise TENDL-2014 data is presented with the 5, 30 and 80 keV broadened cross sections in red, green and blue, respectively. The upper energy limit of the TENDL-2014 URR is shown as a vertical line with the value, E_h, printed in each figure. Alongside these curves, in darker shades of the respective colors, are the binned energy-dependent reaction rates normalised to the total effective cross section for each temperature. These are the output of the FISPACT-II collapse, which is given in the 660 group structure. In many cases these are very similar to pure Maxwellian distributions, convolved with some $1/v$ or relatively smooth microscopic cross section. Whenever resonance structure remains in the 10-1000 keV range after broadening, the reaction rate will reflect this and many complex features of the temperature-dependent averaged cross section curve can be directly related to the broadened microscopic data. Some particularly interesting cases are ^{13}C and ^{18}O, which possess strong first resonances around 100 keV. While the lower energy 5 keV Maxwellian does not 'see' these resonances, at 30 keV the combination of broadening and the range

[2]Unfortunately ENDF/B-VII.1 does not contain neutron-incident files for 65 KADoNiS nuclides and JENDL-4.0 does not contain 68.

of the spectrum results in a strongly peaked reaction rate over the resonance and the temperature-dependent average cross section experiences an order-of-magnitude jump over the energies where the resonances become accessible.

For some nuclides of interest, comments are made in the discussion section of this report and in some cases the ENDF/B-VII.1 and/or JENDL-4.0 cross sections are shown for comparison where the TENDL-2014 cross sections could benefit from re-evaluation using the data from those other libraries. A complete summary of all 5, 30 and 80 keV MACS is provided in Table 1 of Appendix A. Note that these are calculated using `maxwav` on each of those temperatures and given as C/E values against the corresponding KADoNiS data. While a compendium of all predicted MACS for arbitrary temperatures (and potentially 2632 nuclides) could be easily generated using this method, the purpose of this report is to compare the data with astrophysical measurements and the data is restricted only to those which appear in KADoNiS.

All KADoNiS data which is the product of statistical model codes is presented in the following figures, but for every such case the page heading includes an appropriately red warning: (KADoNiS=SMC). These cases should be treated with greater care, as the theoretical models and assumptions regarding level densities *etc* may not be accurate and the quoted uncertainty may be insufficient.

Comparisons of all 30 keV values computed with `maxwav` with KADoNiS values are shown in Figures 6 and 7. Those nuclides with |C/E| values greater than 10 are identified in the first and removed in the second, which identifies a few nuclides which show considerable difference. A library comparison of C/E values for 30 keV MACS is shown in Figure 8, where missing nuclides are tallied into the C/E<1/10 bin. Setting aside the fifth of KADoNiS nuclides which are only contained in TENDL-2014, the global performance of TENDL-2014 is still superior to the other libraries. The JENDL-4.0 distribution shows a strong peak around C/E=1 which suggests that handmade renormalisations and/or resonance parameter selections with knowledge of astrophysical MACS has formed part of the evaluation process for that library.

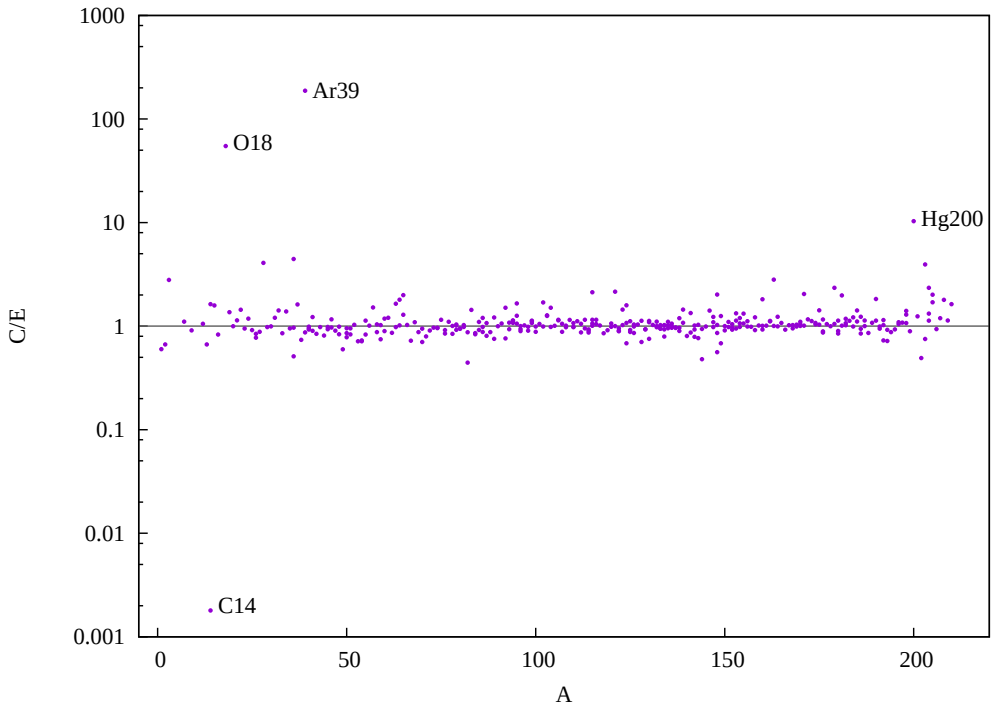


Figure 6: Comparison of all 357 KADoNiS 30 keV cross sections with TENDL-2014 values calculated with maxwav. A few nuclides are isolated which require an adjustment of over one order of magnitude.

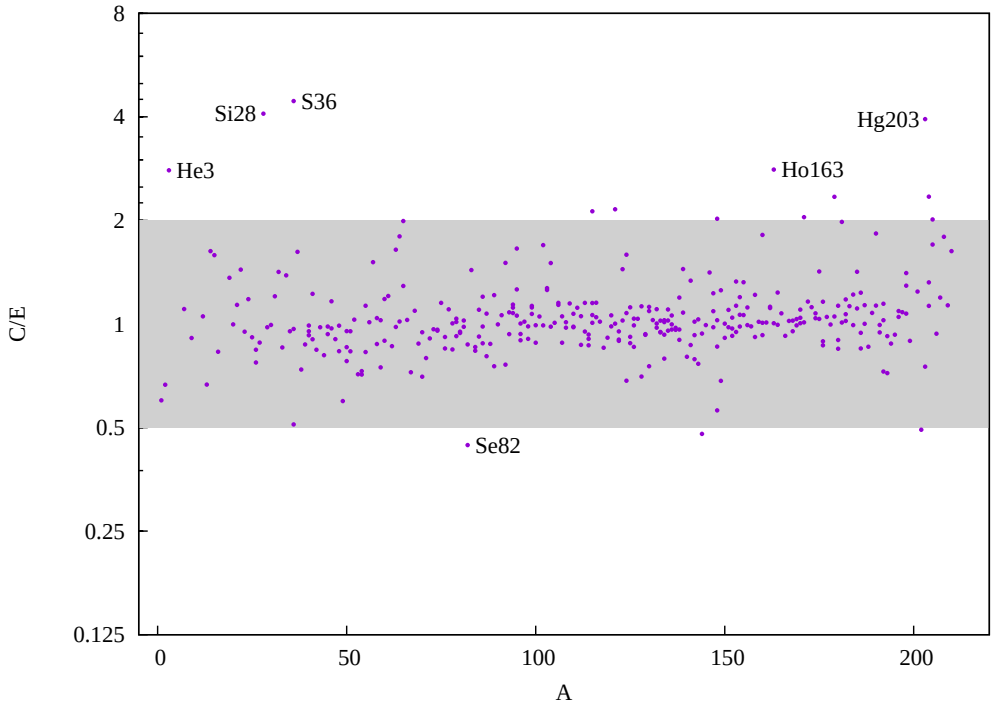


Figure 7: Comparison of all 357 KADoNiS 30 keV cross sections with TENDL-2014 values calculated with maxwav where nuclides with more than one order of magnitude difference are removed. The band shows the region between C/E=[0.5,2].

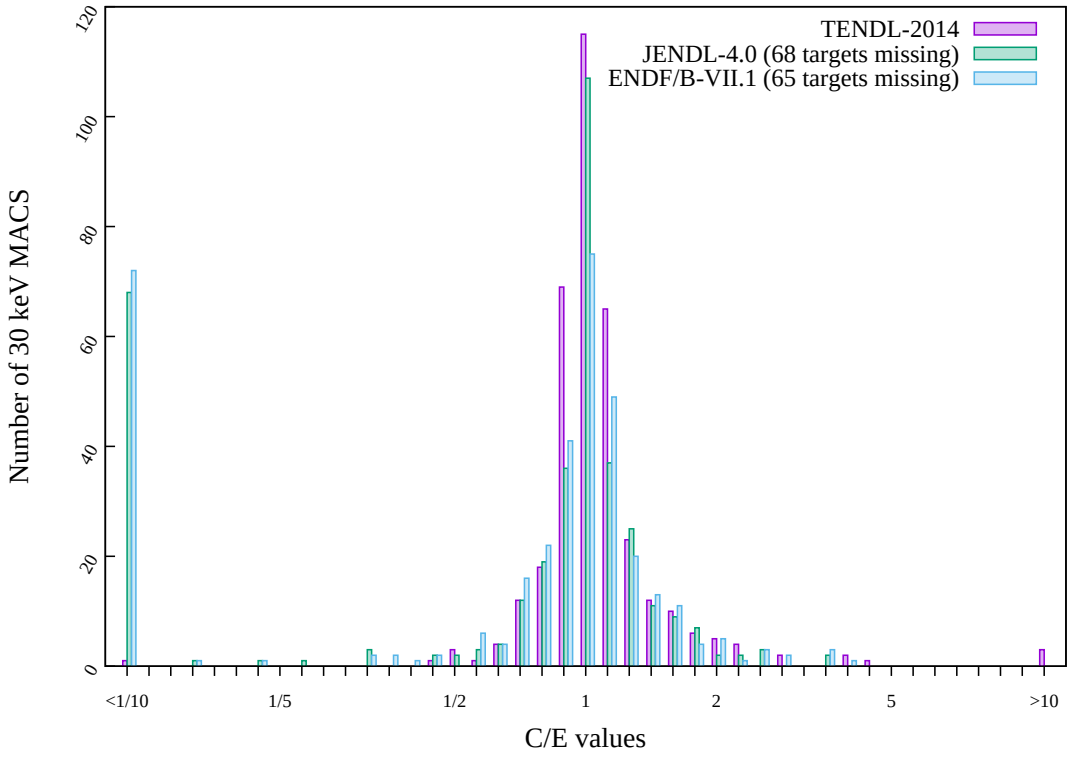
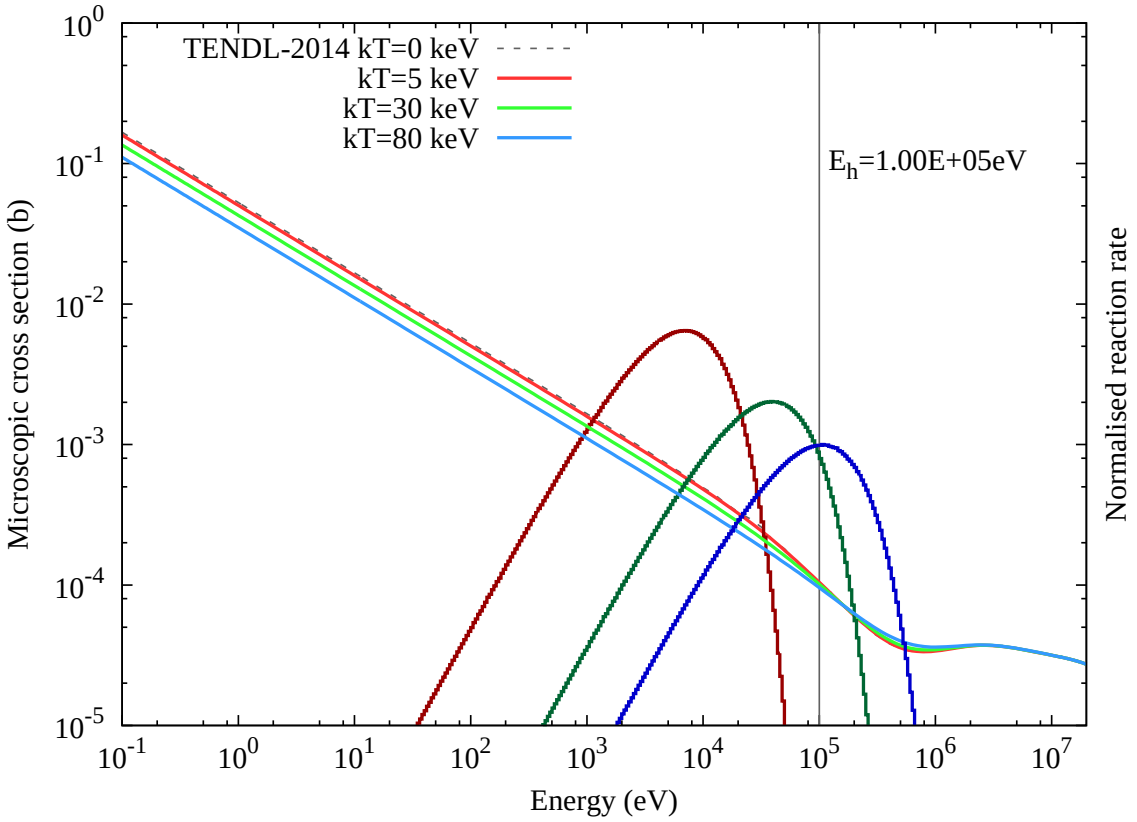
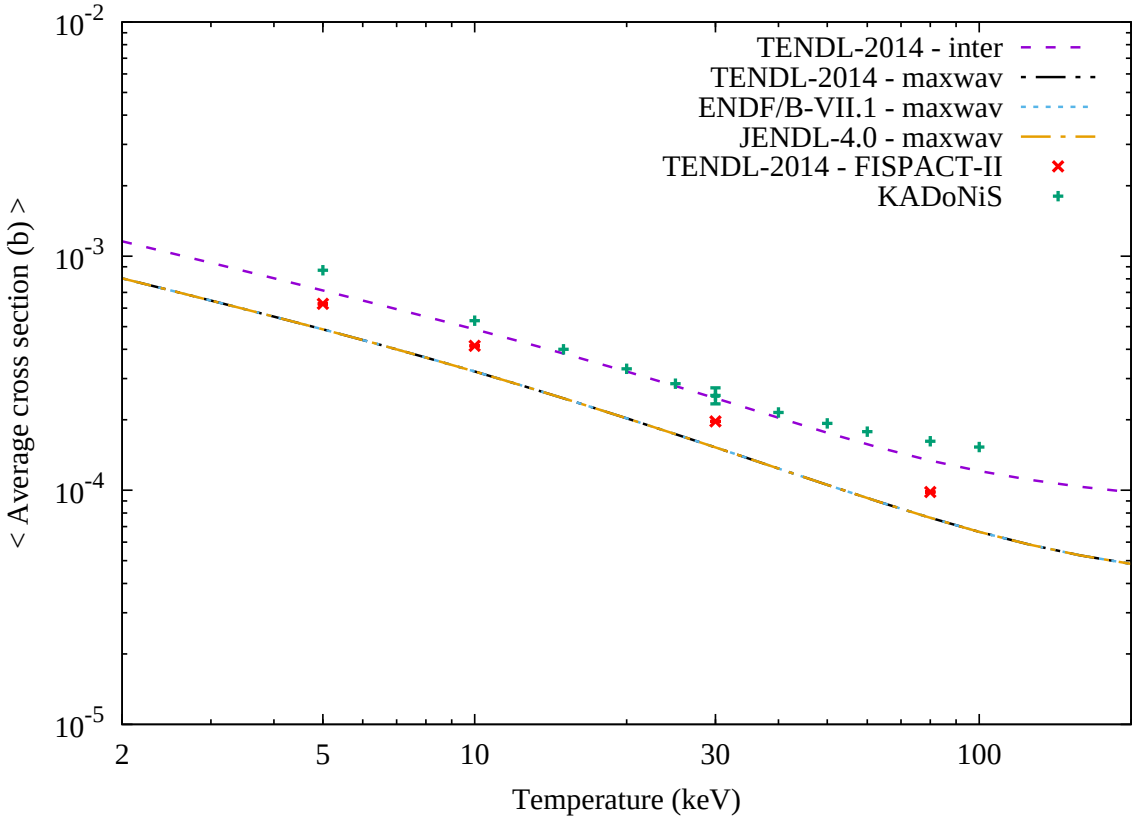


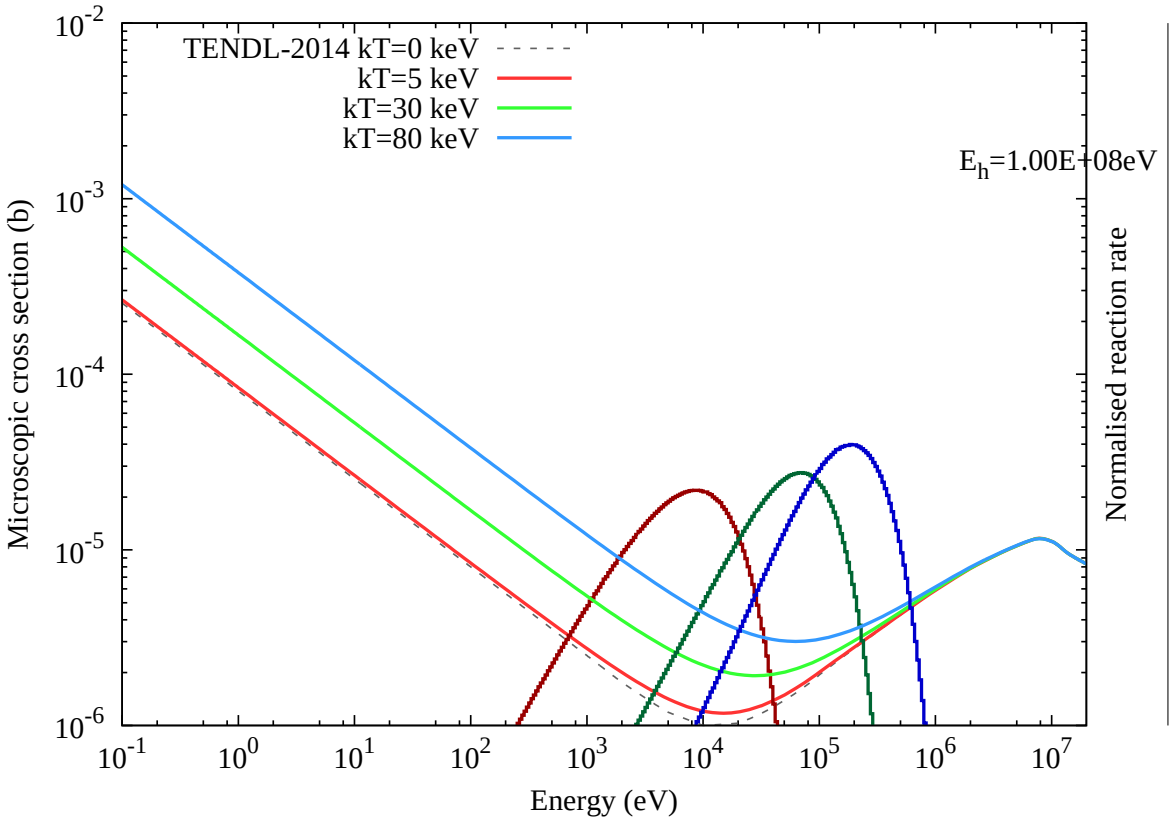
Figure 8: Comparison of C/E distributions overal all 357 KADoNiS 30 keV cross sections with TENDL-2014, JENDL-4.0 and ENDF/B-VII.1 values calculated with maxwav. C/E values for missing nuclides in JENDL-4.0 and ENDF/B-VII.1 are tallied in the <1/10 bin.

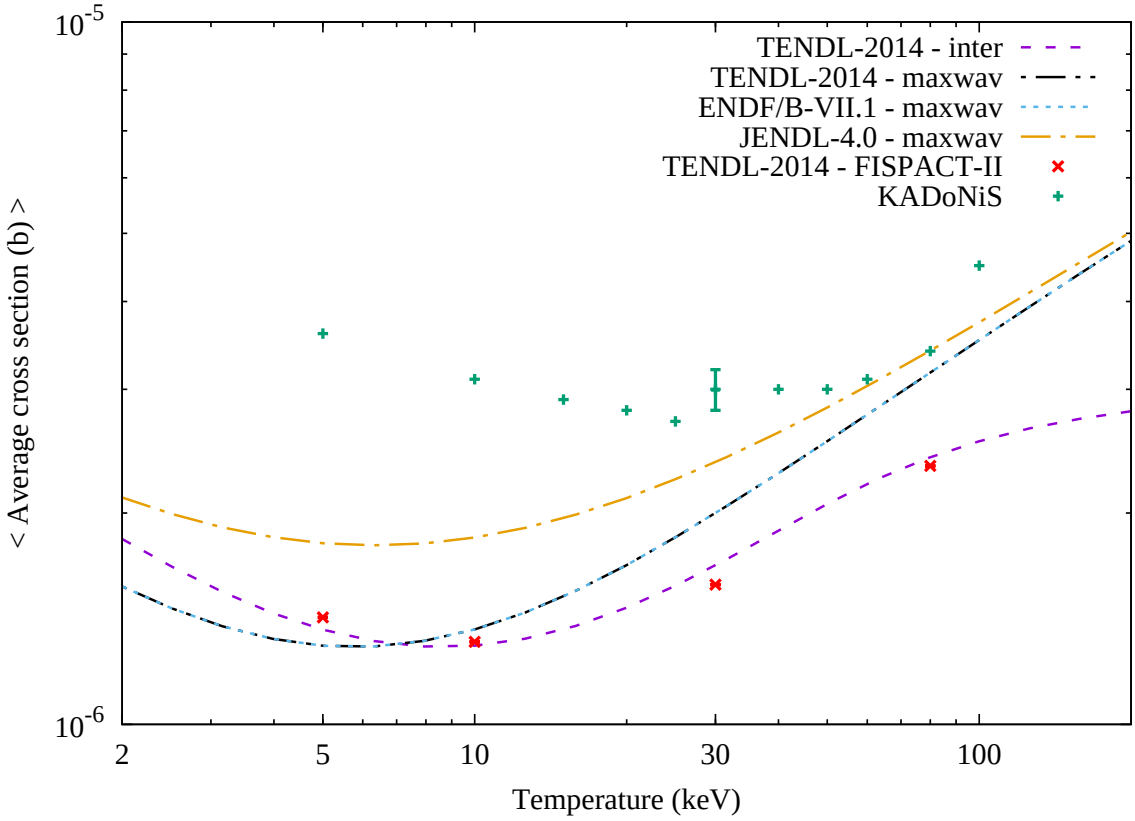
$^{1}H_{1}$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=1.00E+05eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

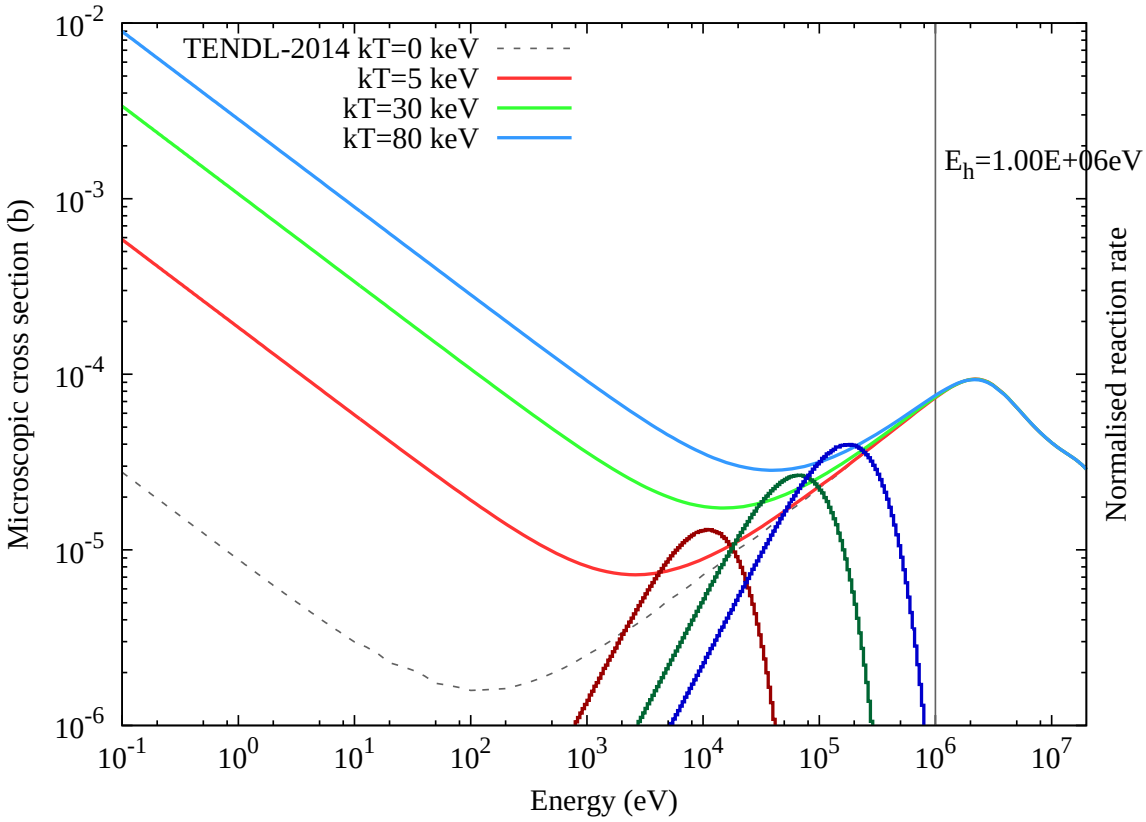

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

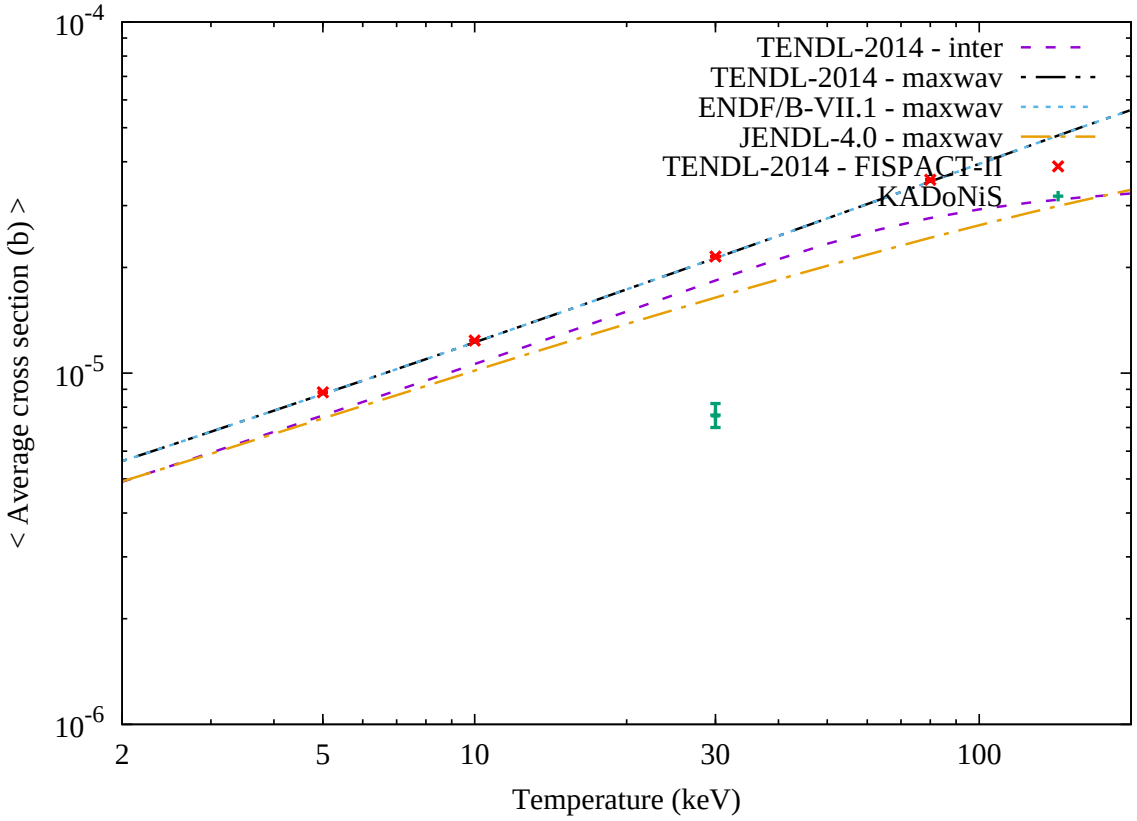
$^{2}H_{1}$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=1.00E+08eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

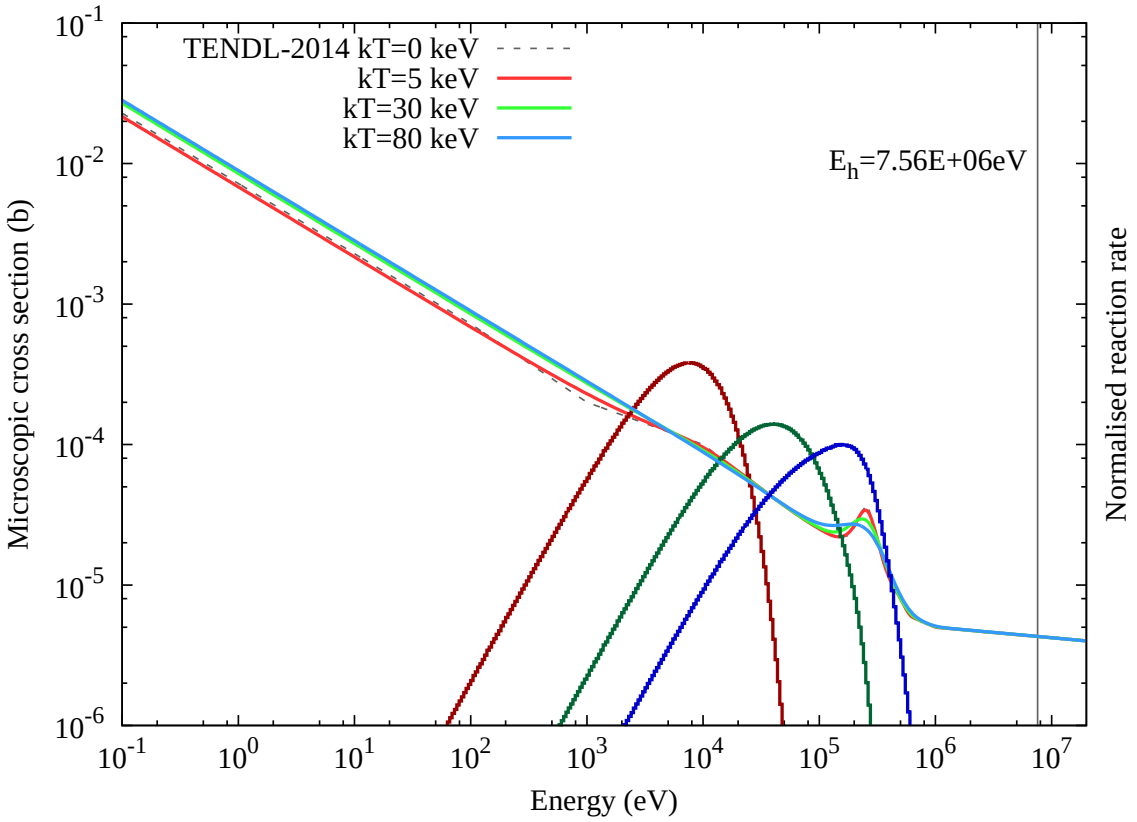

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

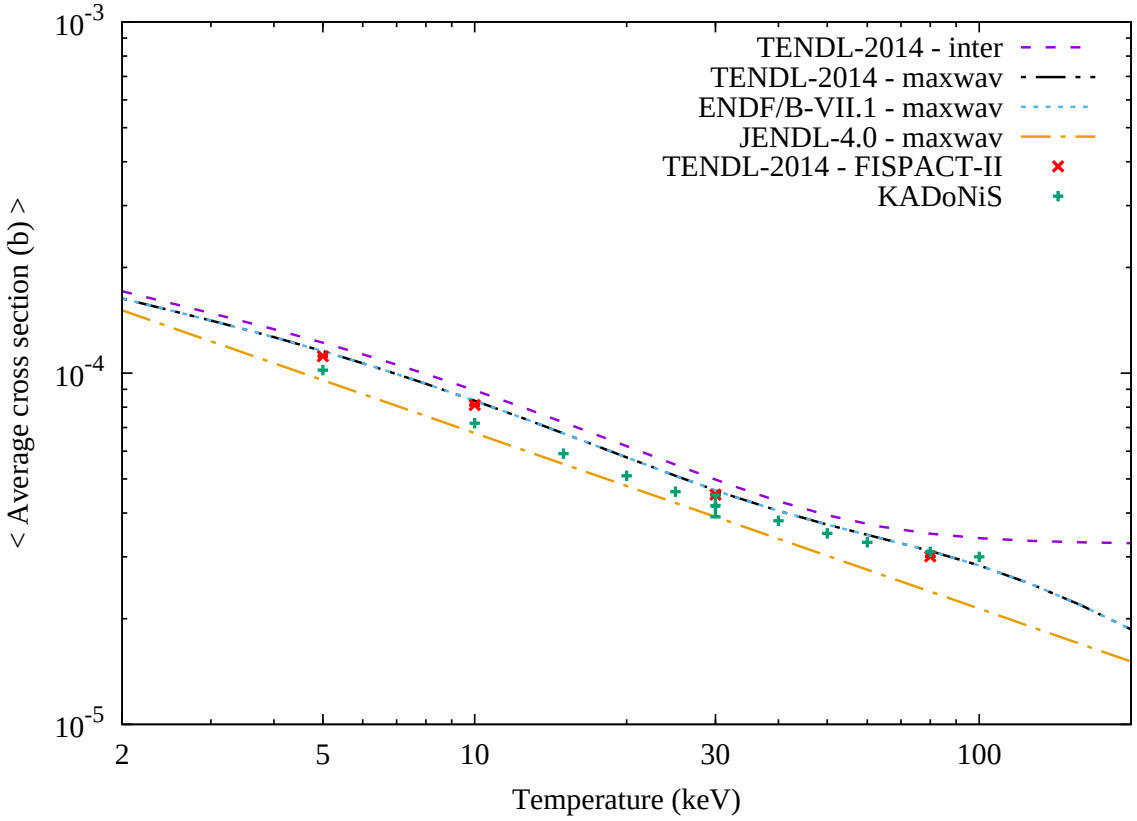
$^{3}He_{2}$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=1.00E+06eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

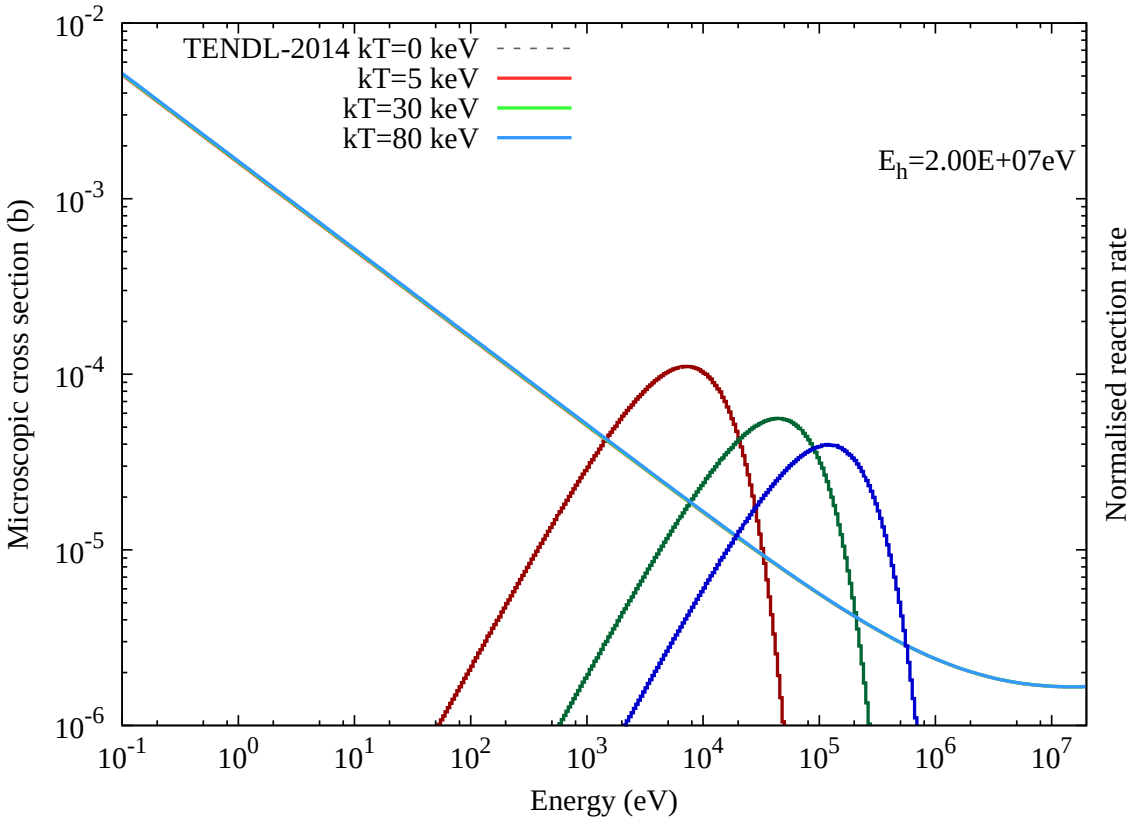

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

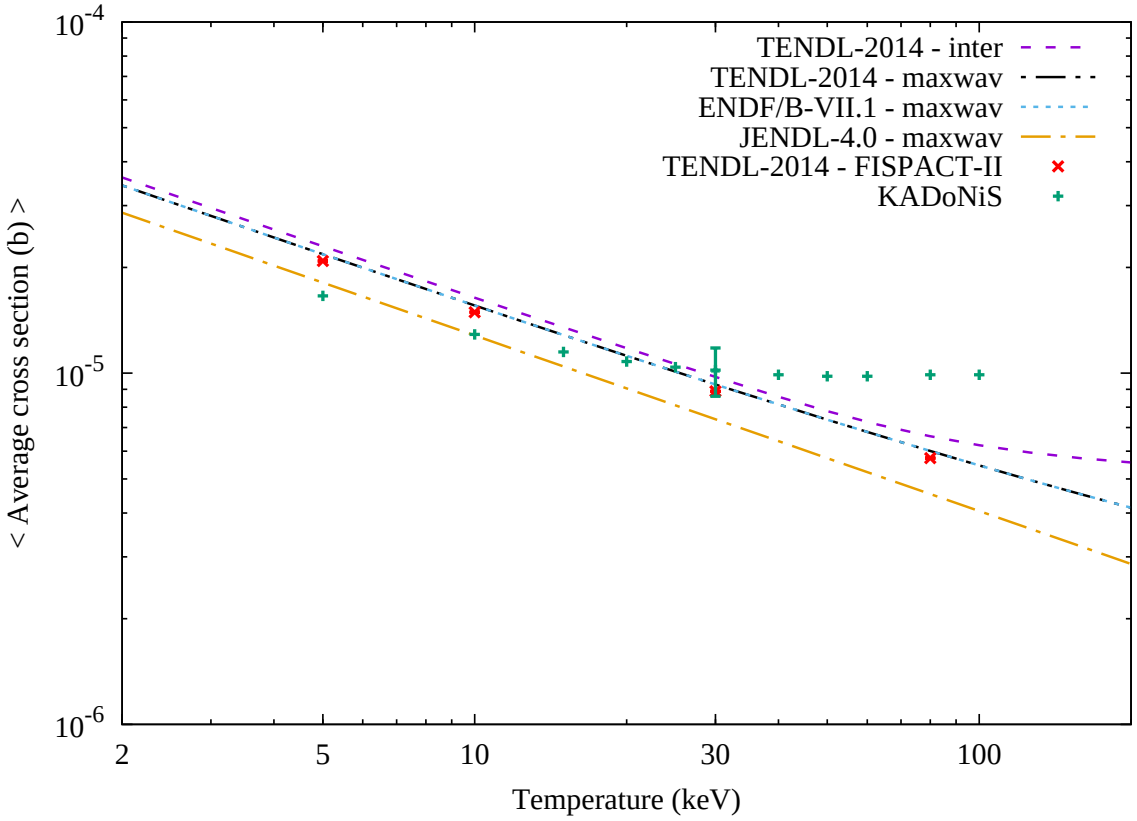
$^{7}Li_{3}$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=7.56E+06eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

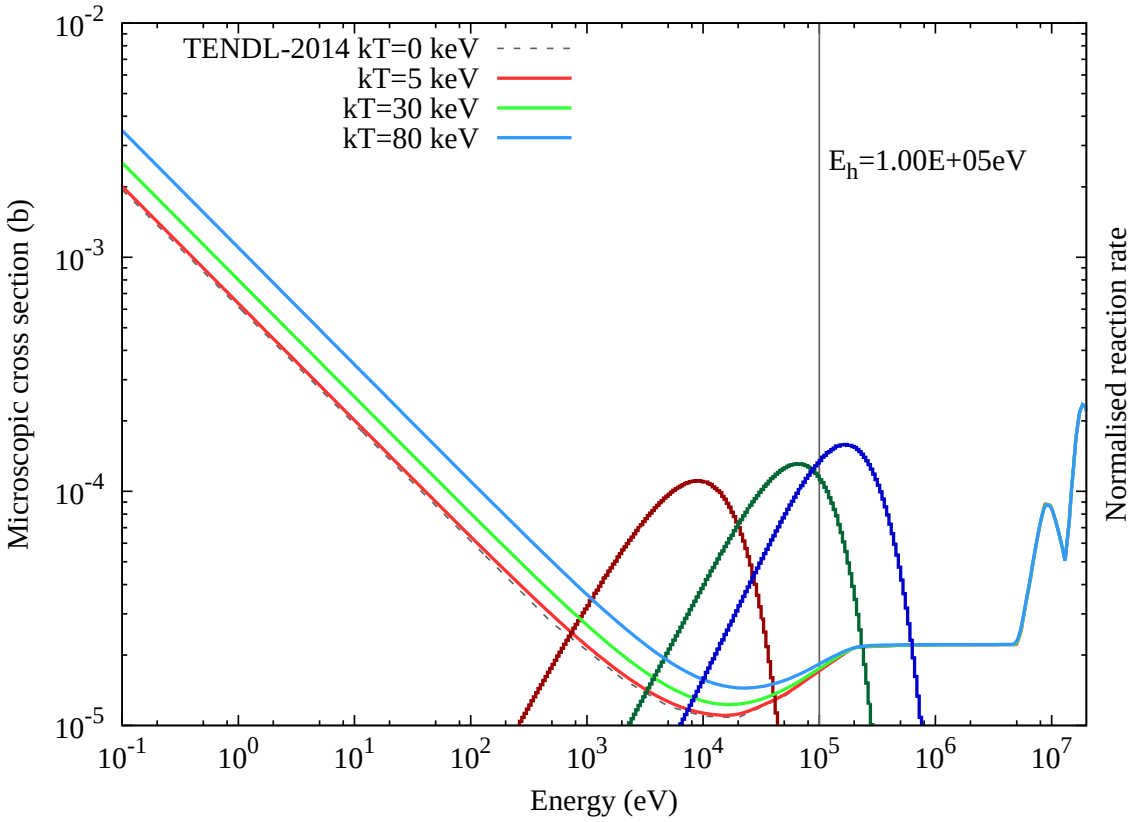

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

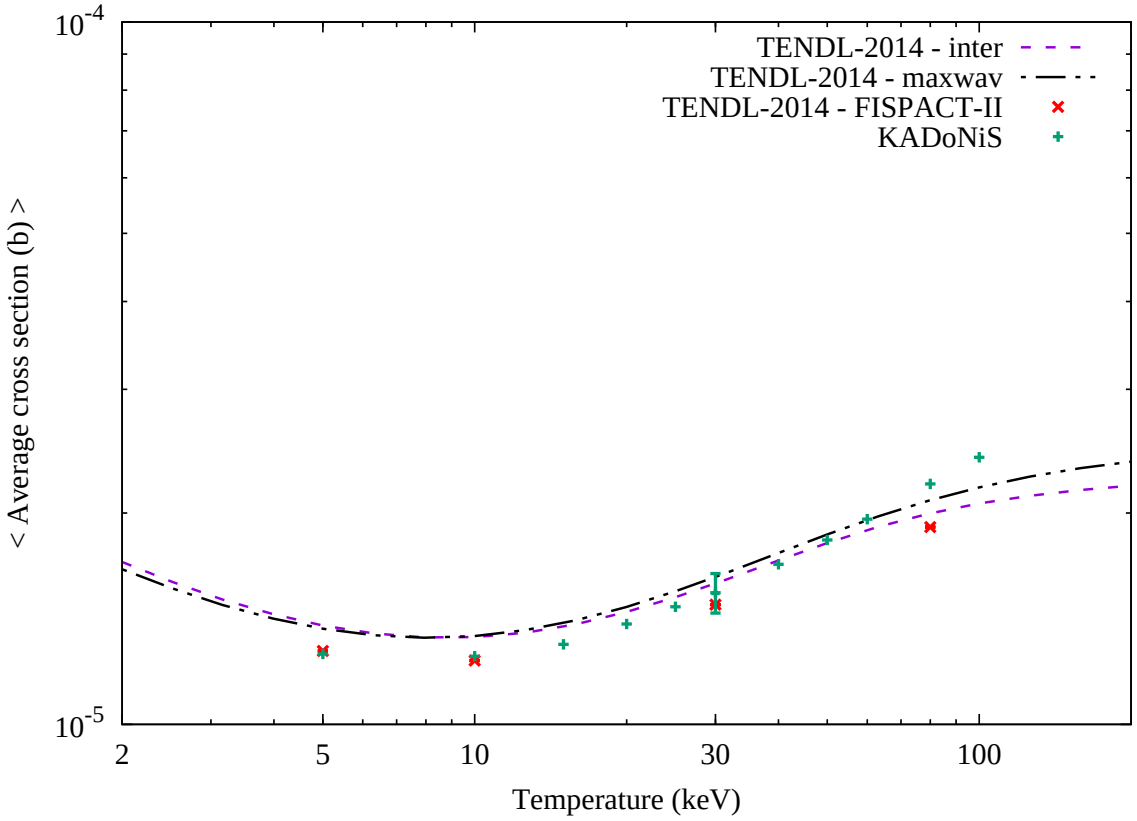
$^{9}Be_{4}$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=2.00E+07eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

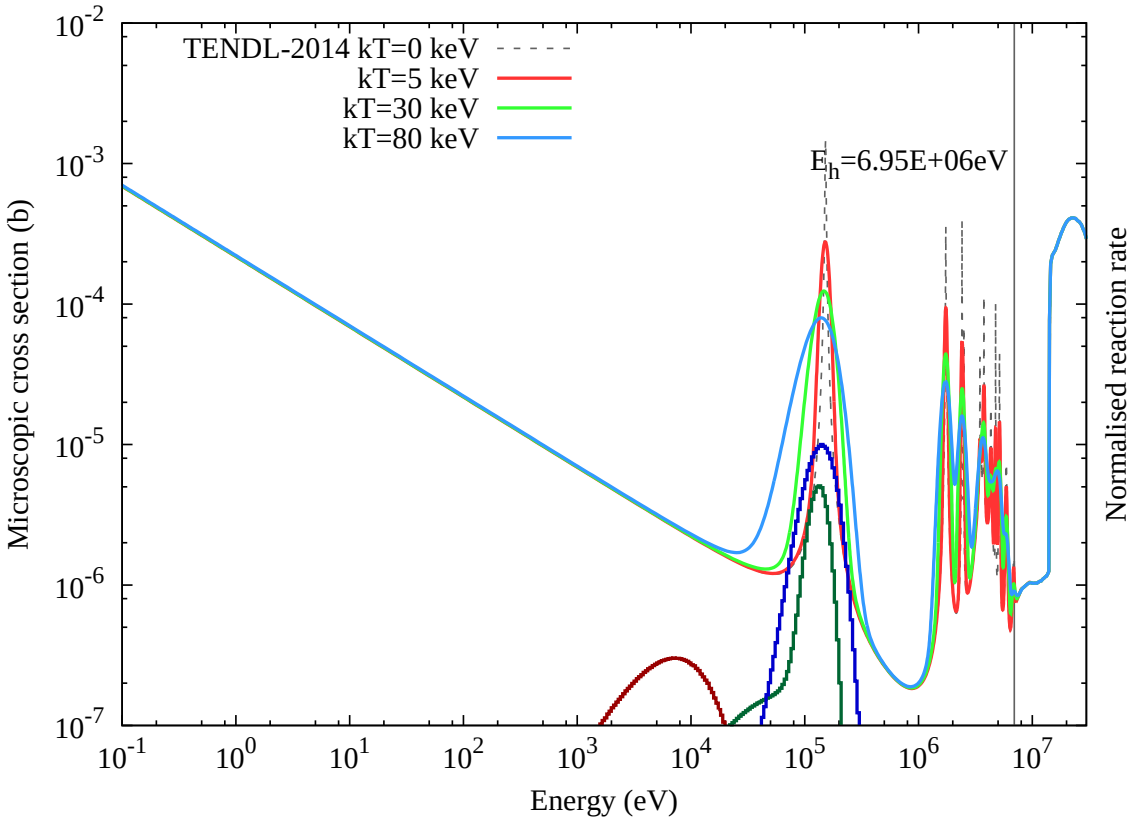

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

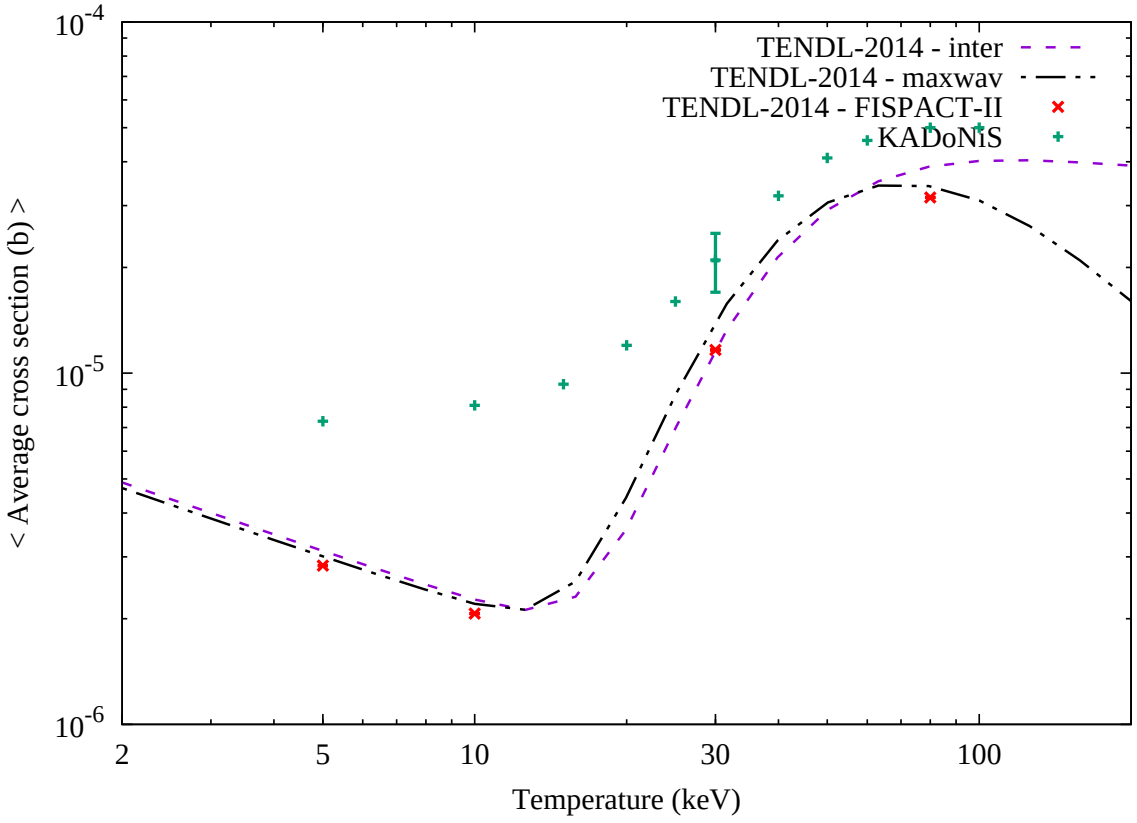
$^{12}C_6$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=1.00E+05eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

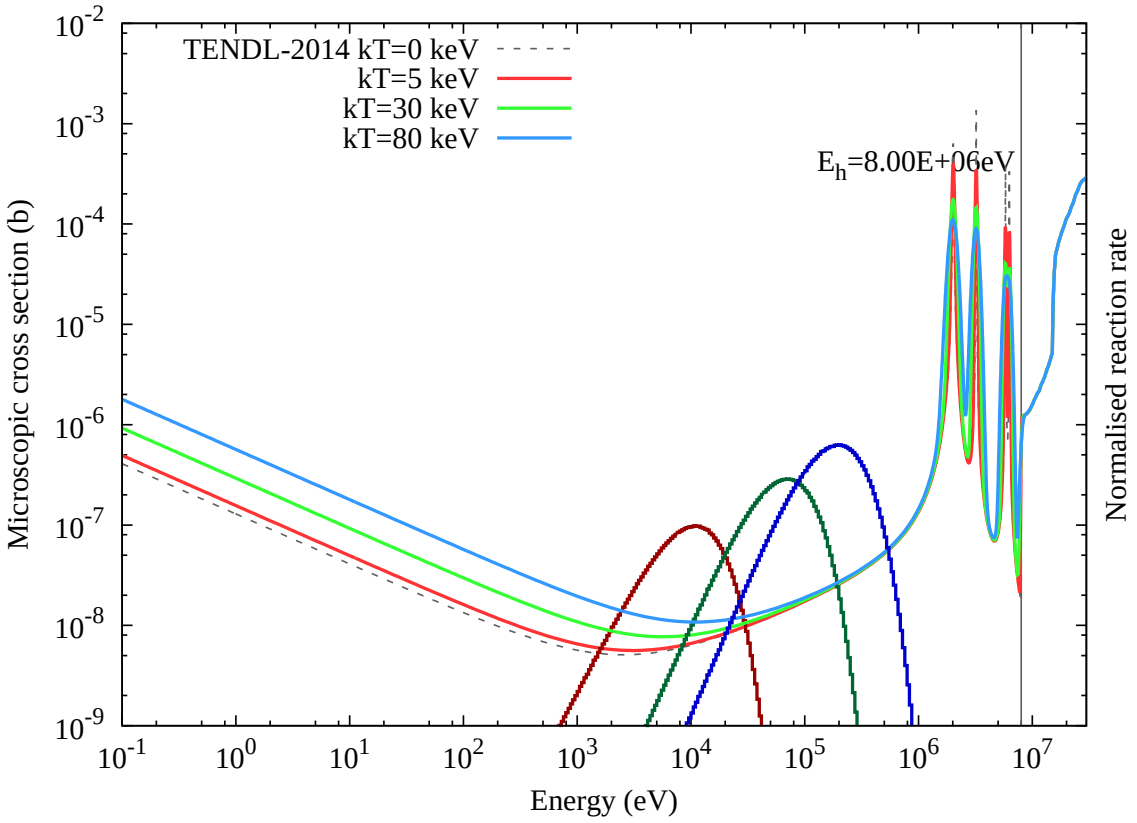

TENDL-2014 - inter
TENDL-2014 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

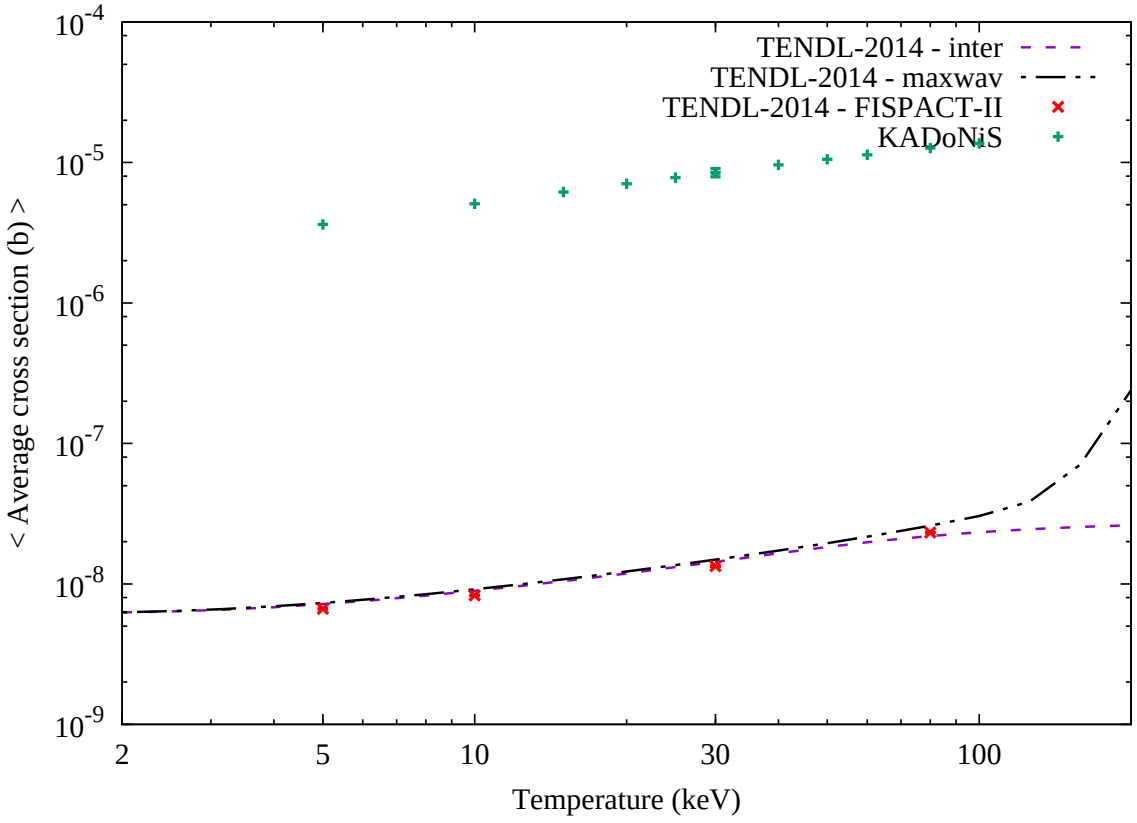
$^{13}C_6$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=6.95E+06eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

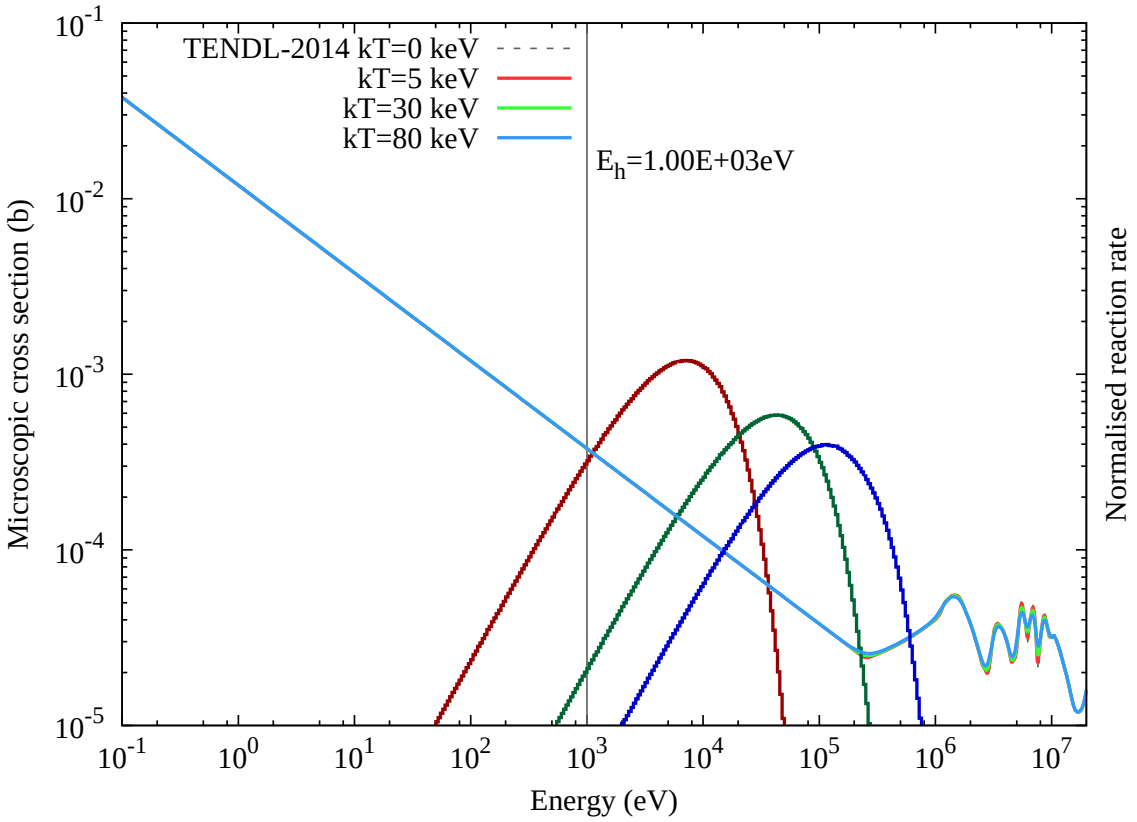

TENDL-2014 - inter
TENDL-2014 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

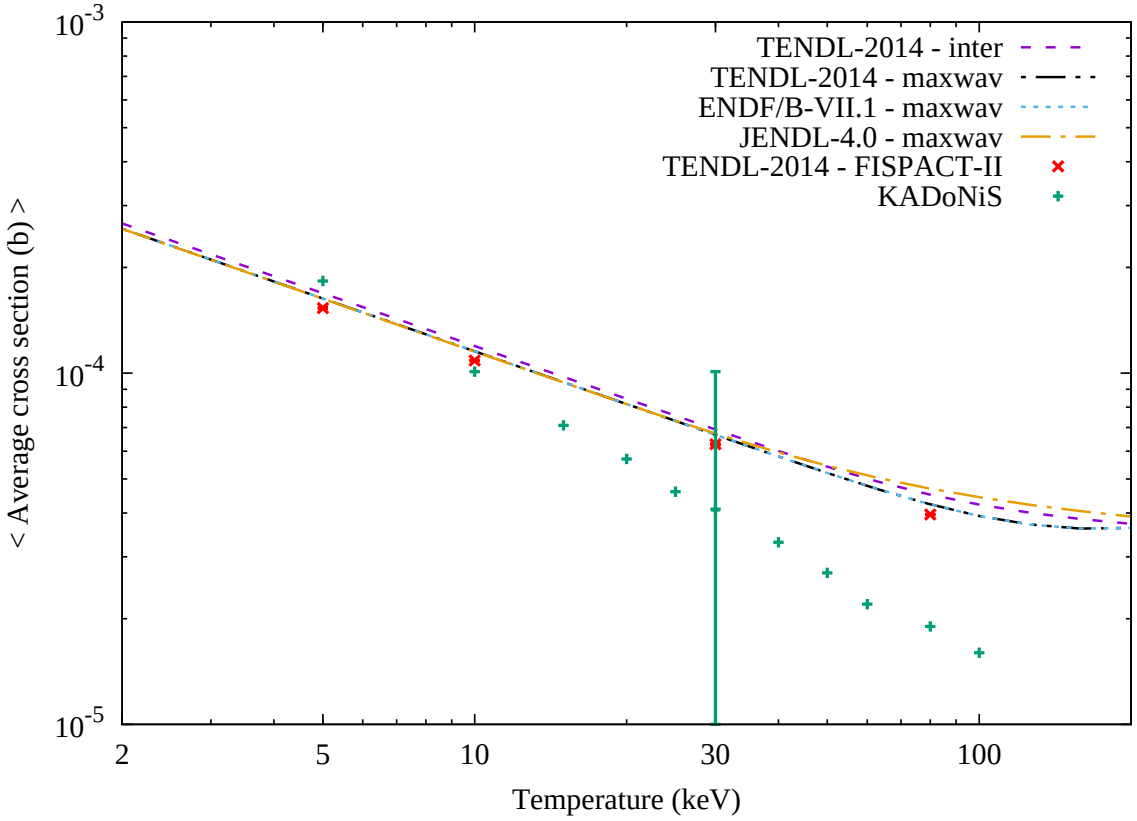
$^{14}C_6$ $[T_{1/2} = 5.70 \times 10^3$ years$]$



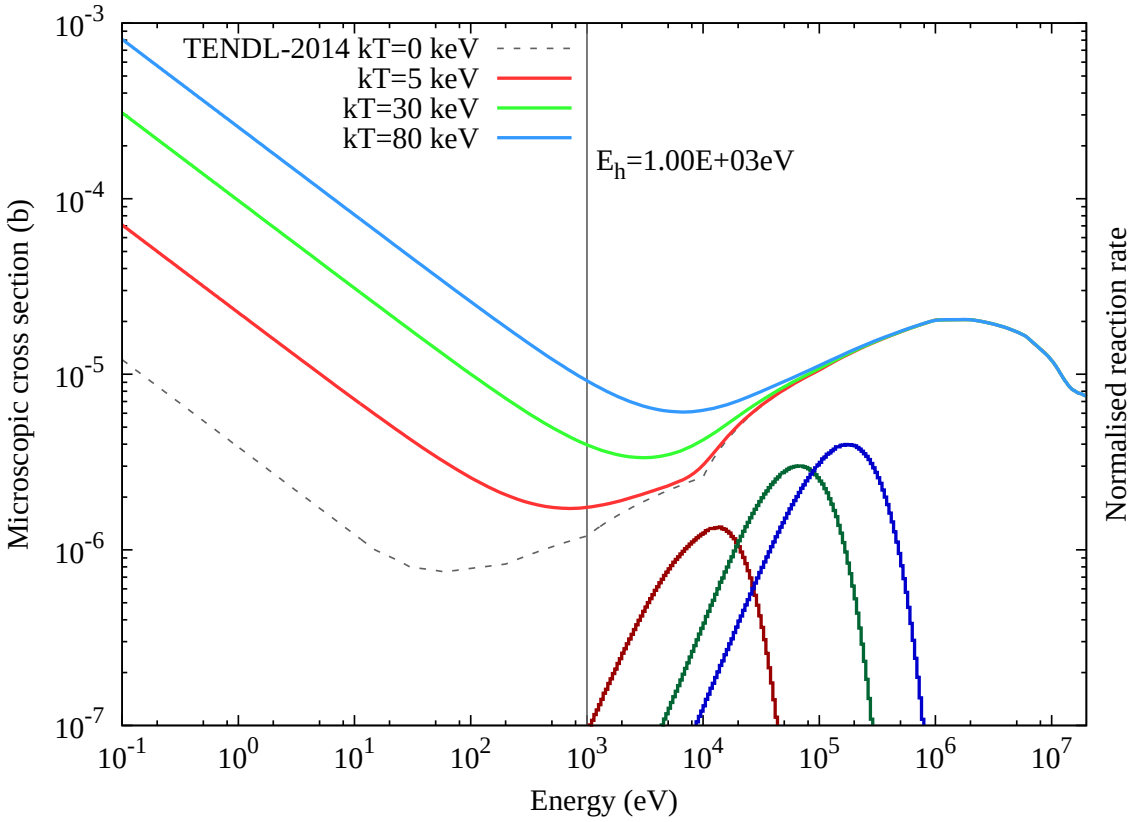


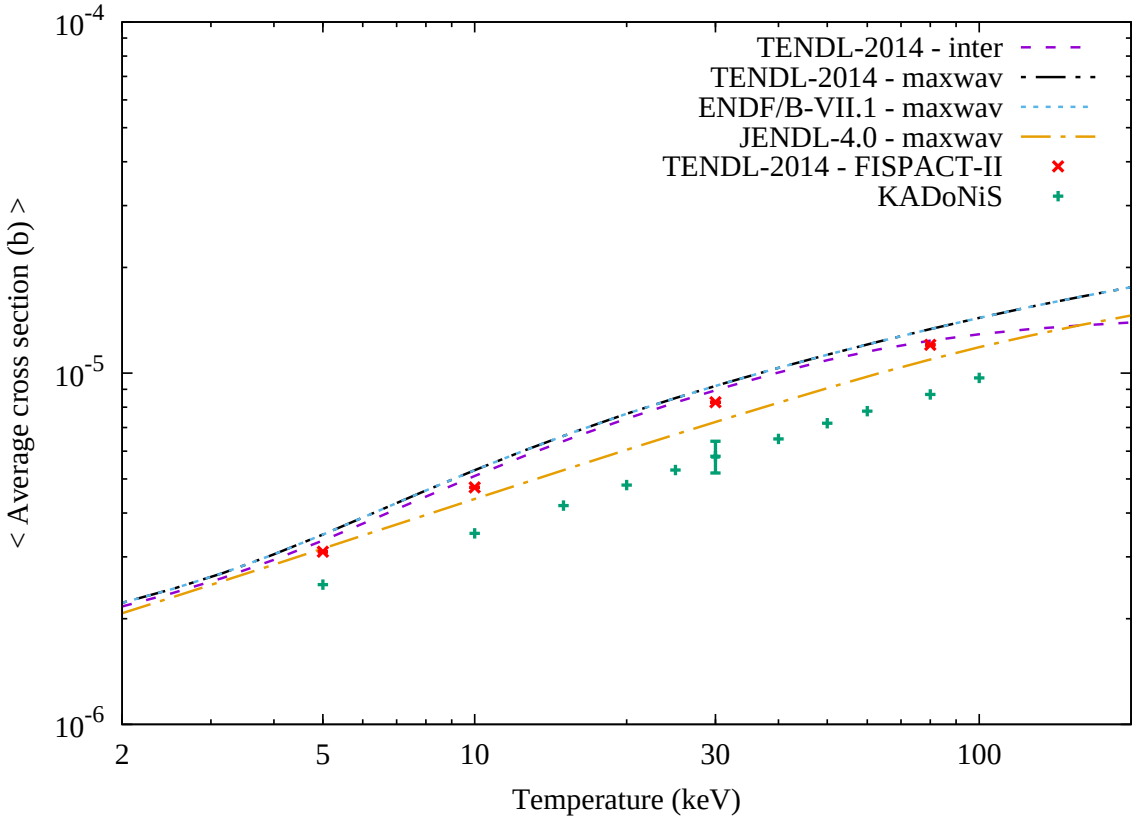
$^{14}N_7$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=1.00E+03eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

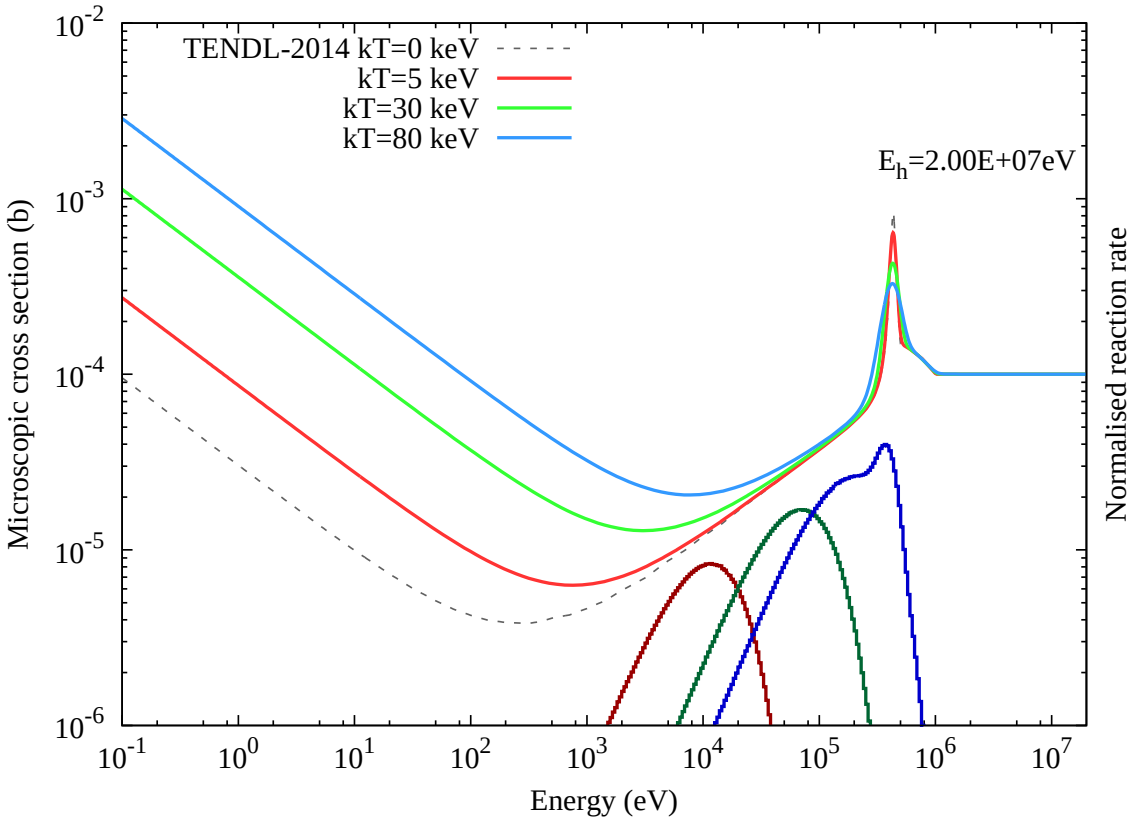

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

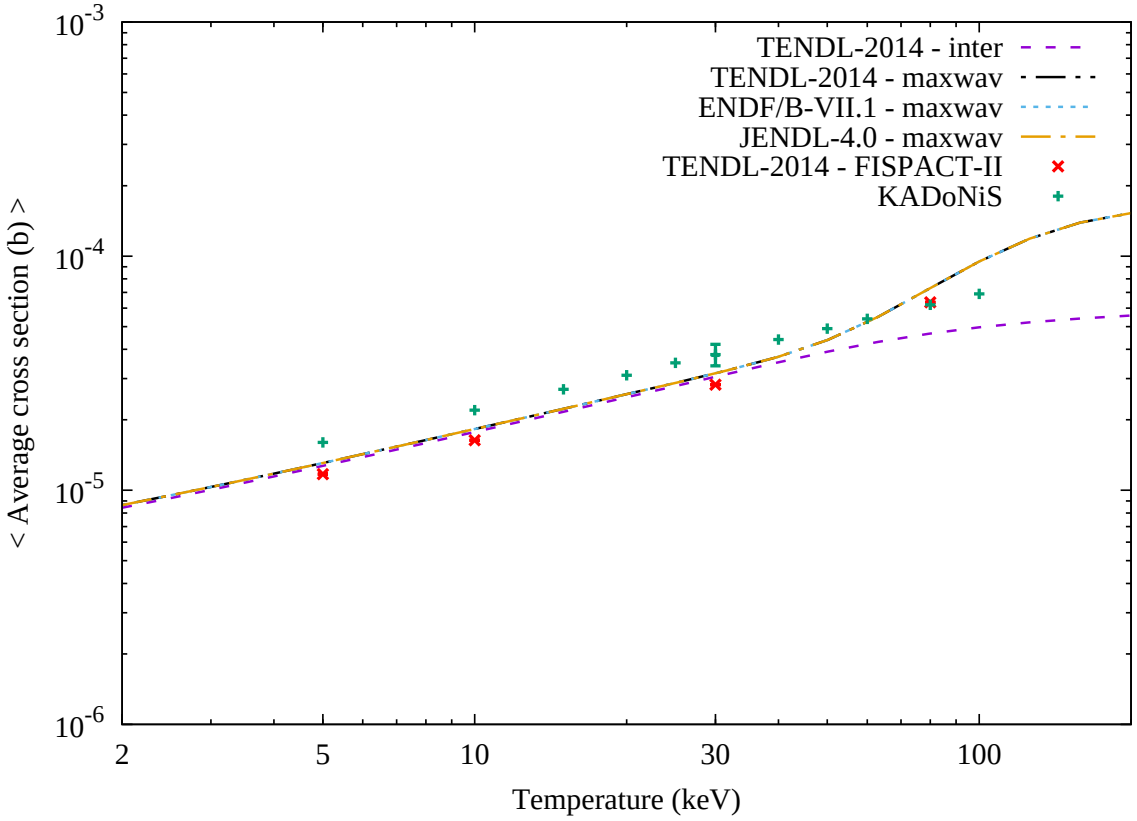
$^{15}N_7$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=1.00E+03eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

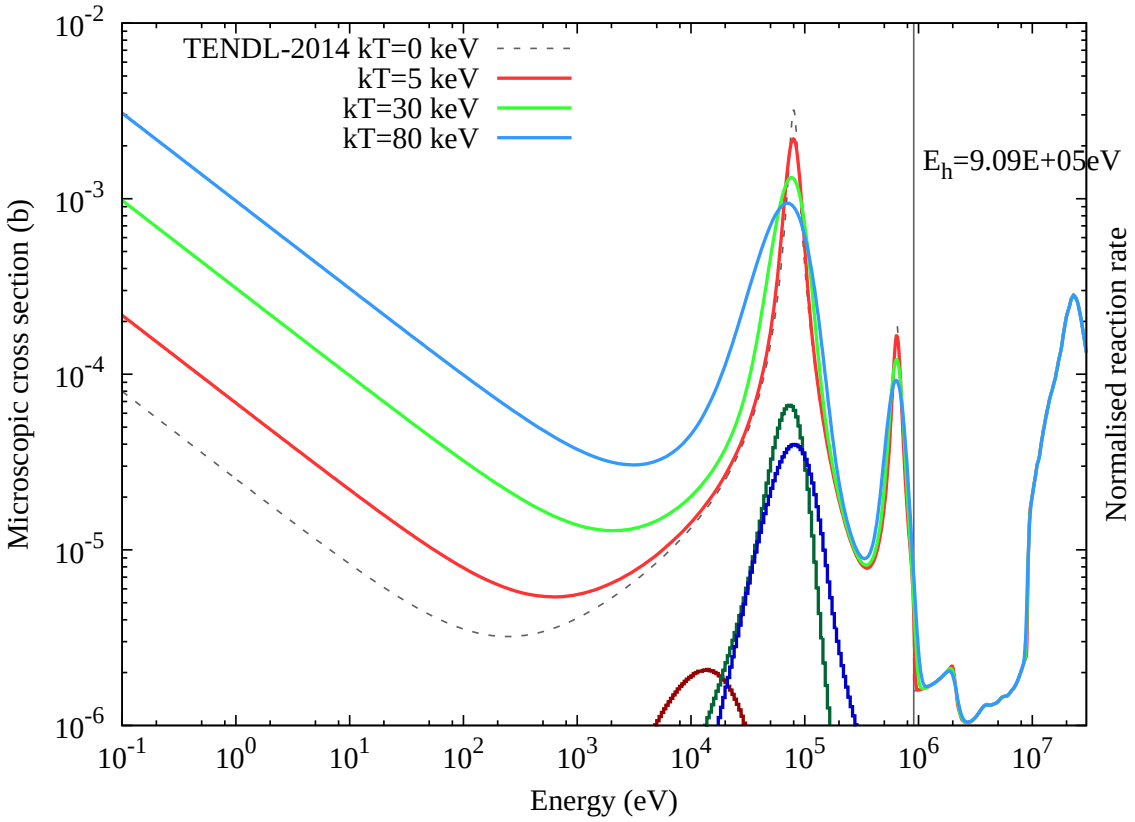

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

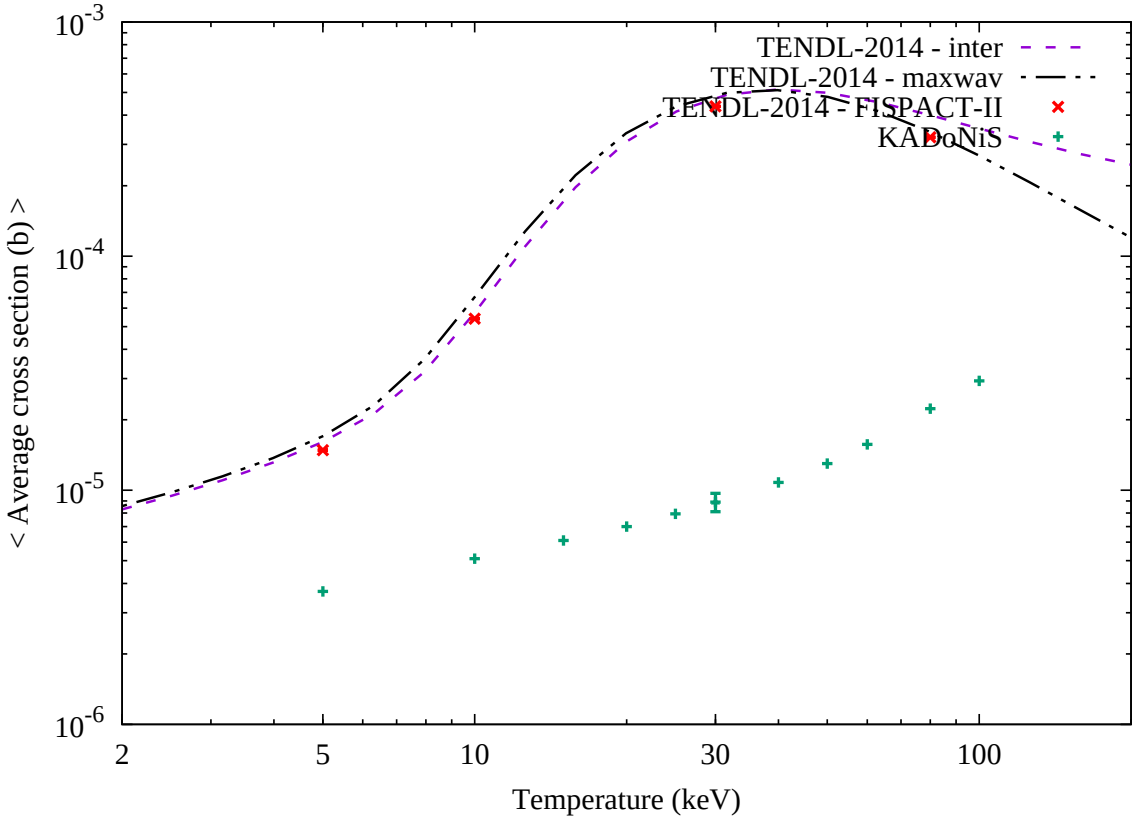
$^{16}O_8$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=2.00E+07eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

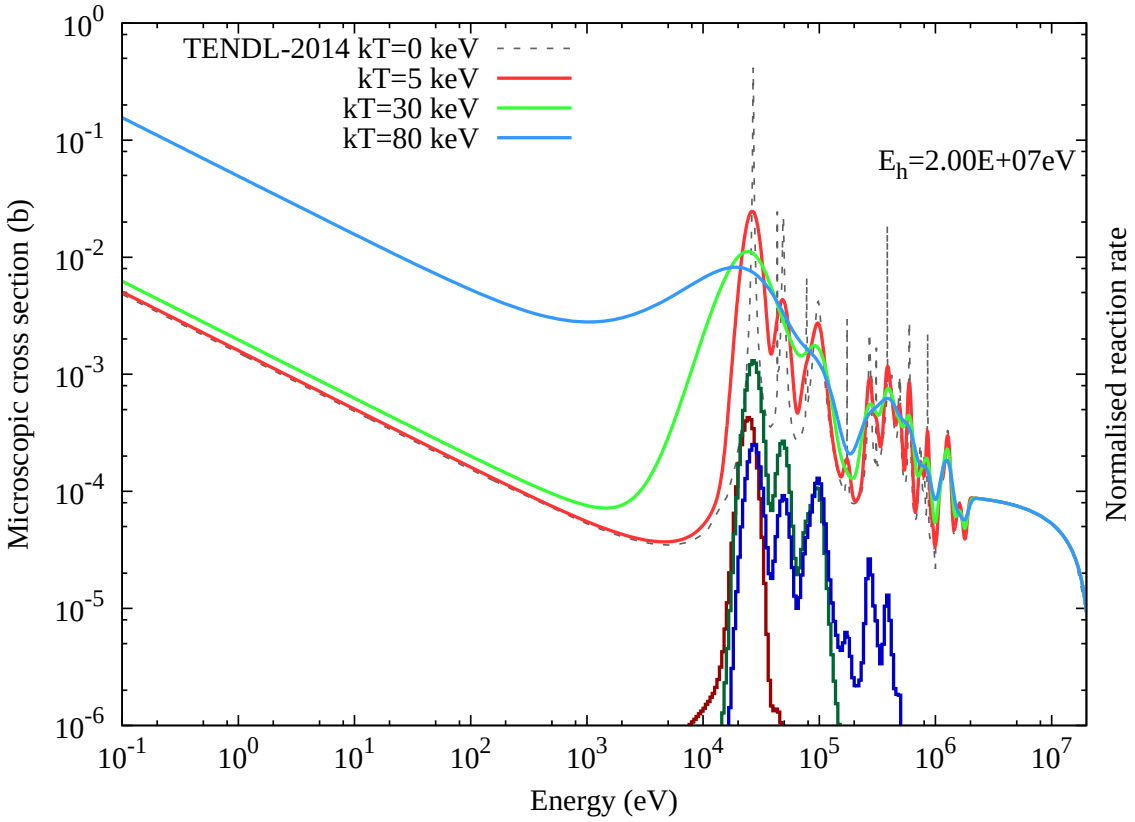

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

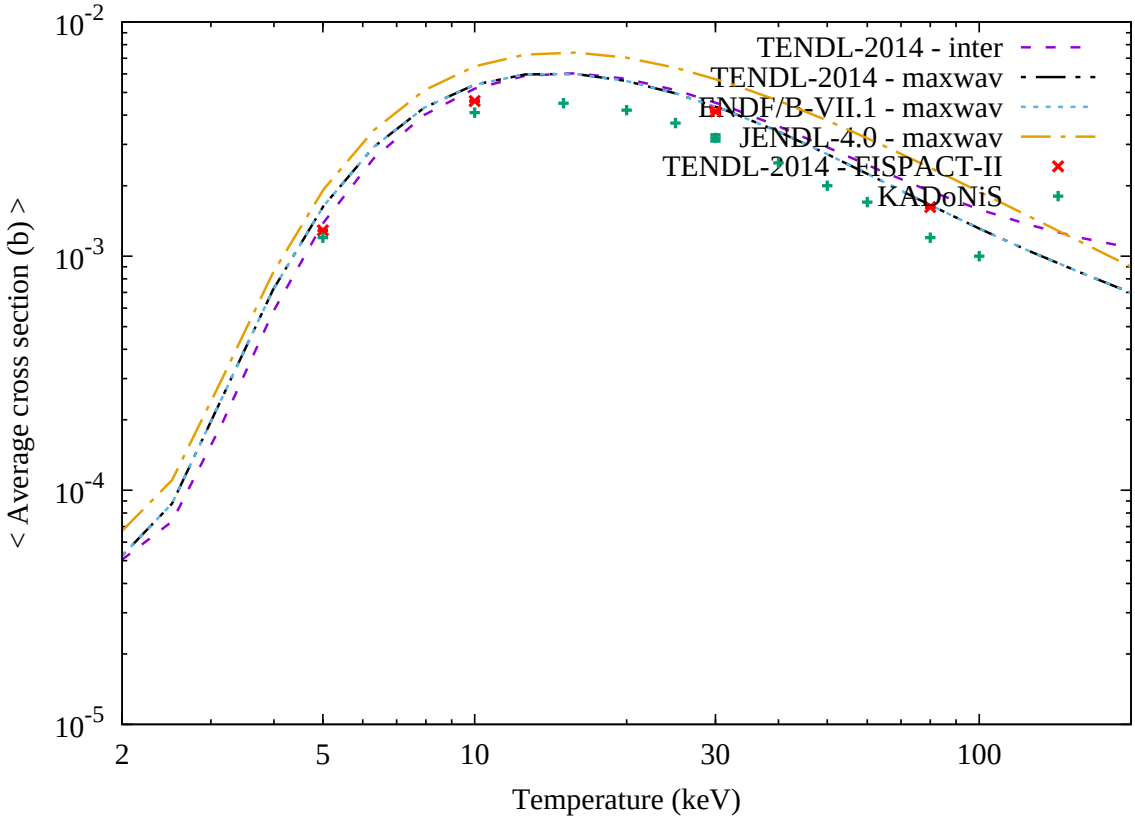
$^{18}O_8$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=9.09E+05eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

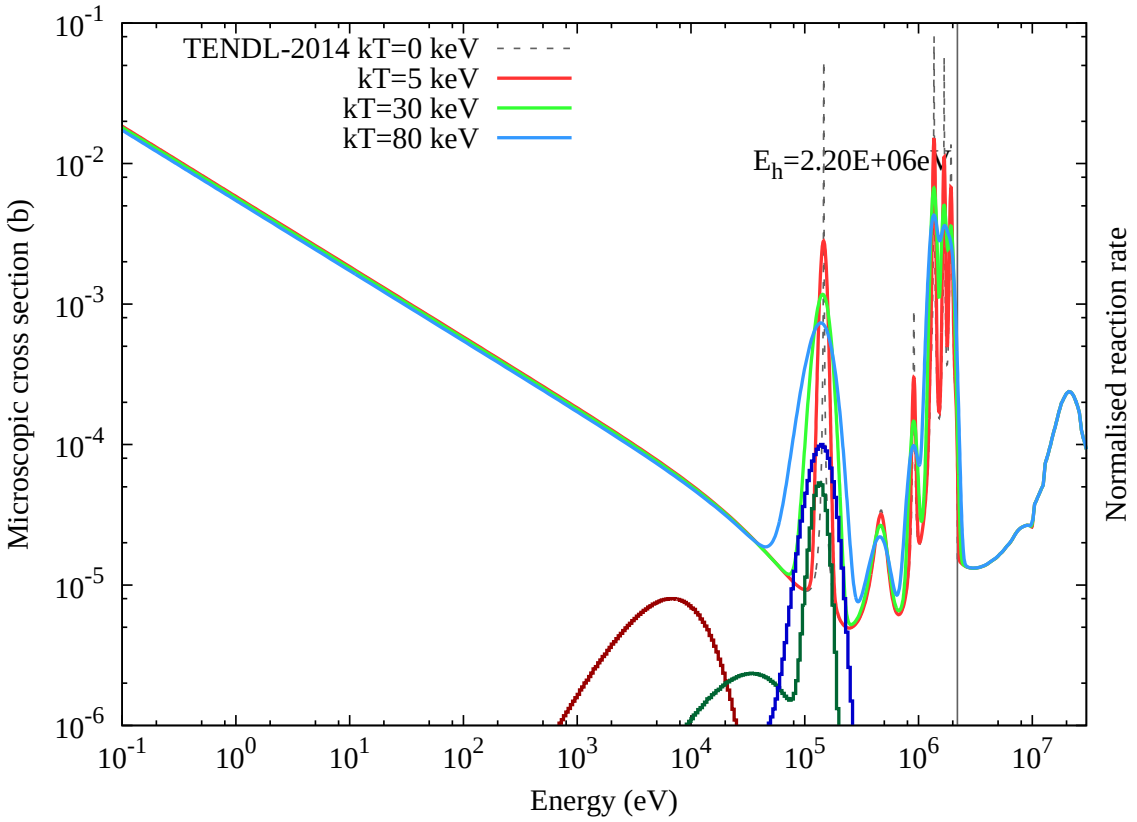

TENDL-2014 - inter
TENDL-2014 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

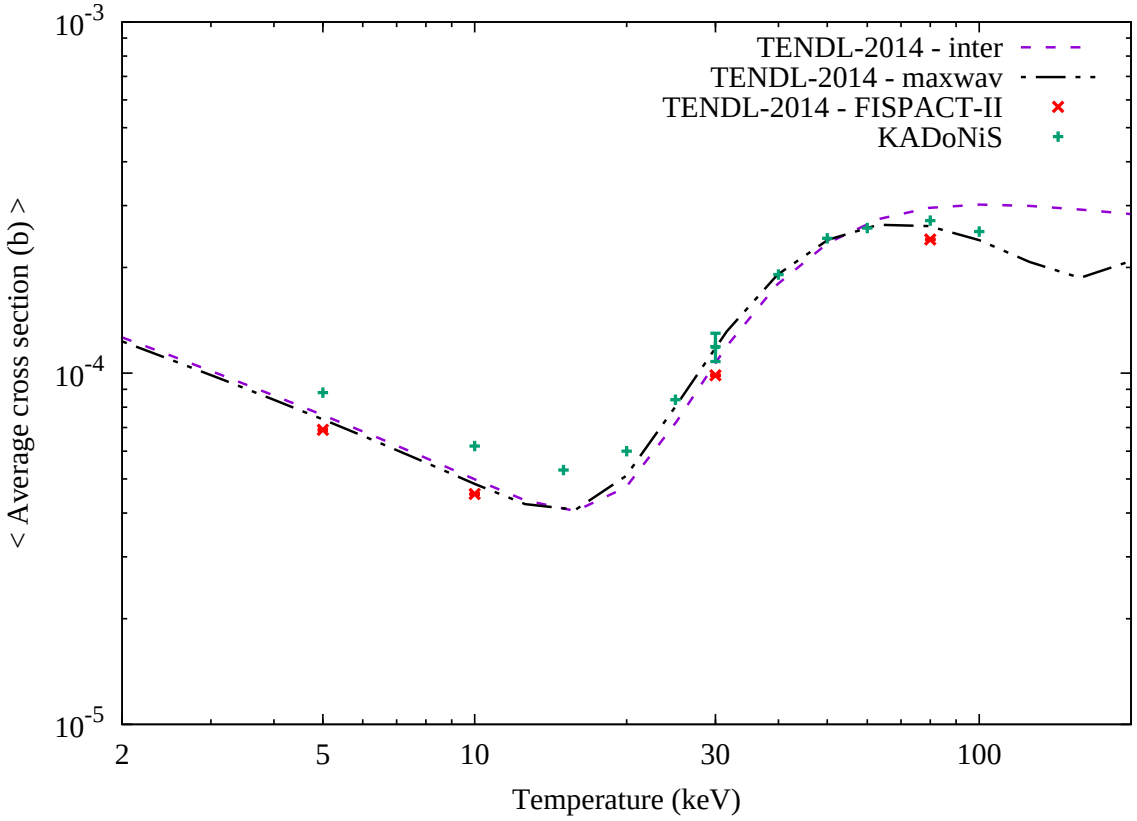
$^{19}F_9$ [Stable]


TENDL-2014 kT=0 keV
kT=5 keV
kT=30 keV
kT=80 keV
E_h=2.00E+07eV
Microscopic cross section (b)
Normalised reaction rate
Energy (eV)

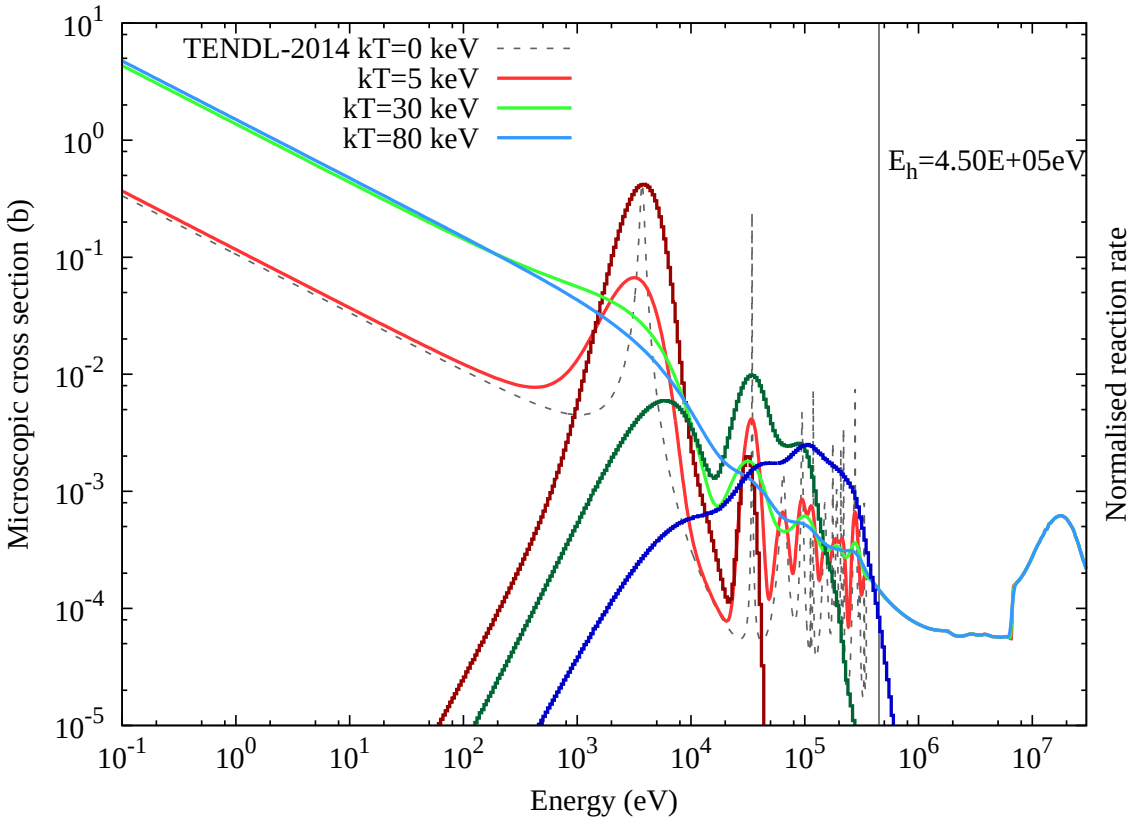

TENDL-2014 - inter
TENDL-2014 - maxwav
ENDF/B-VII.1 - maxwav
JENDL-4.0 - maxwav
TENDL-2014 - FISPACT-II
KADoNiS
< Average cross section (b) >
Temperature (keV)

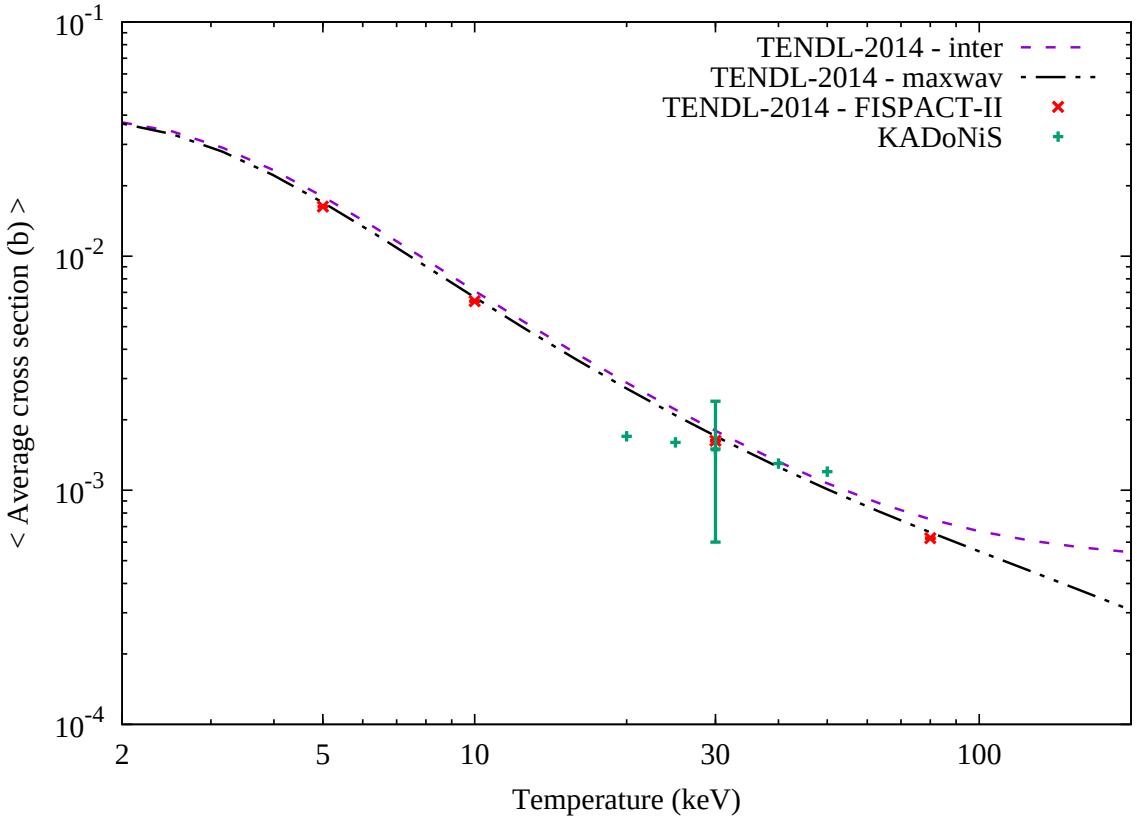
$^{20}Ne_{10}$ [Stable]



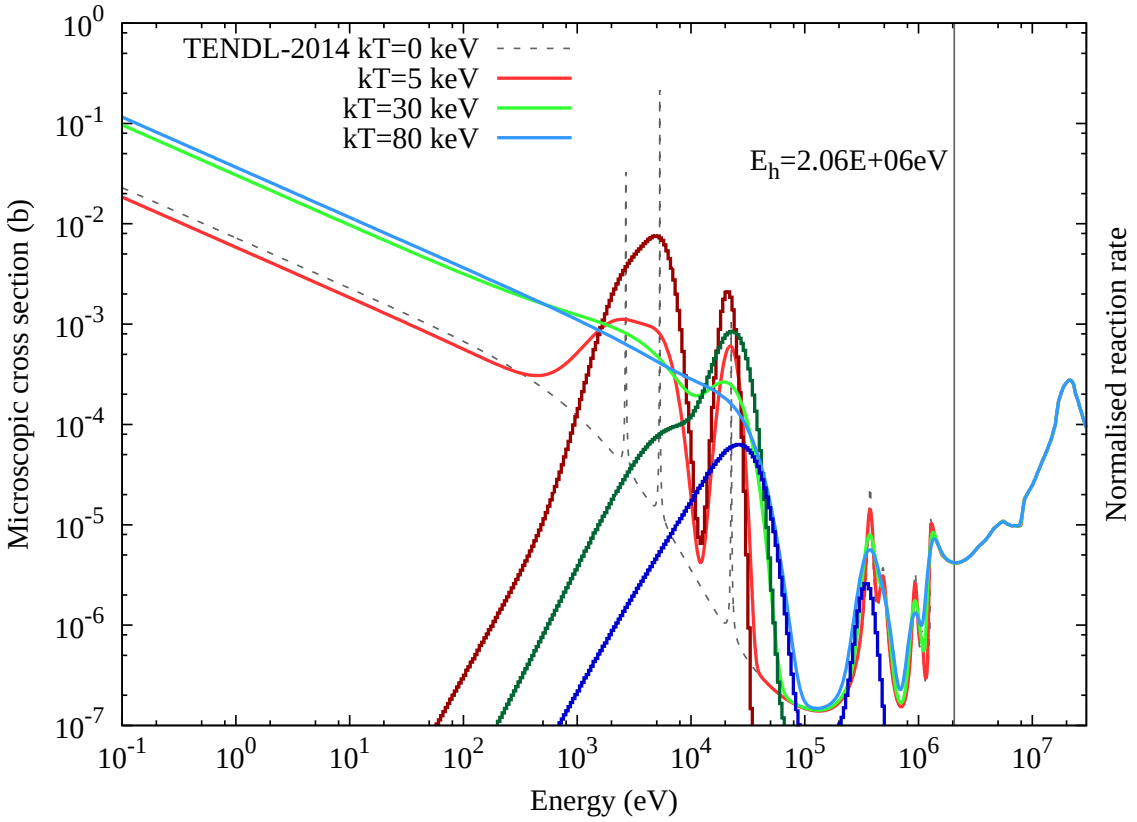


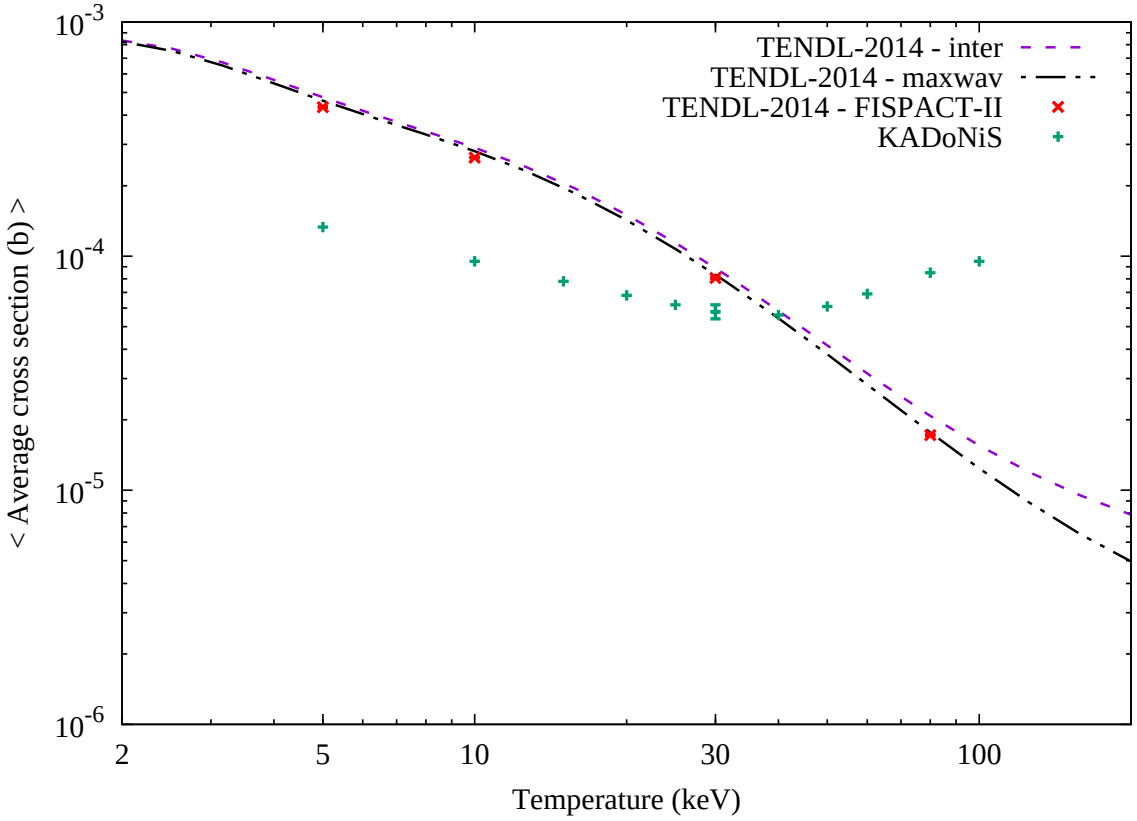
$^{21}Ne_{10}$ [Stable]



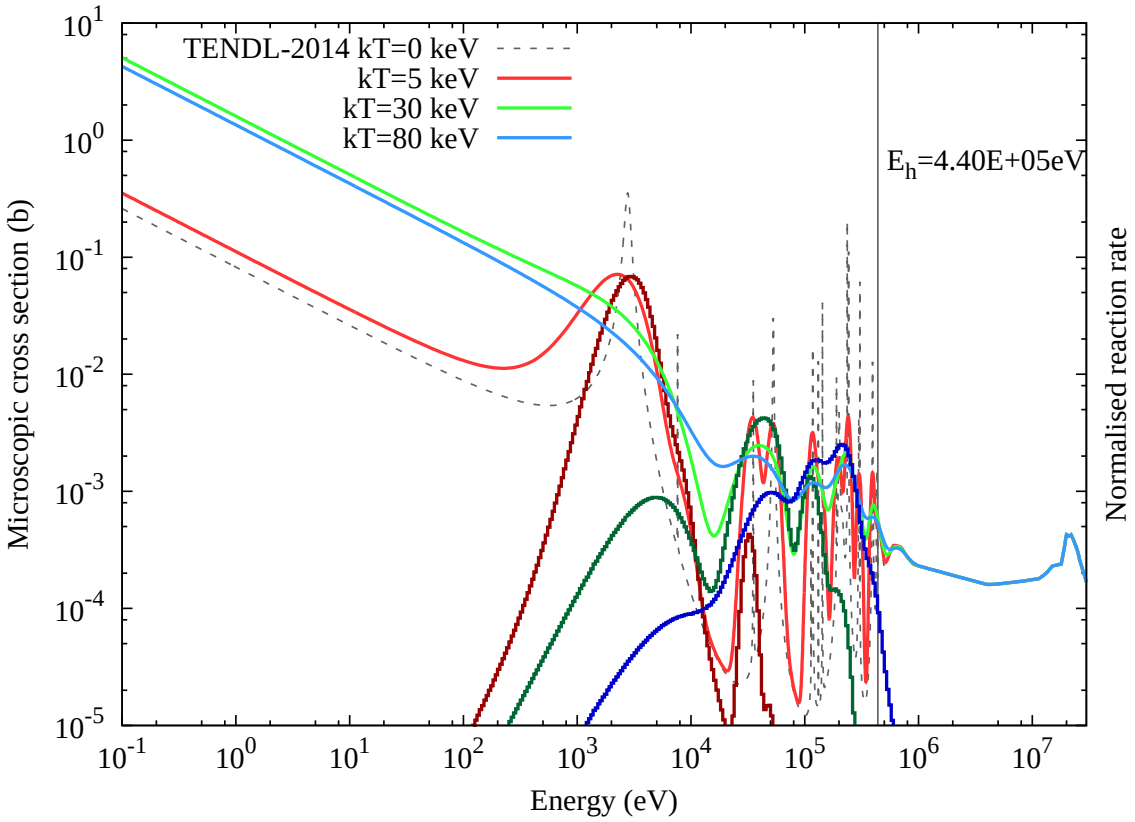


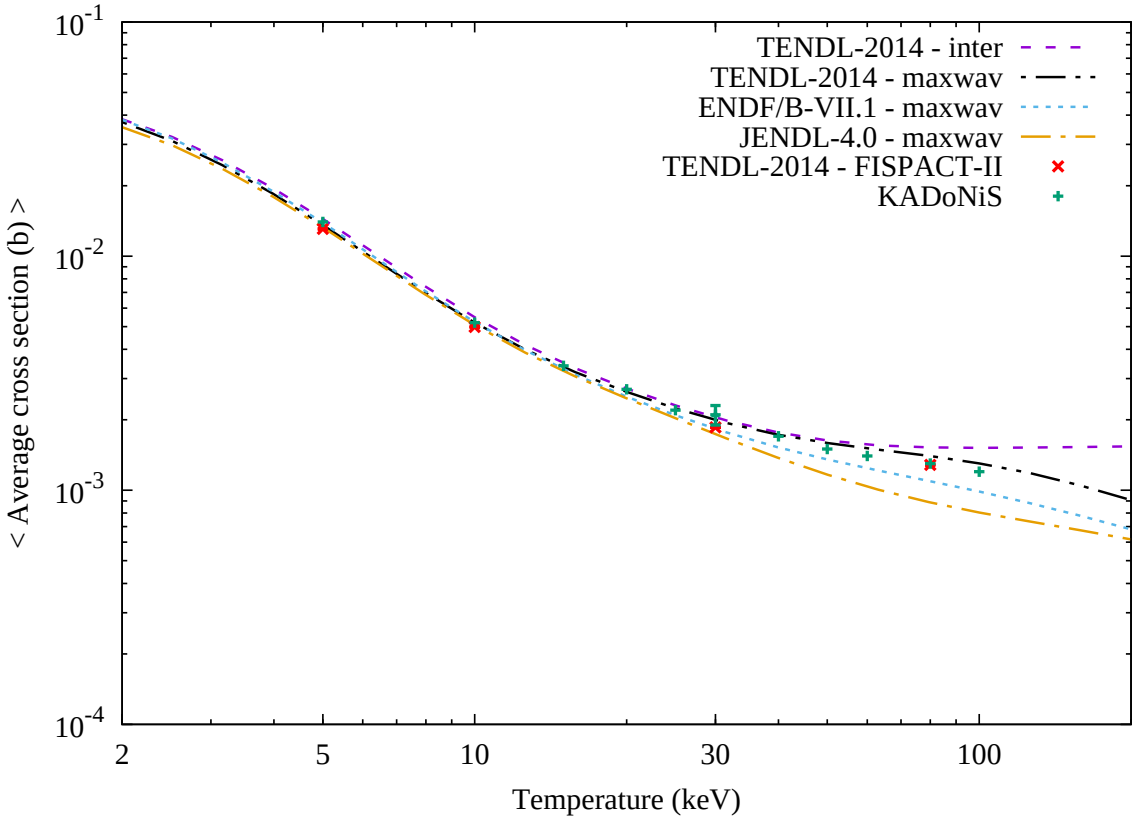
$^{22}Ne_{10}$ [Stable]



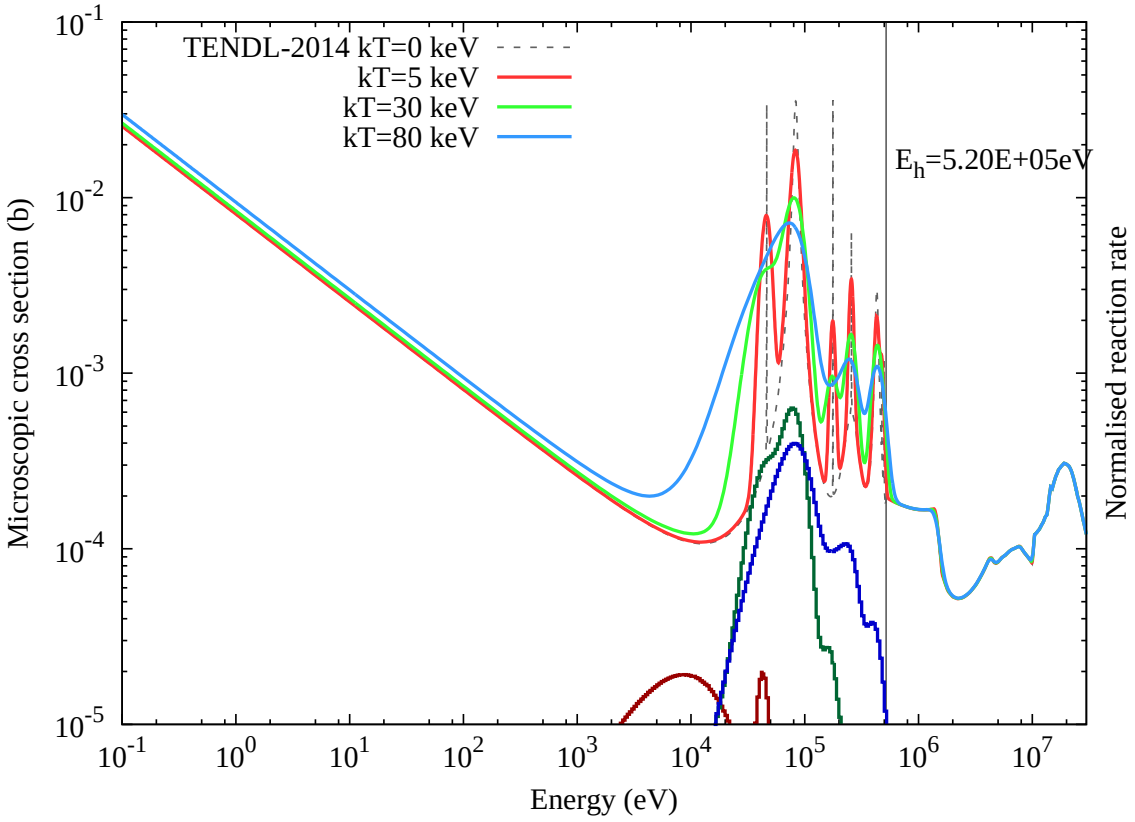


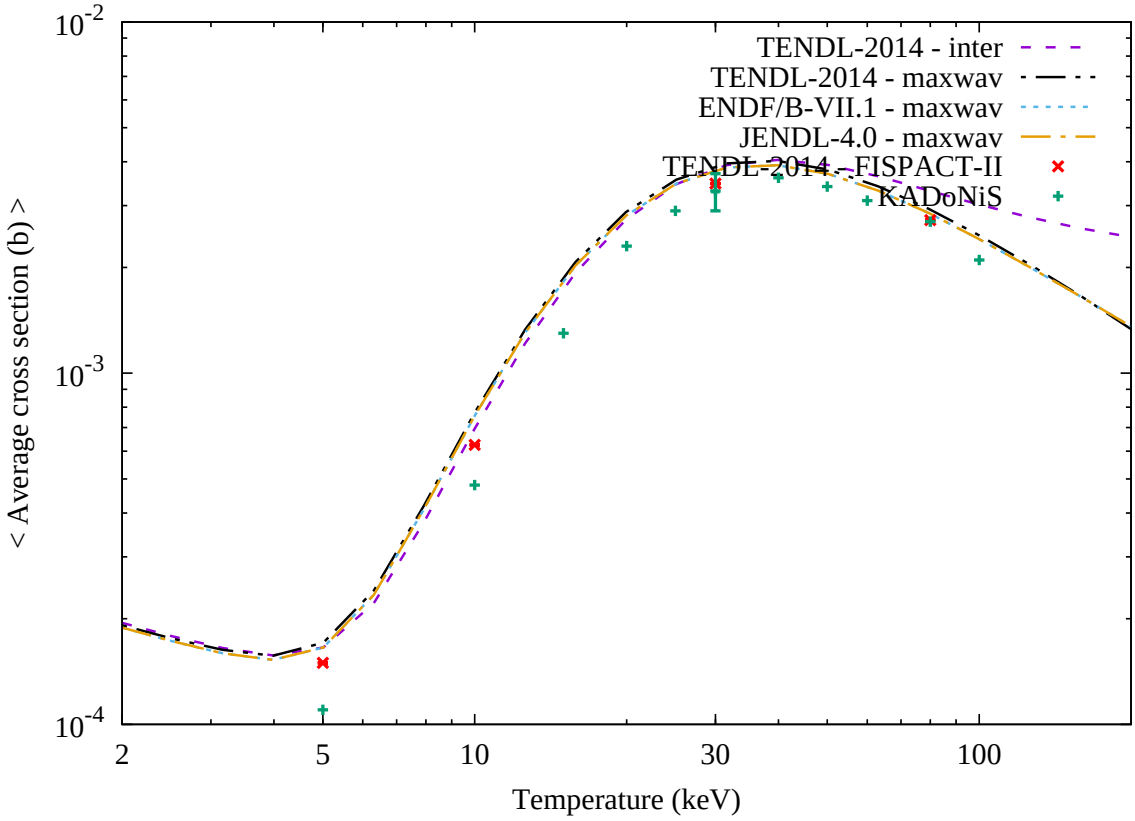
$^{23}Na_{11}$ [Stable]



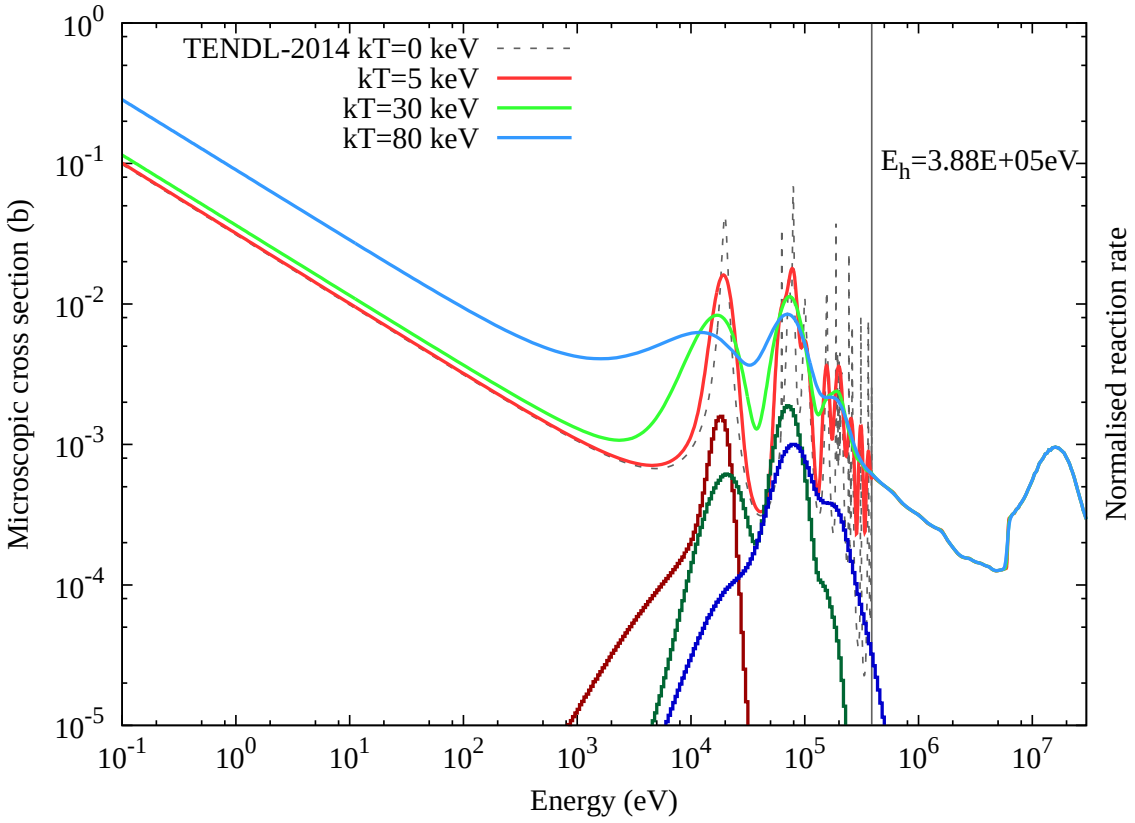


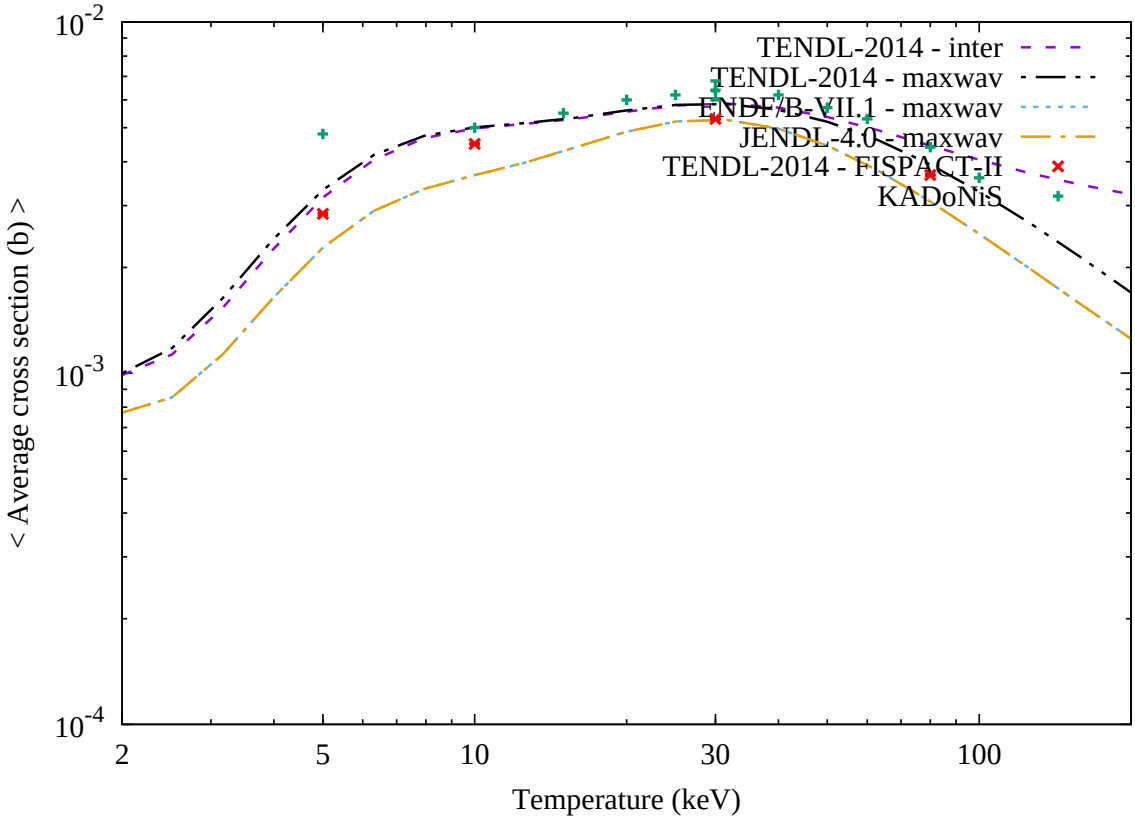
$^{24}Mg_{12}$ [Stable]



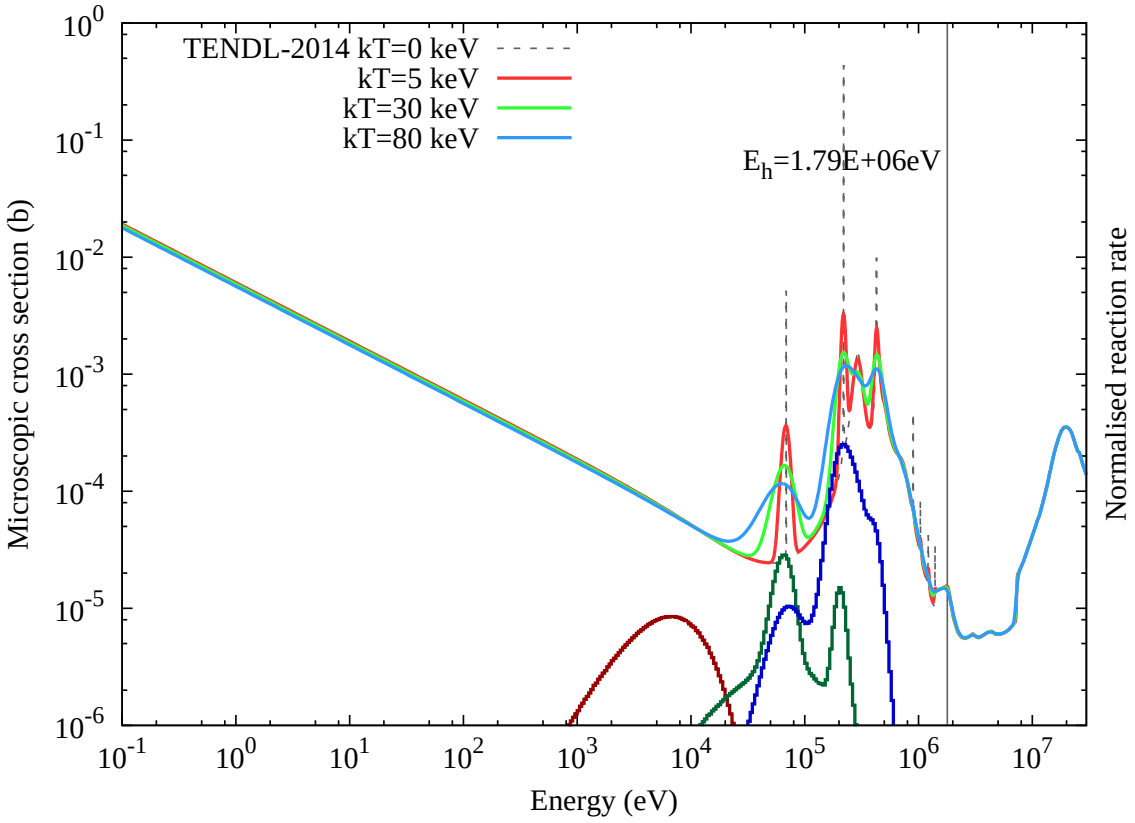


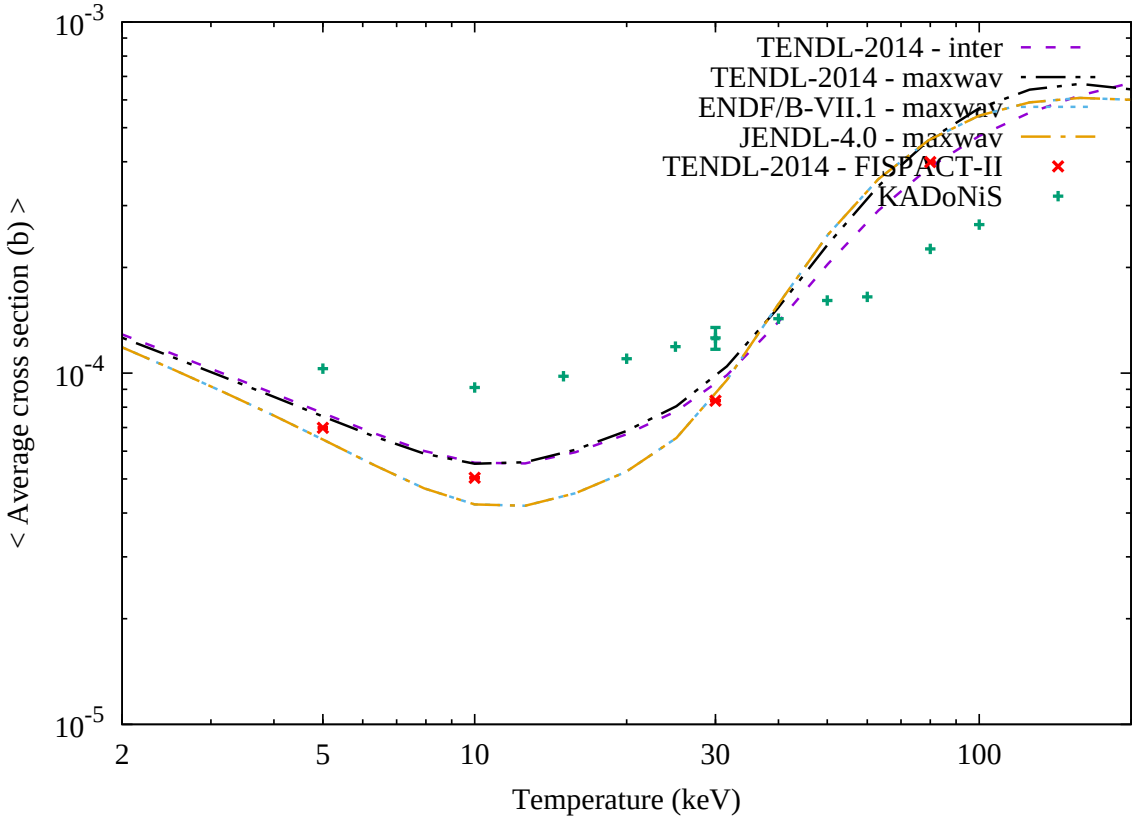
$^{25}Mg_{12}$ [Stable]



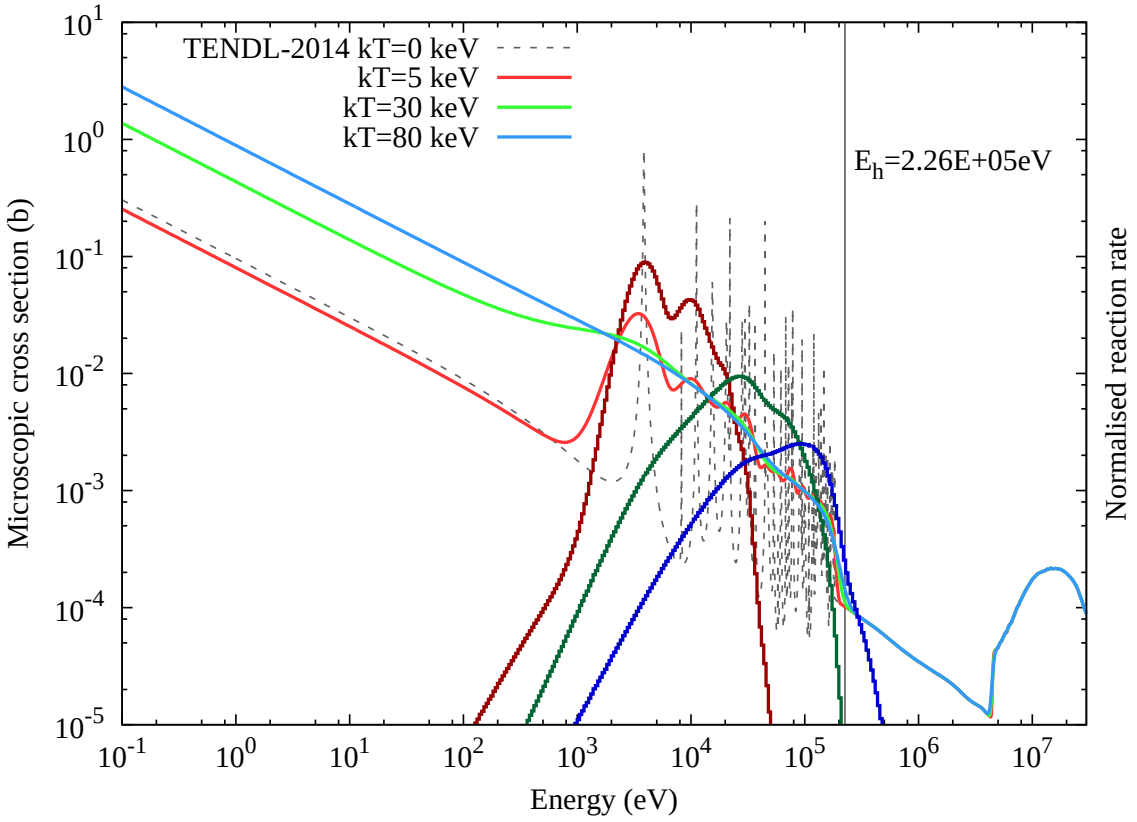


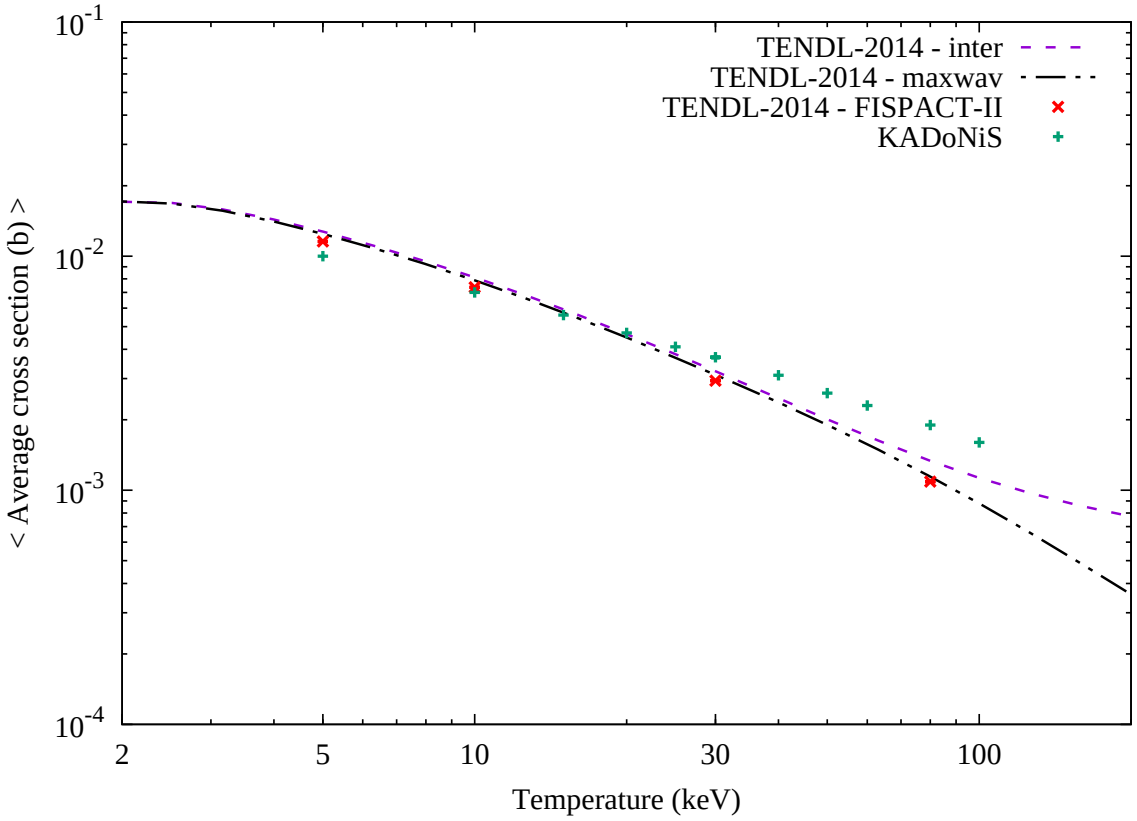
$^{26}Mg_{12}$ [Stable]



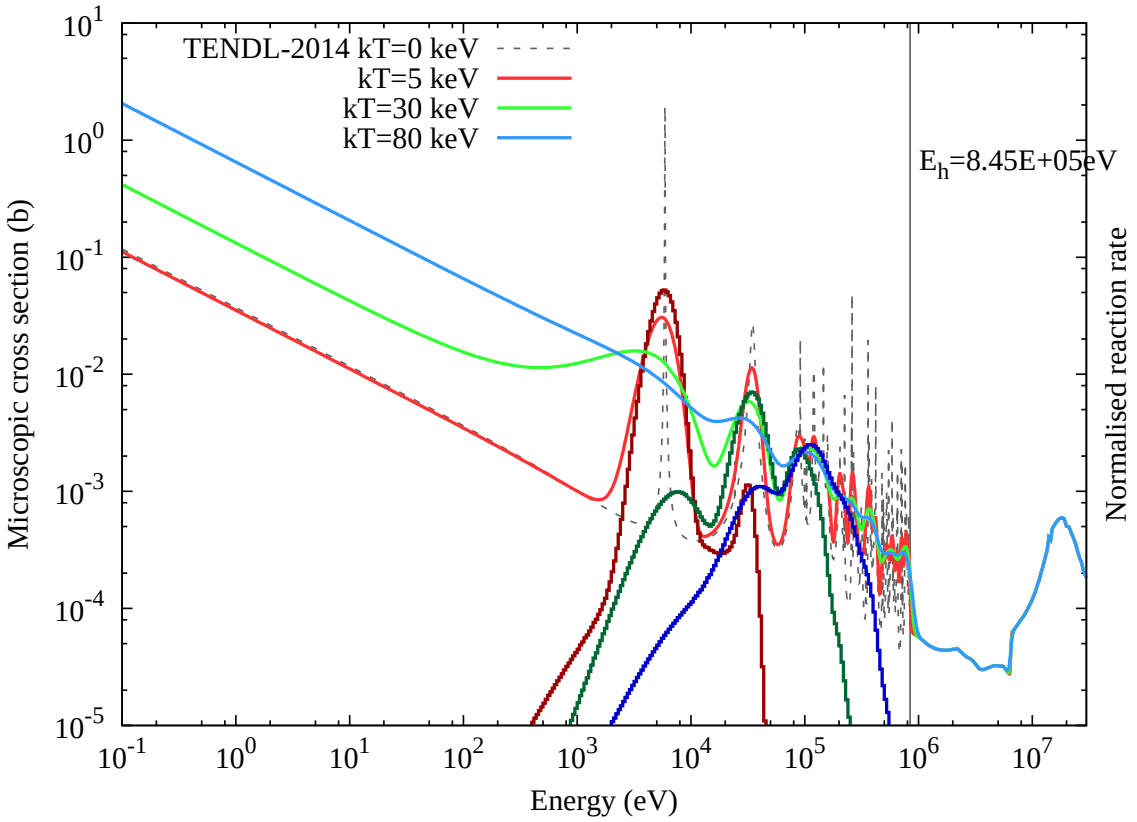


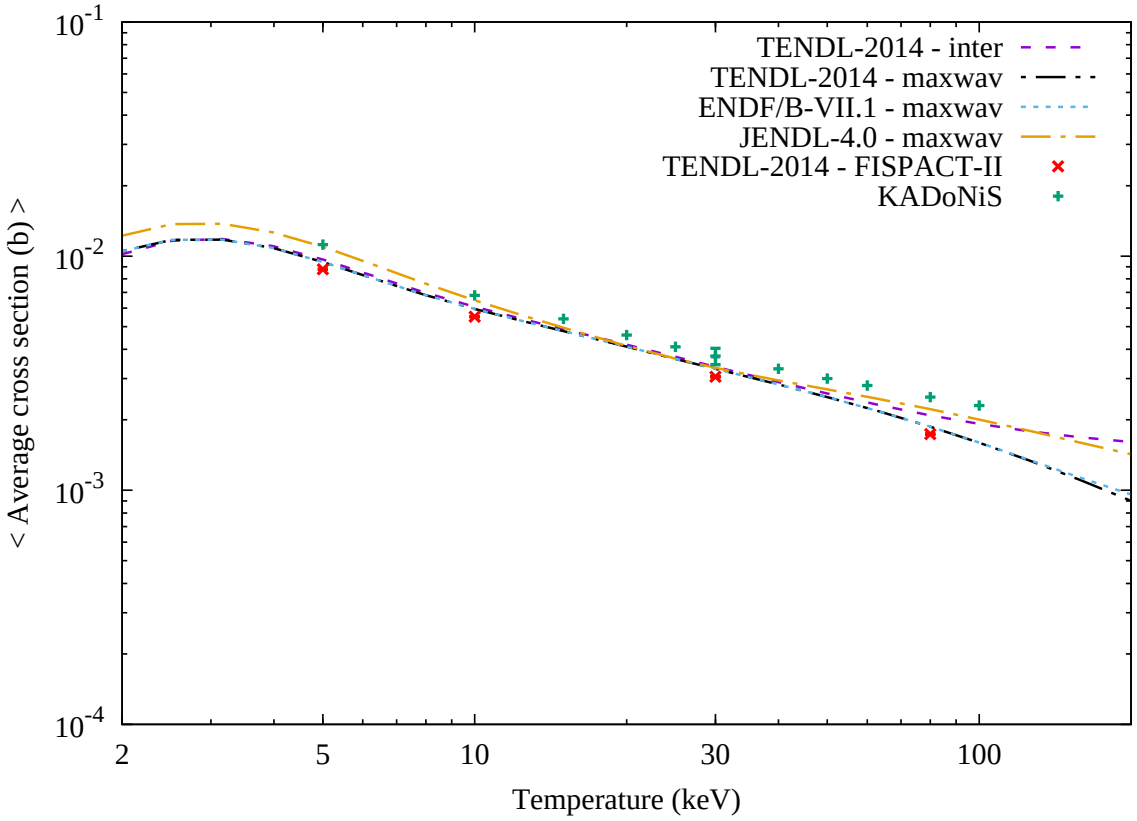
$^{26}Al_{13}$ $[T_{1/2} = 7.17 \times 10^5$ years] (KADoNiS=SMC)



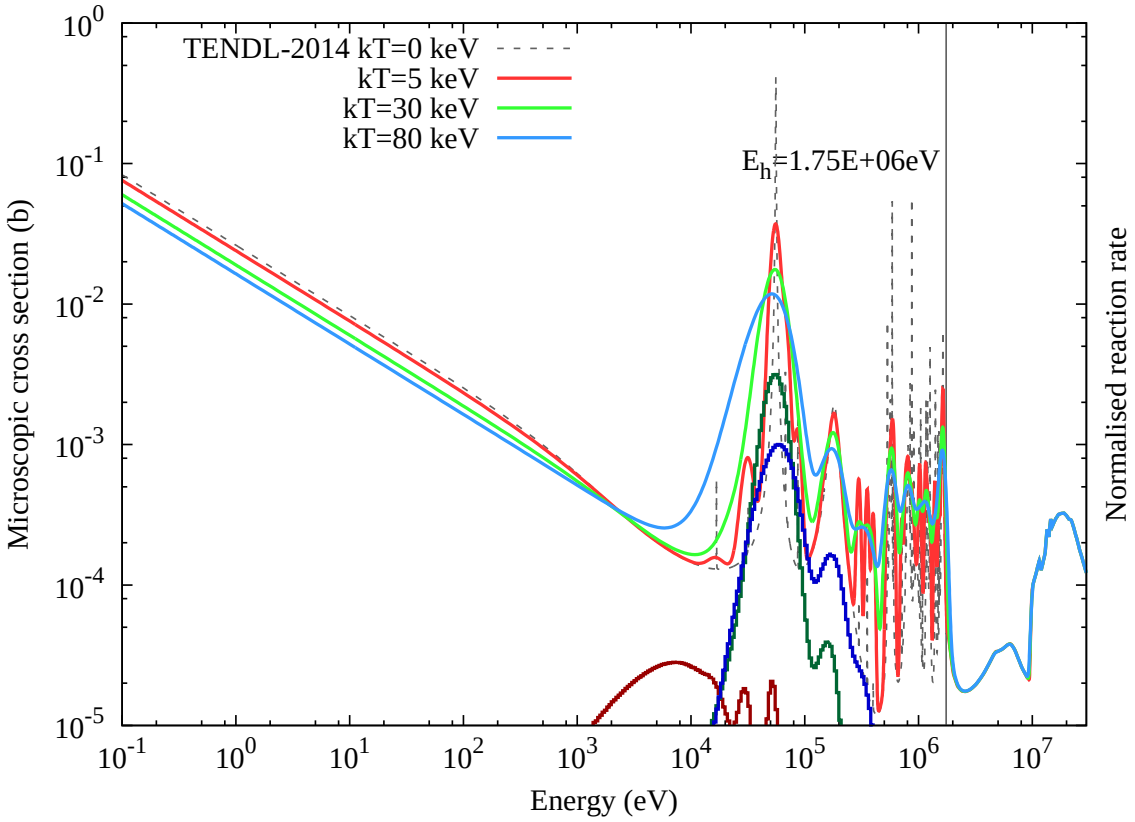


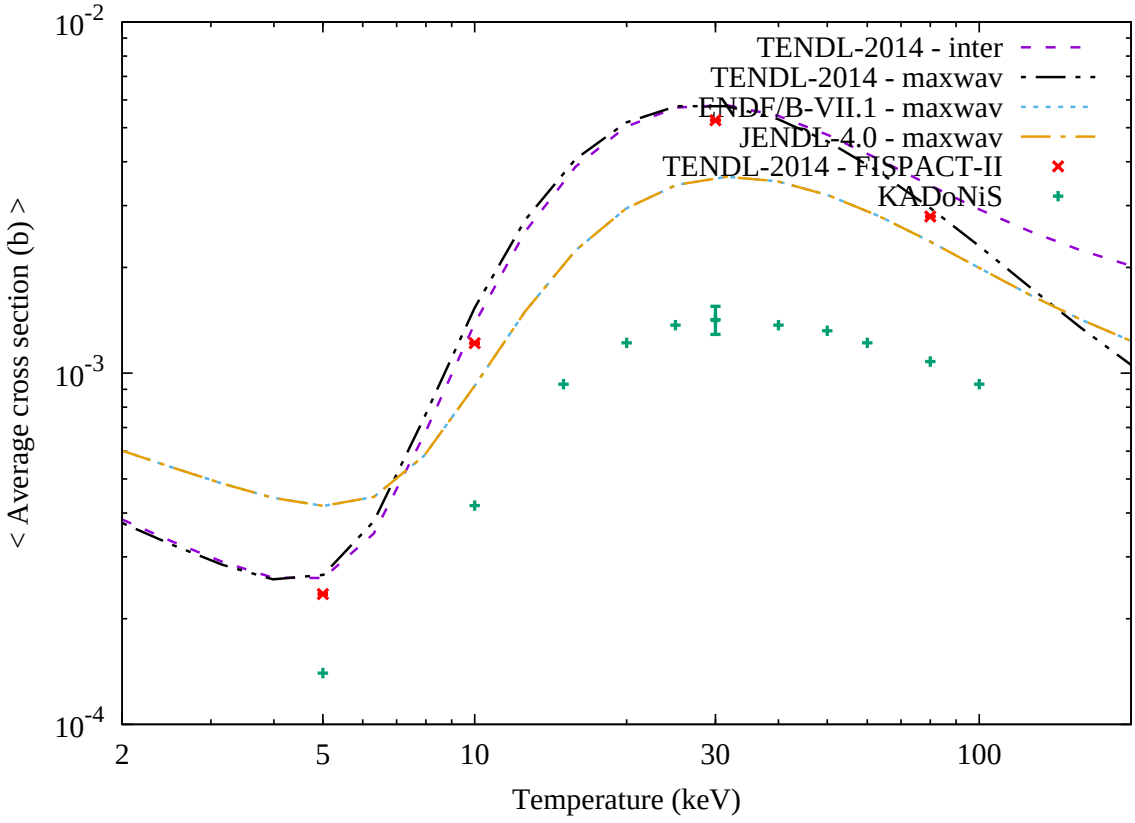
$^{27}Al_{13}$ [Stable]



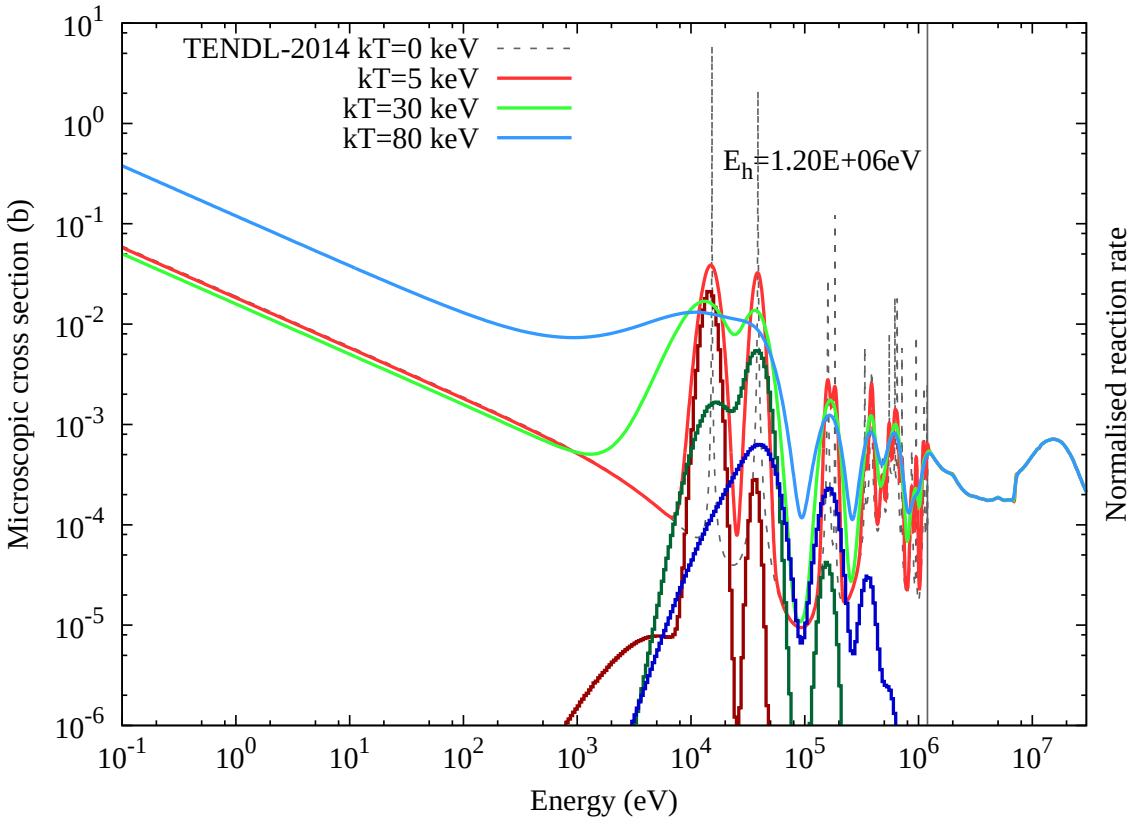


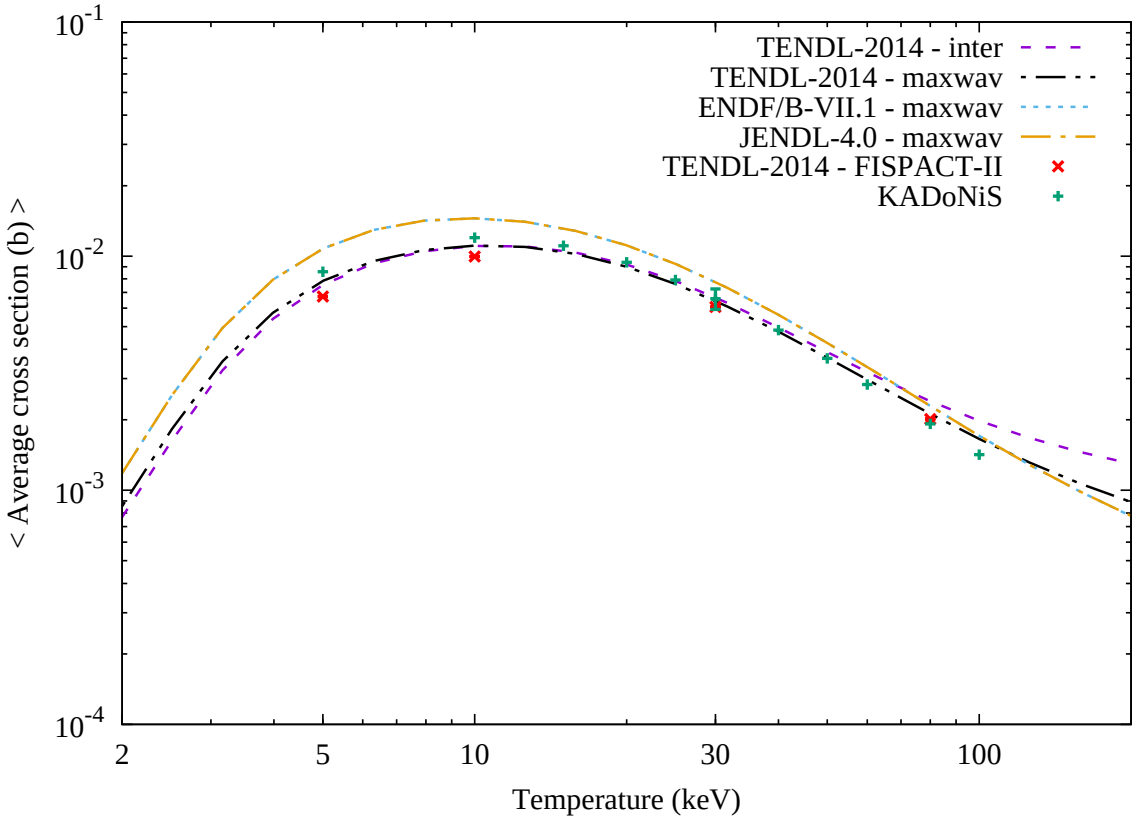
$^{28}Si_{14}$ [Stable]



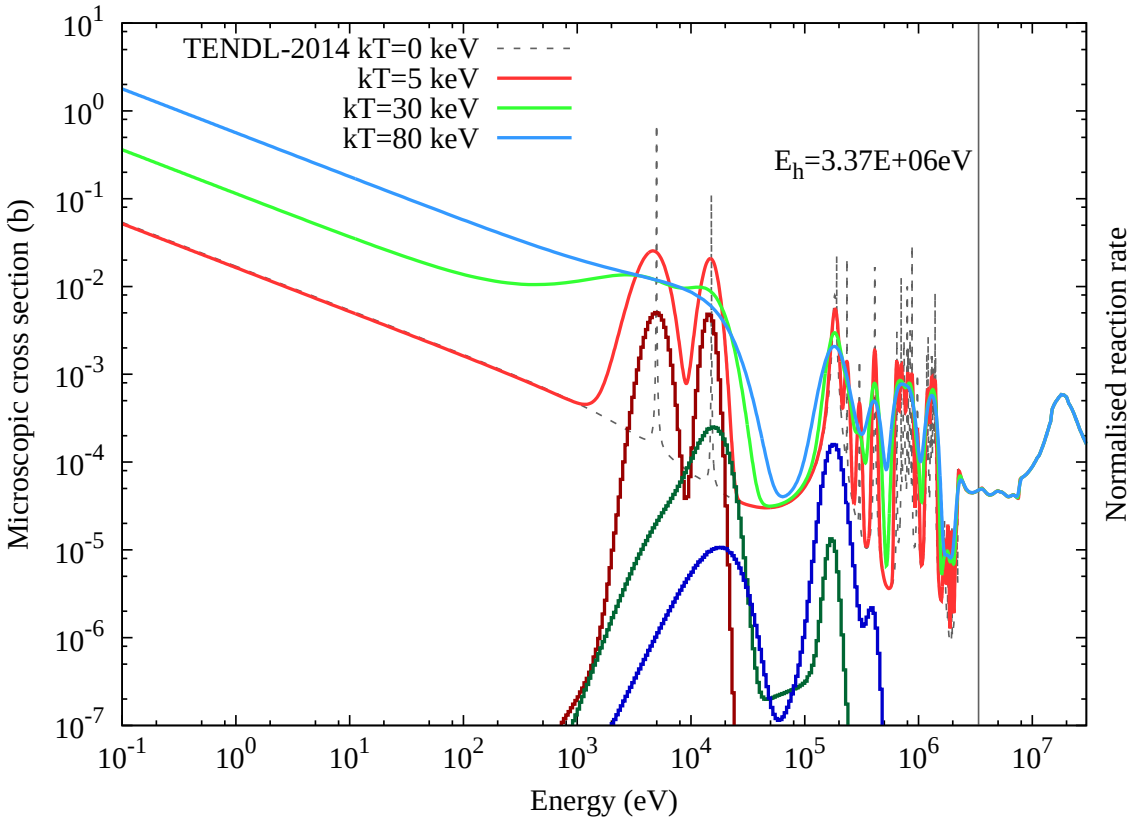


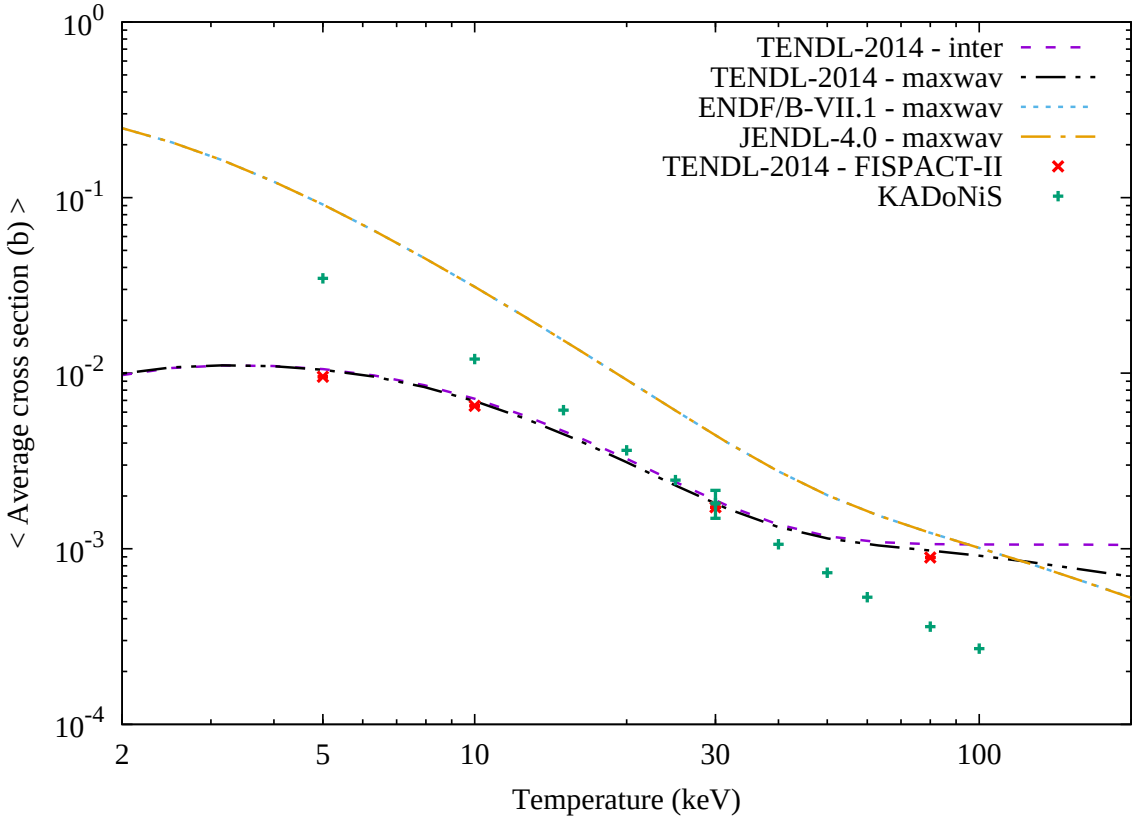
$^{29}Si_{14}$ [Stable]



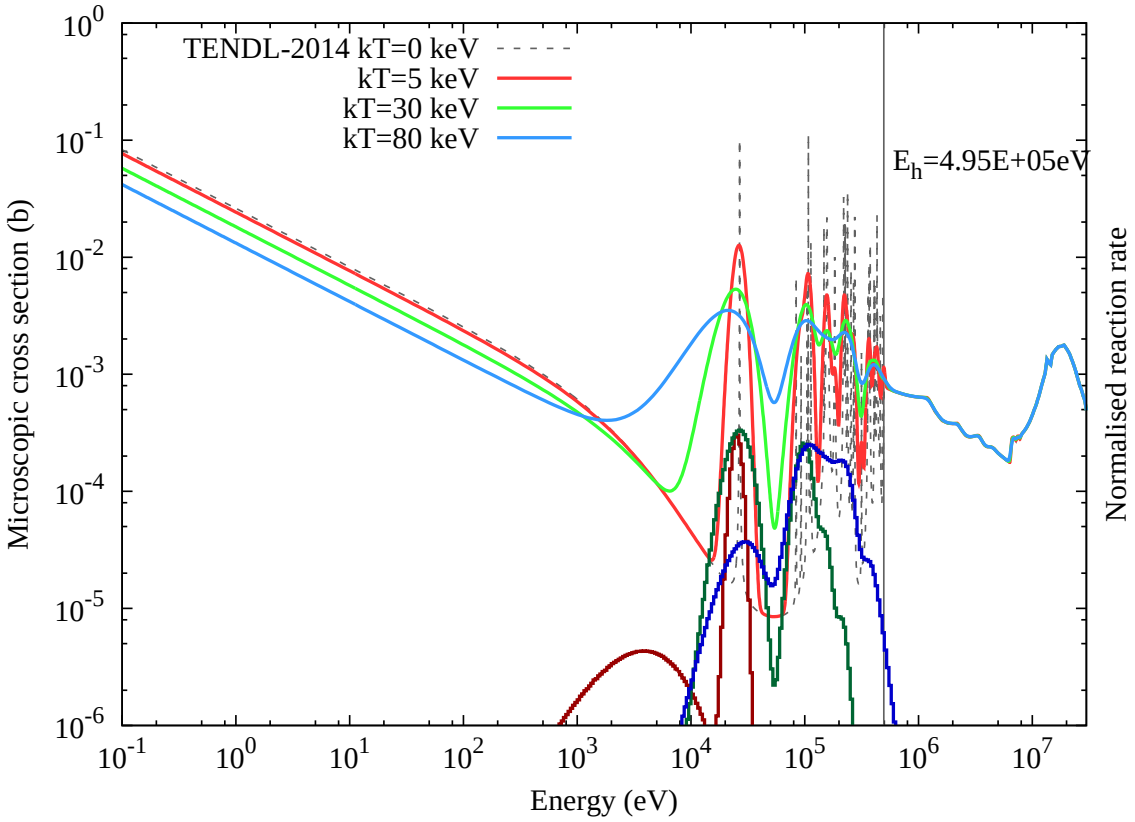


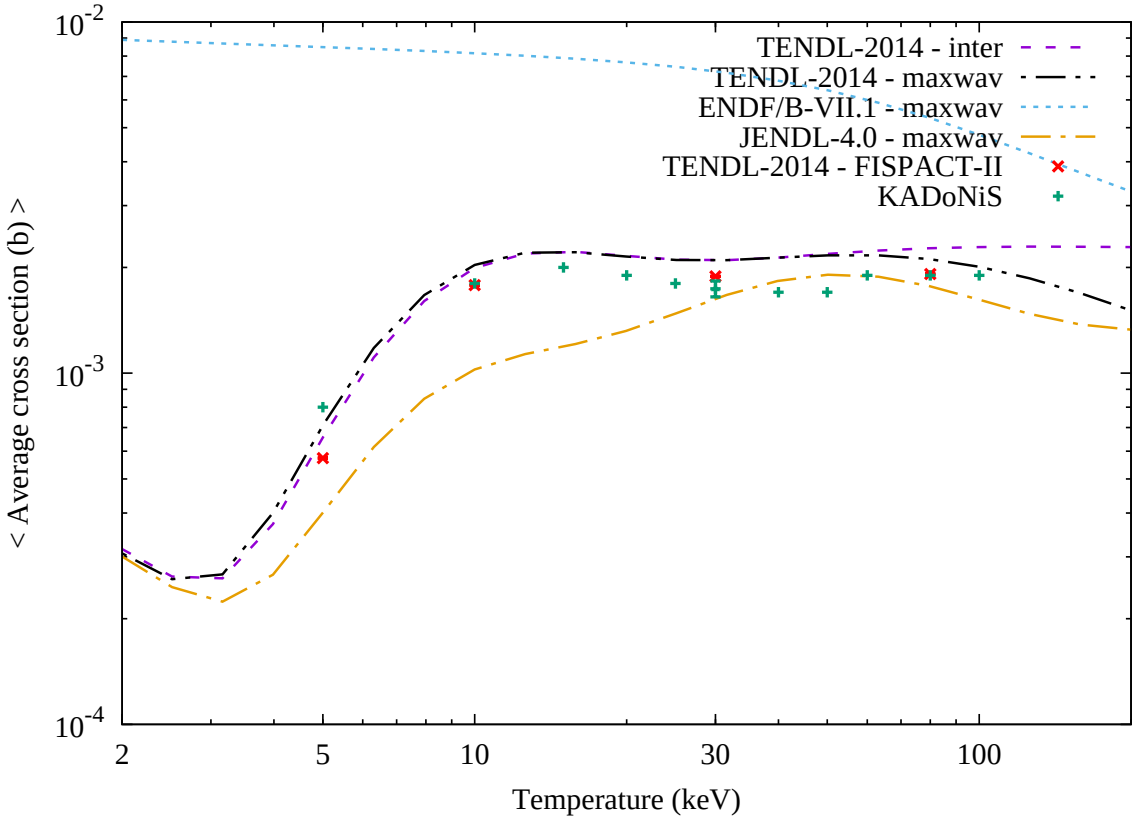
$^{30}Si_{14}$ [Stable]



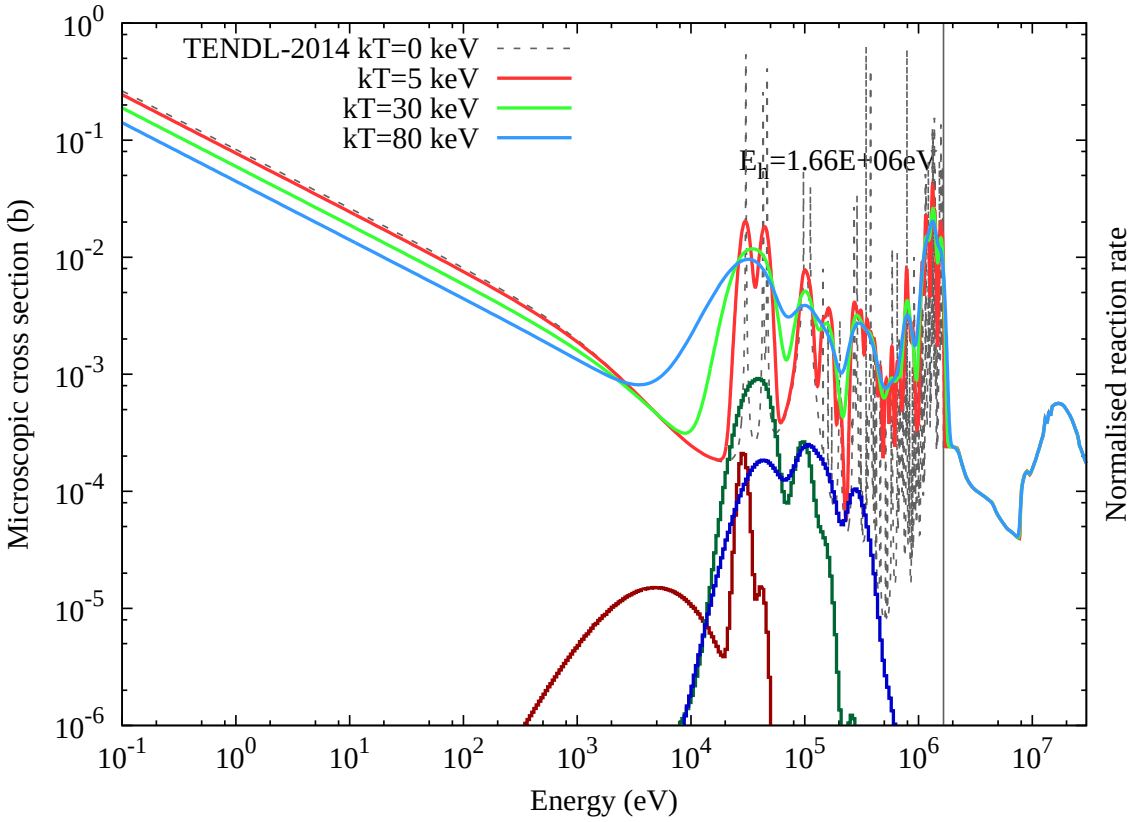


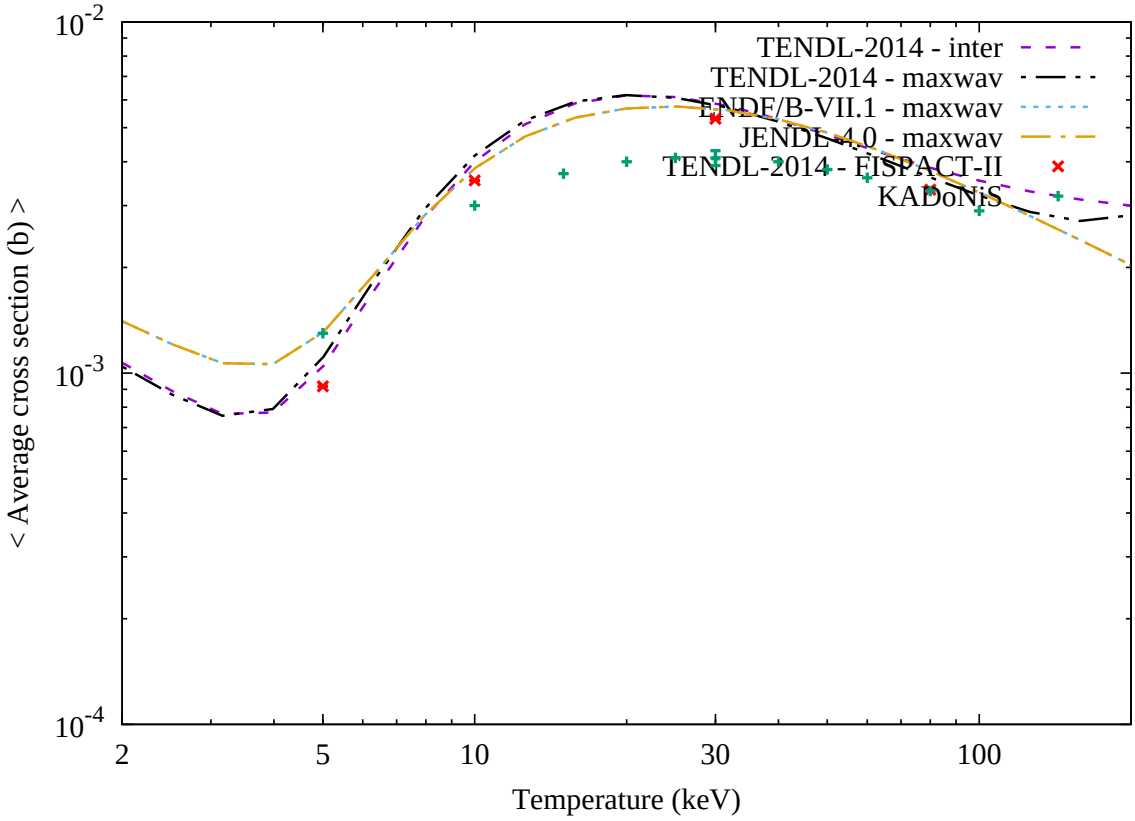
$^{31}P_{15}$ [Stable]



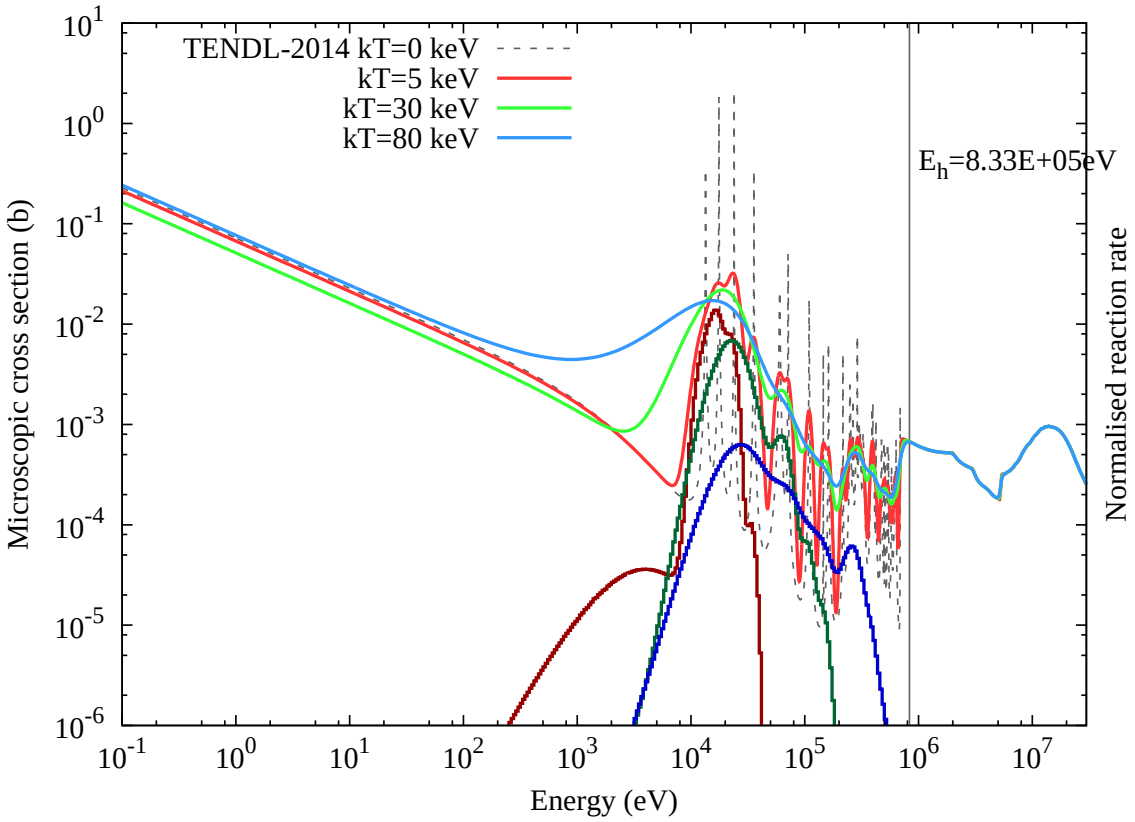


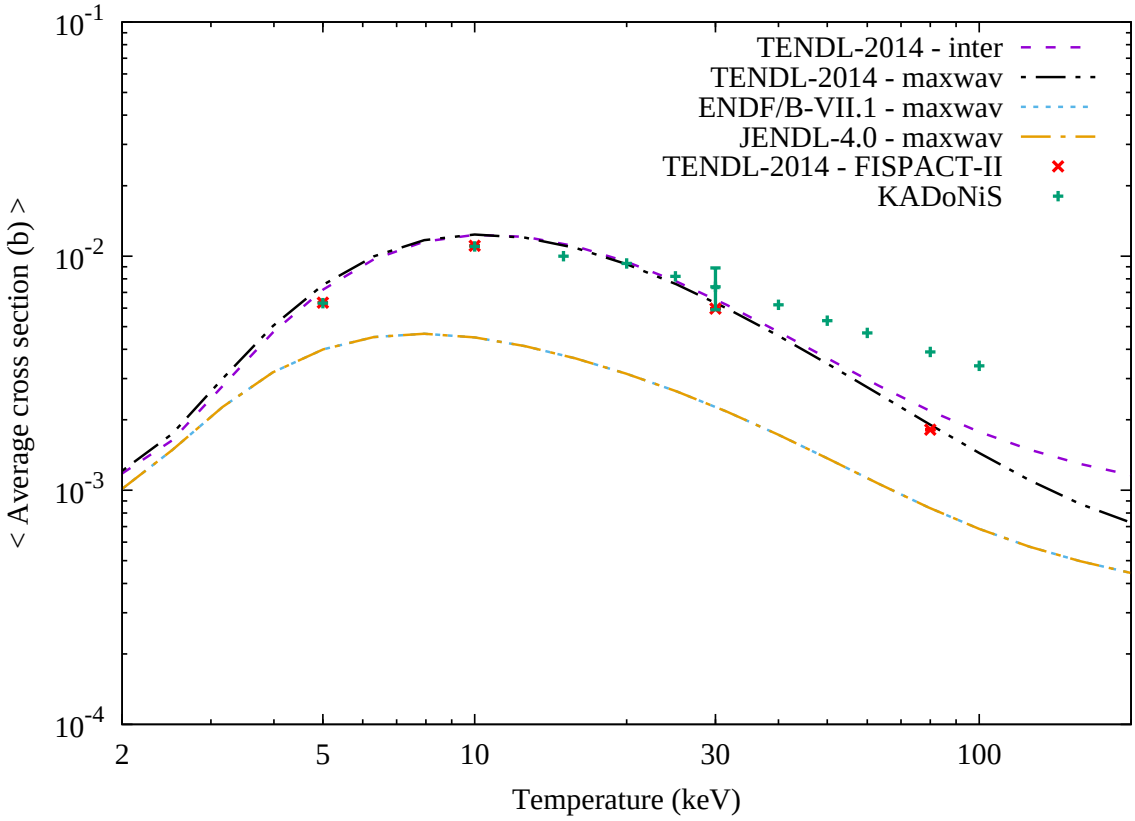
$^{32}S_{16}$ [Stable]



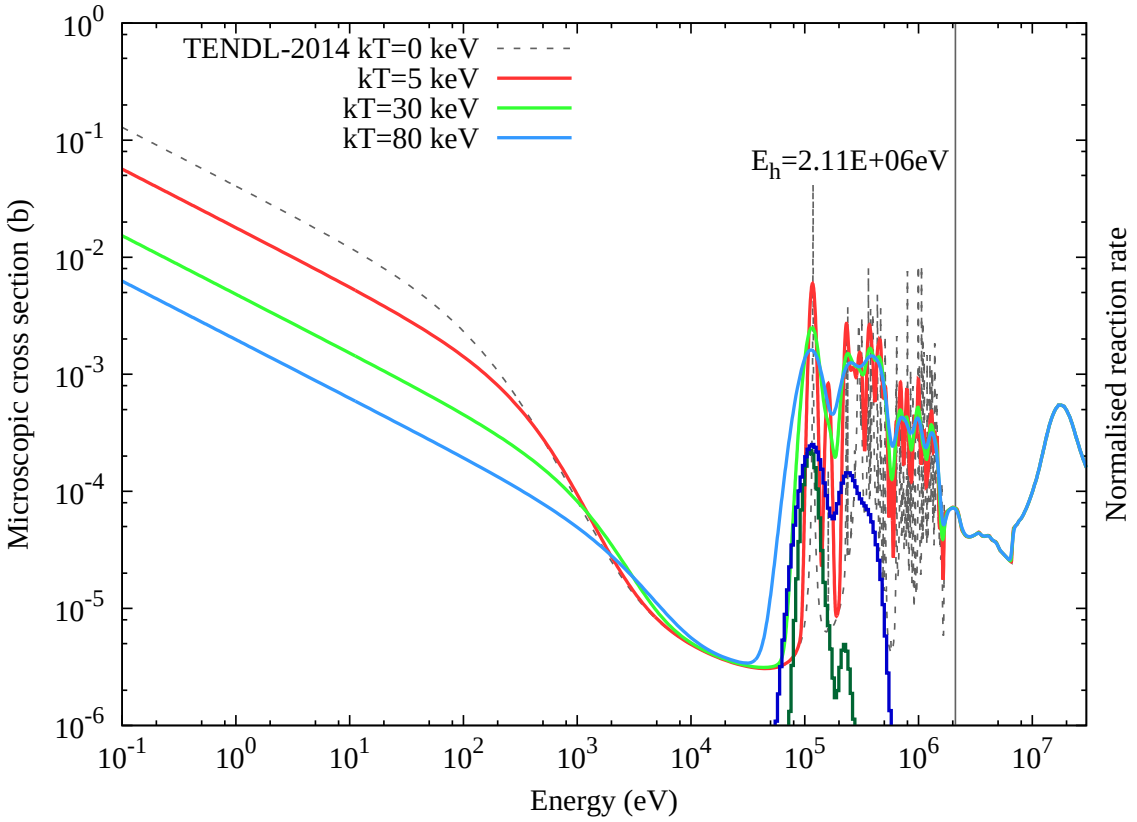


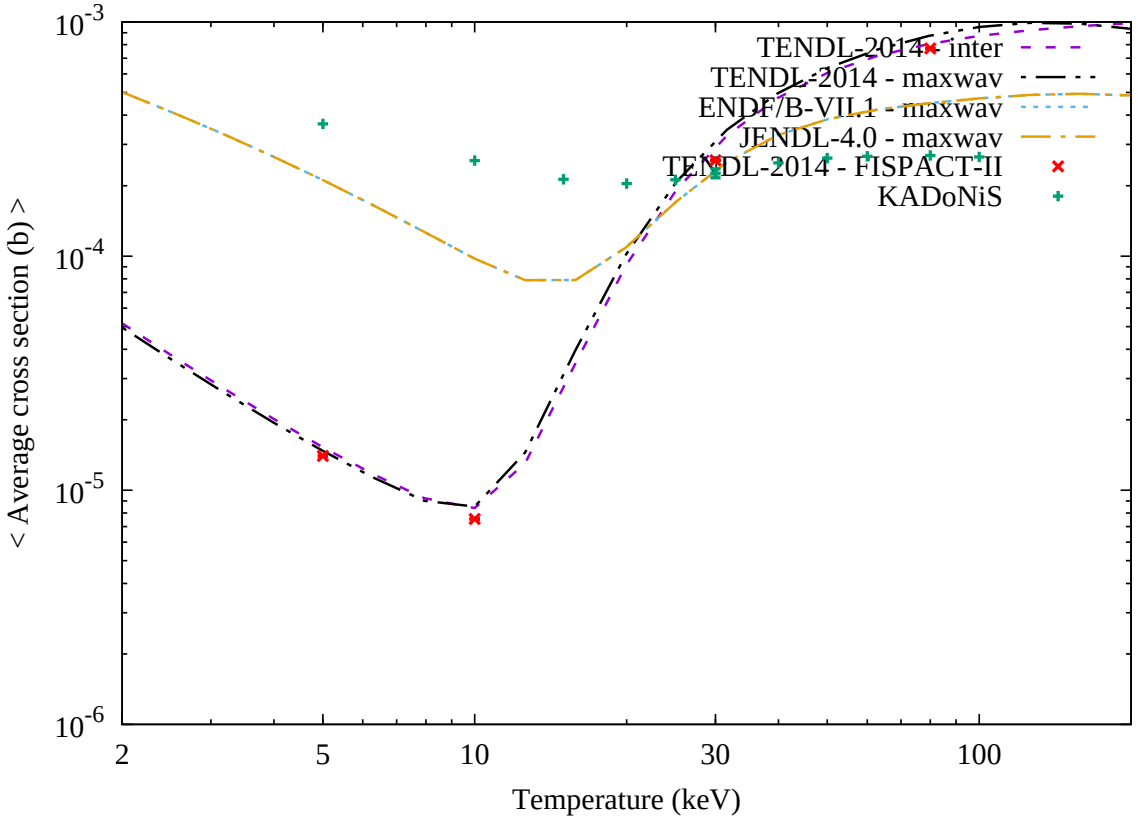
$^{33}S_{16}$ [Stable]



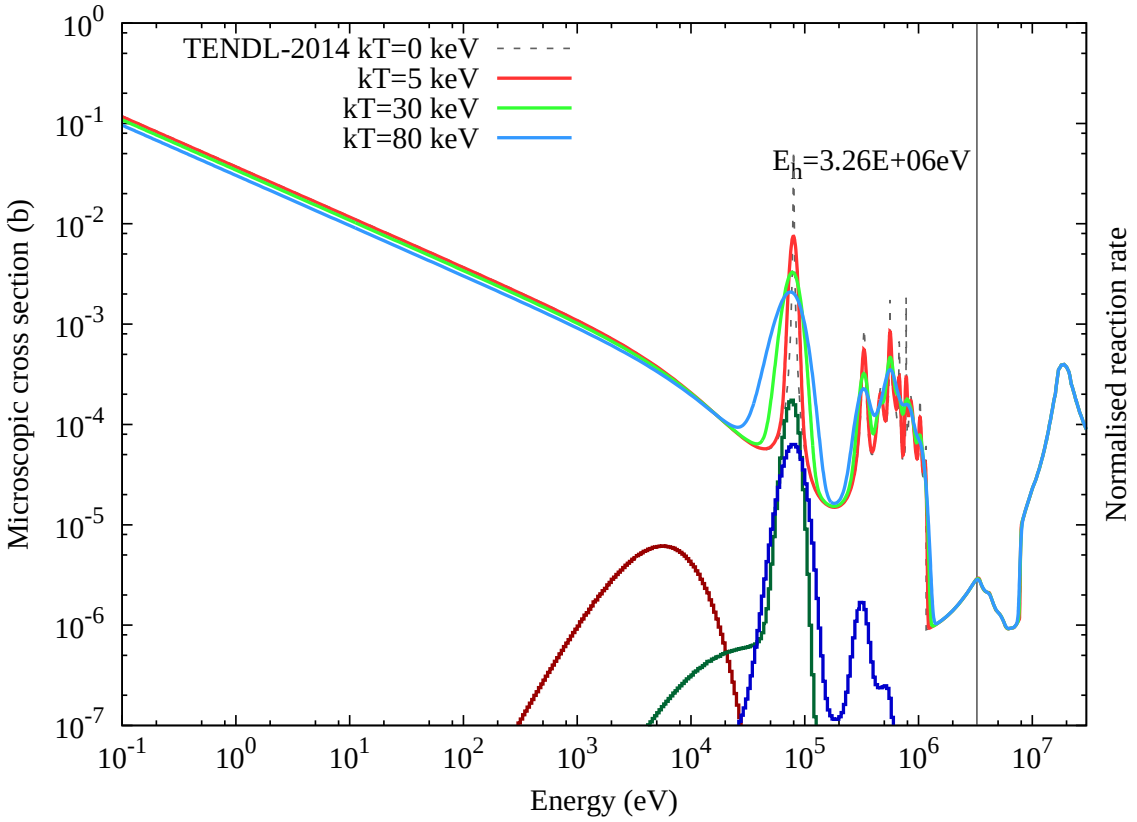


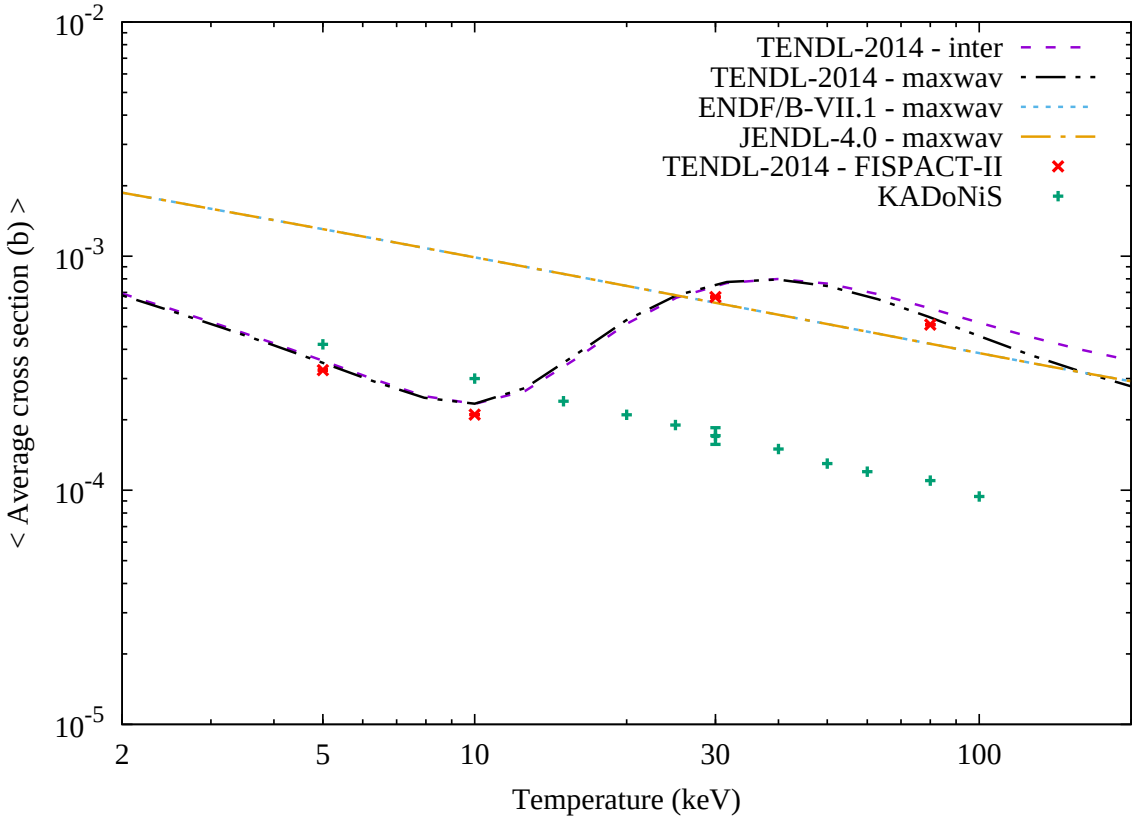
$^{34}S_{16}$ [Stable]



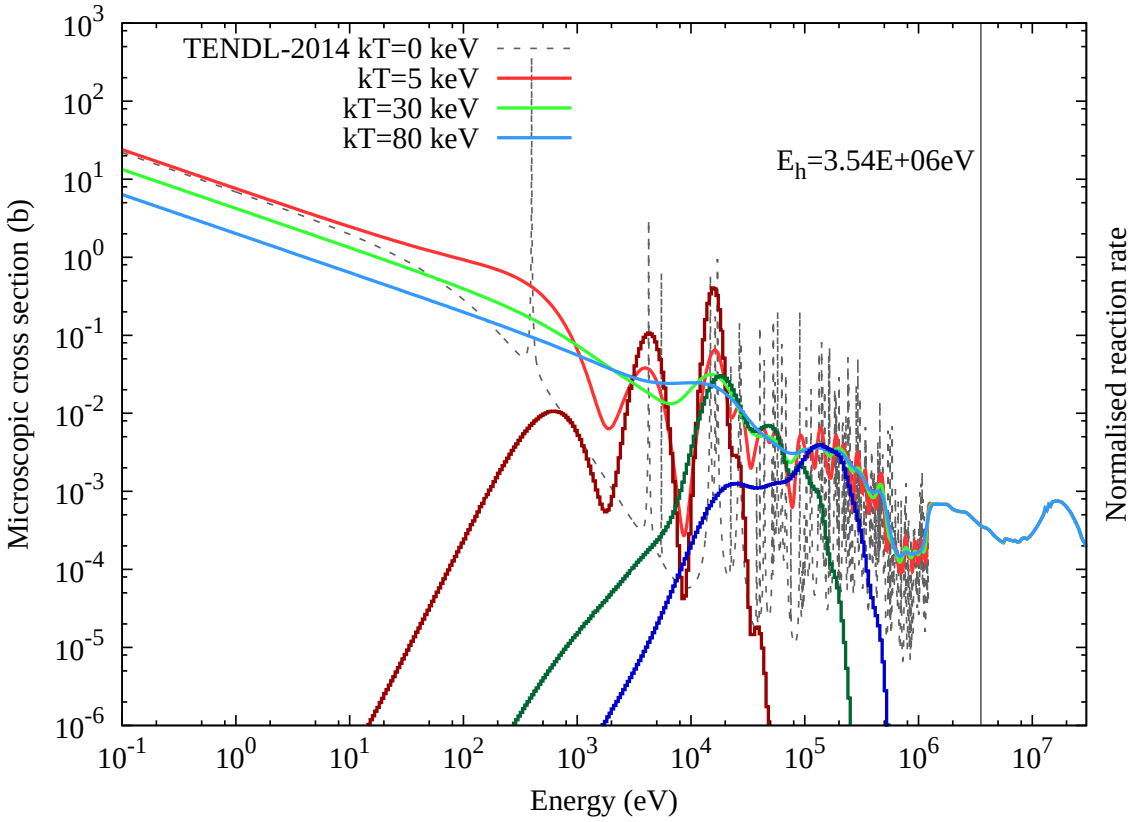


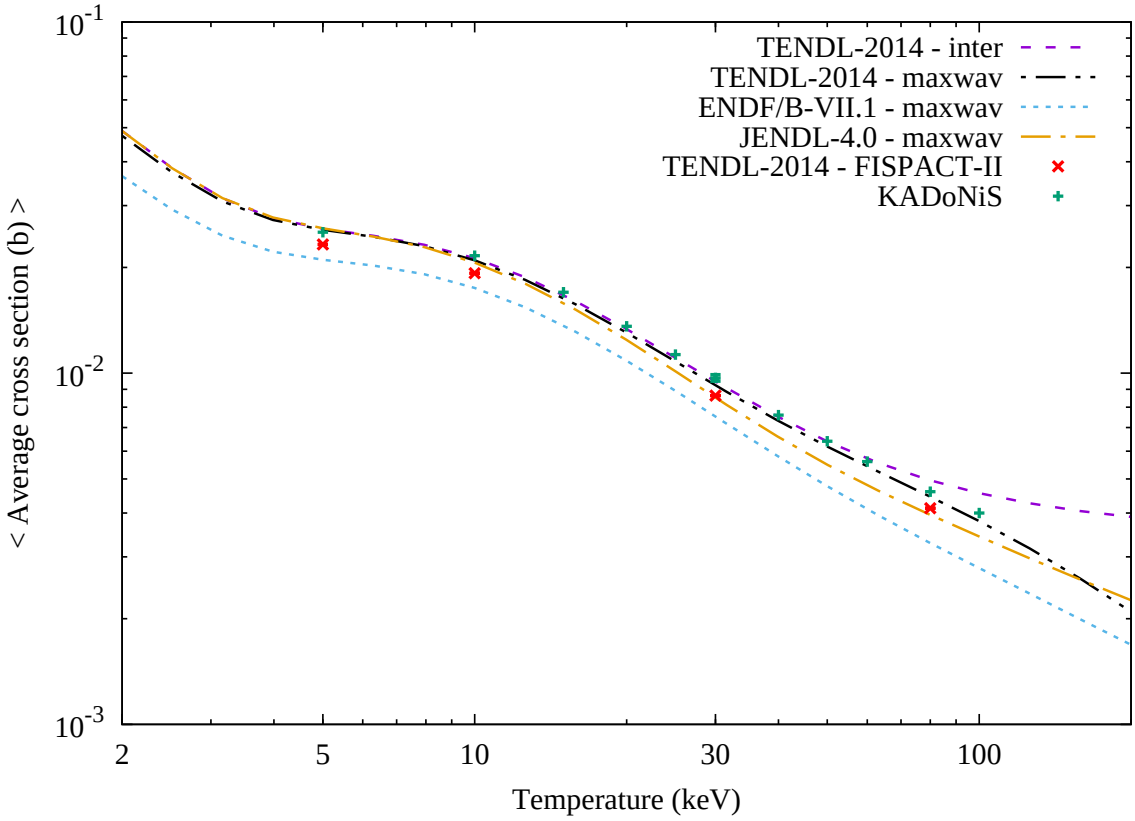
$^{36}S_{16}$ [Stable]



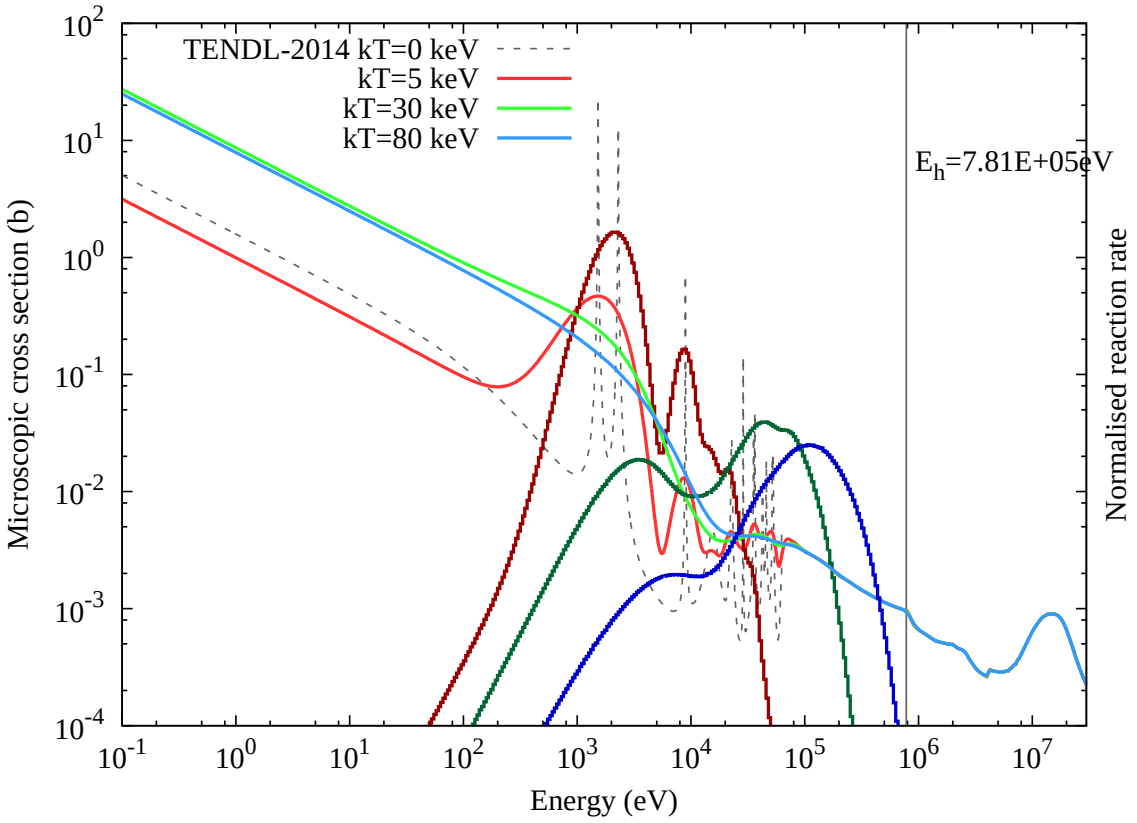


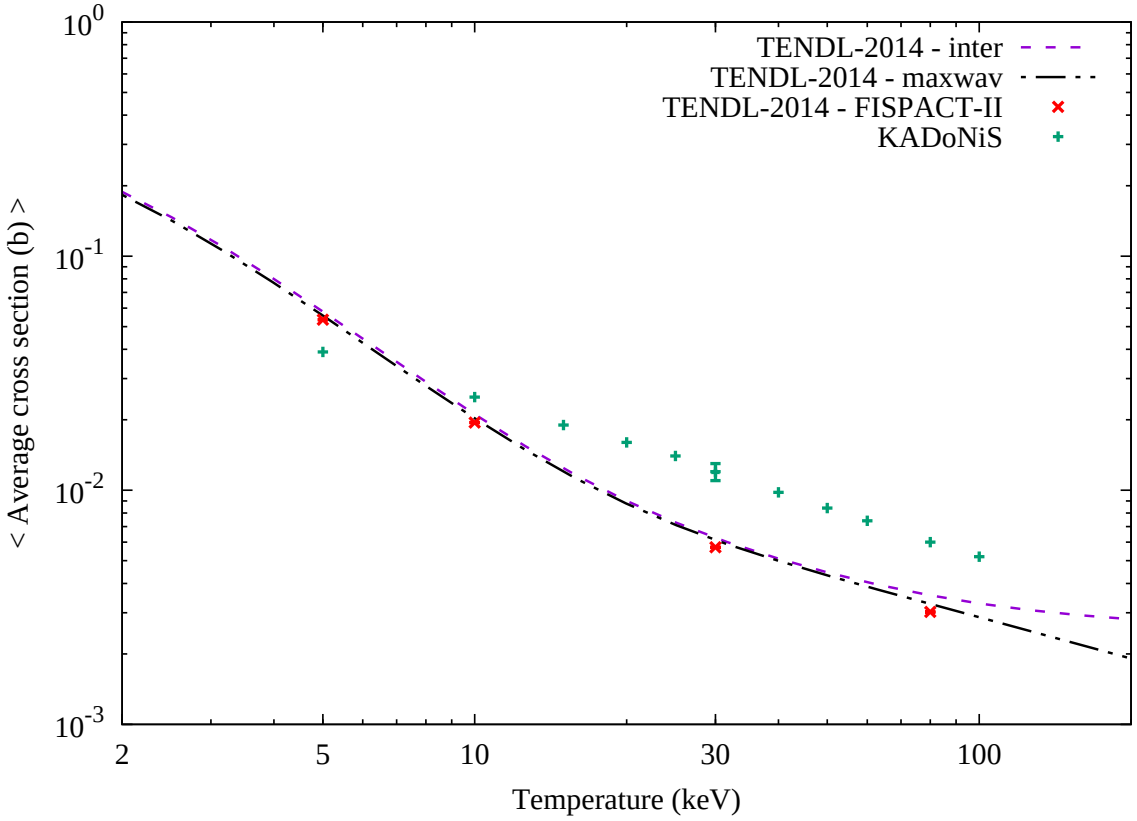
$^{35}Cl_{17}$ [Stable]



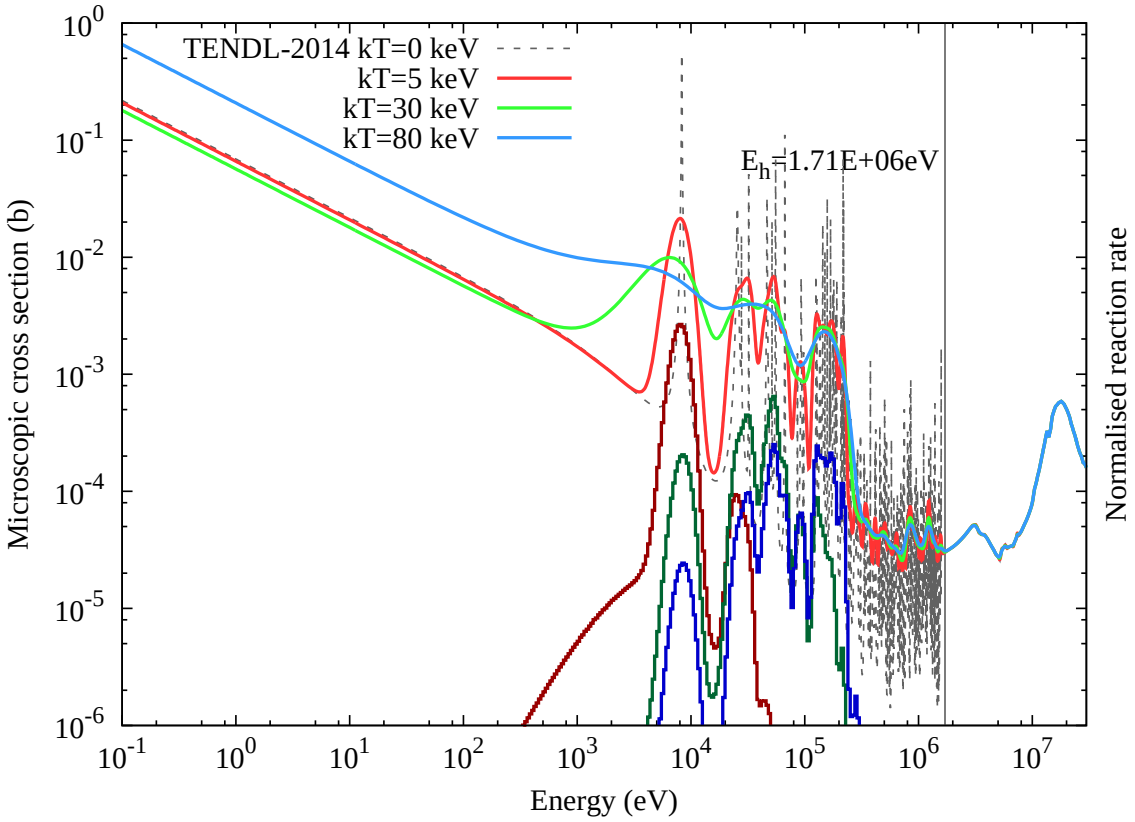


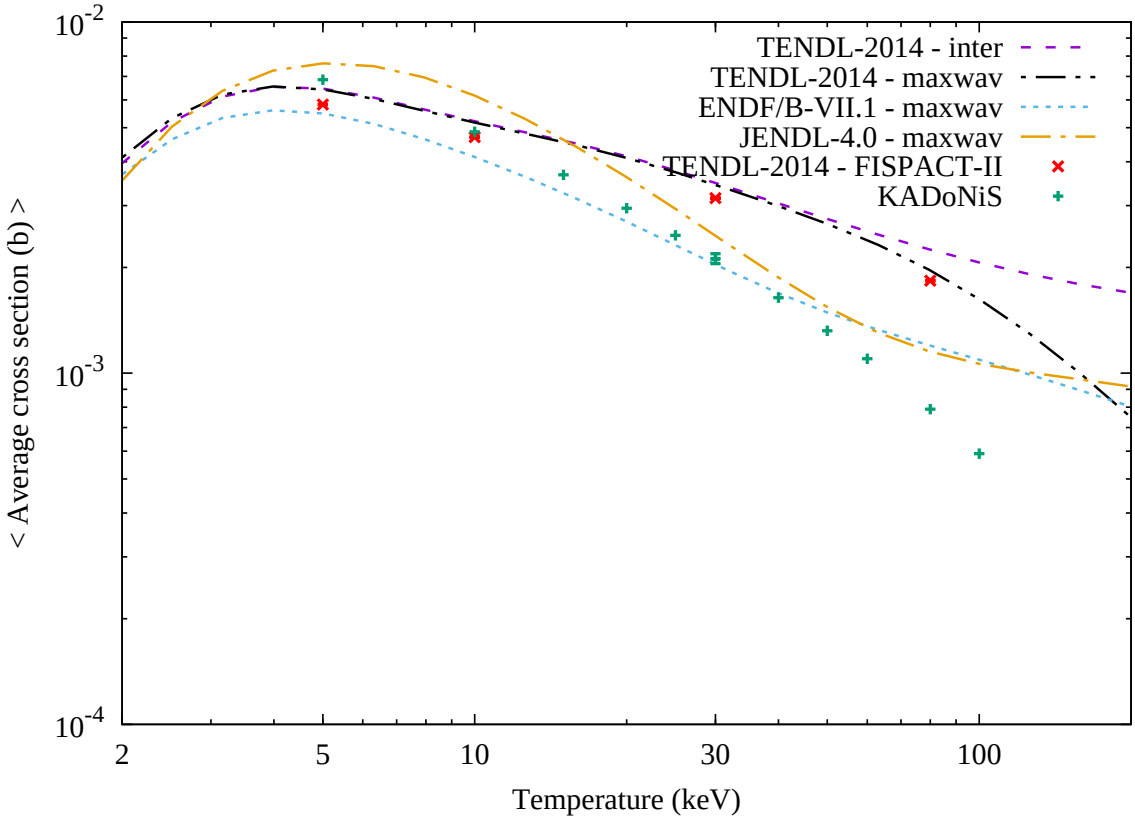
$^{36}Cl_{17}$ $[T_{1/2} = 3.01 \times 10^5$ years] (KADoNiS=SMC)



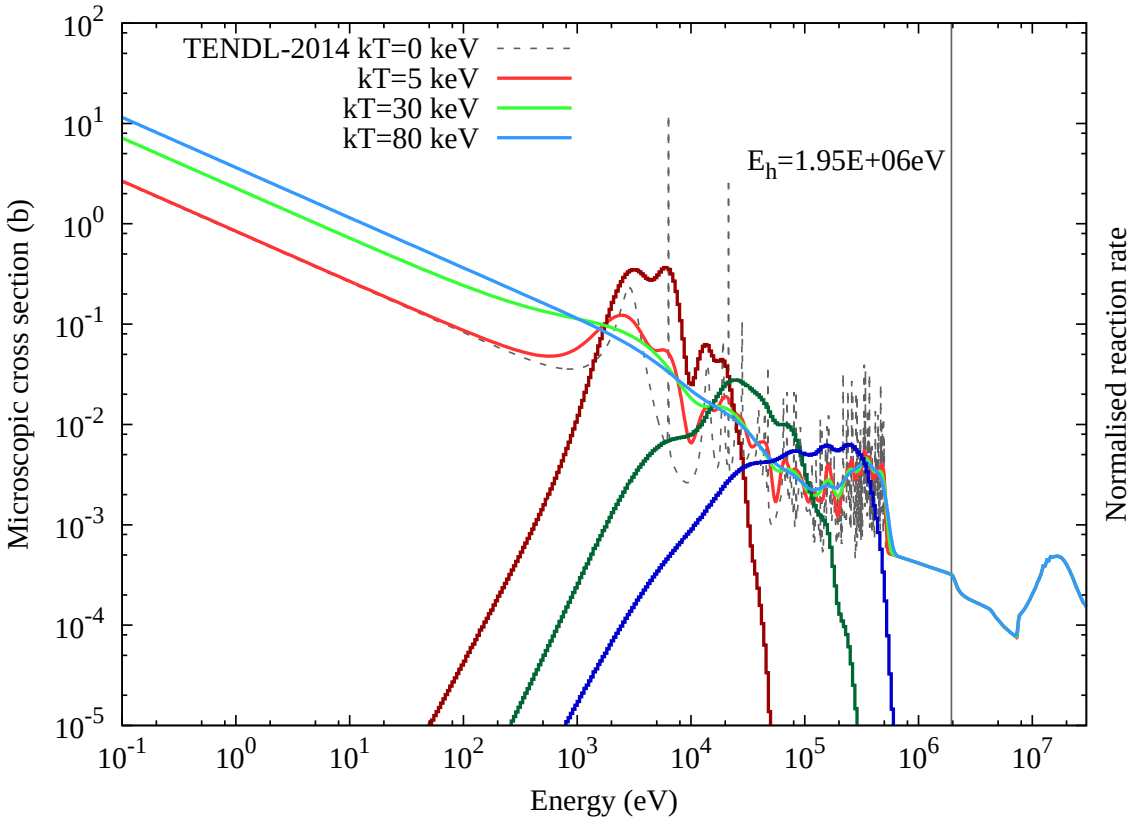


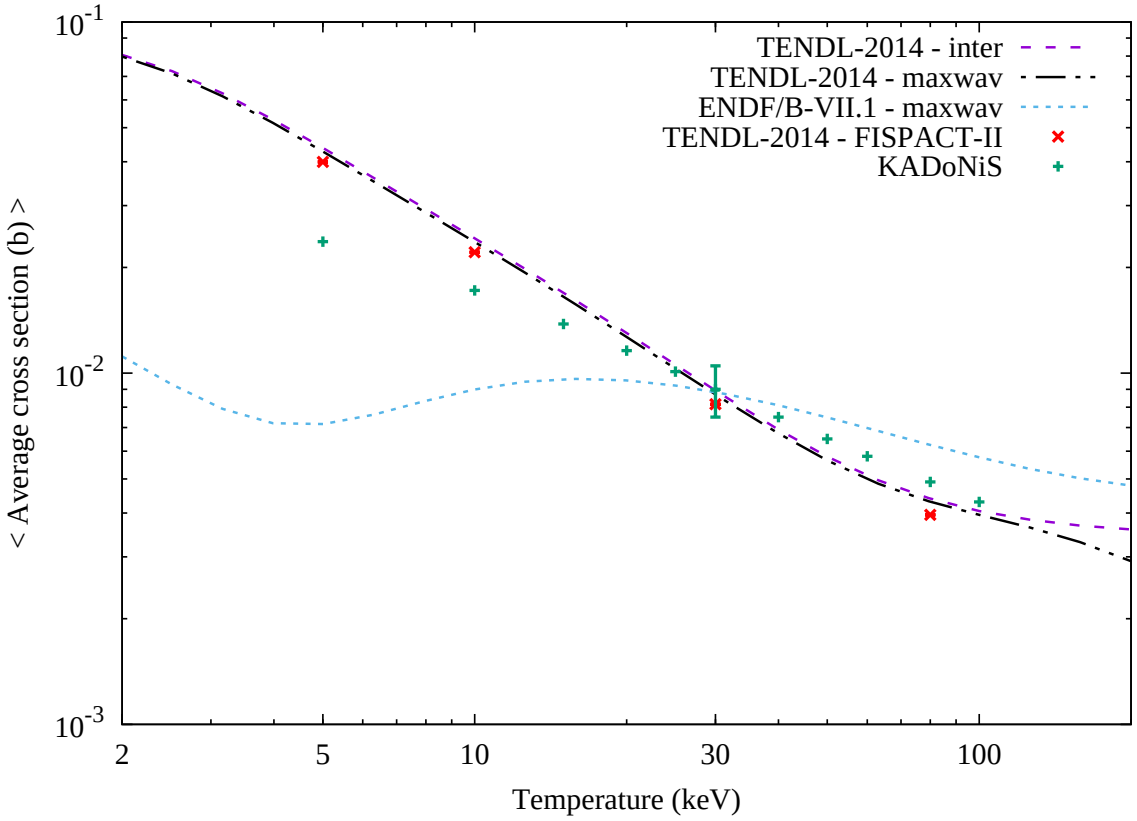
$^{37}Cl_{17}$ [Stable]



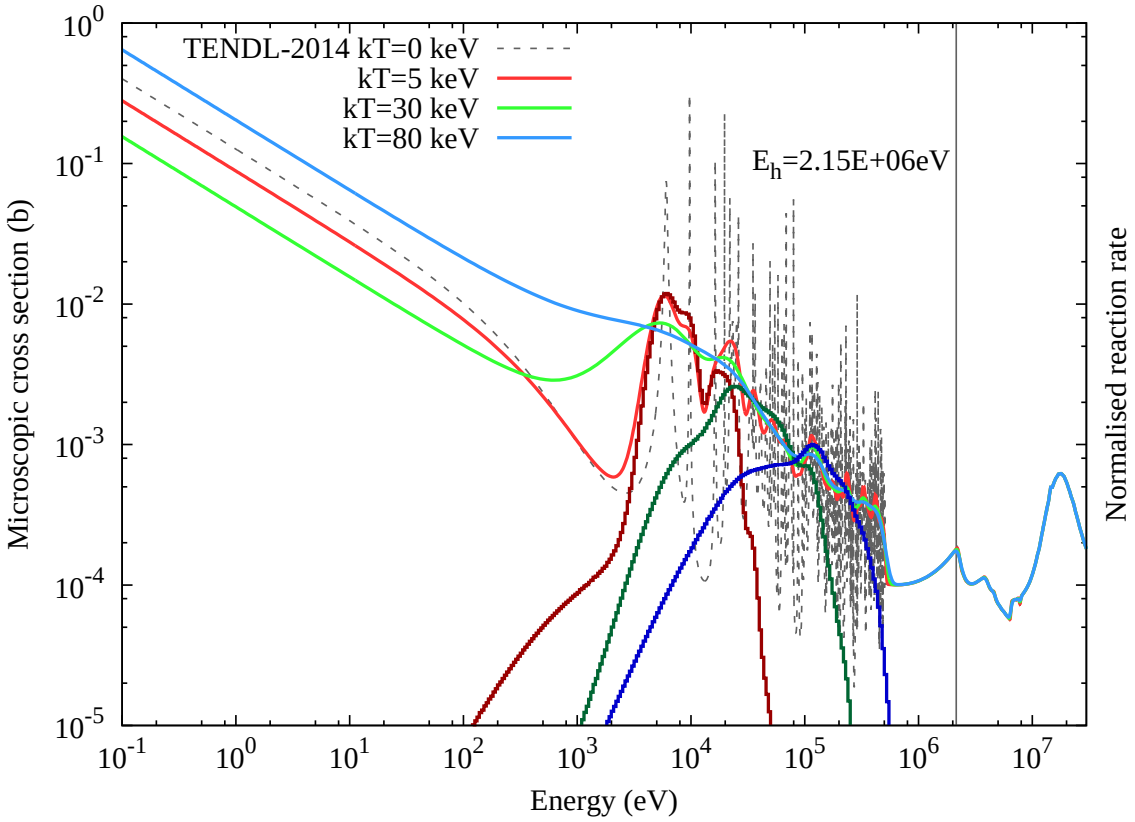


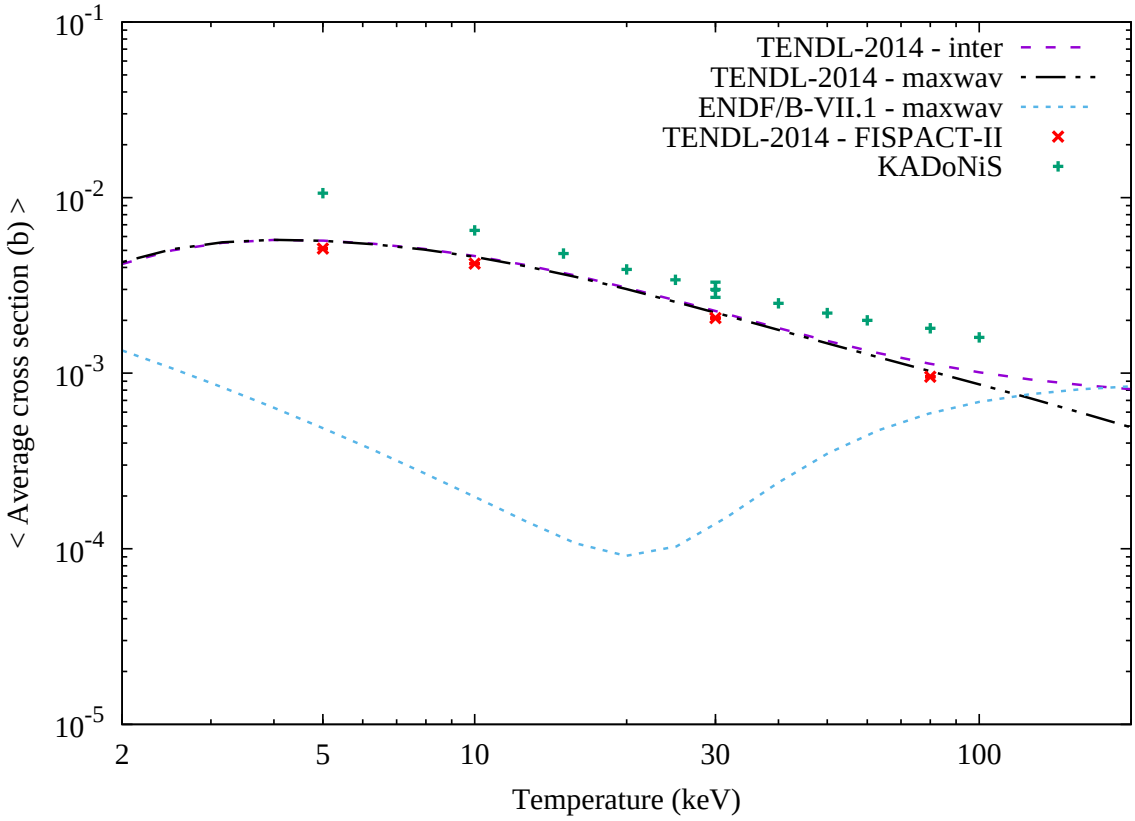
$^{36}Ar_{18}$ [Stable] (KADoNiS=SMC)



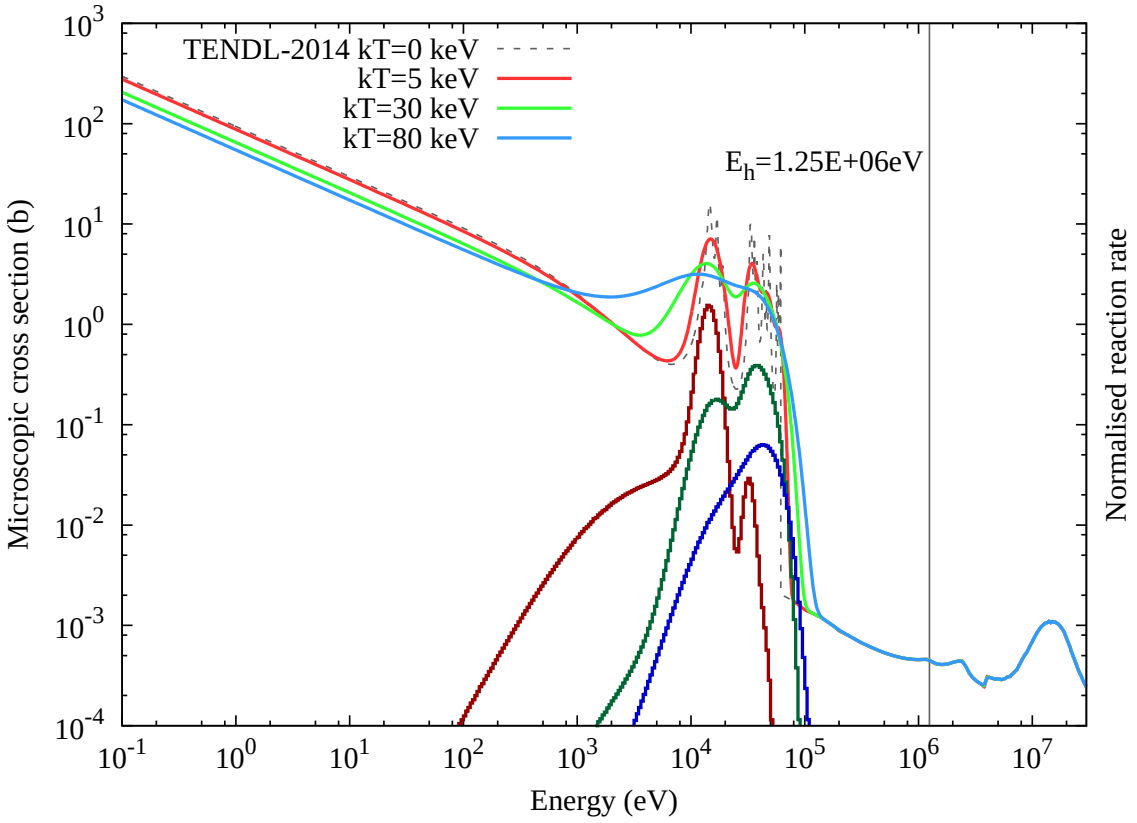


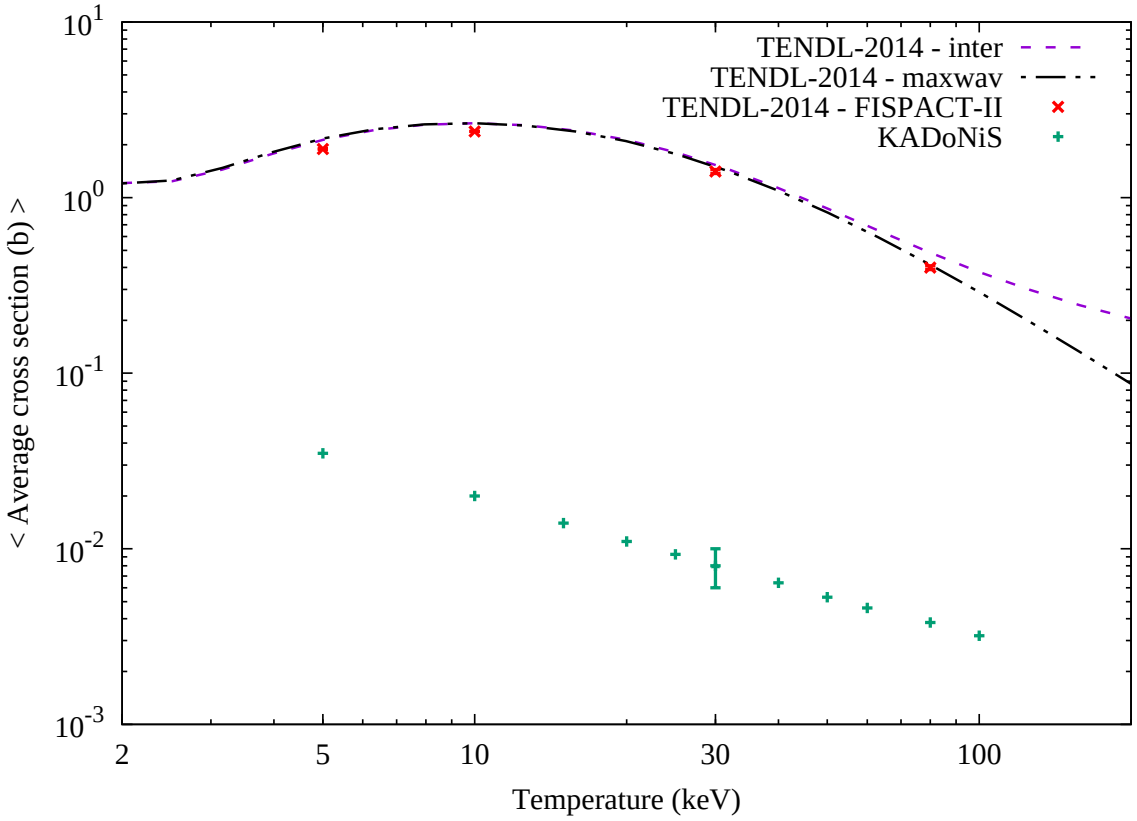
$^{38}Ar_{18}$ [Stable] (KADoNiS=SMC)



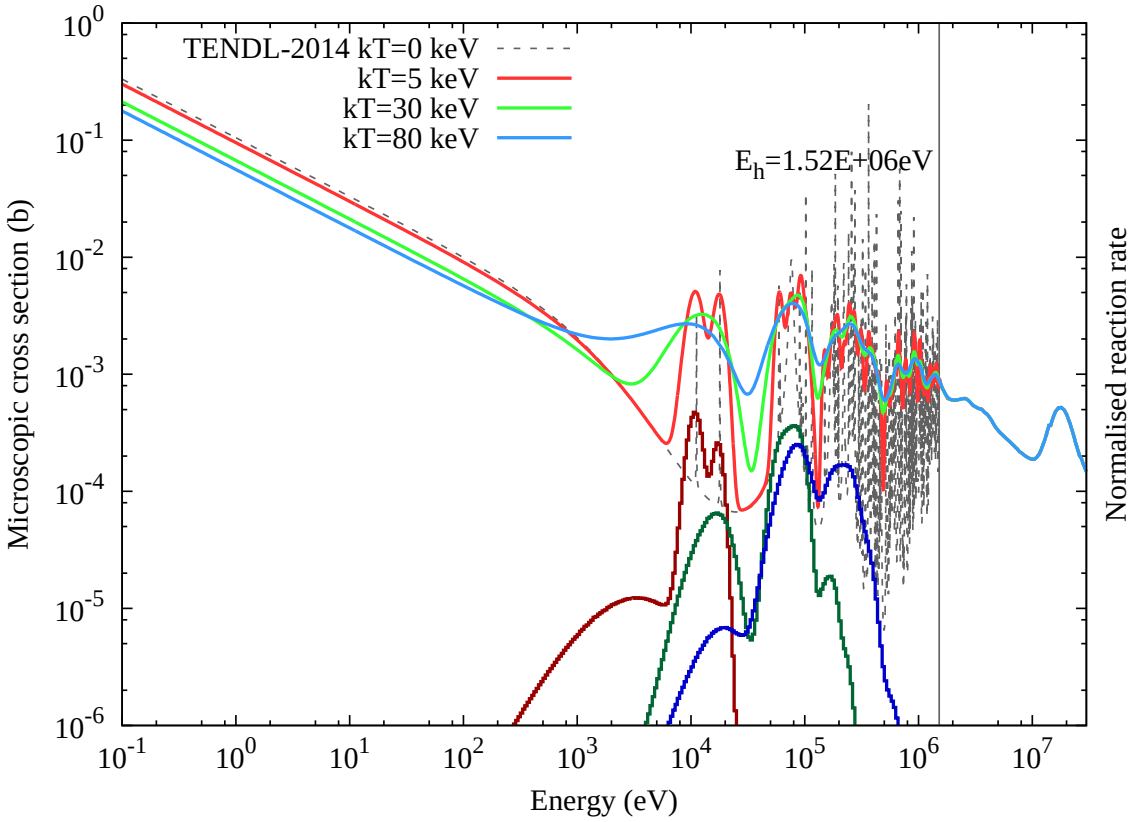


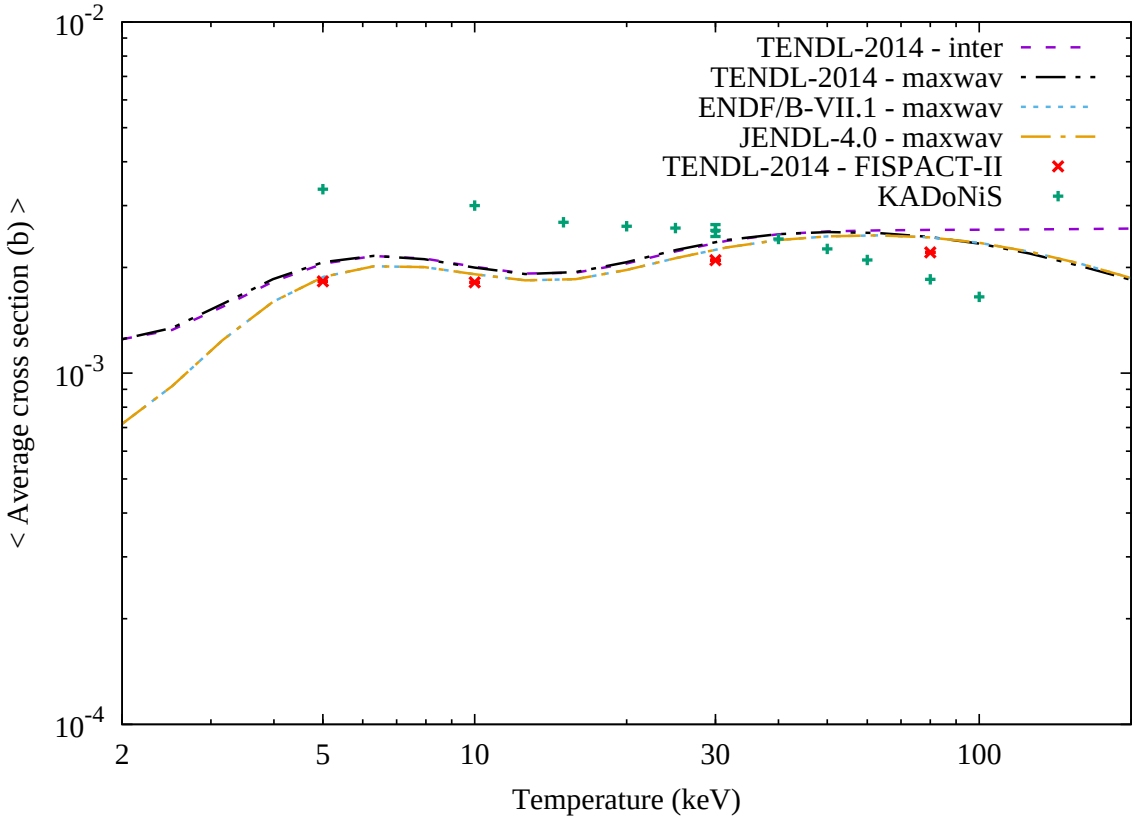
$^{39}Ar_{18}$ $[T_{1/2} = 269.00$ years$]$ (KADoNiS=SMC)



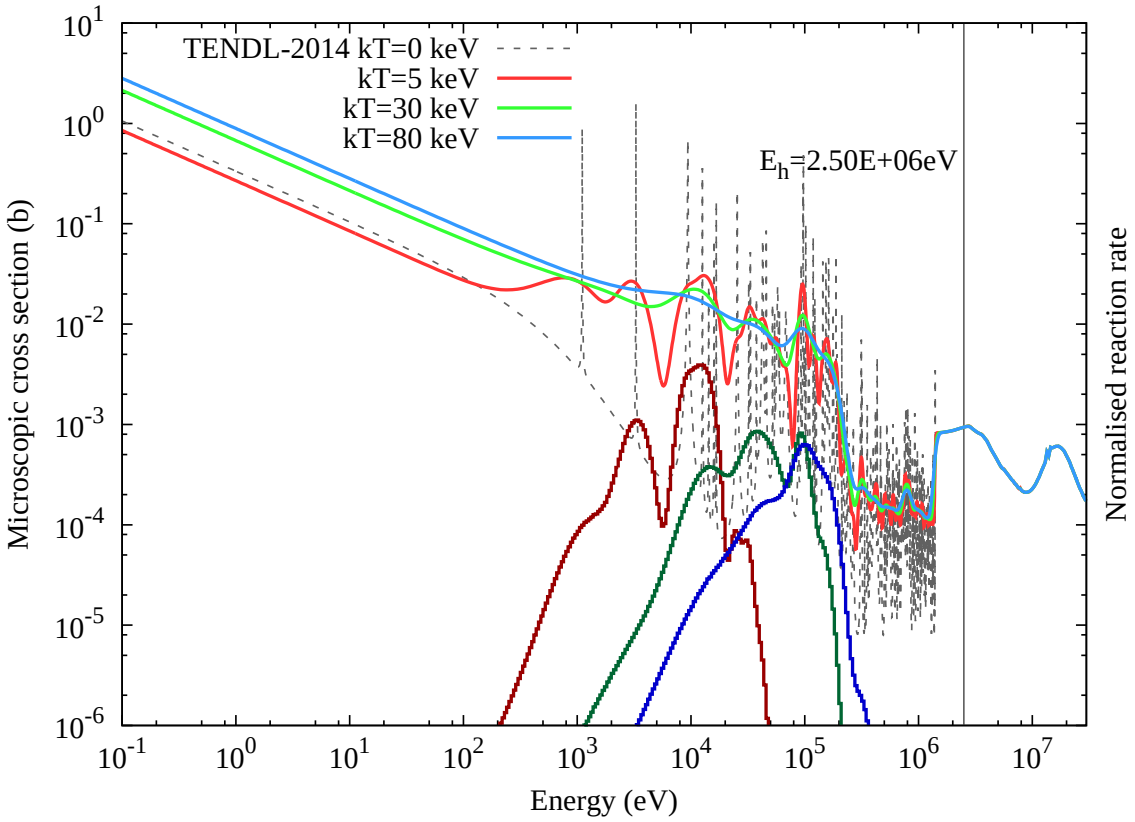


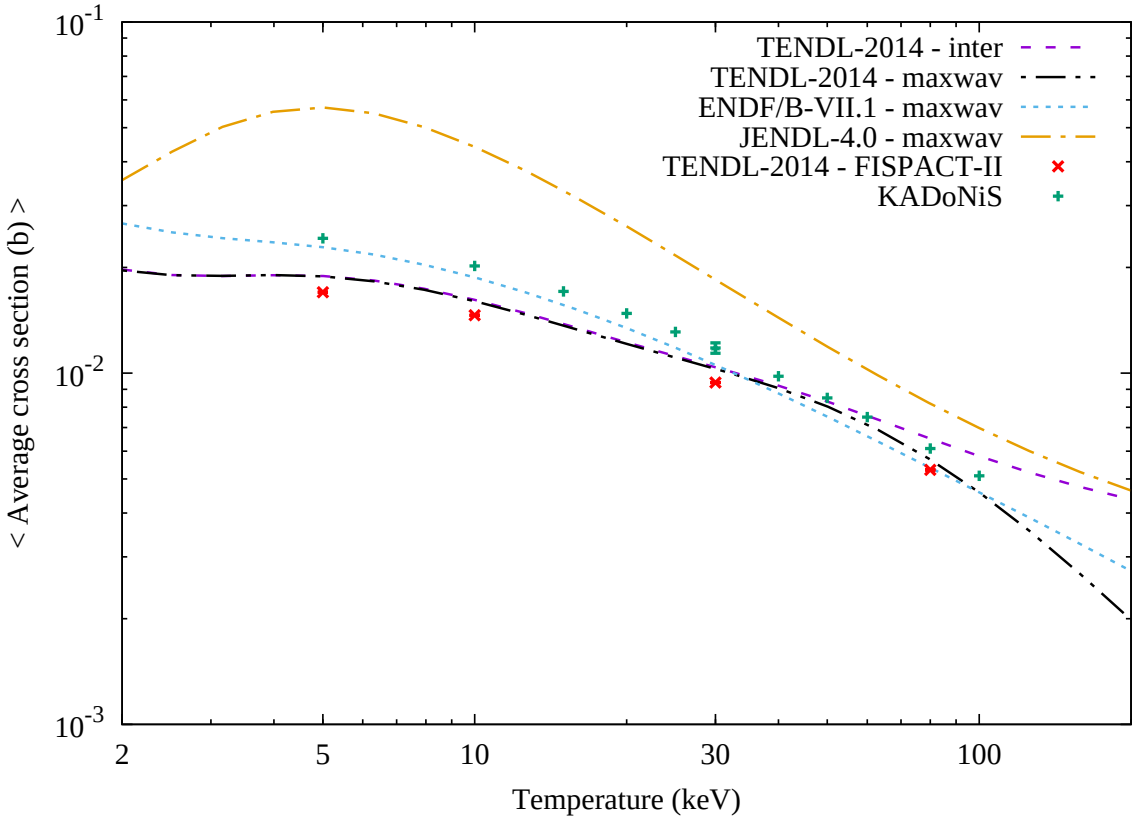
$^{40}Ar_{18}$ [Stable]



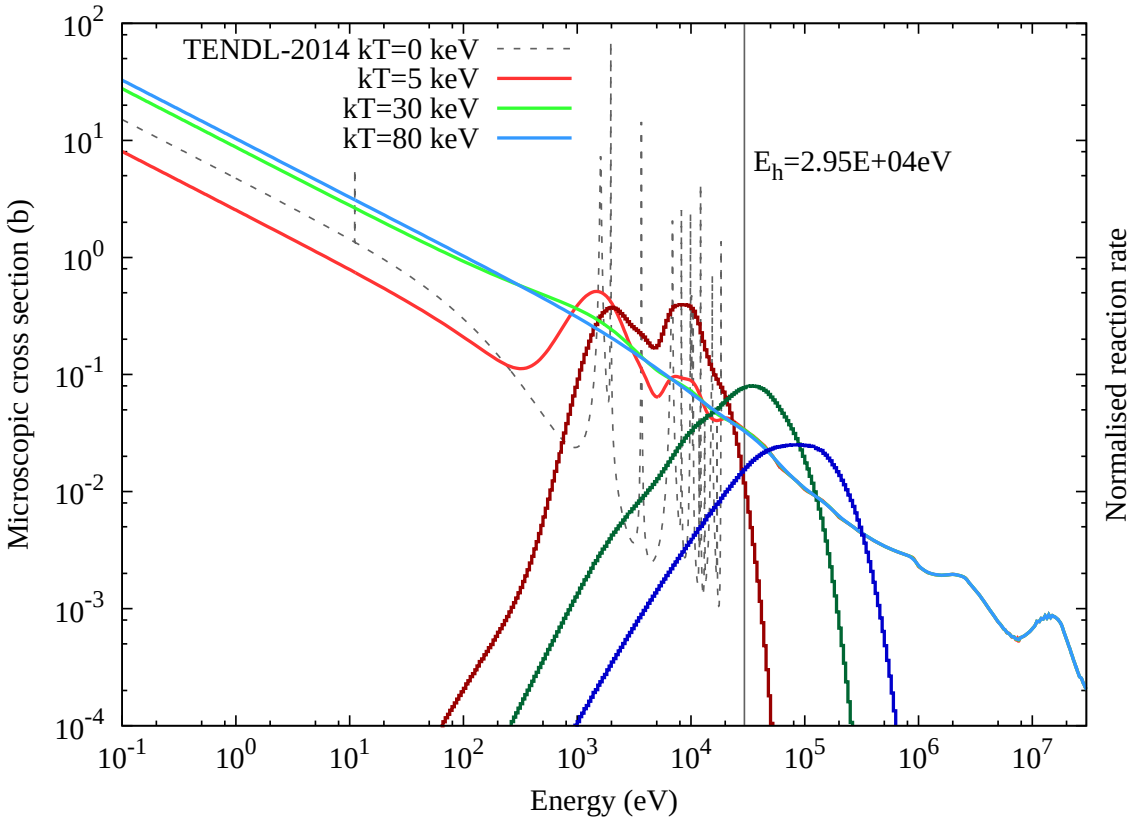


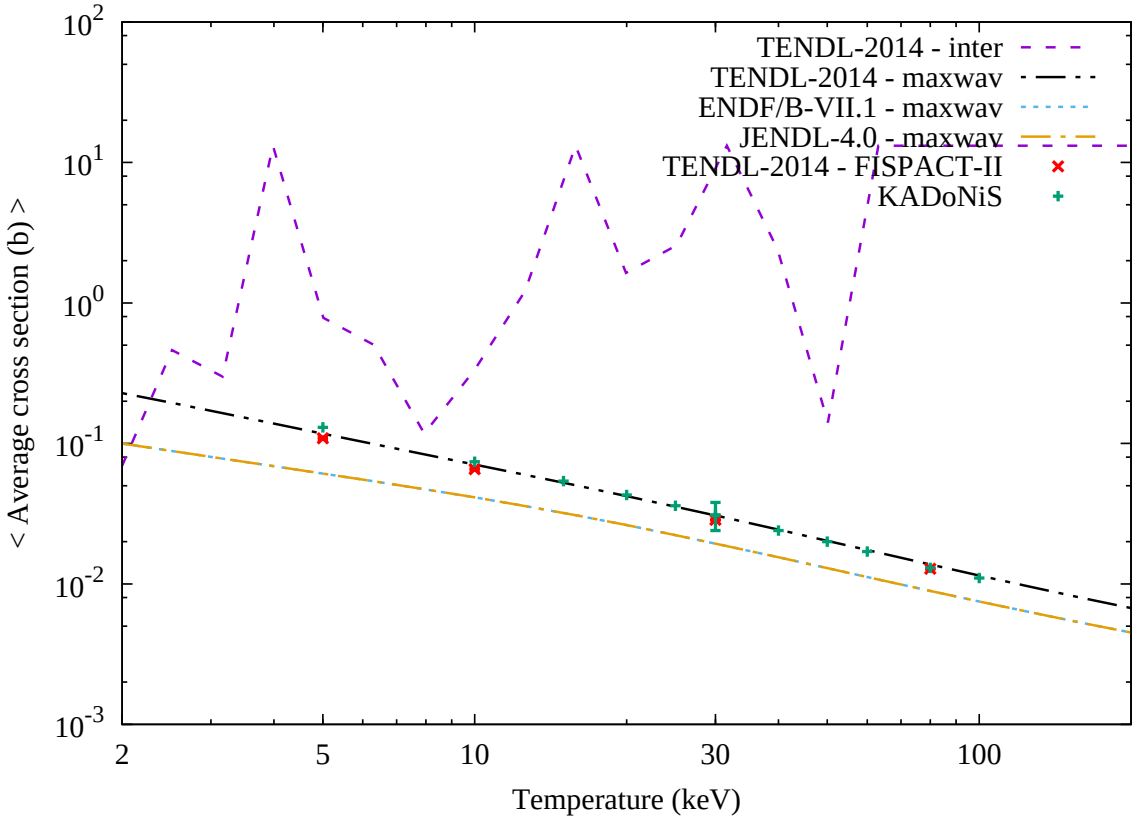
$^{39}K_{19}$ [Stable]



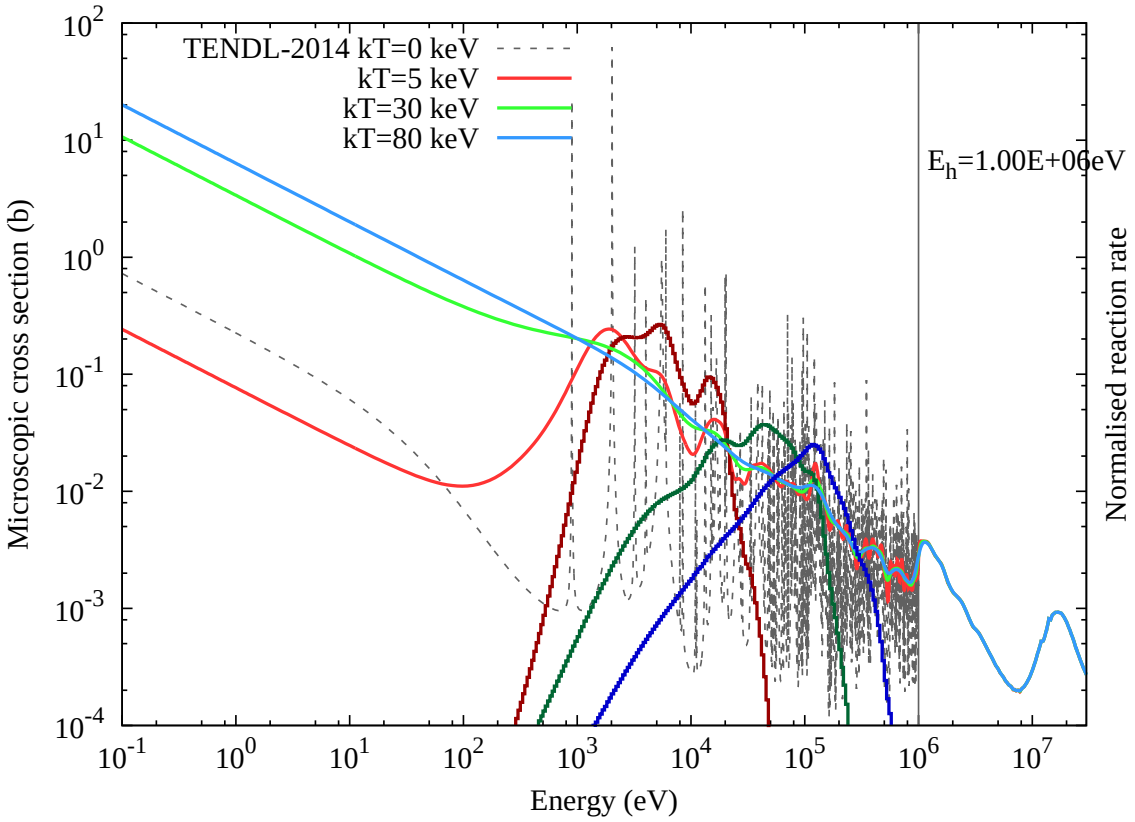


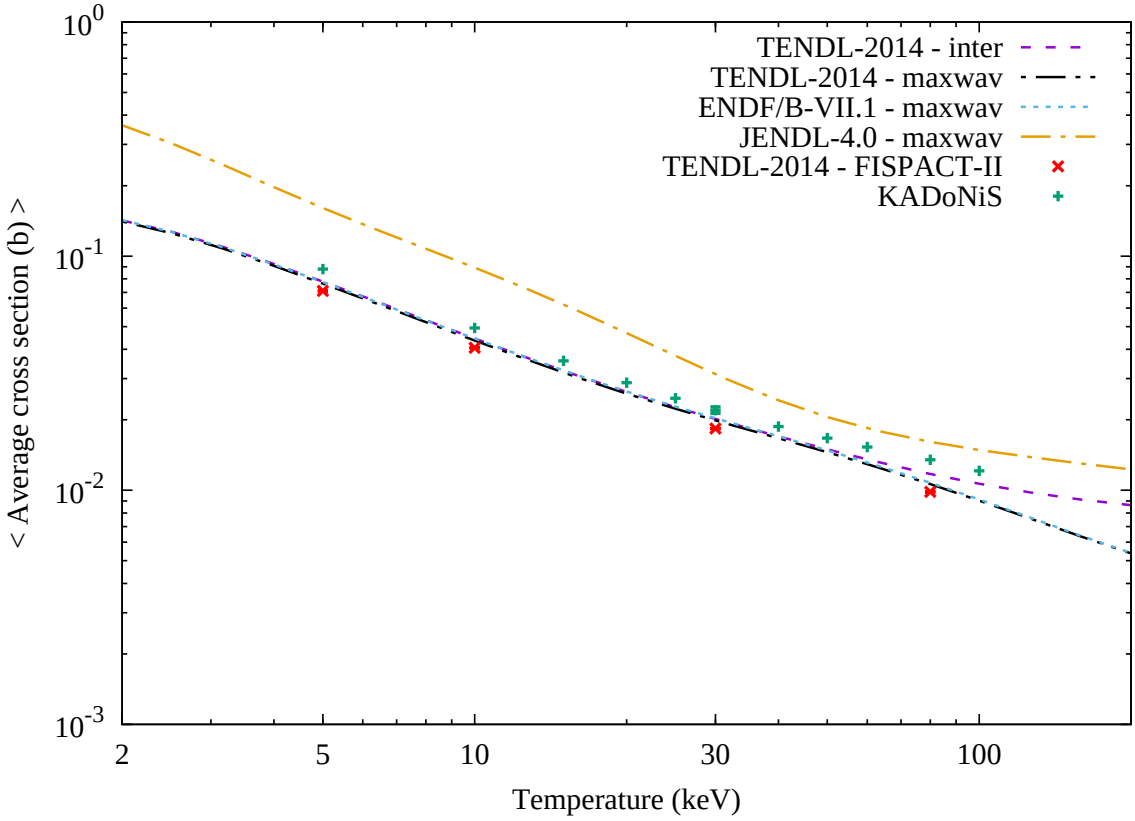
$^{40}K_{19}$ $[T_{1/2} = 1.26 \times 10^9$ years] (KADoNiS=SMC)



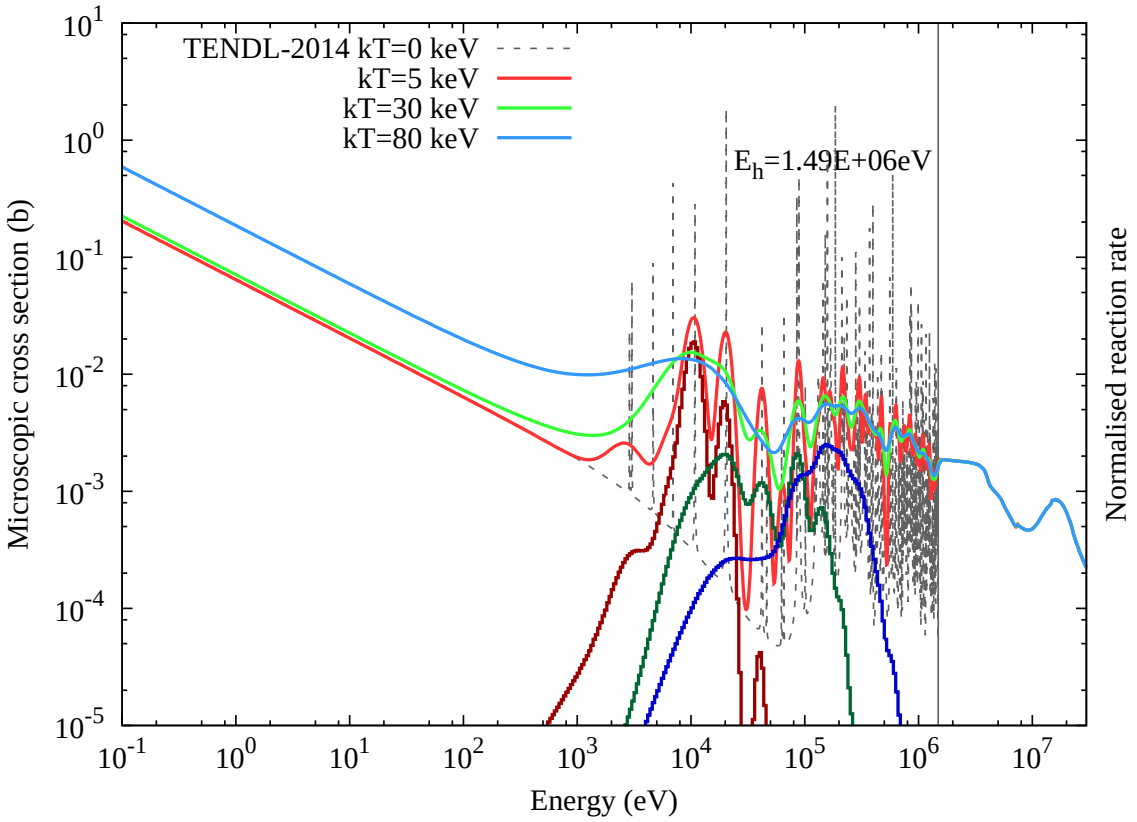


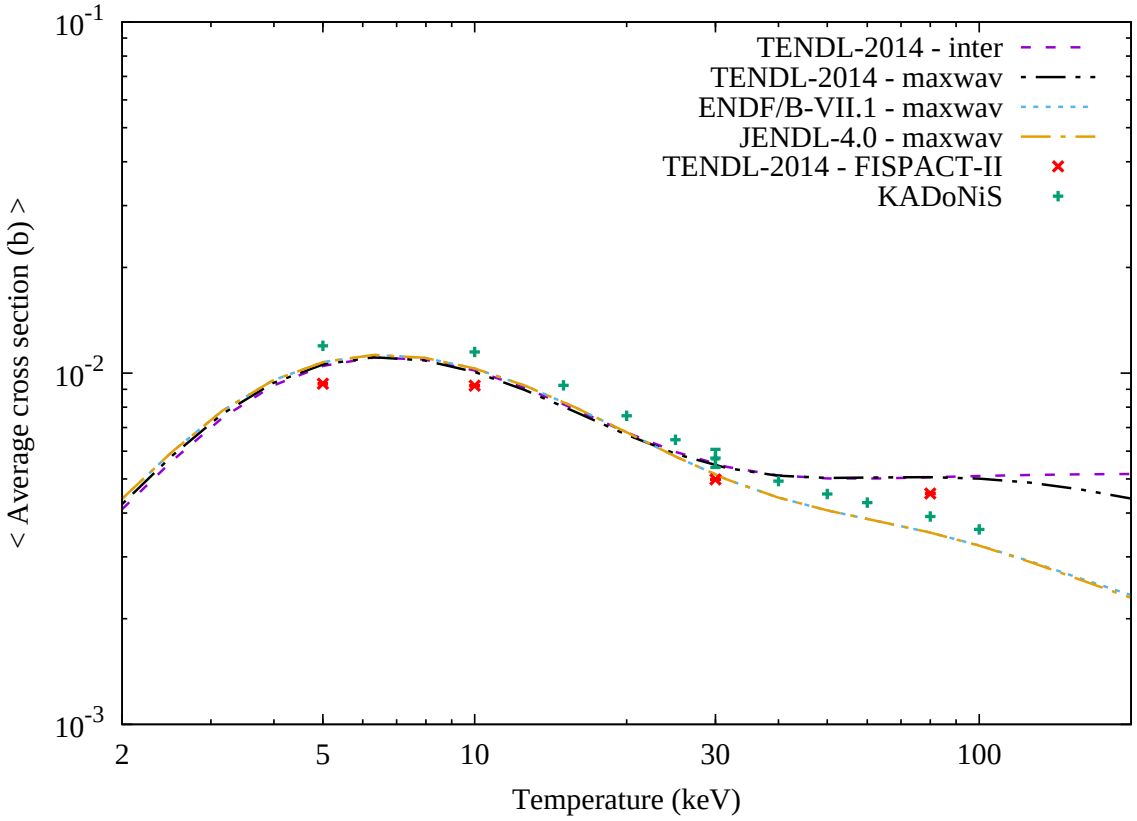
$^{41}K_{19}$ [Stable]



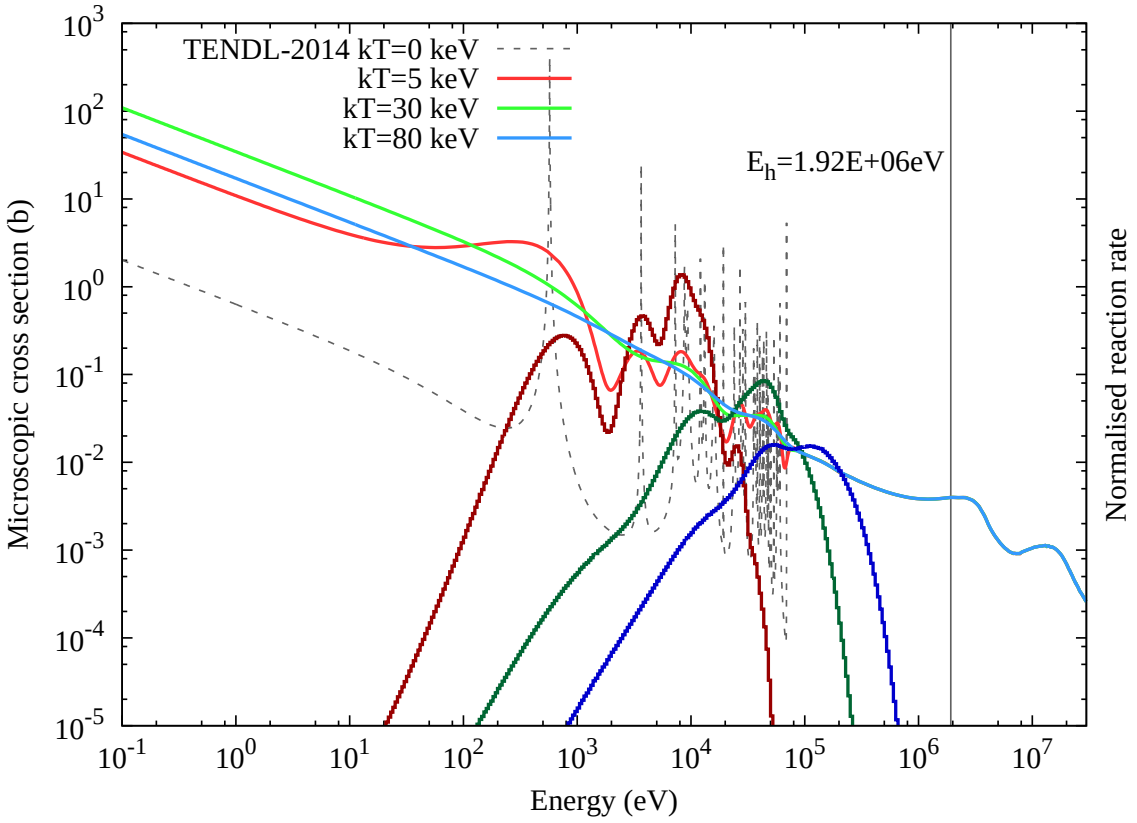


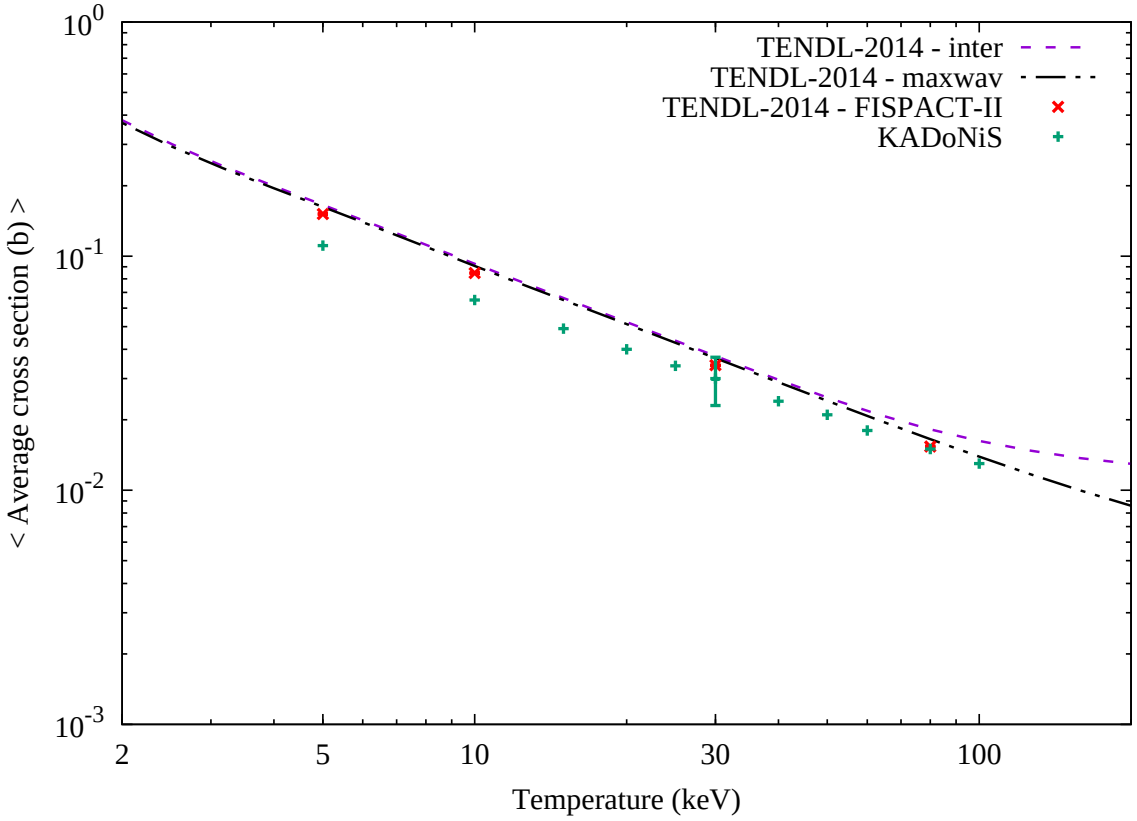
$^{40}Ca_{20}$ [Stable]



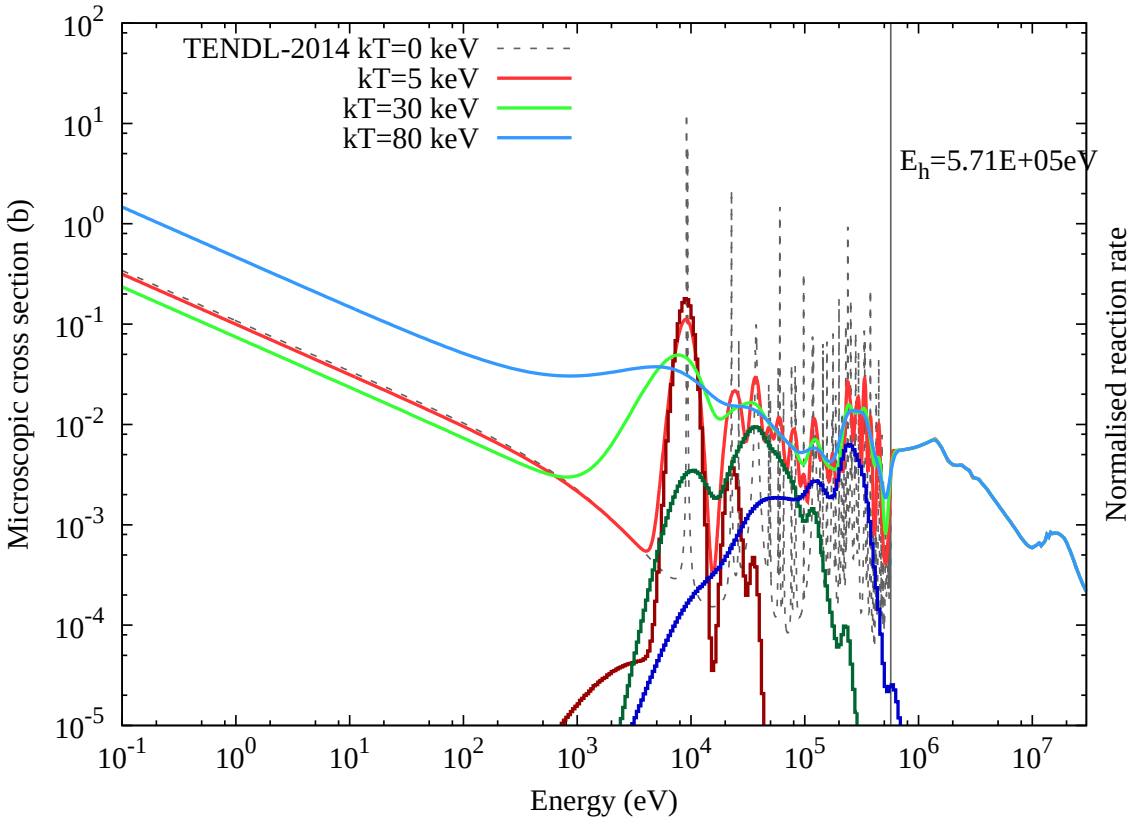


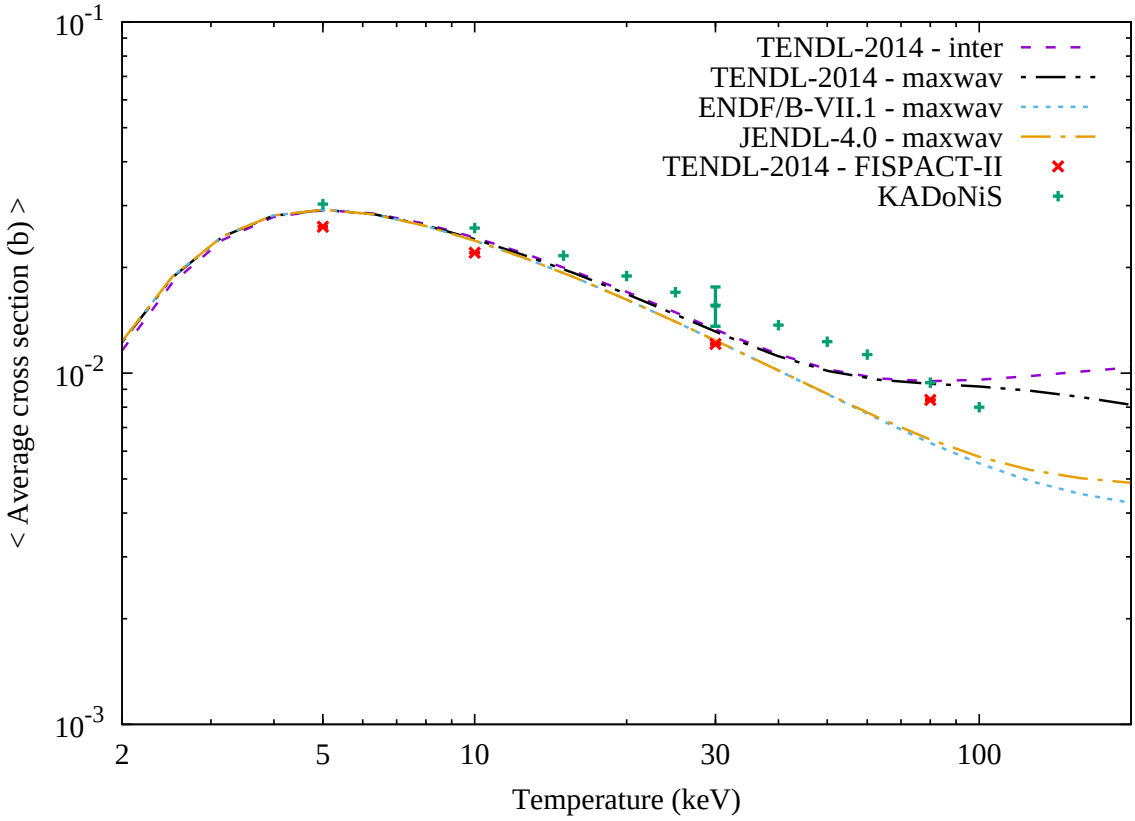
$^{41}Ca_{20}$ $[T_{1/2} = 1.03 \times 10^5$ years] (KADoNiS=SMC)



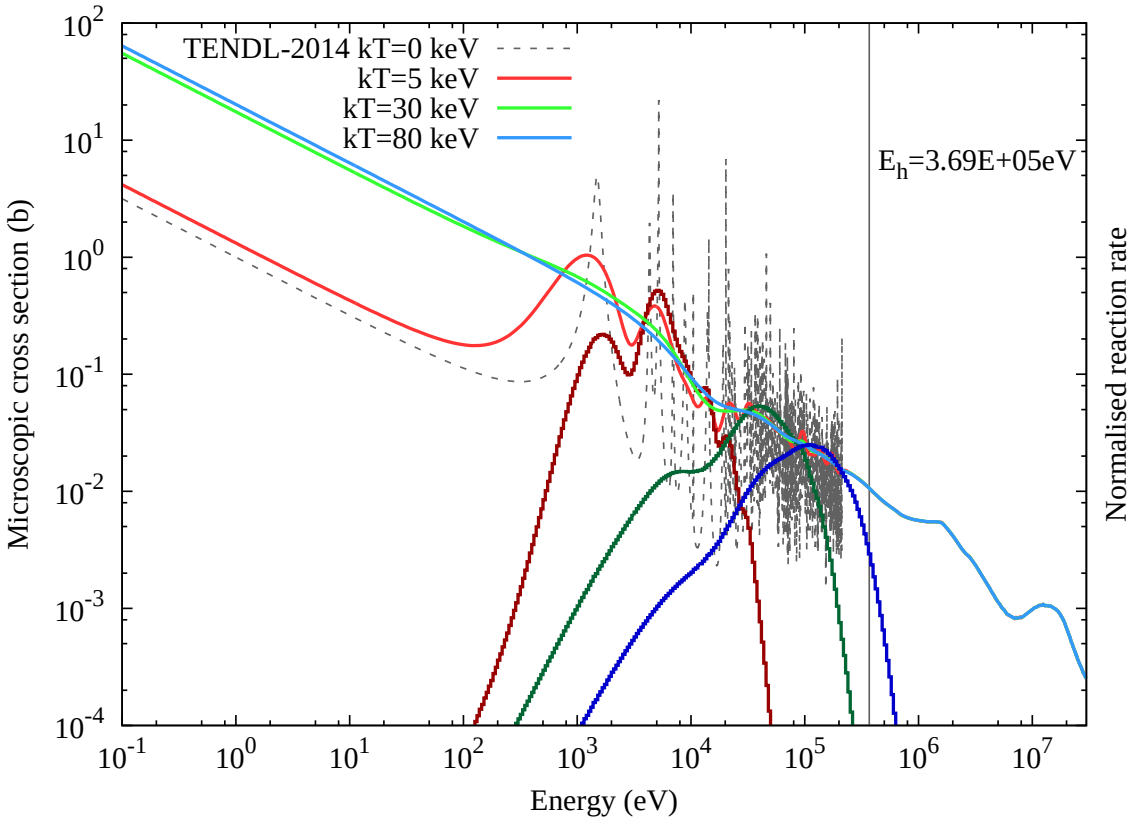


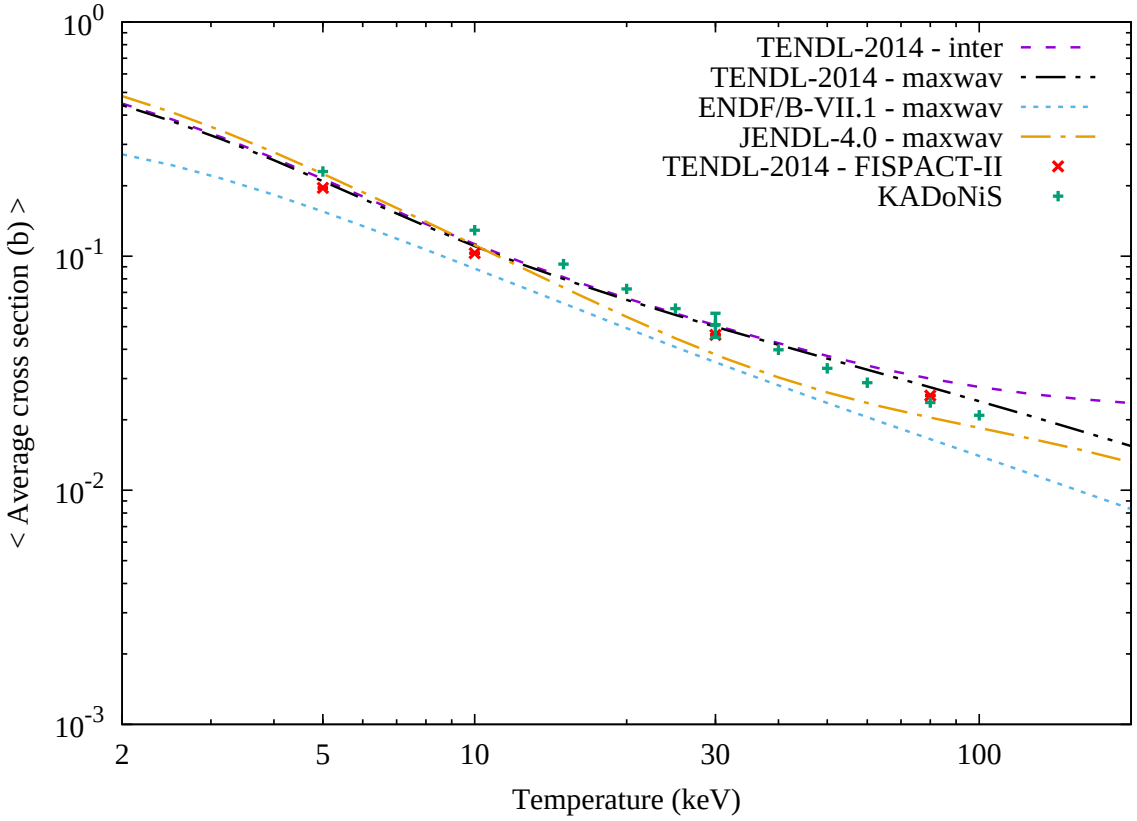
$^{42}Ca_{20}$ [Stable]



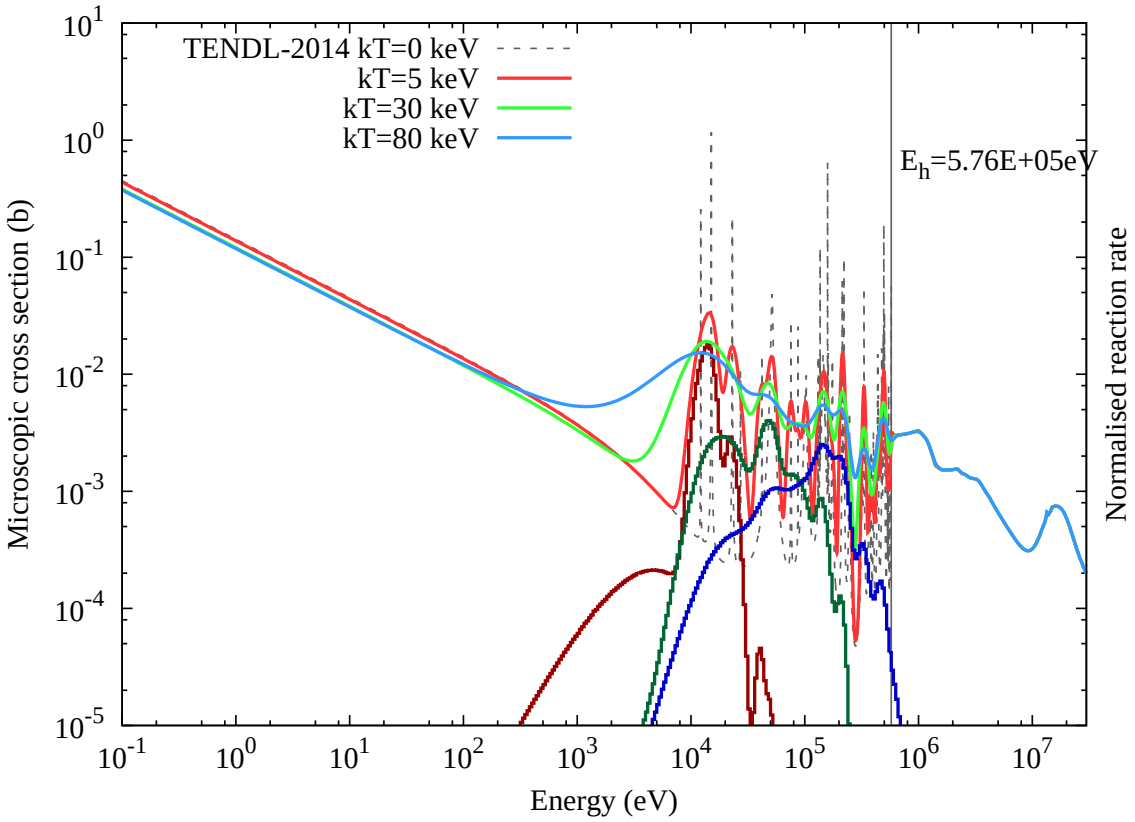


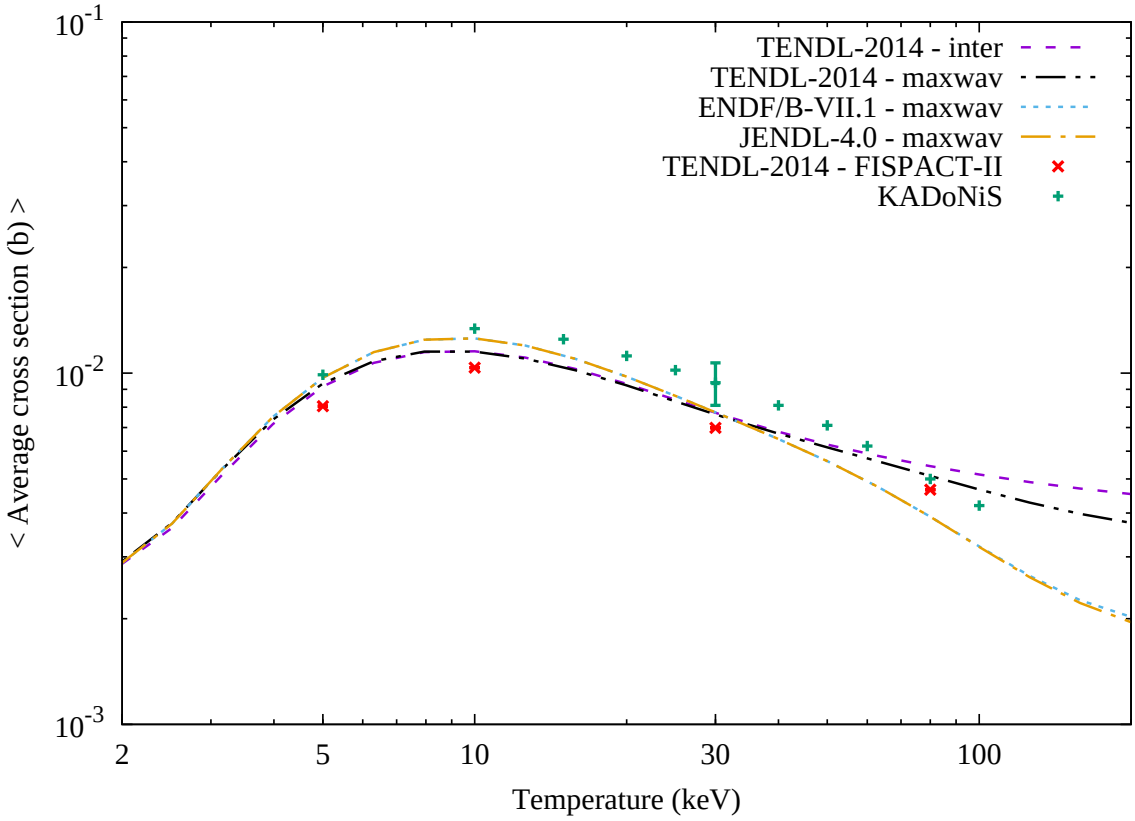
$^{43}Ca_{20}$ [Stable]



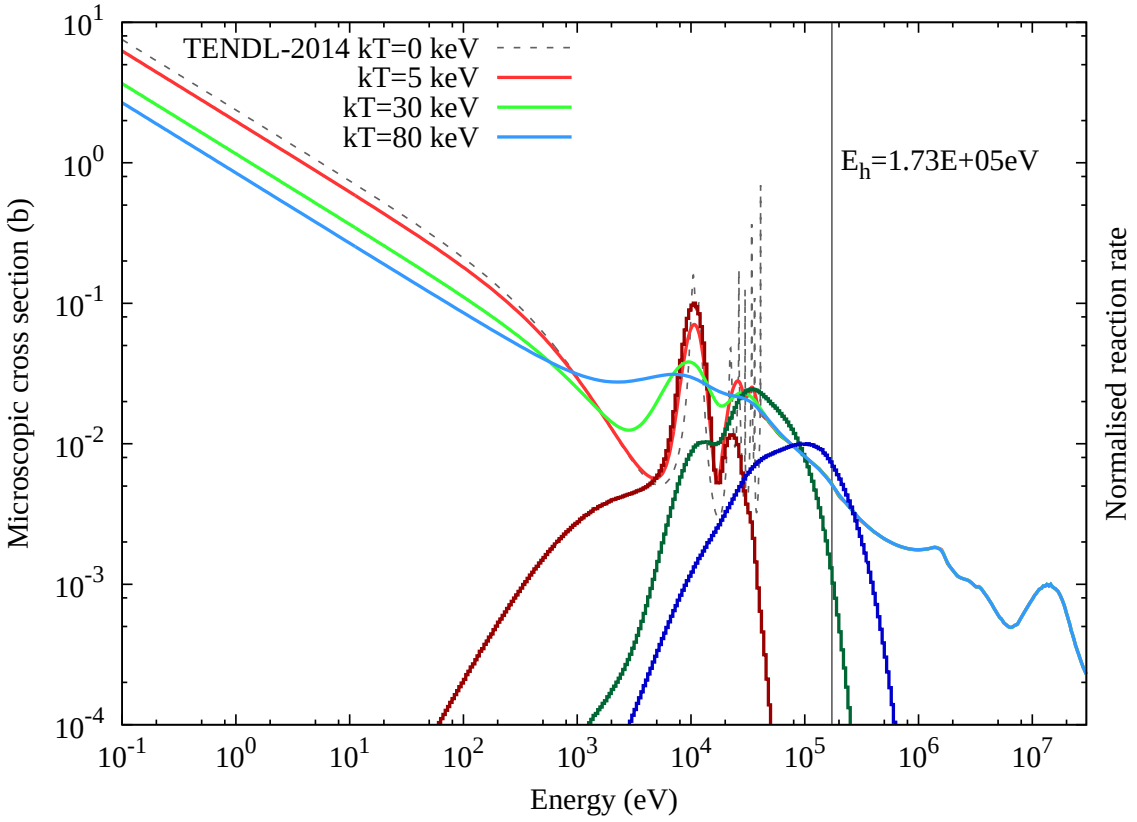


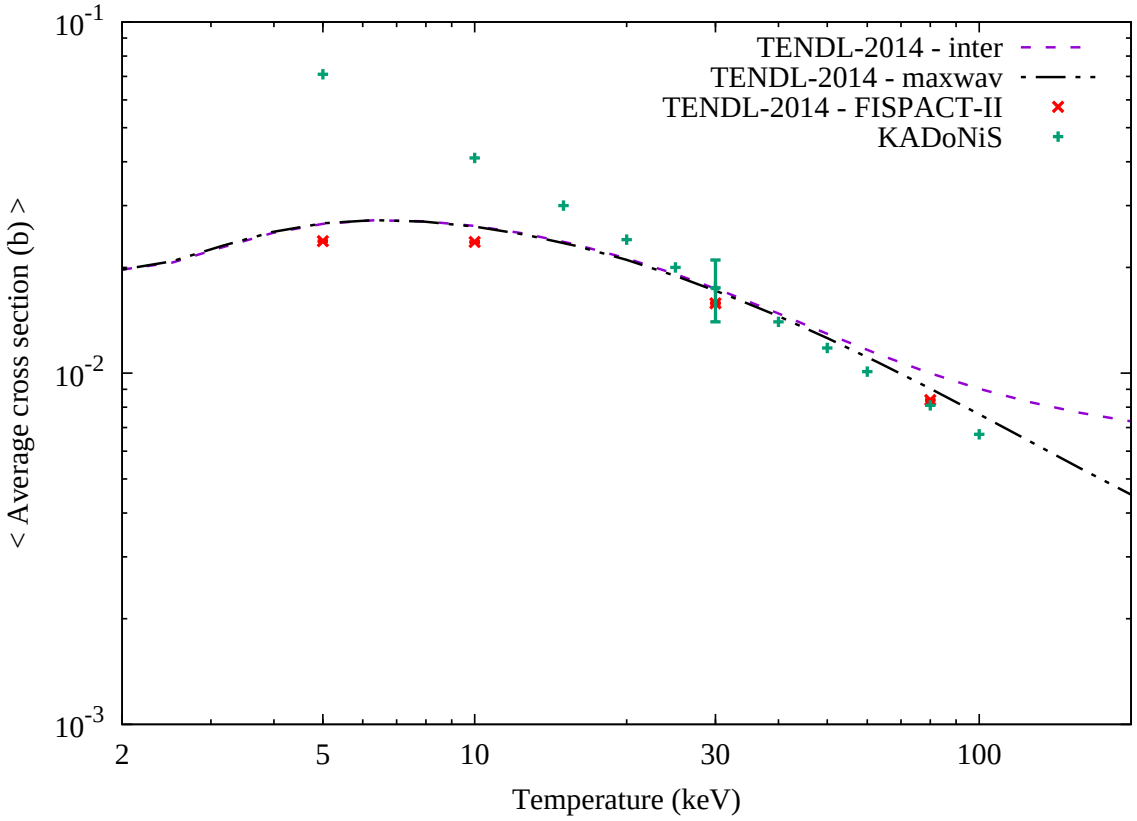
$^{44}Ca_{20}$ [Stable]



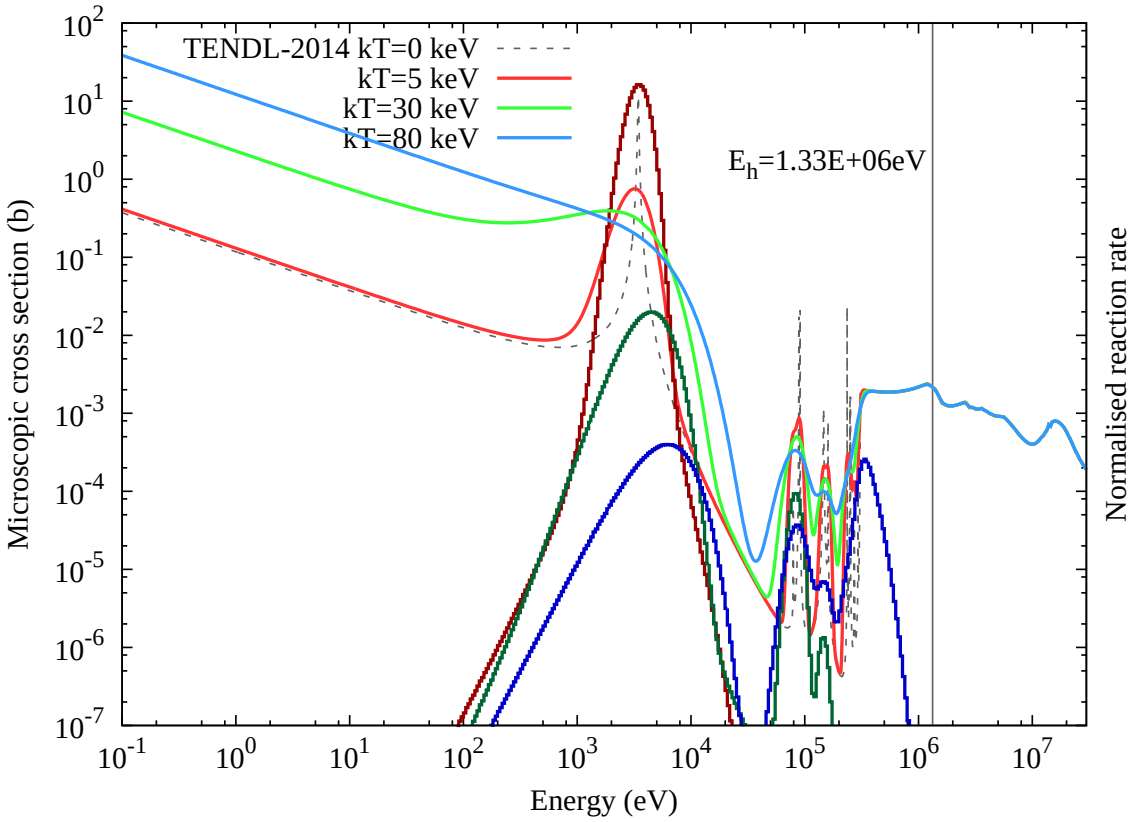


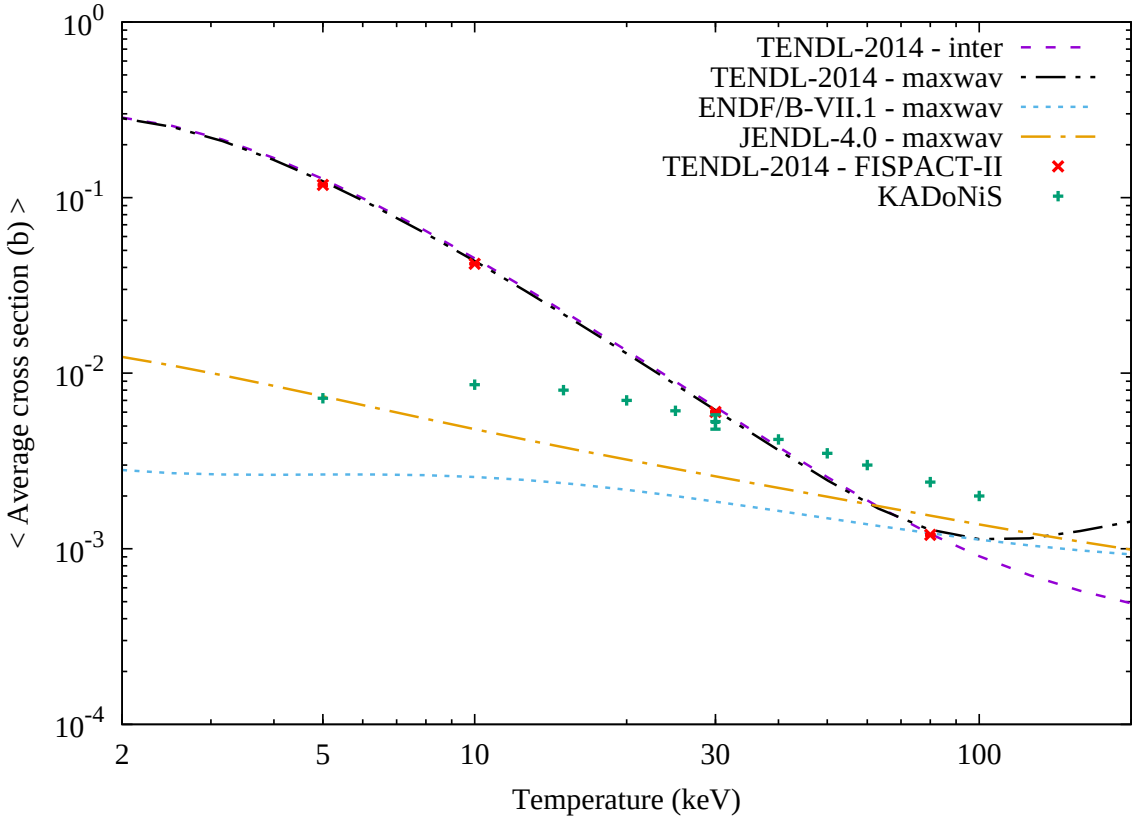
$^{45}Ca_{20}$ $[T_{1/2} = 163.00 \text{ days}]$ (KADoNiS=SMC)



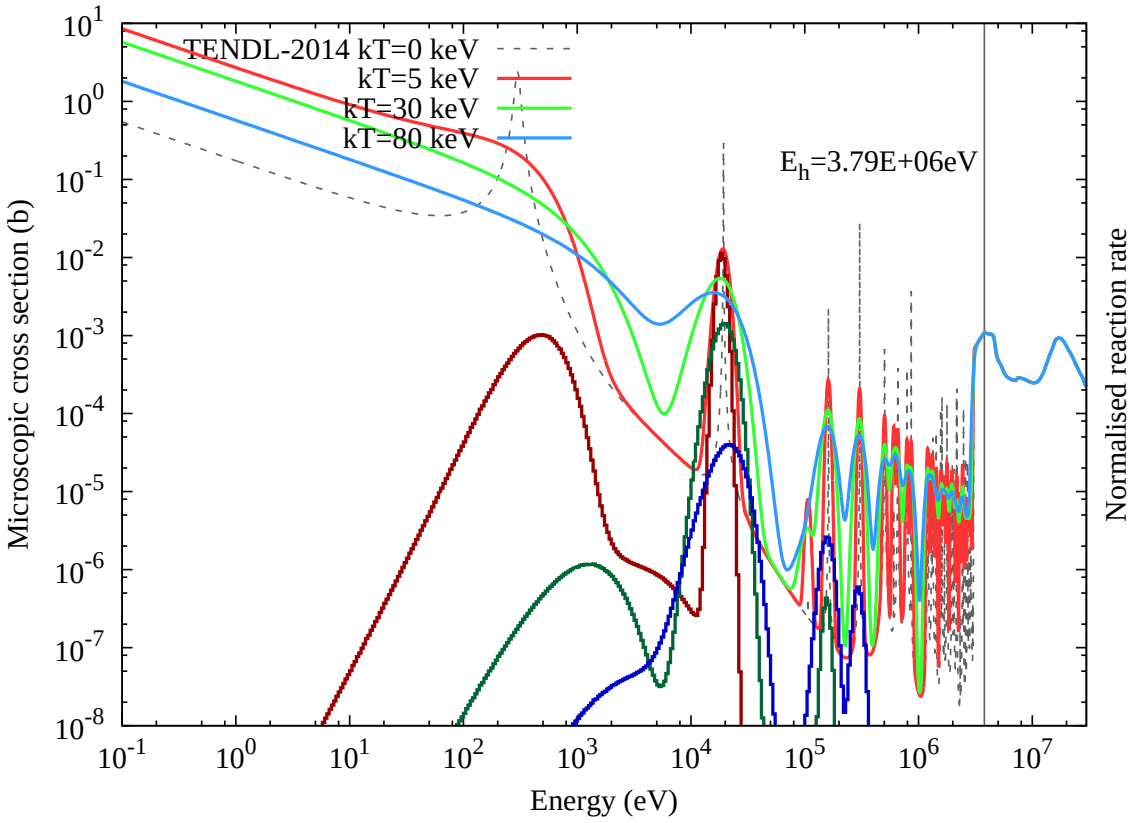


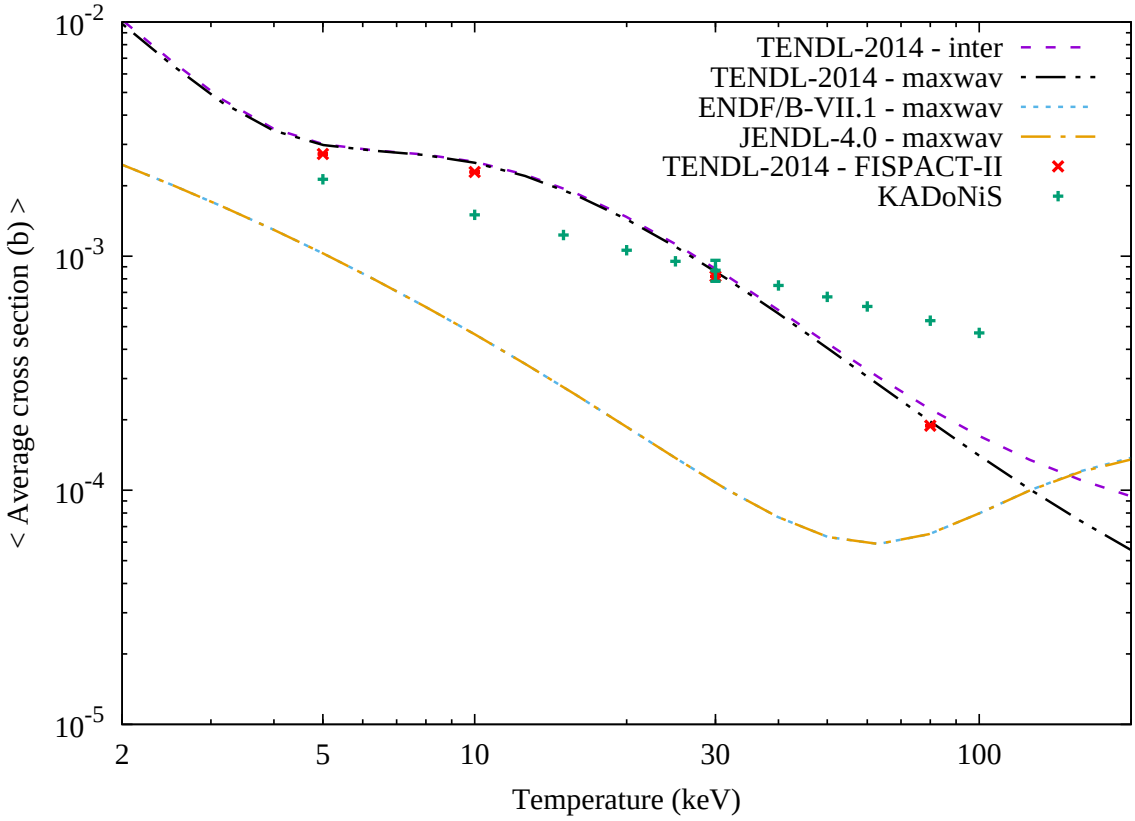
$^{46}Ca_{20}$ [Stable]



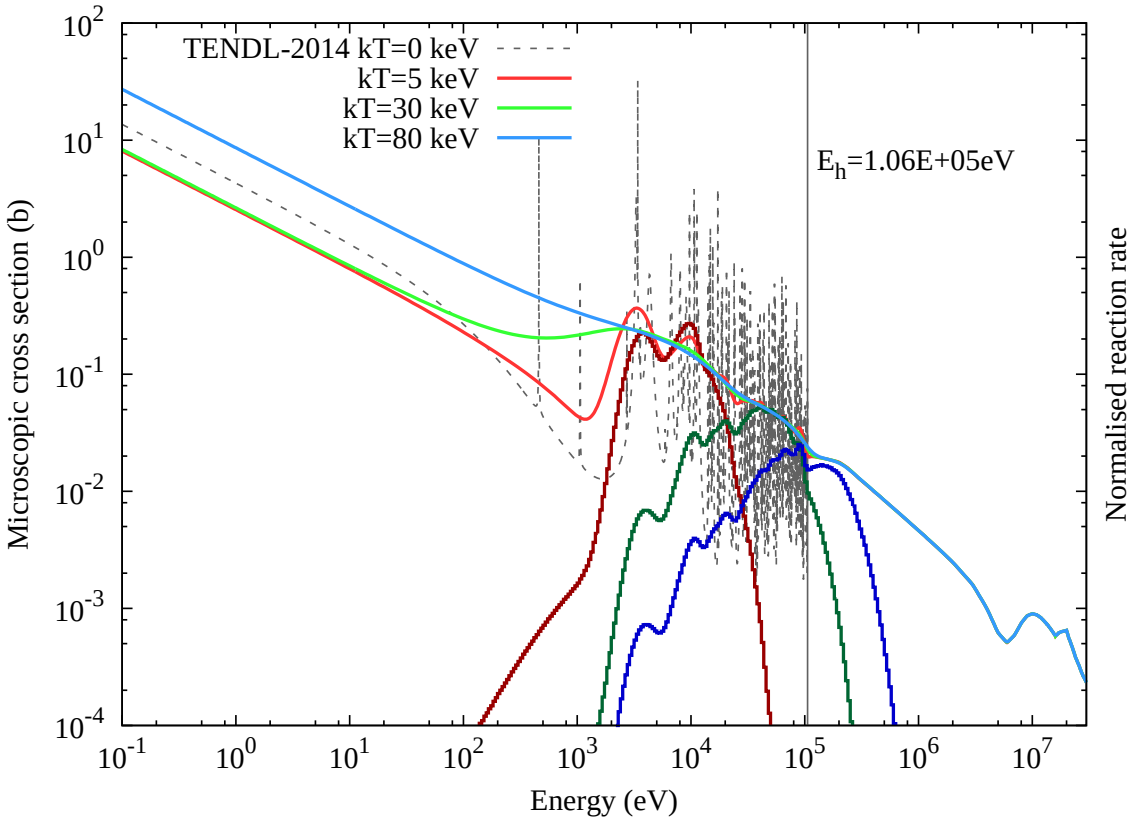


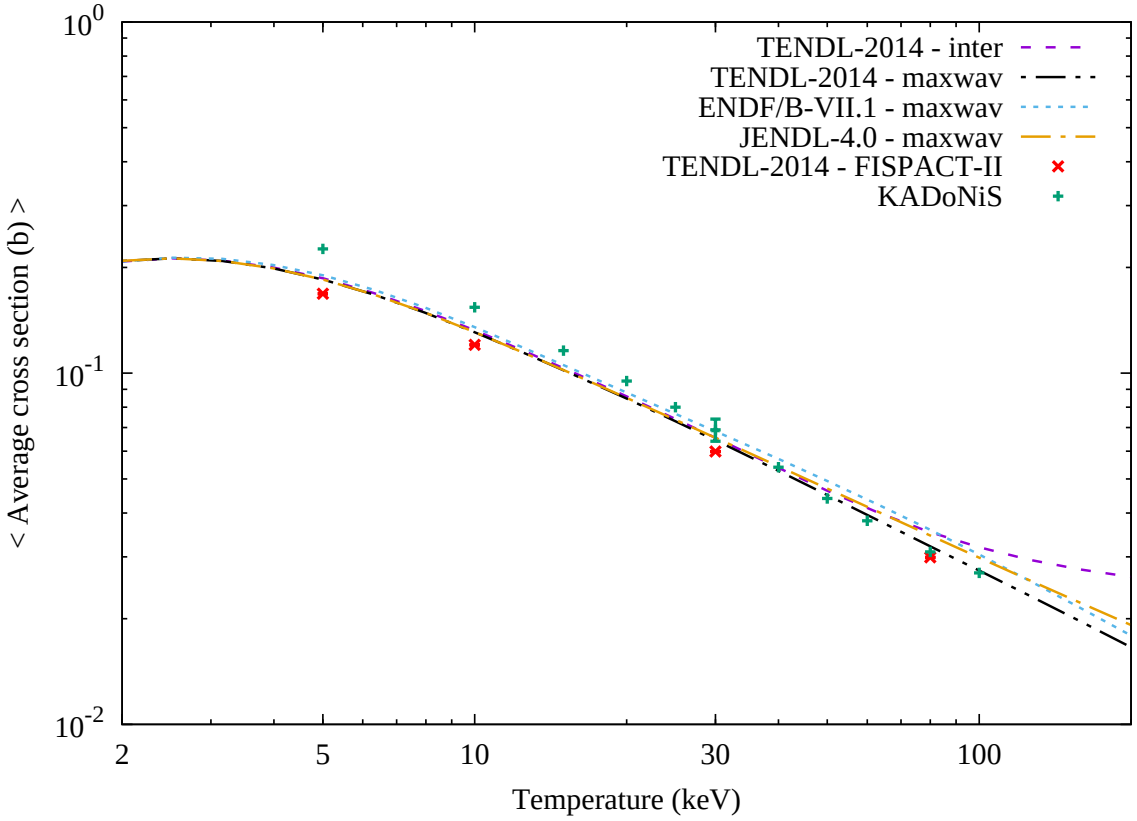
$^{48}Ca_{20}$ $[T_{1/2} = 5.30 \times 10^{19}$ years$]$



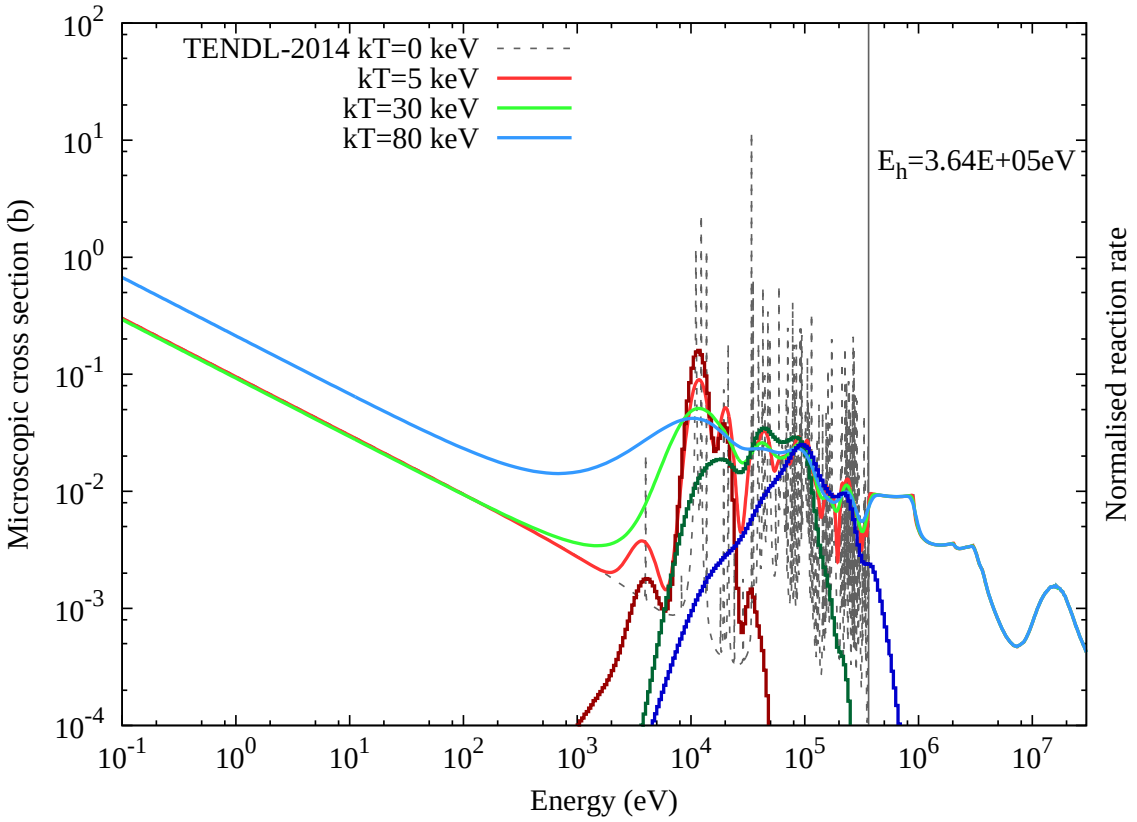


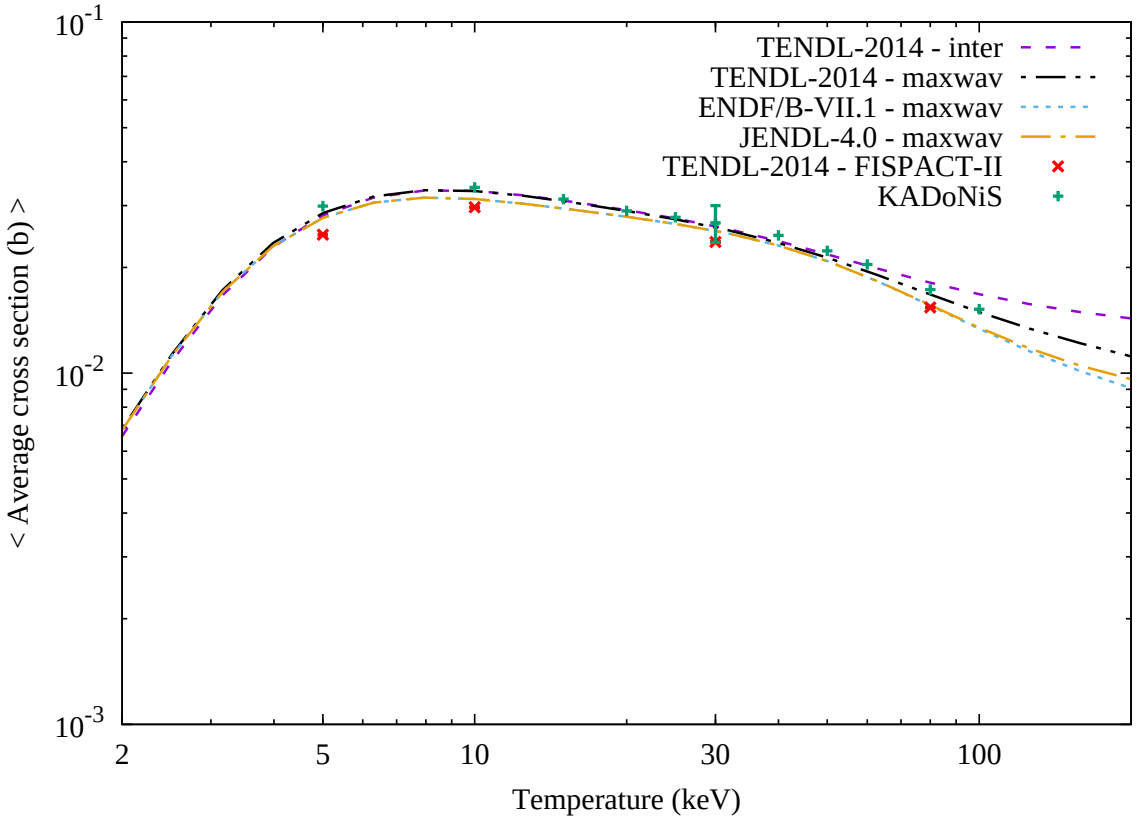
$^{45}Sc_{21}$ [Stable]



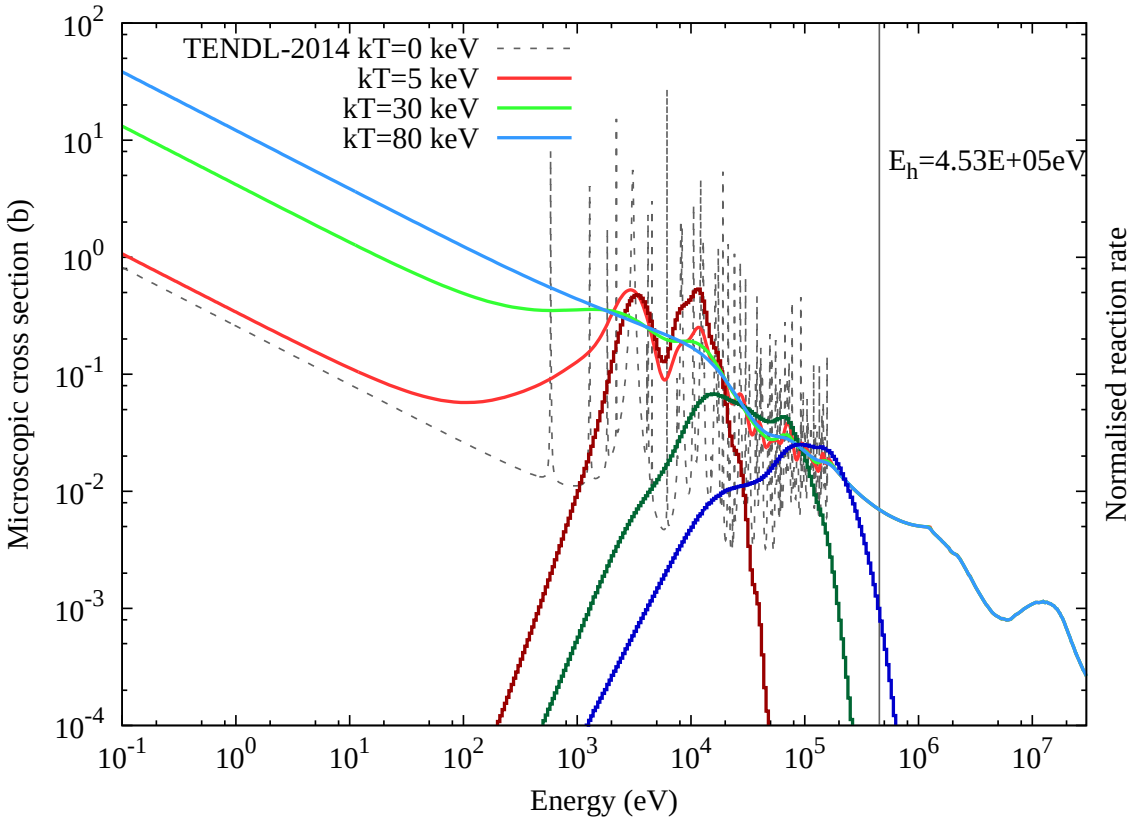


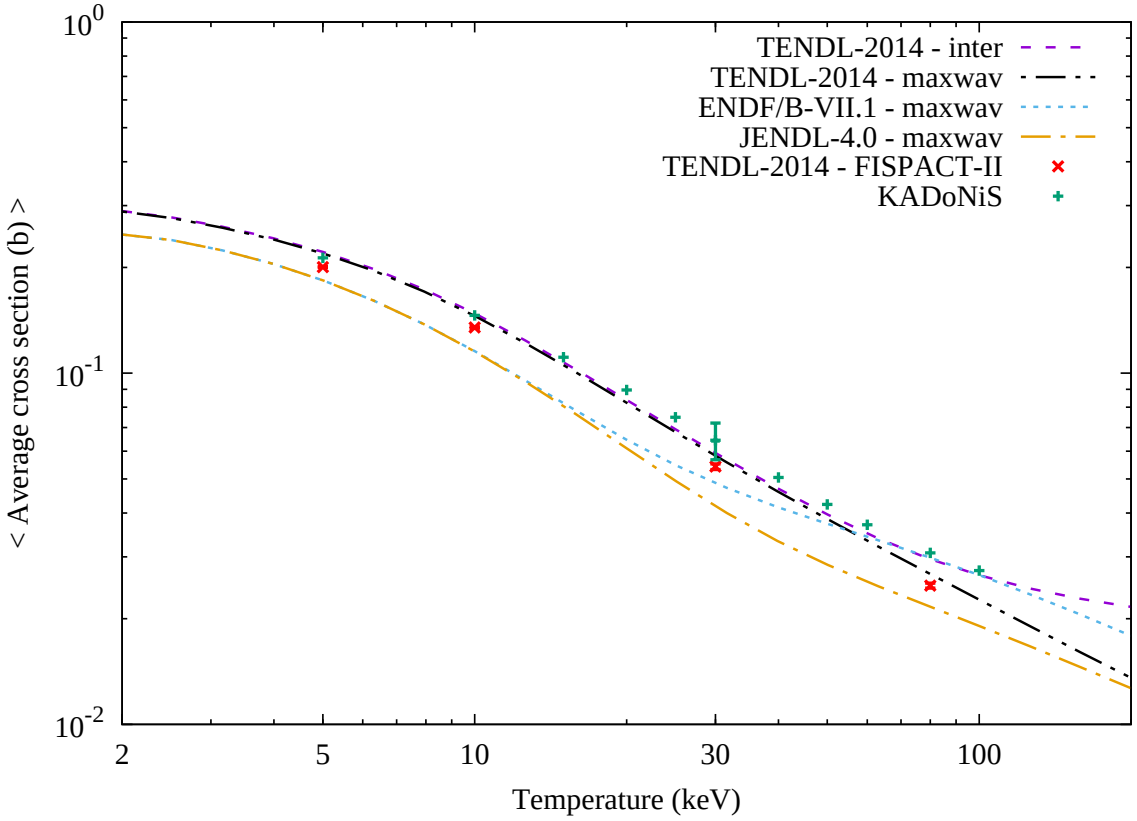
$^{46}Ti_{22}$ [Stable]



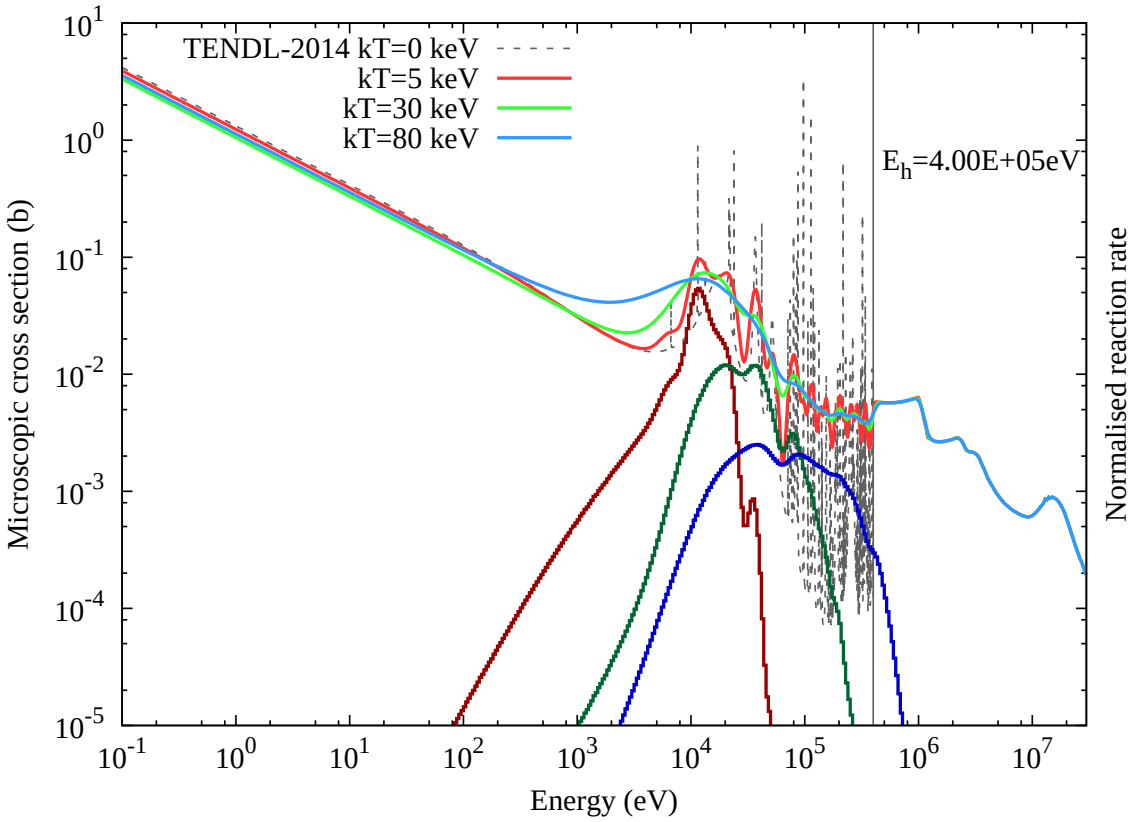


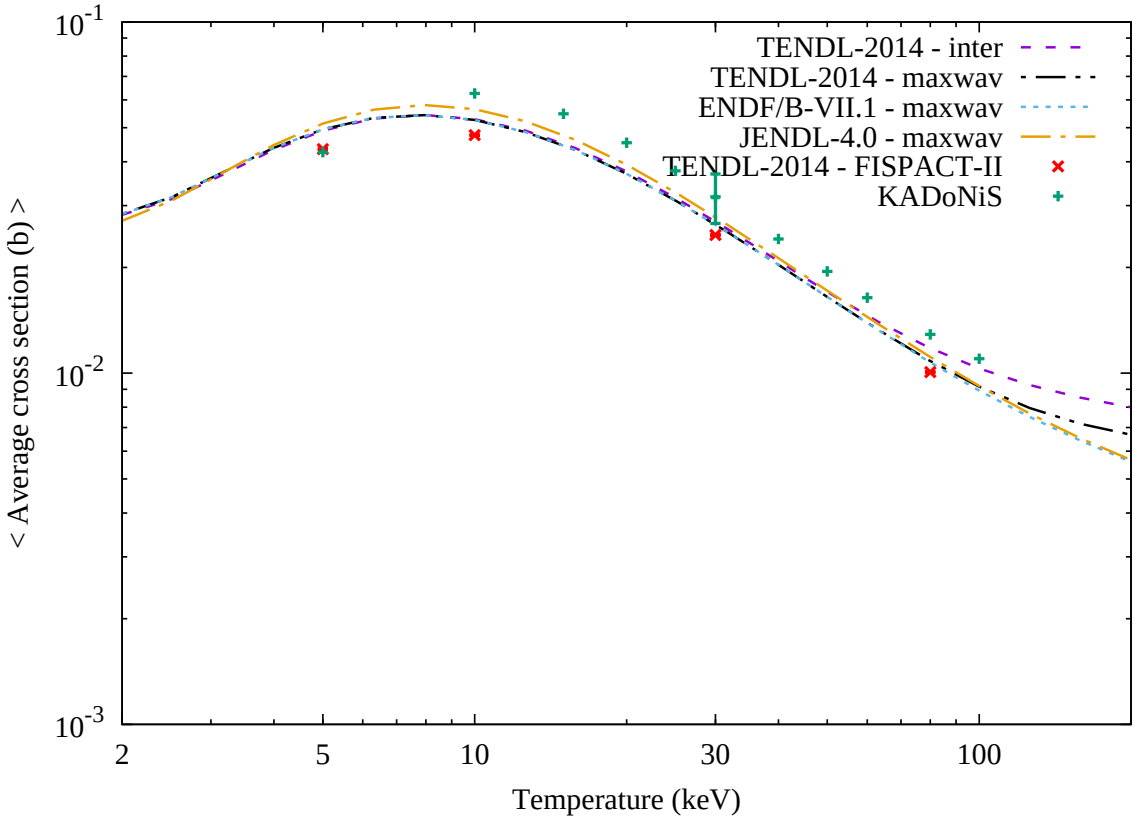
$^{47}Ti_{22}$ [Stable]



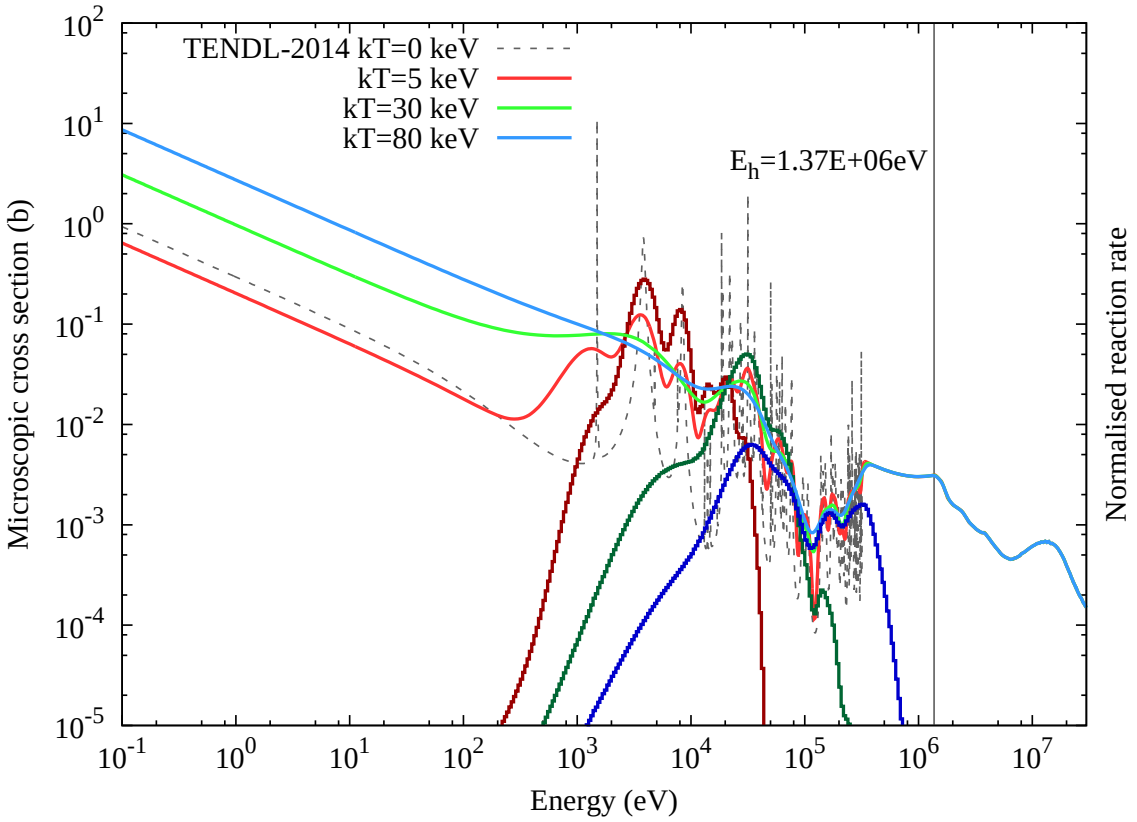


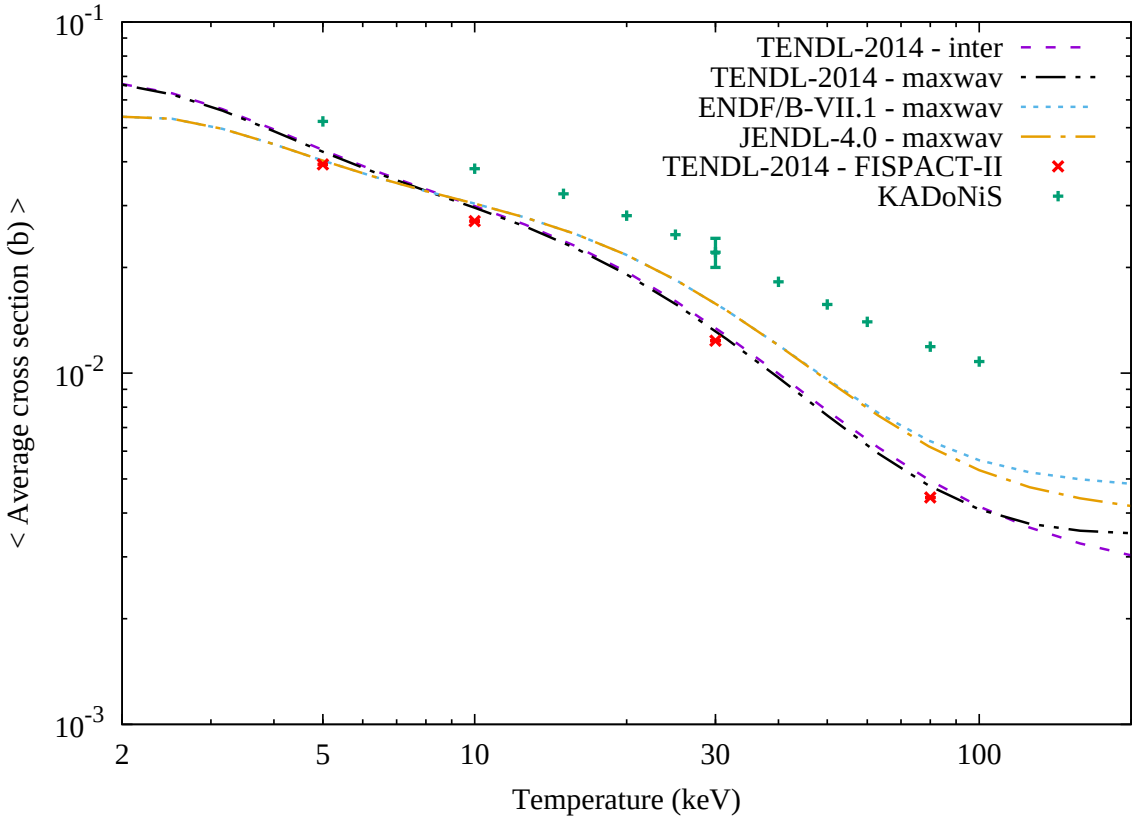
$^{48}Ti_{22}$ [Stable]



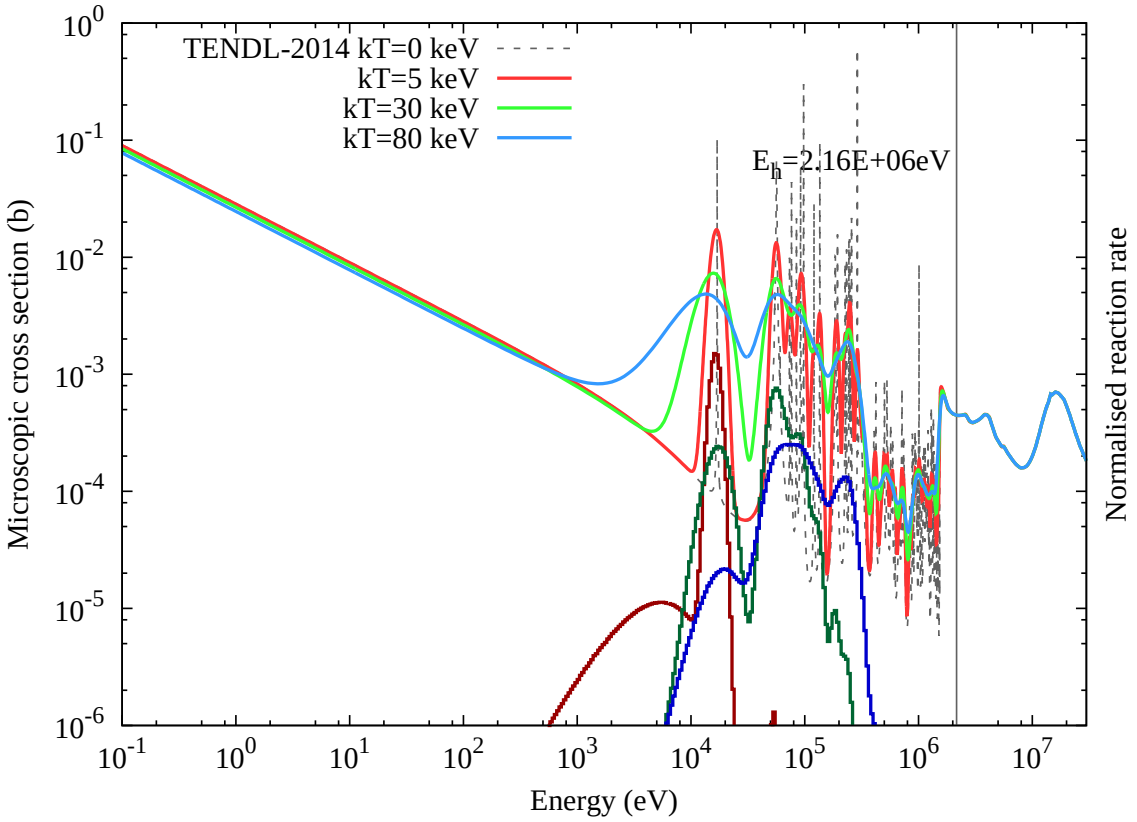


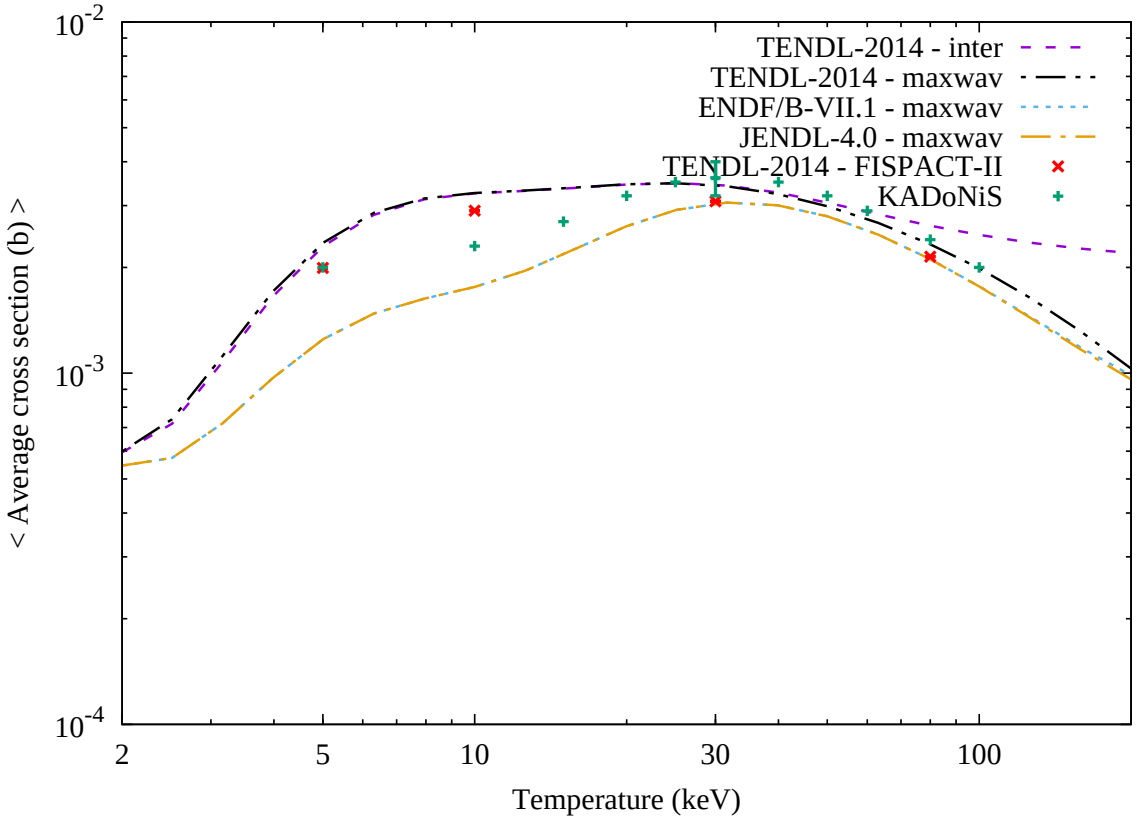
$^{49}Ti_{22}$ [Stable]



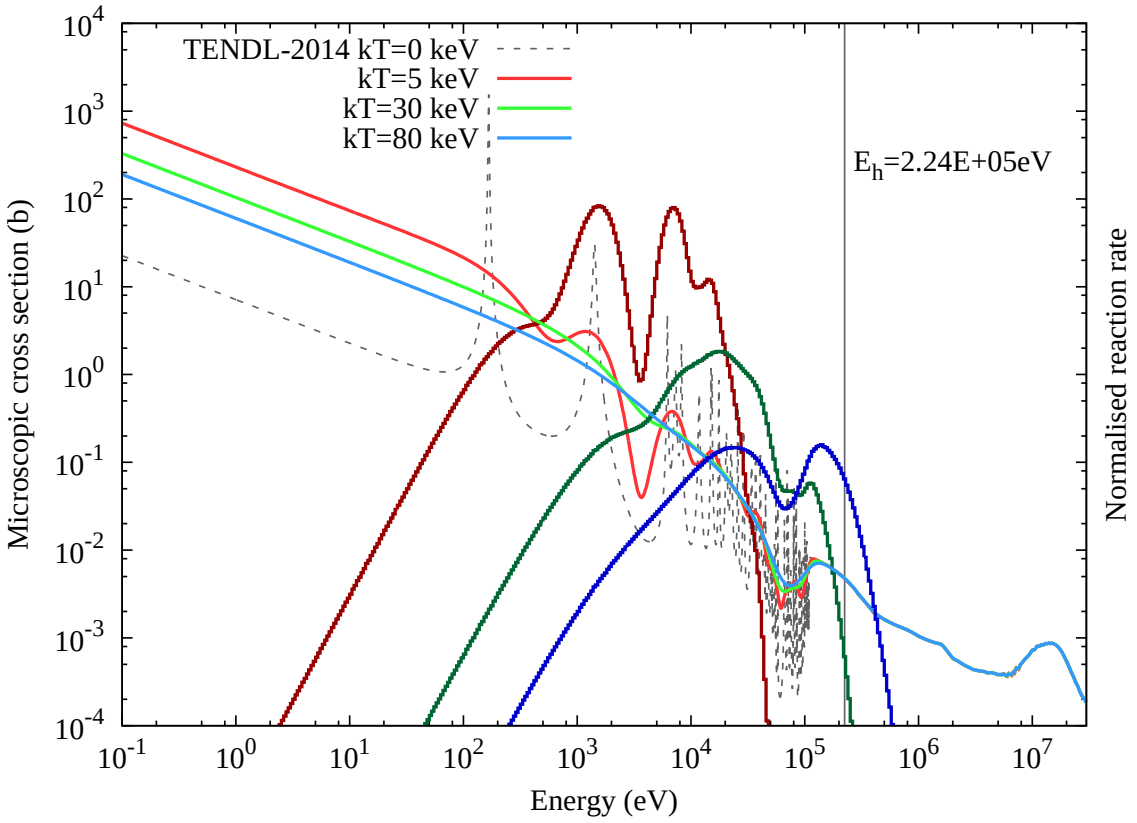


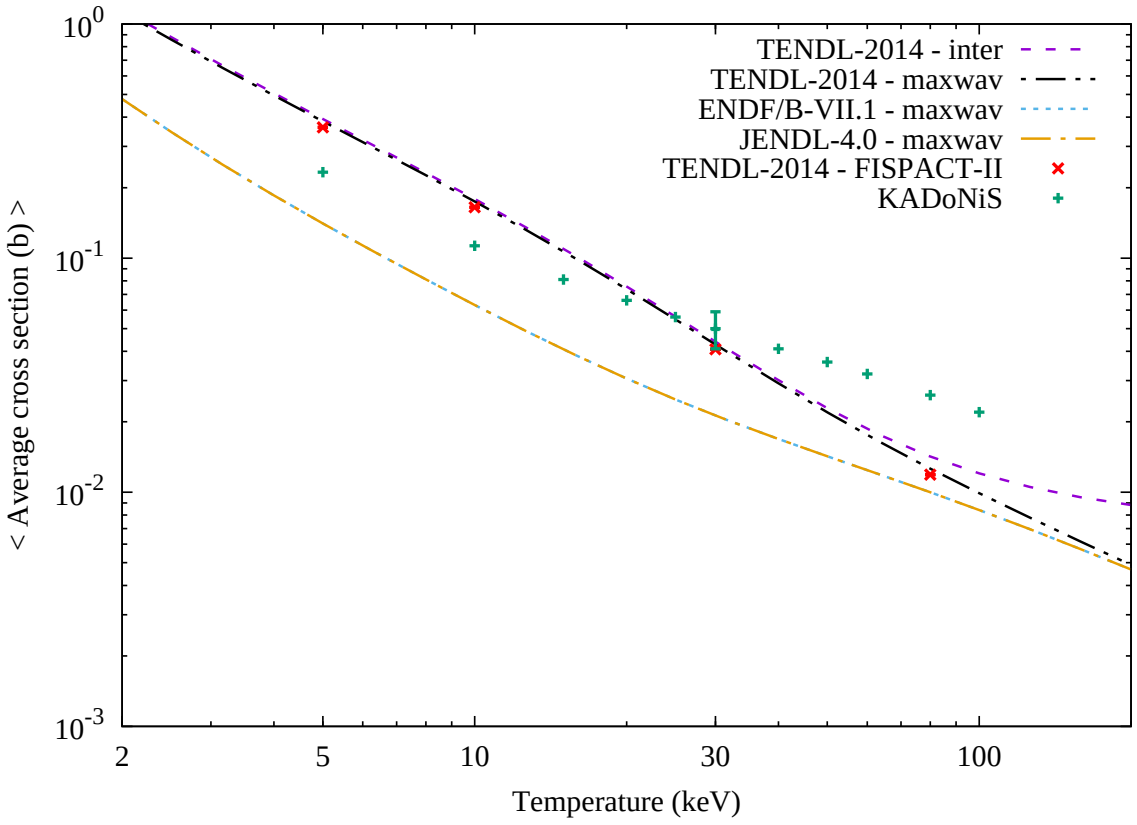
$^{50}Ti_{22}$ [Stable]



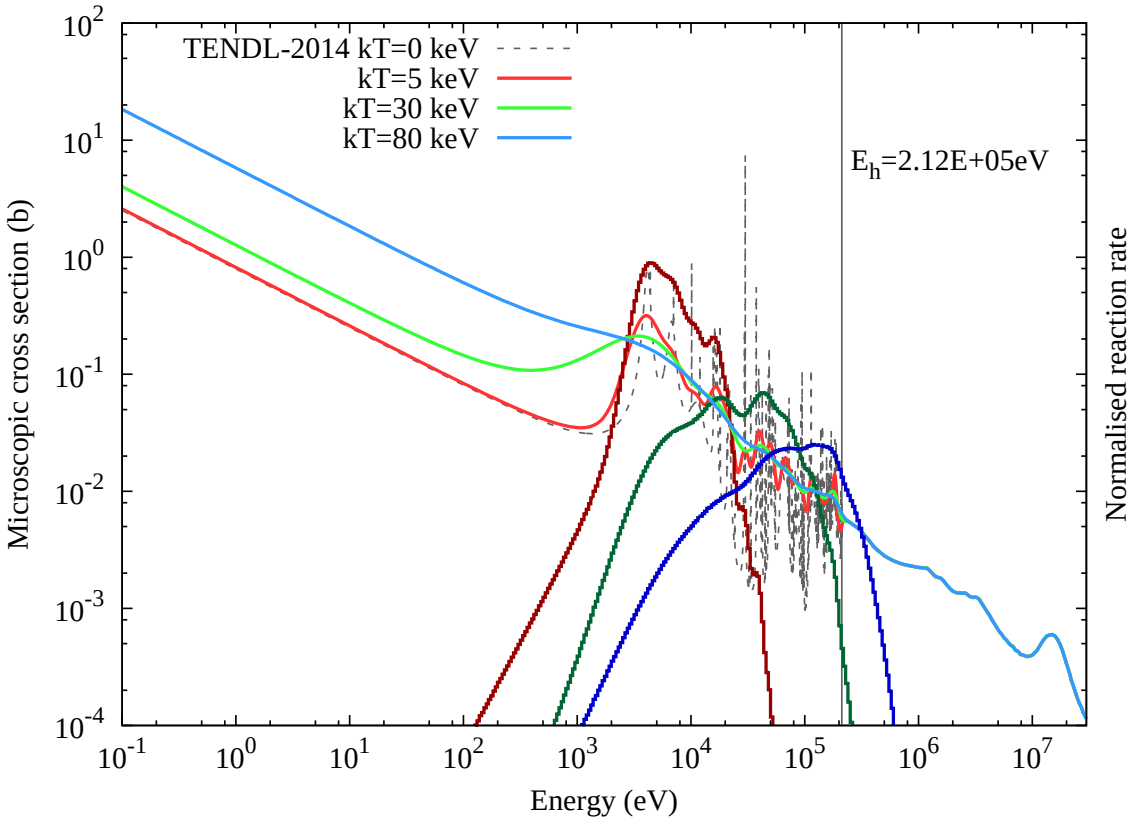


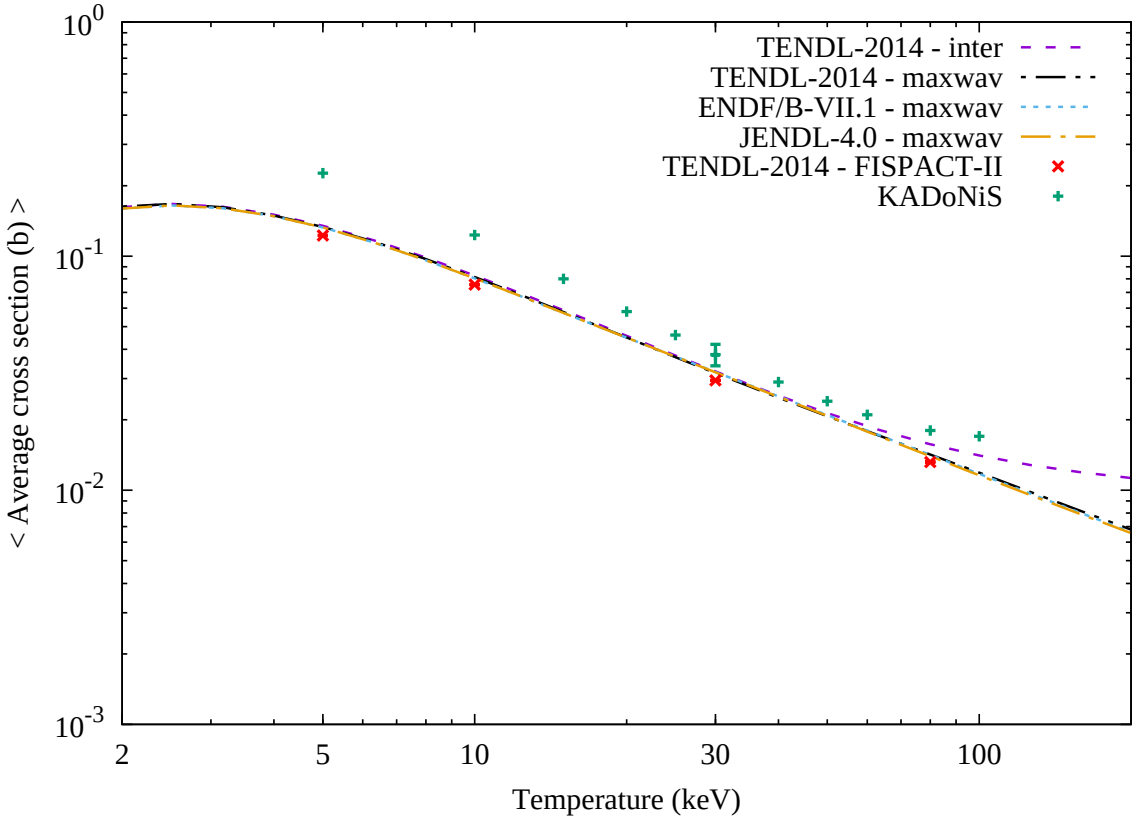
$^{50}V_{23}$ $[T_{1/2} = 1.40 \times 10^{17}$ years] (KADoNiS=SMC)



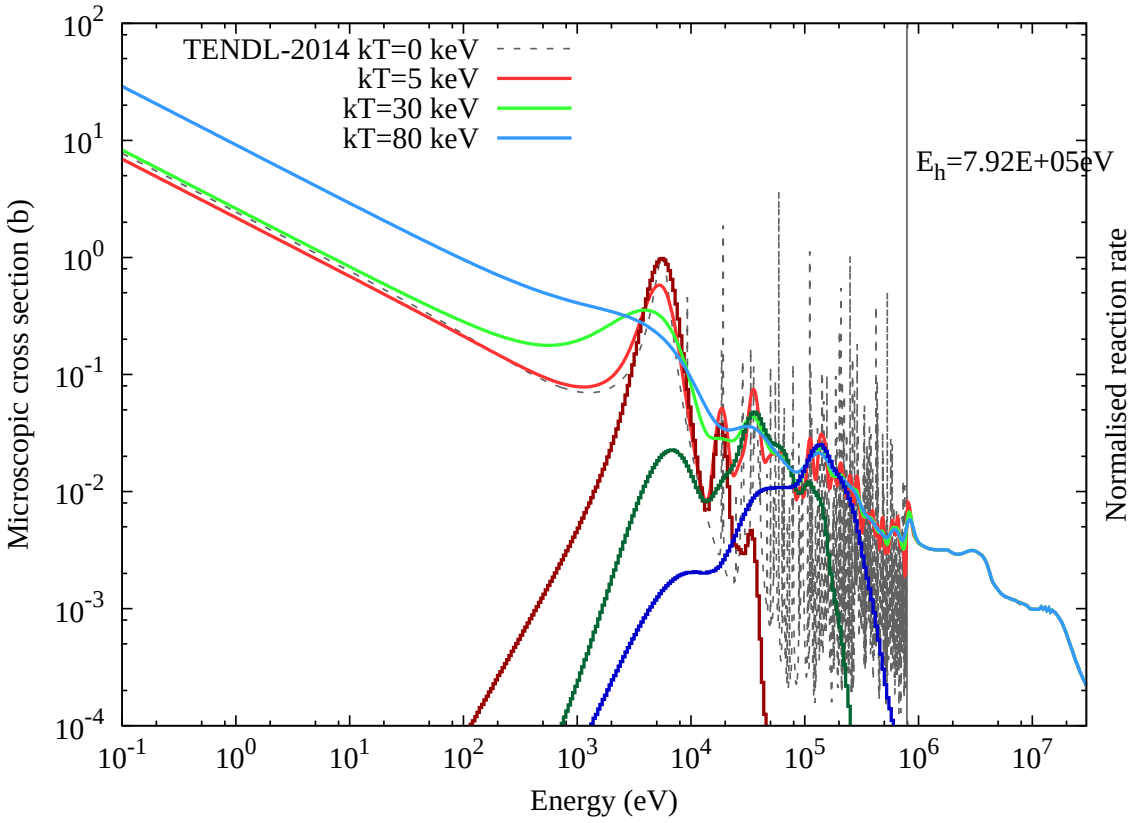


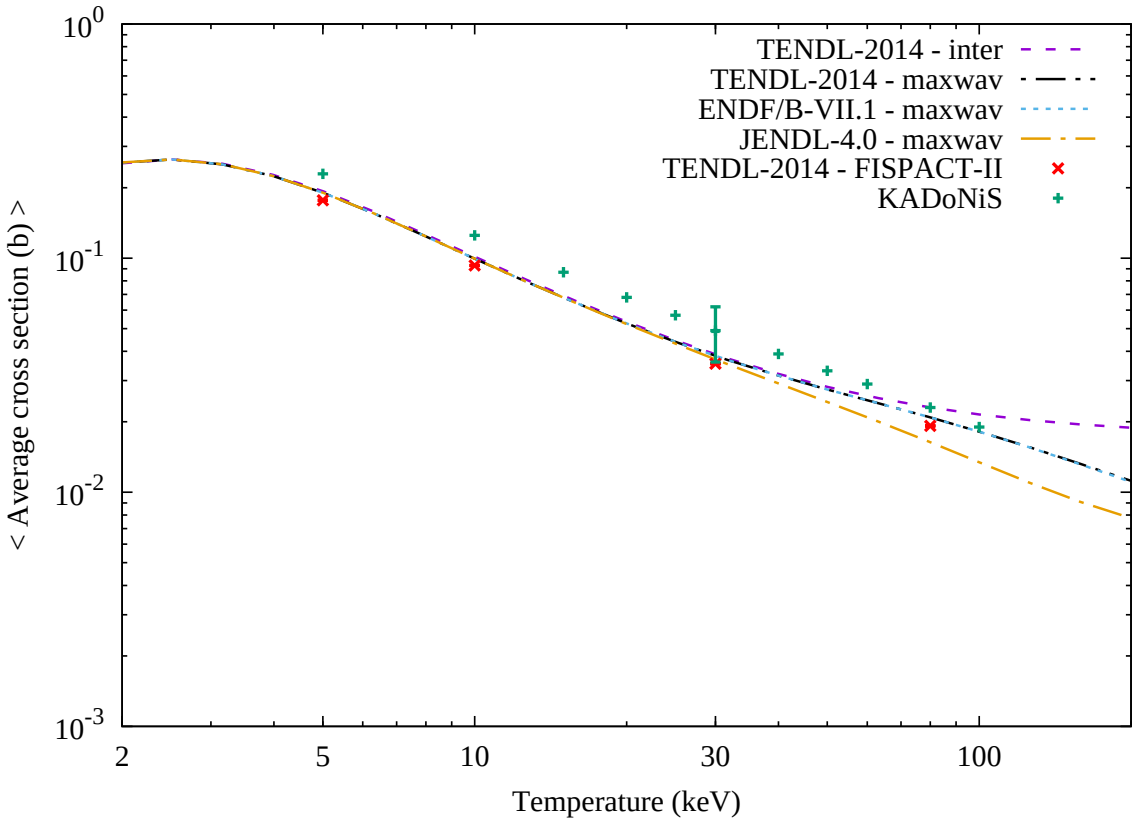
$^{51}V_{23}$ [Stable]



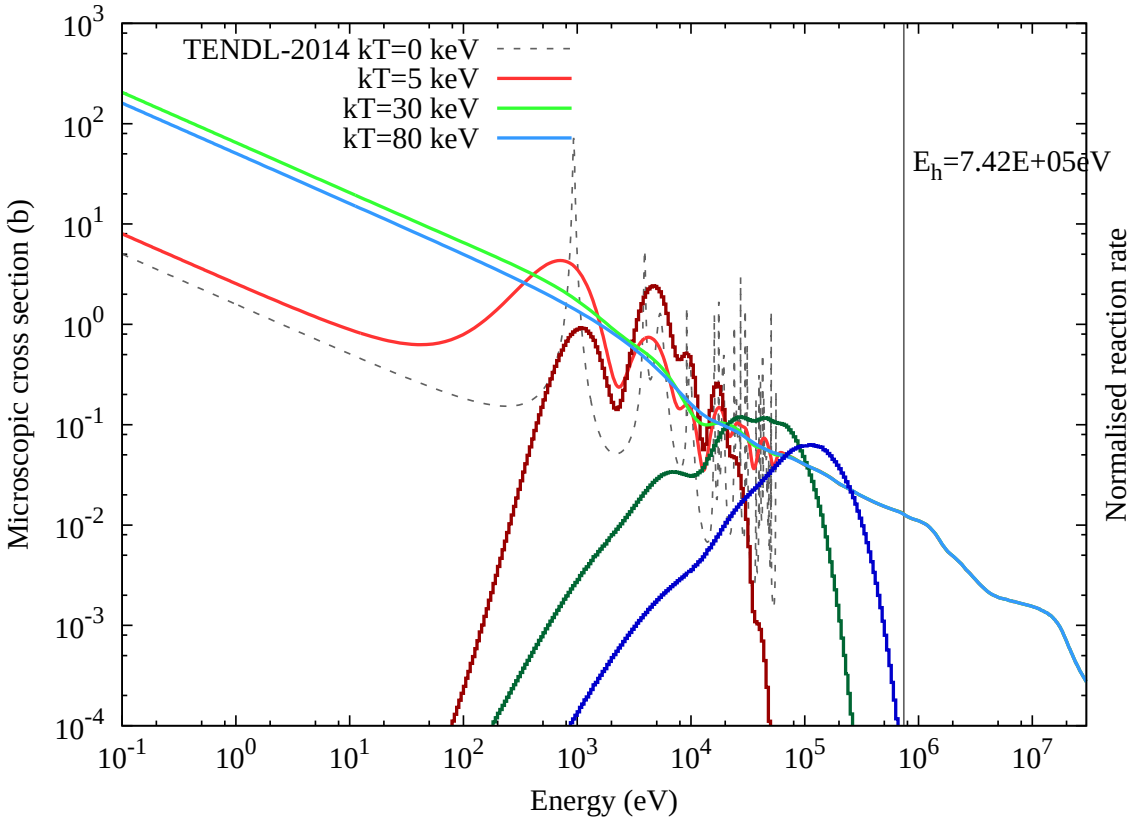


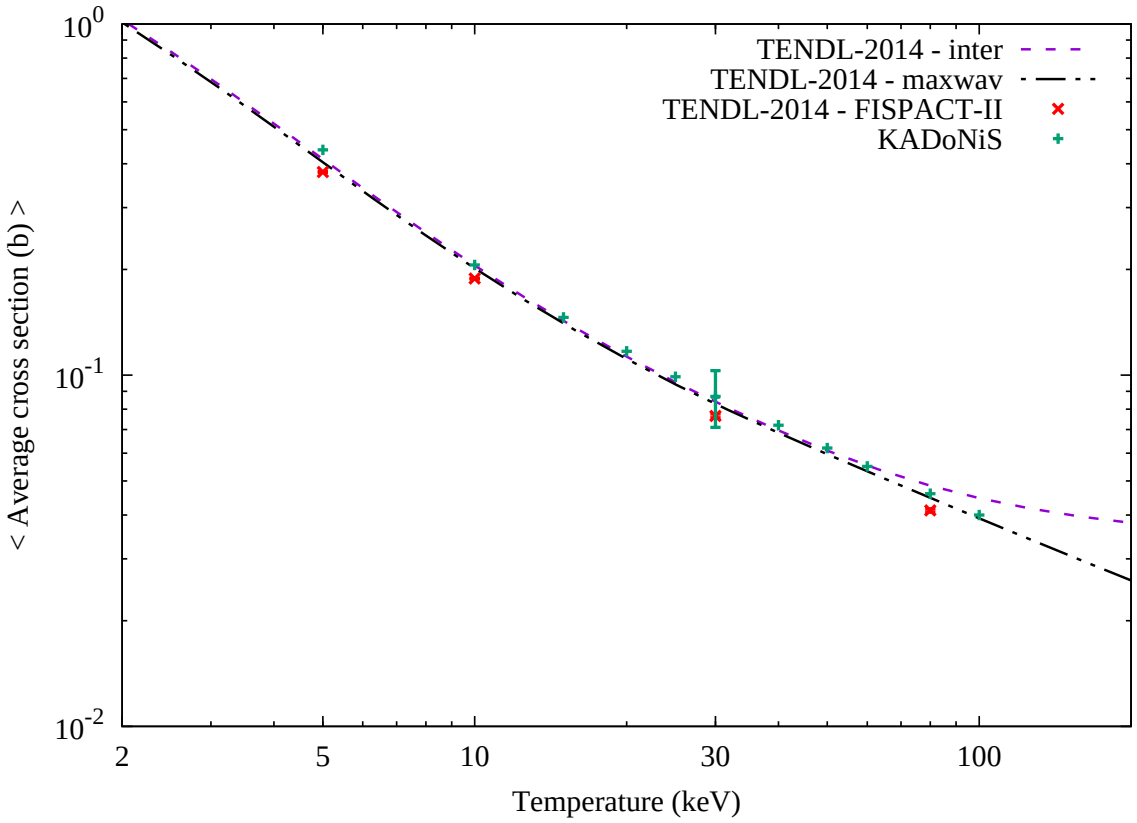
$^{50}Cr_{24}$ $[T_{1/2} = 1.80 \times 10^{17}$ years$]$



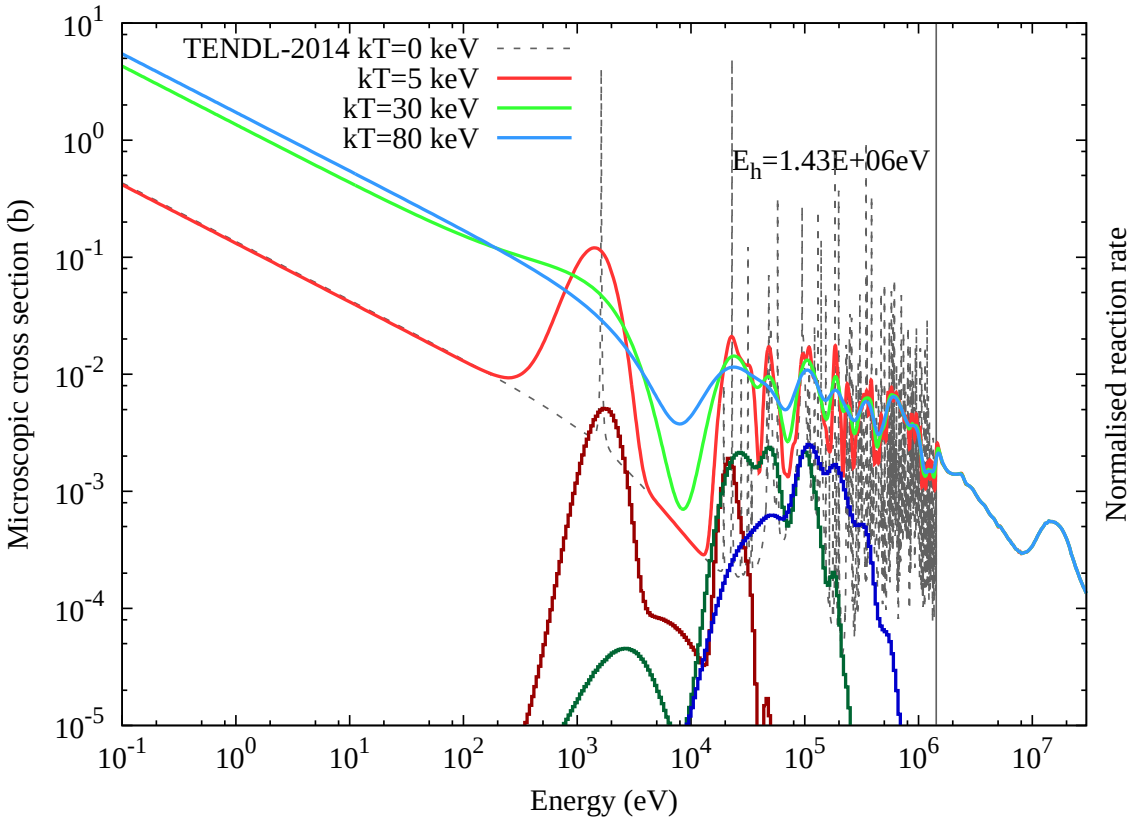


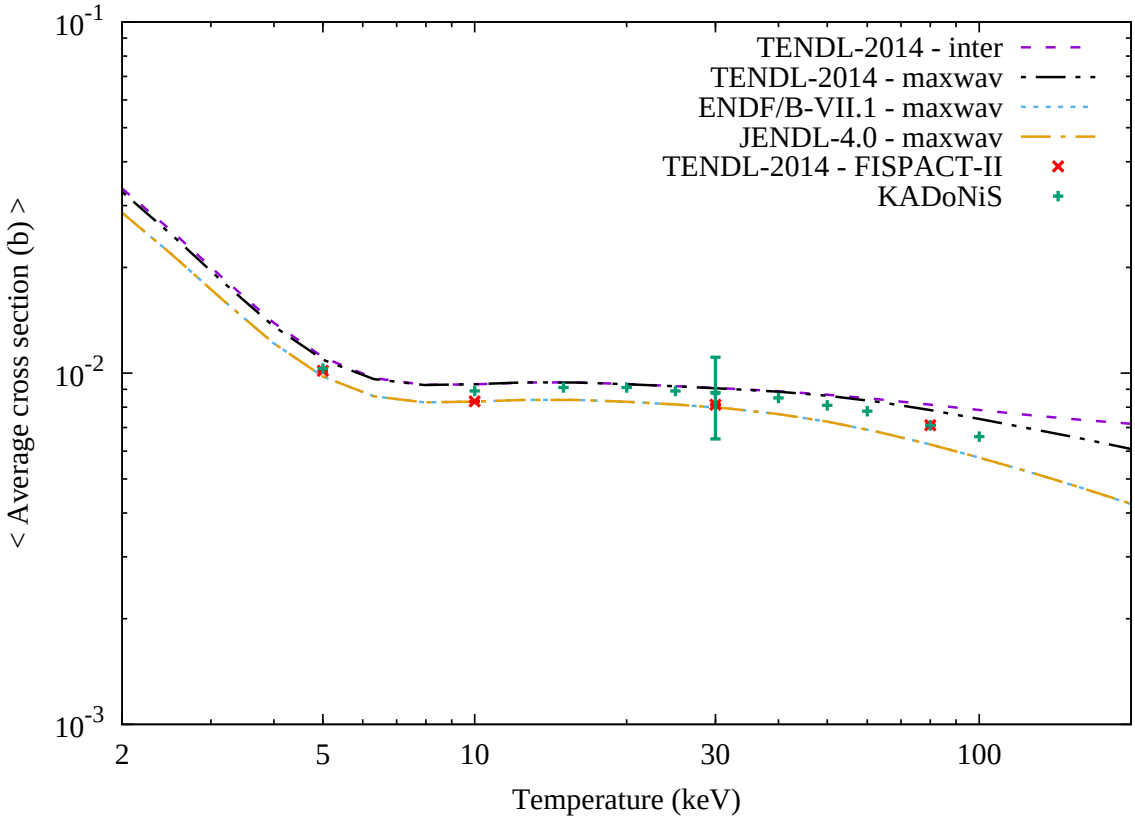
$^{51}Cr_{24}$ $[T_{1/2} = 27.70 \text{ days}]$ (KADoNiS=SMC)



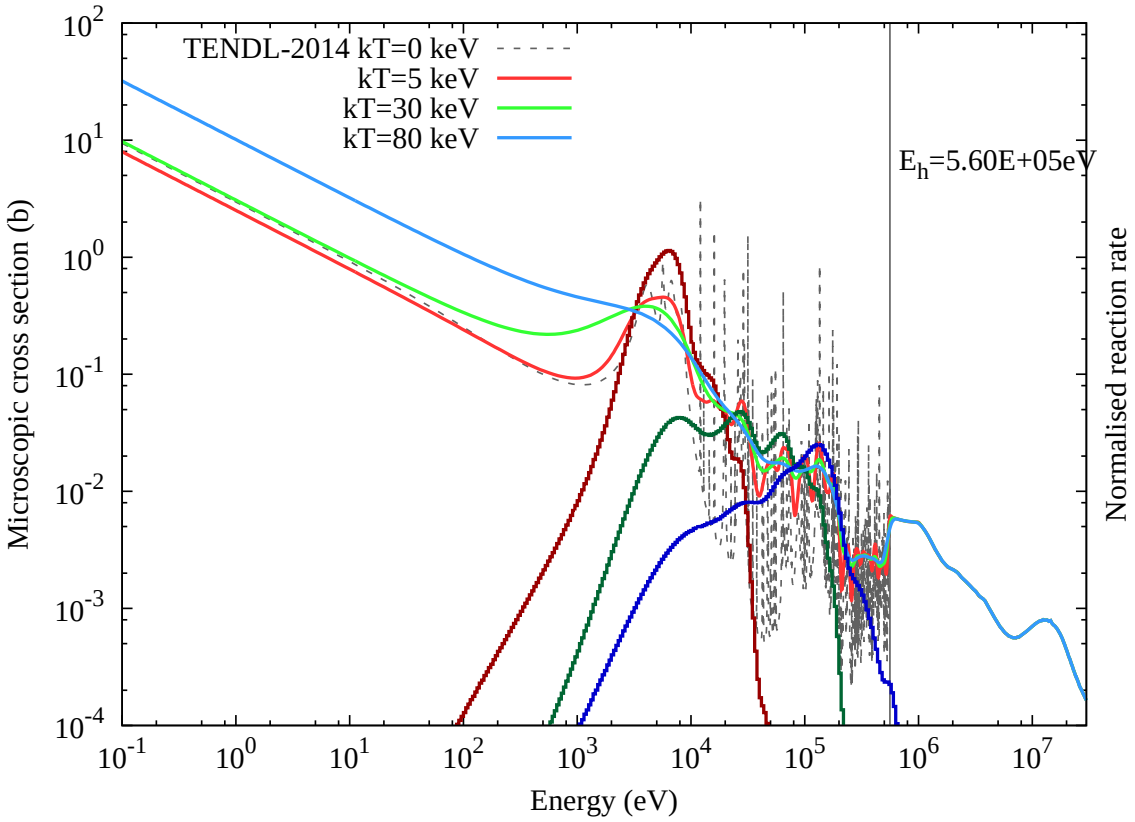


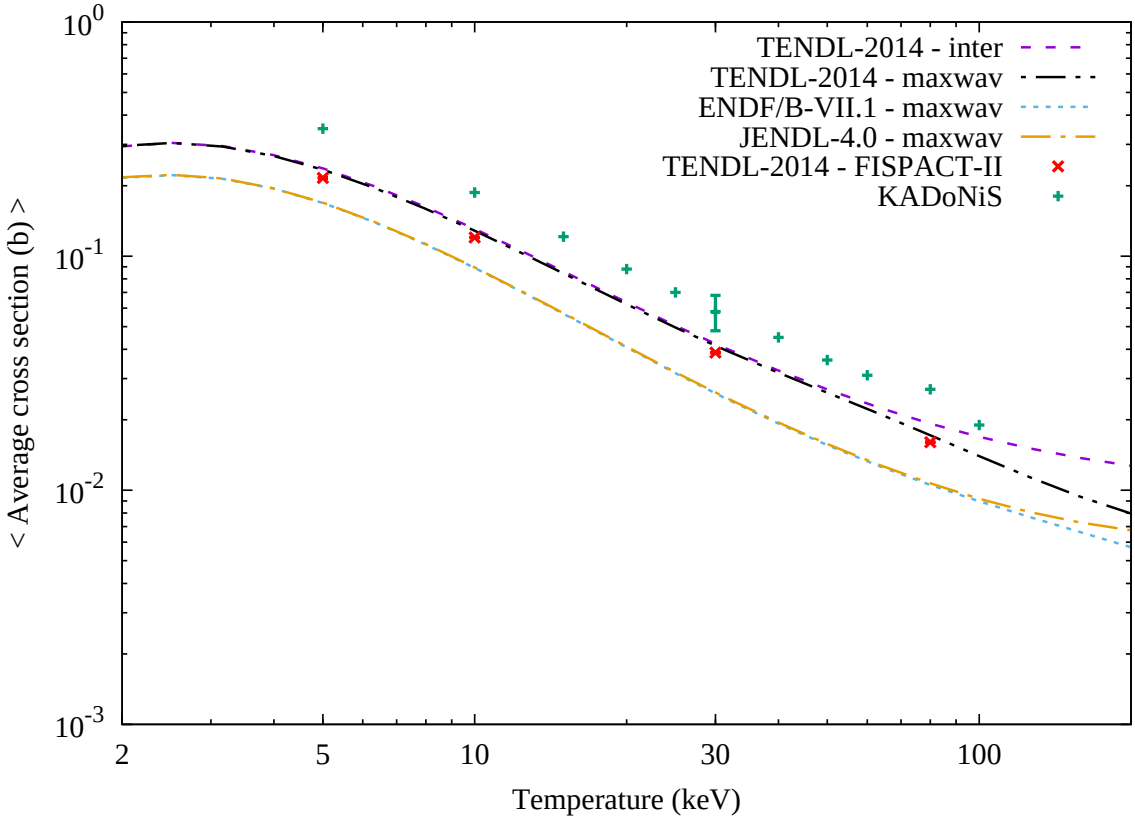
$^{52}Cr_{24}$ [Stable]



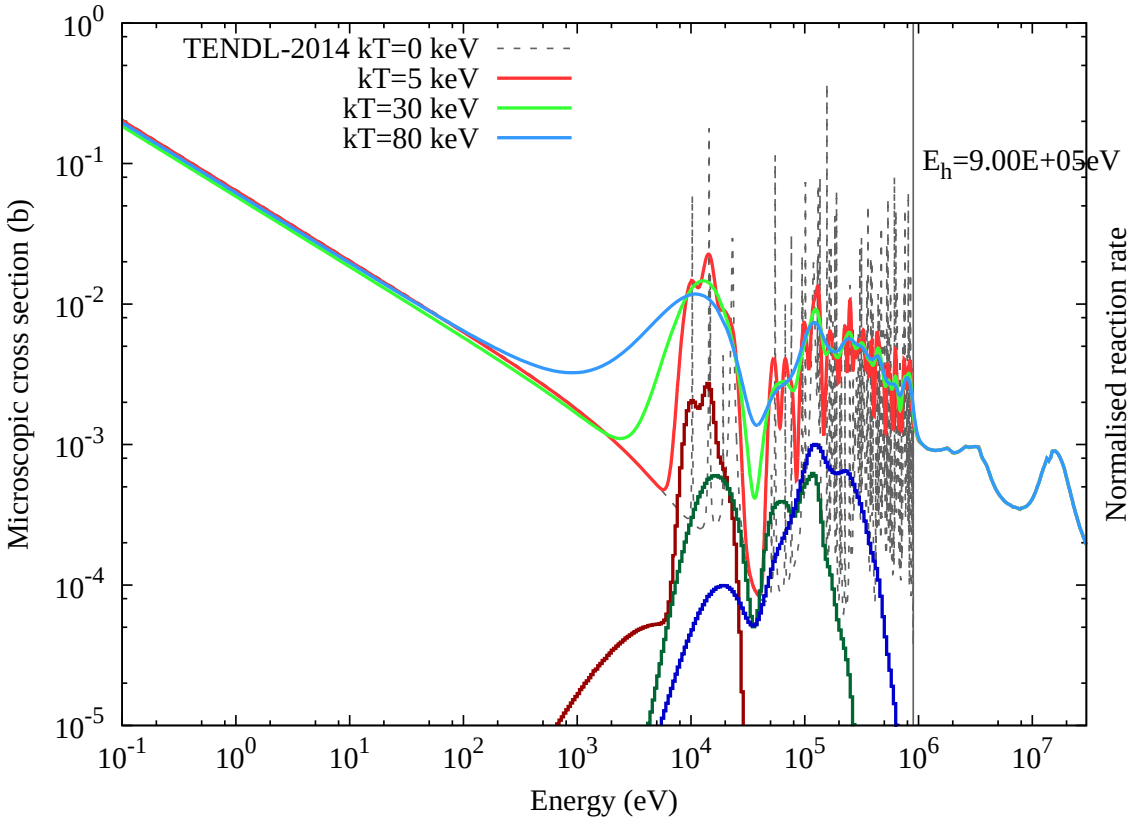


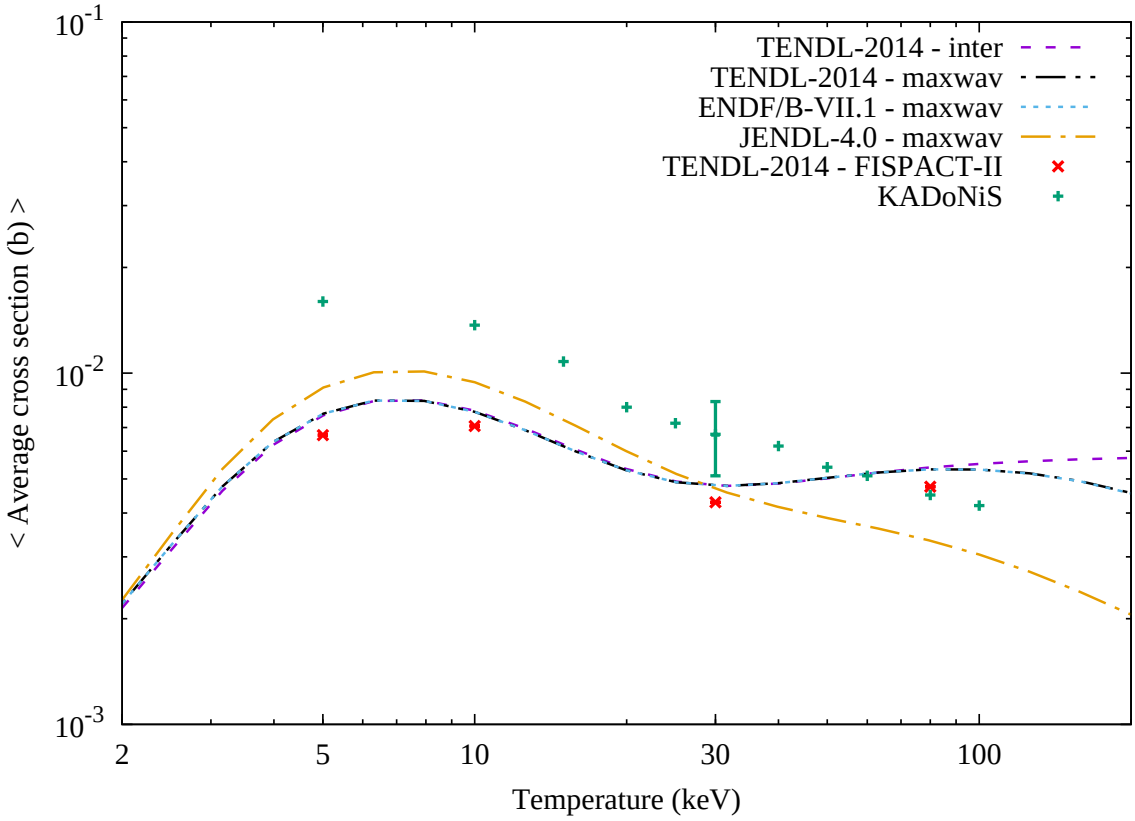
$^{53}Cr_{24}$ [Stable]



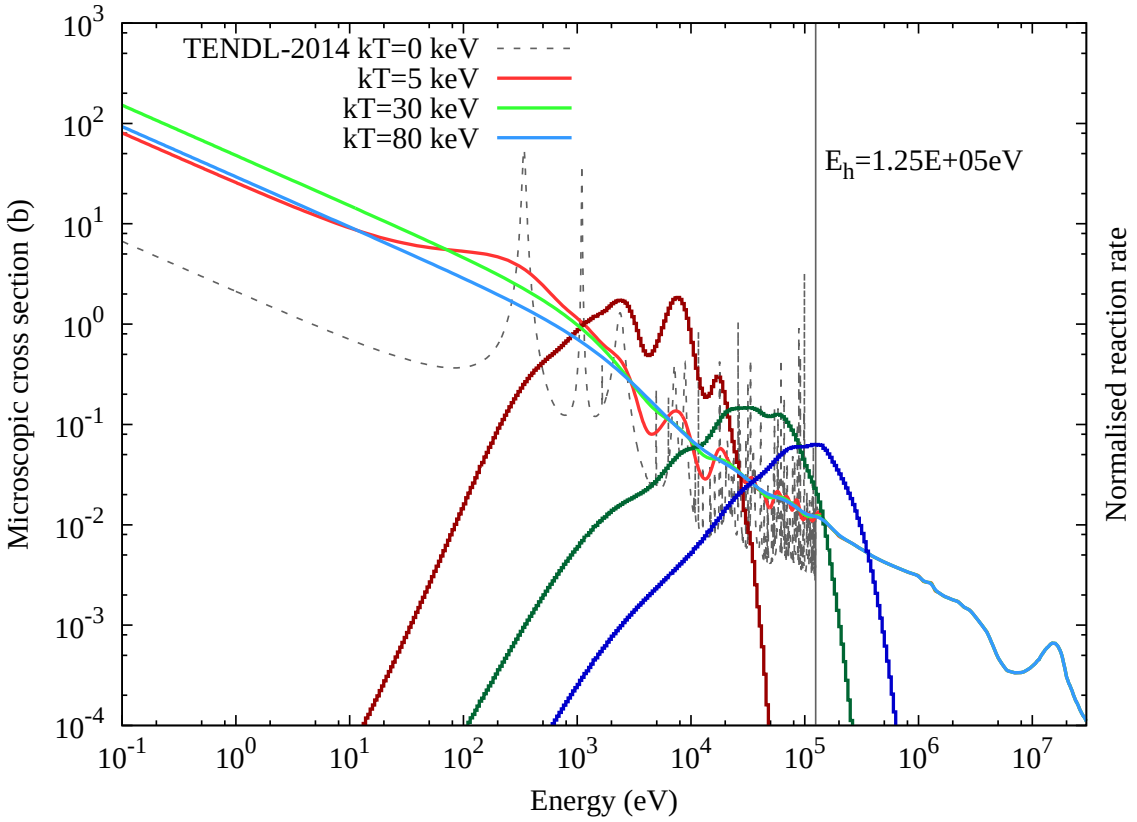


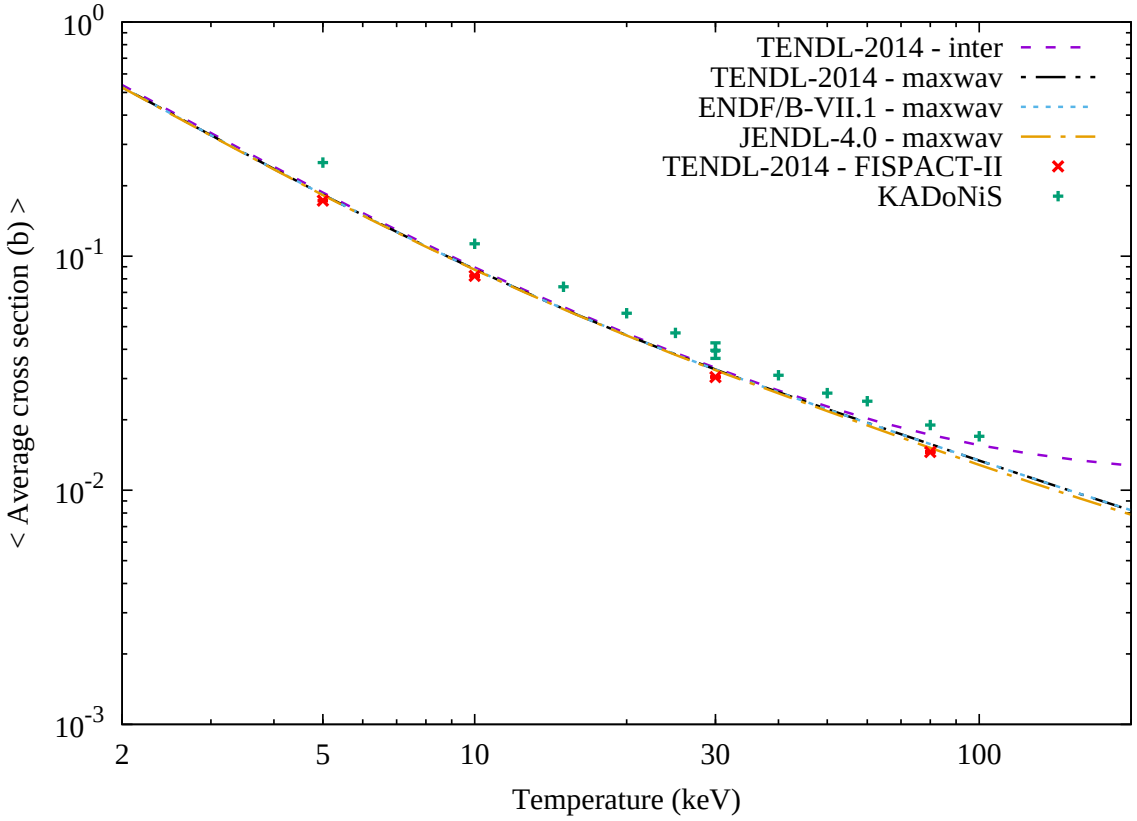
$^{54}Cr_{24}$ [Stable]



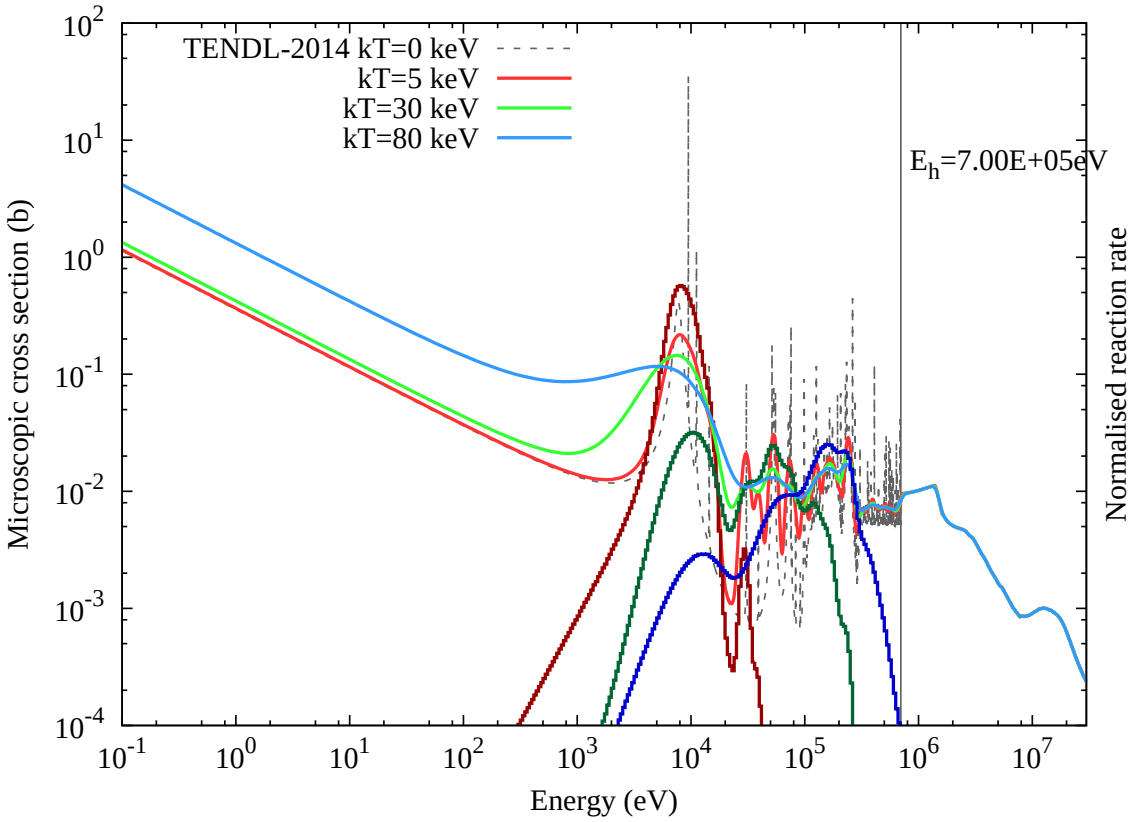


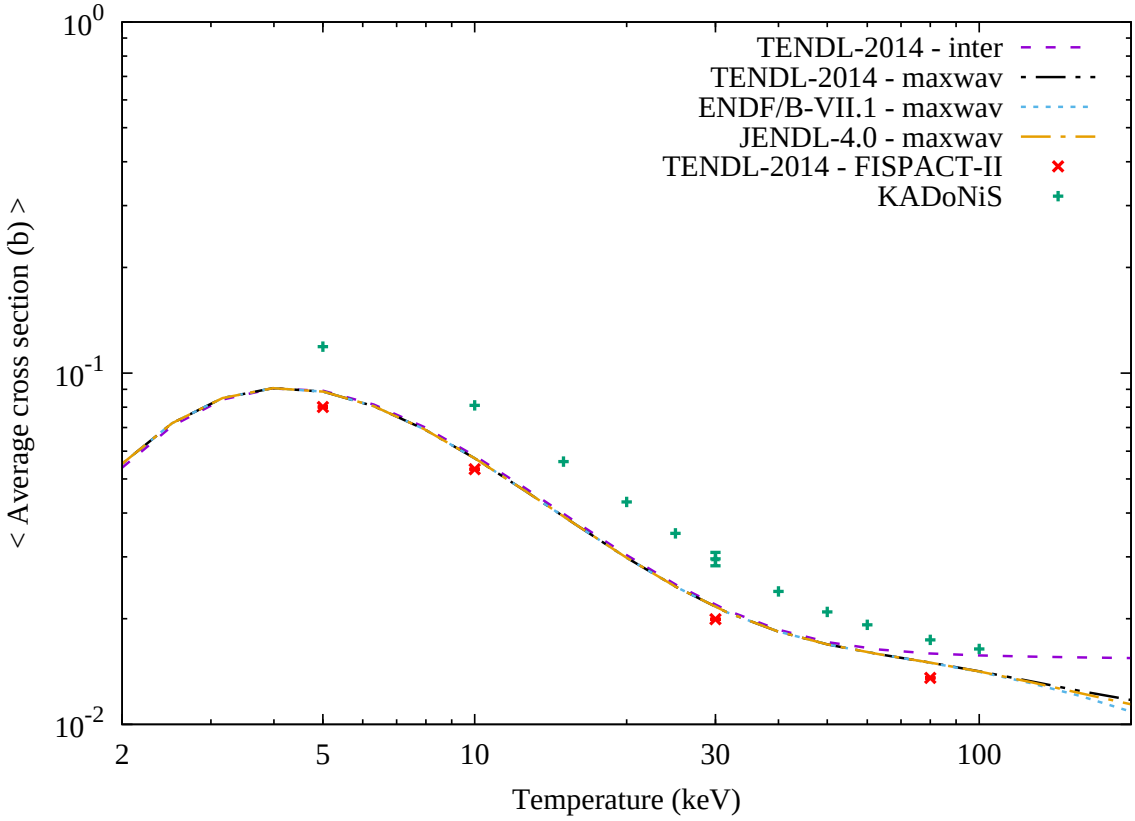
$^{55}Mn_{25}$ [Stable]



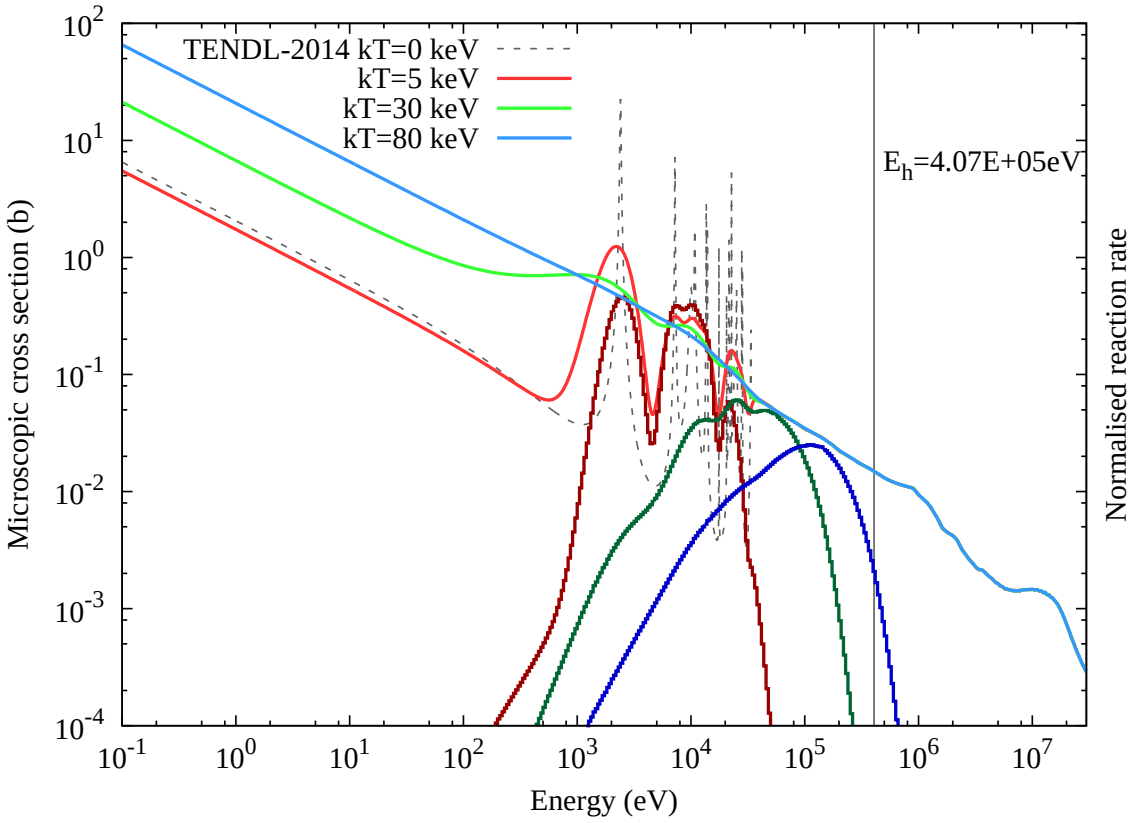


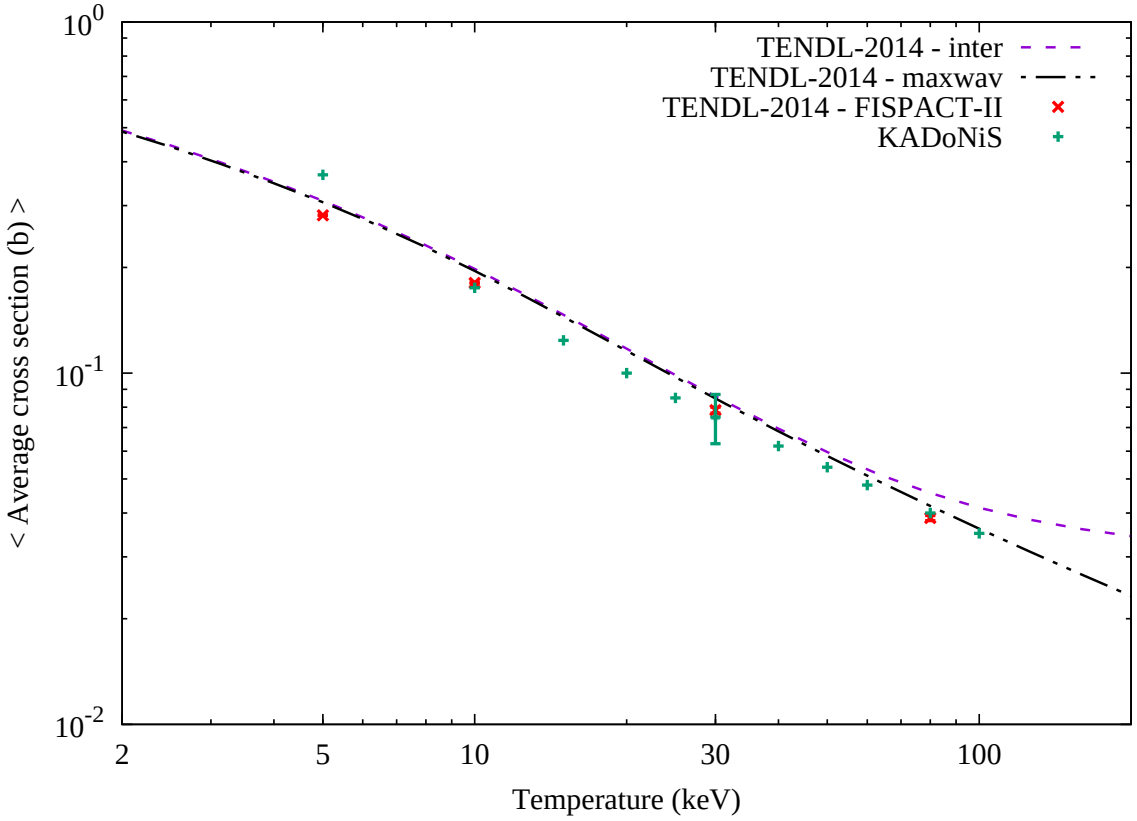
$^{54}Fe_{26}$ [Stable]



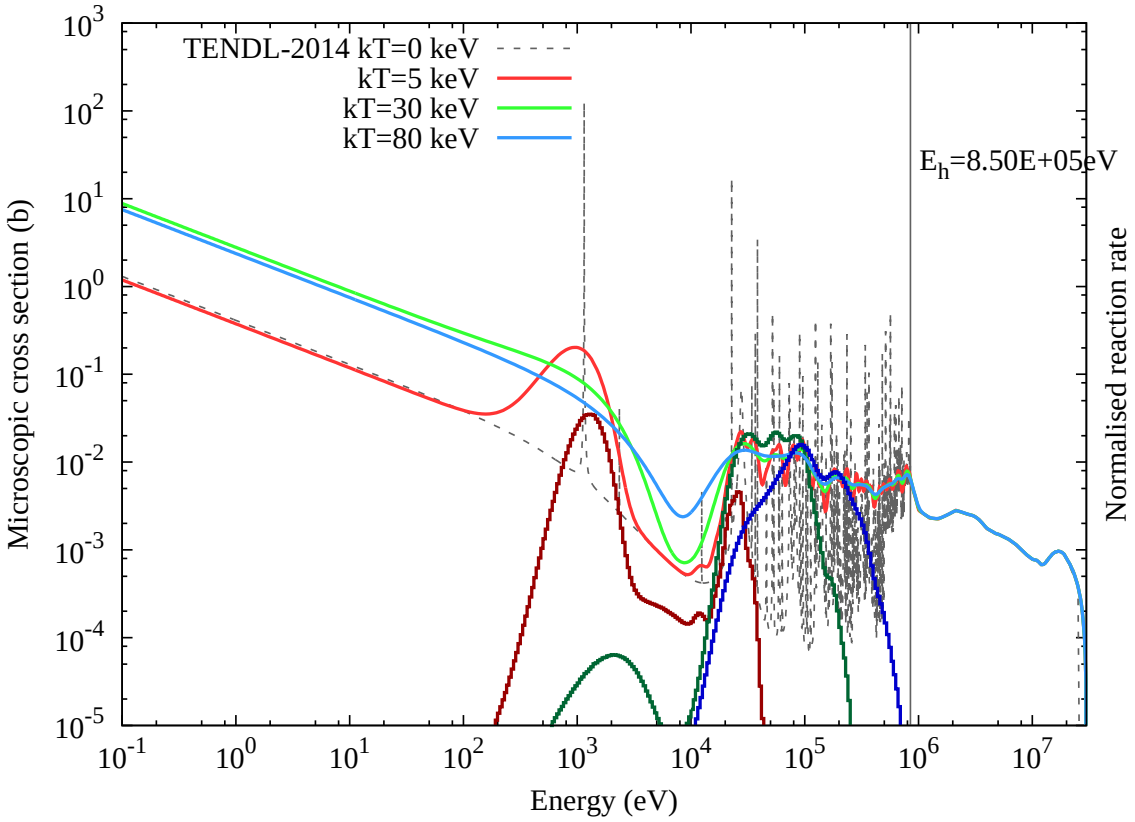


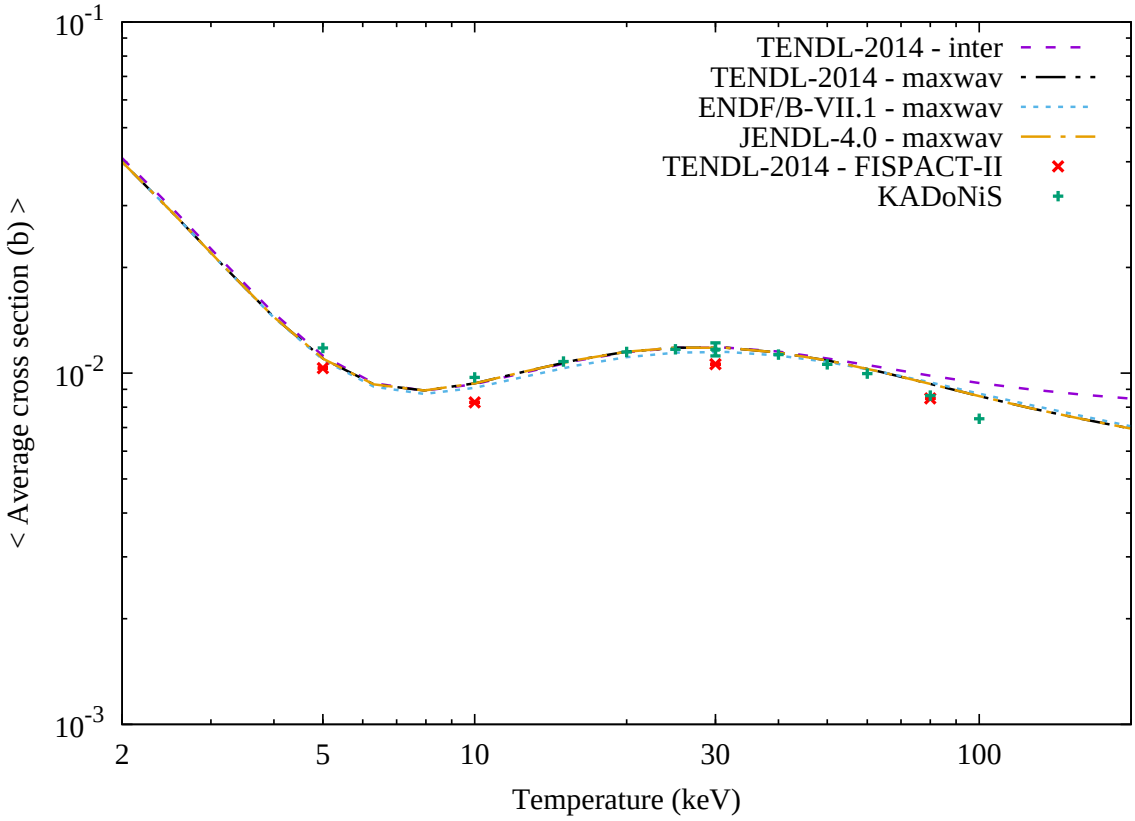
$^{55}Fe_{26}$ $[T_{1/2} = 2.73$ years$]$ (KADoNiS=SMC)



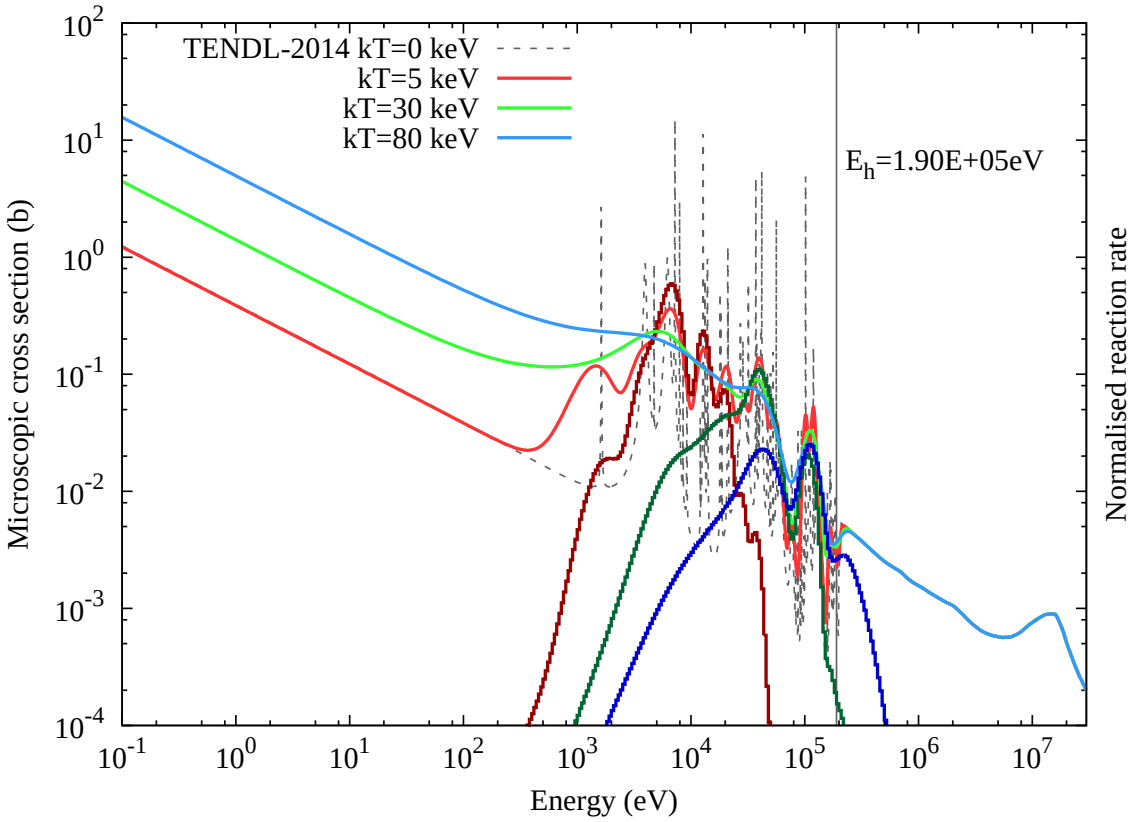


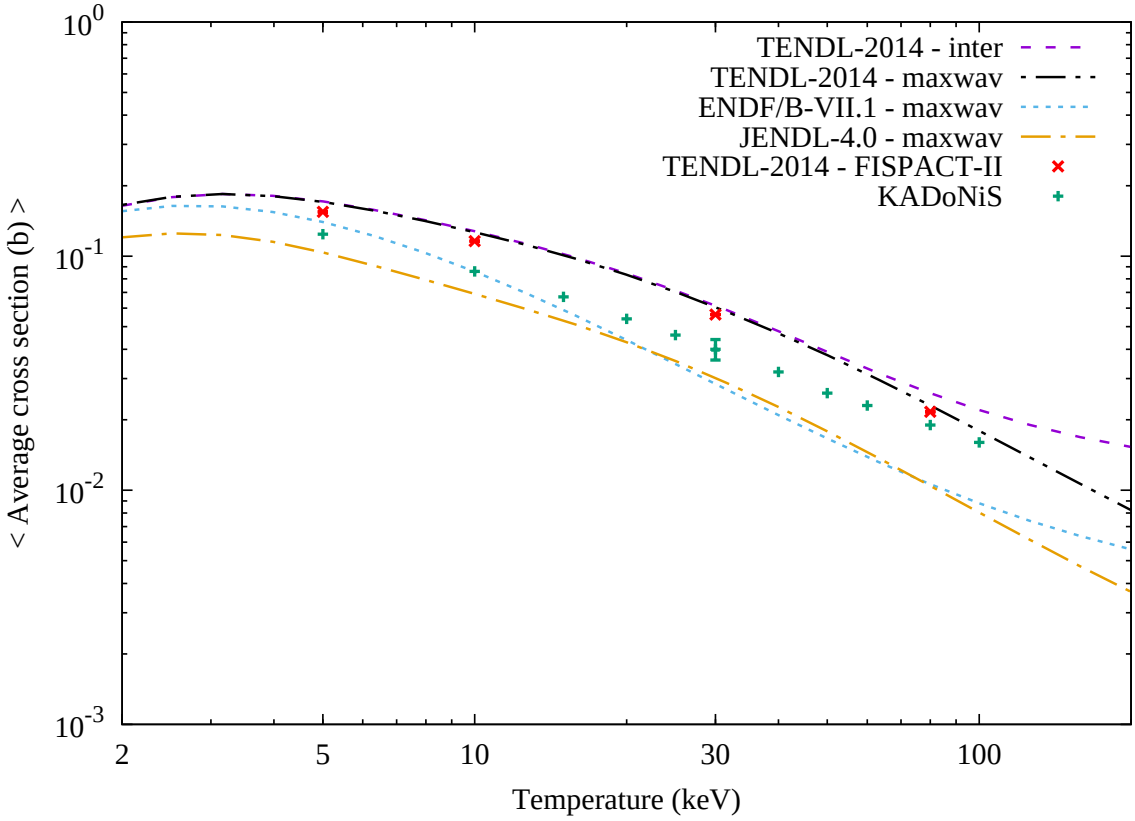
$^{56}Fe_{26}$ [Stable]



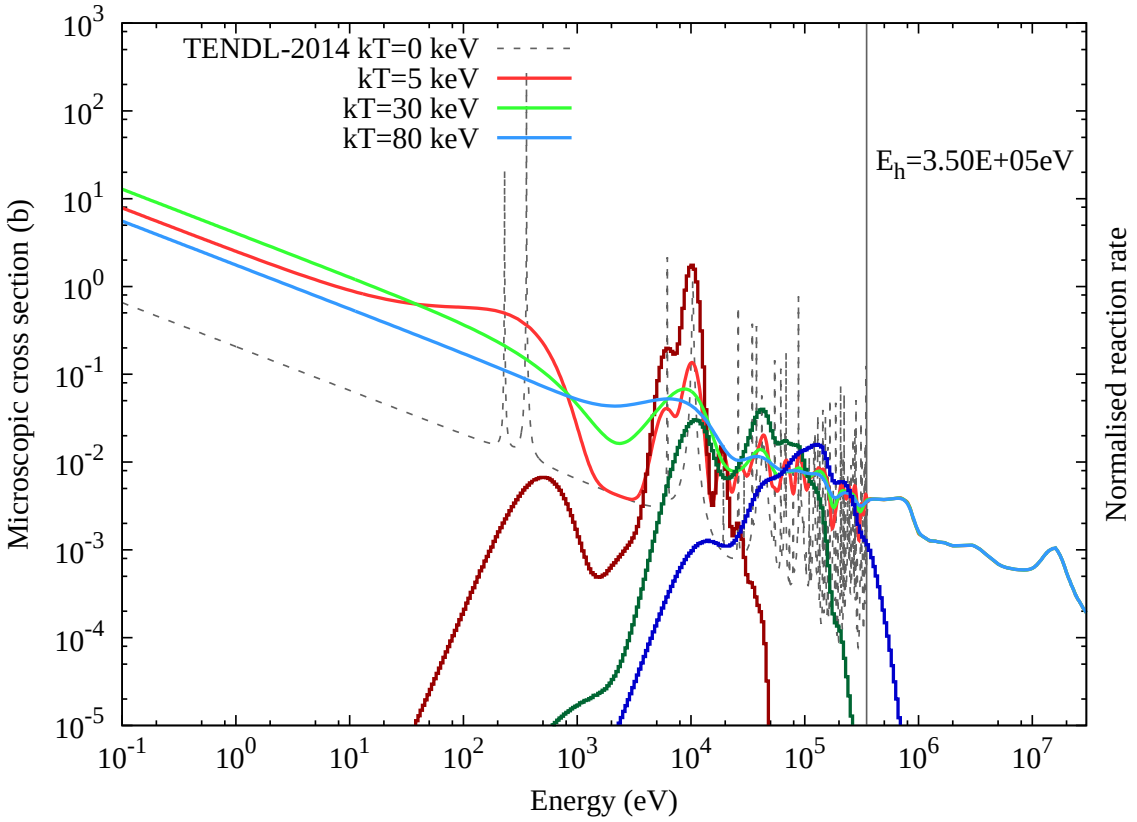


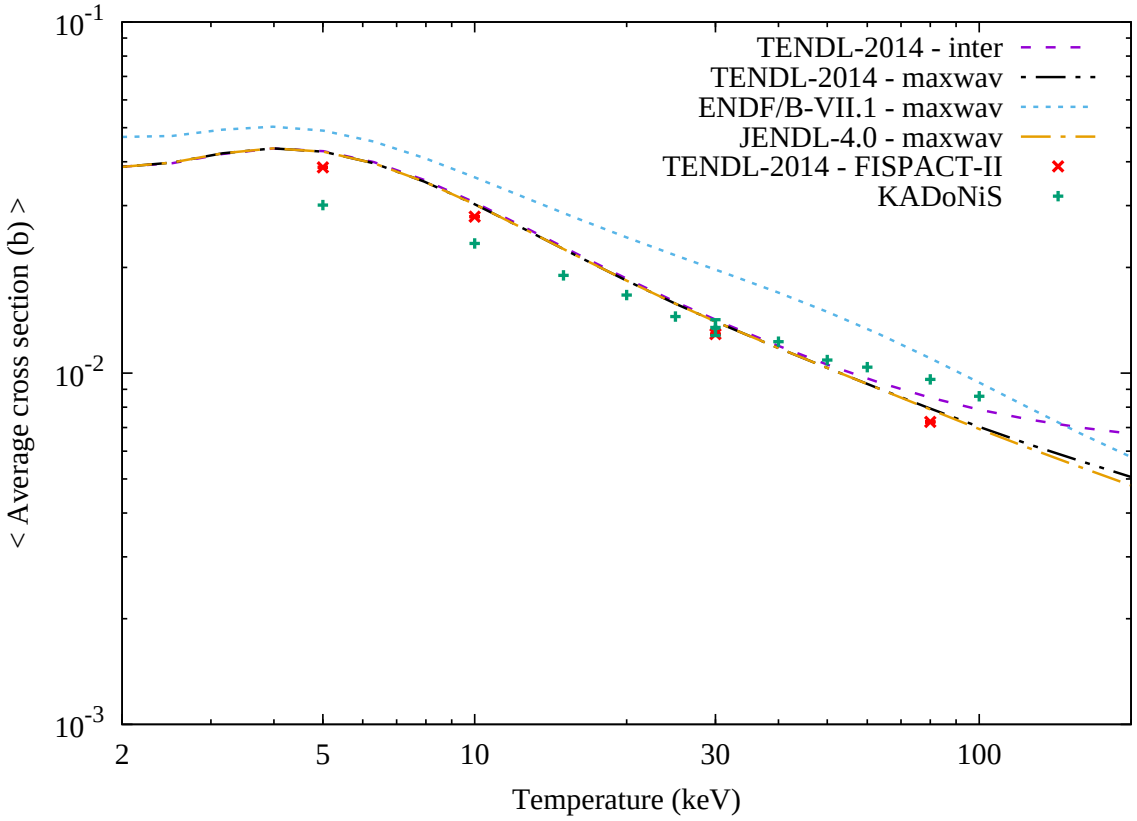
$^{57}Fe_{26}$ [Stable]



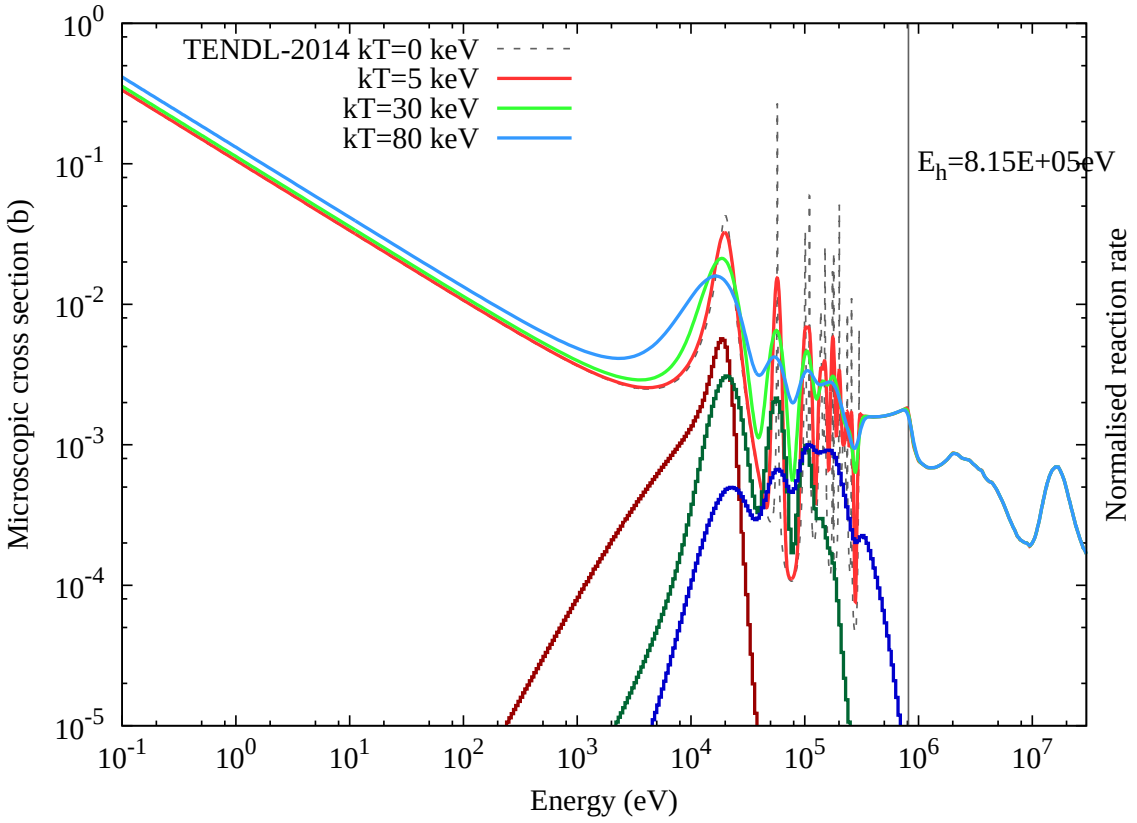


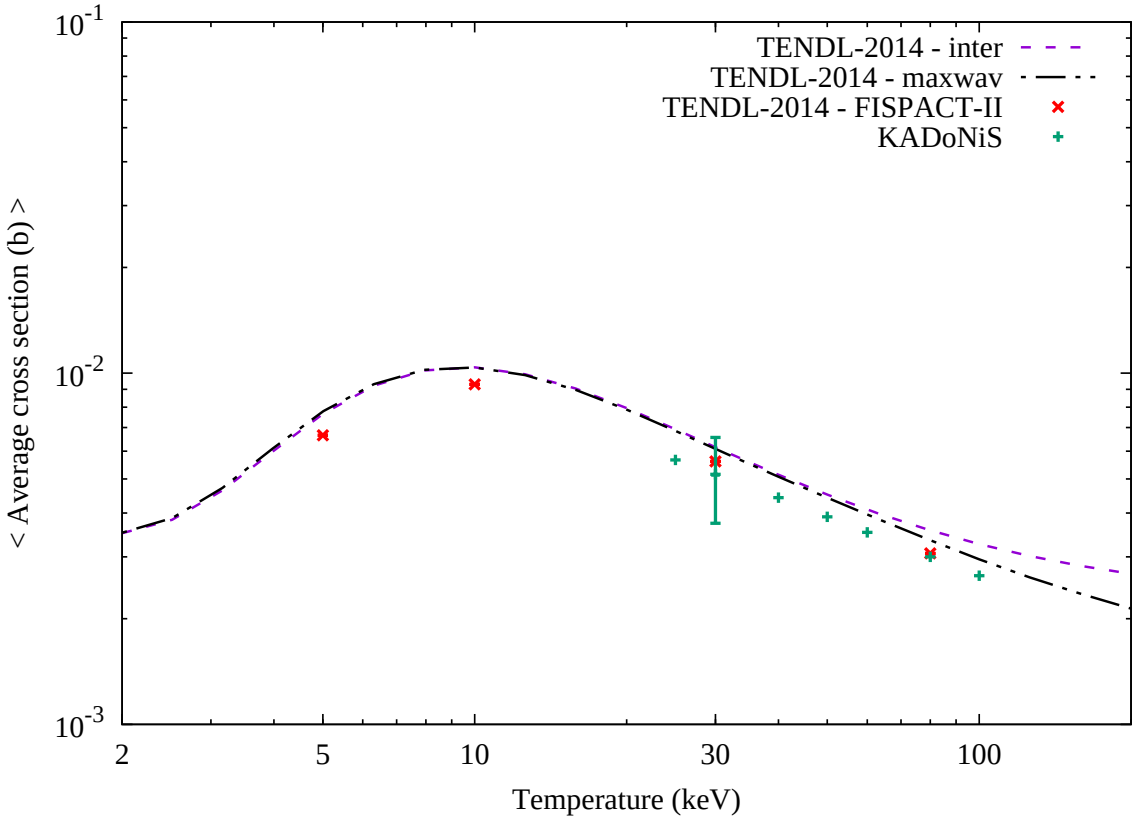
$^{58}Fe_{26}$ [Stable]



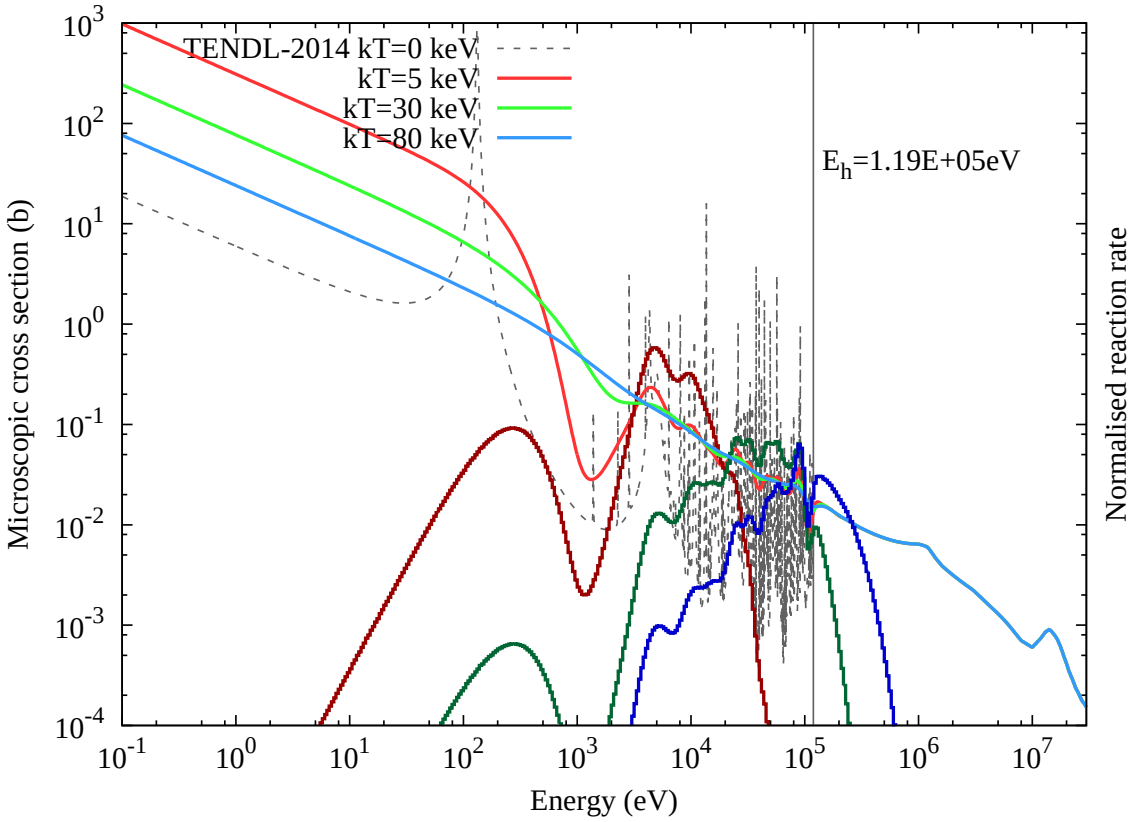


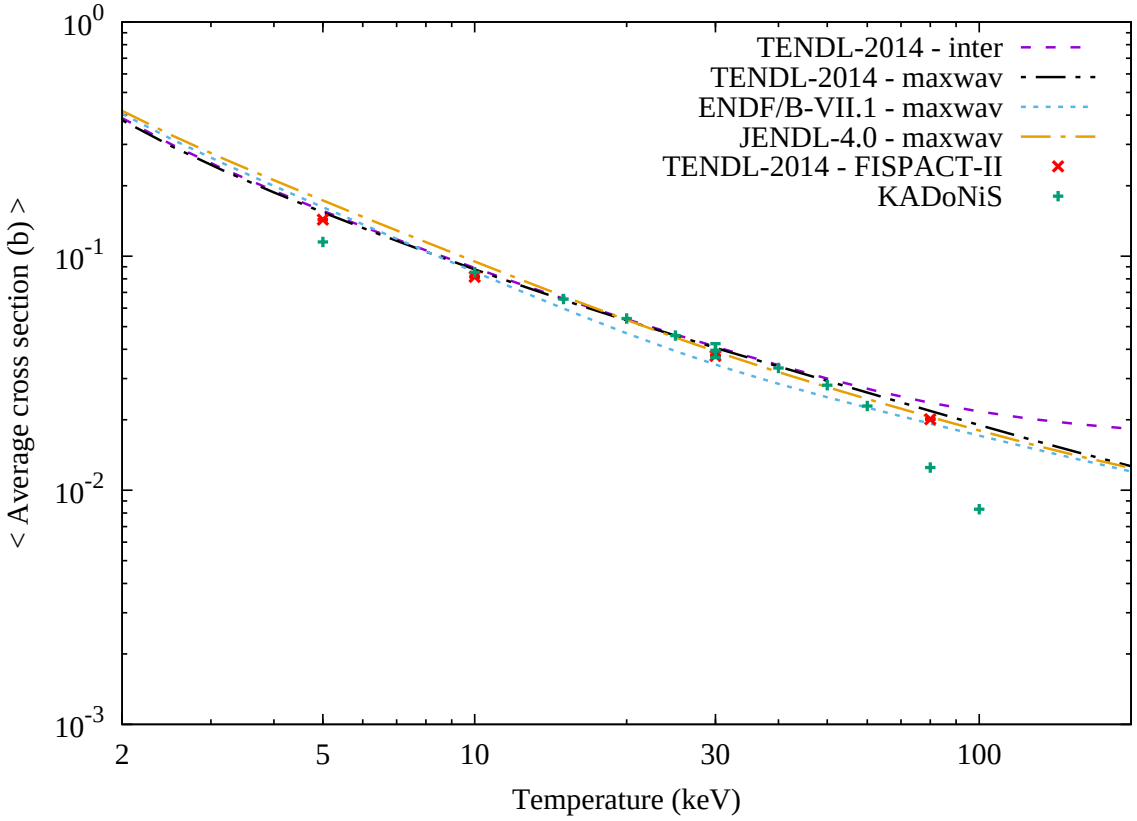
$^{60}Fe_{26}$ $[T_{1/2} = 1.50 \times 10^6$ years] (KADoNiS=SMC)



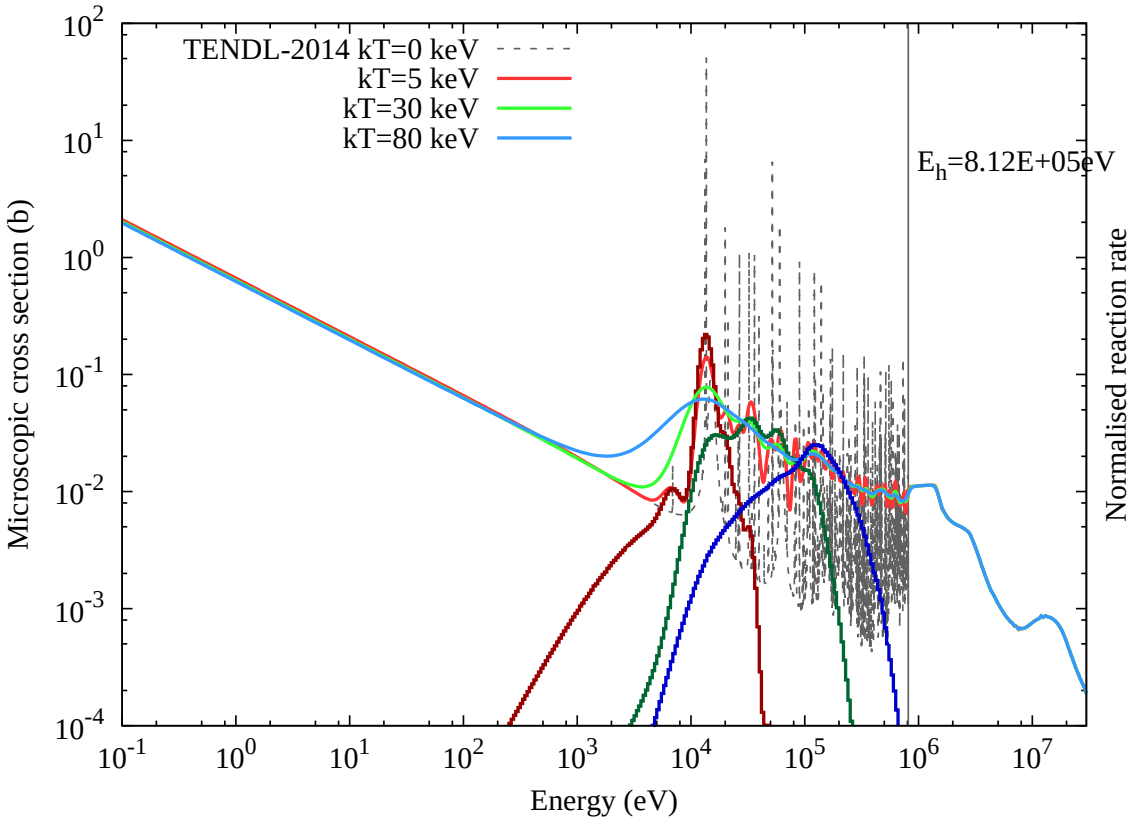


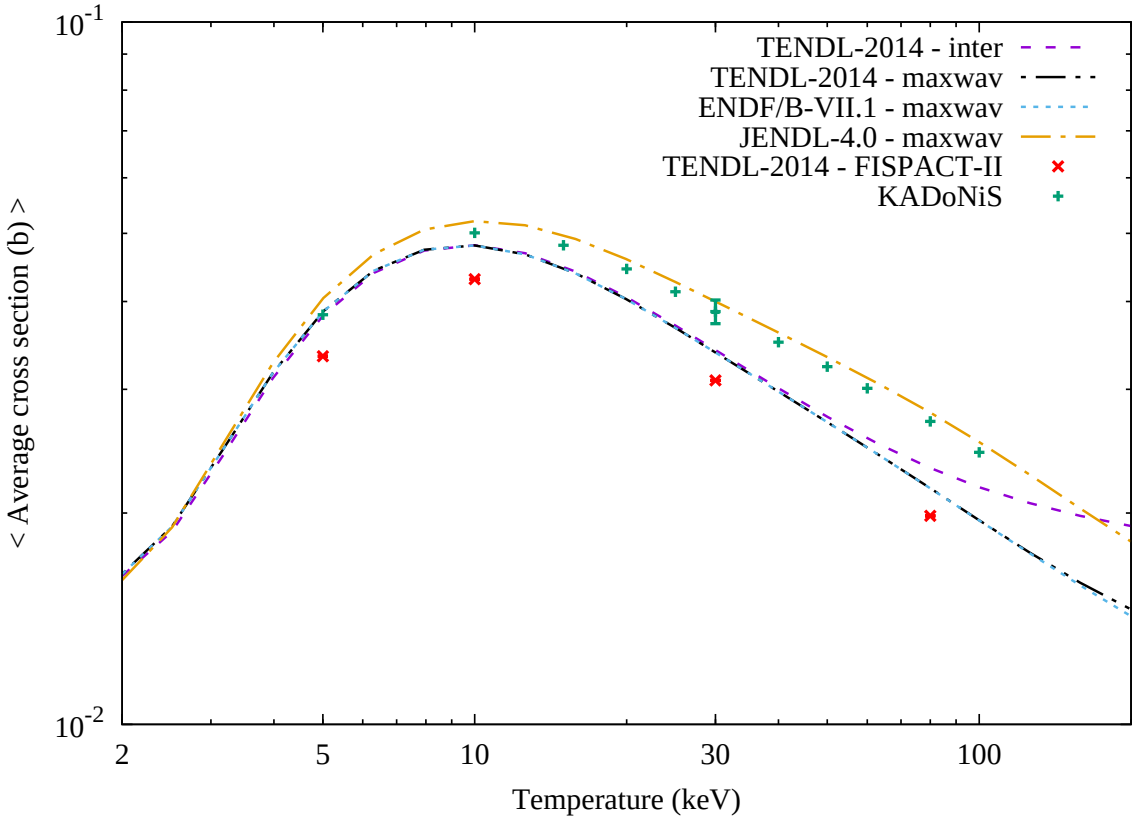
$^{59}Co_{27}$ [Stable]



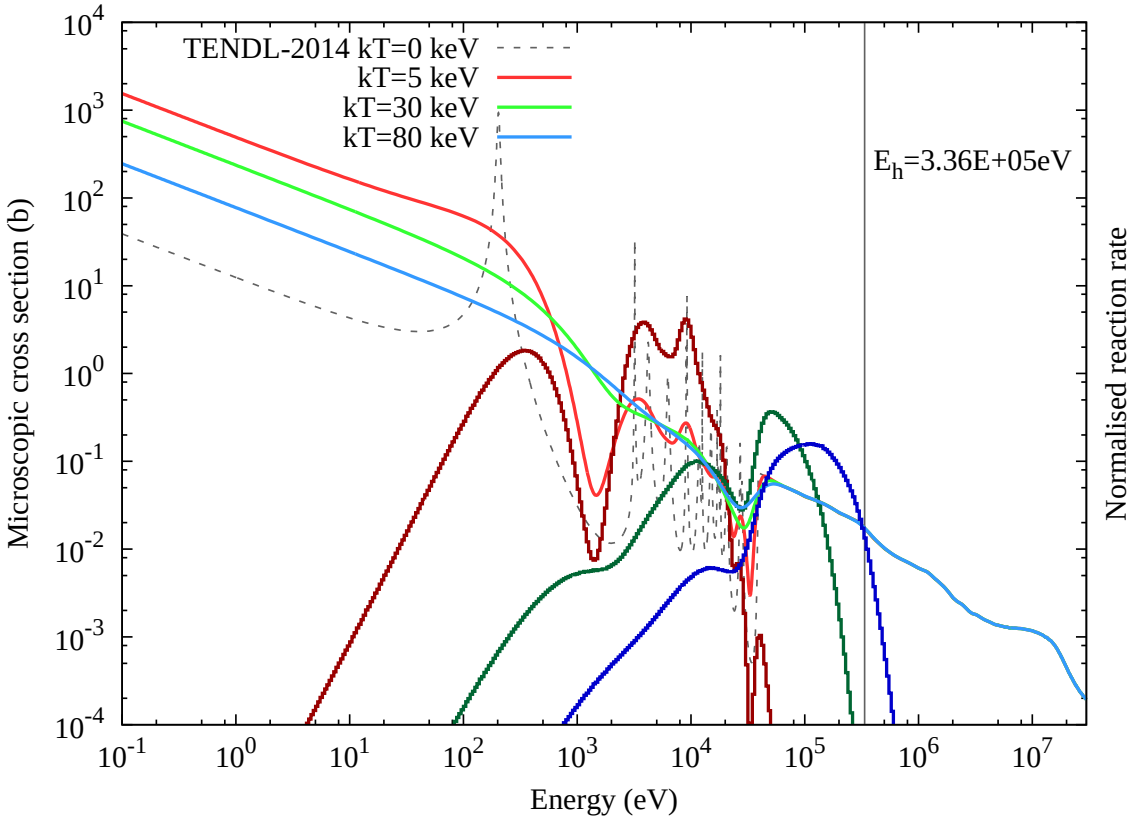


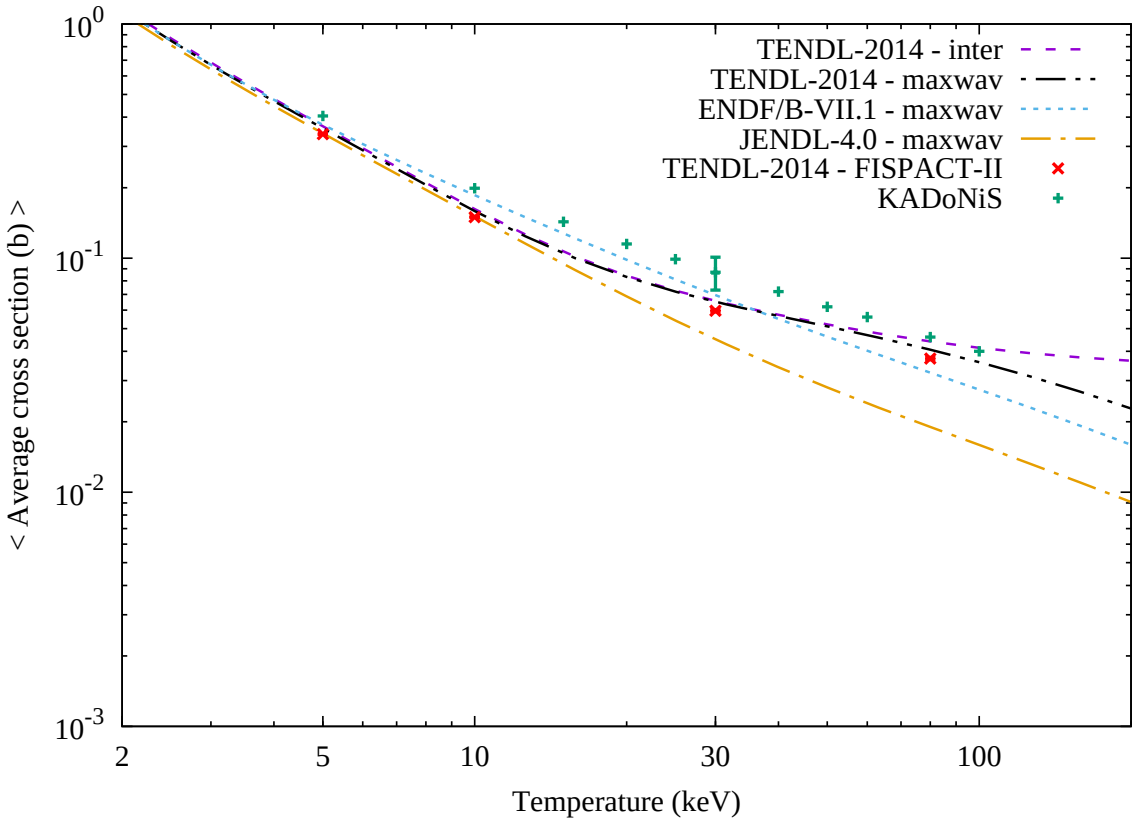
$^{58}Ni_{28}$ $[T_{1/2} = 7.00 \times 10^{20}$ years$]$



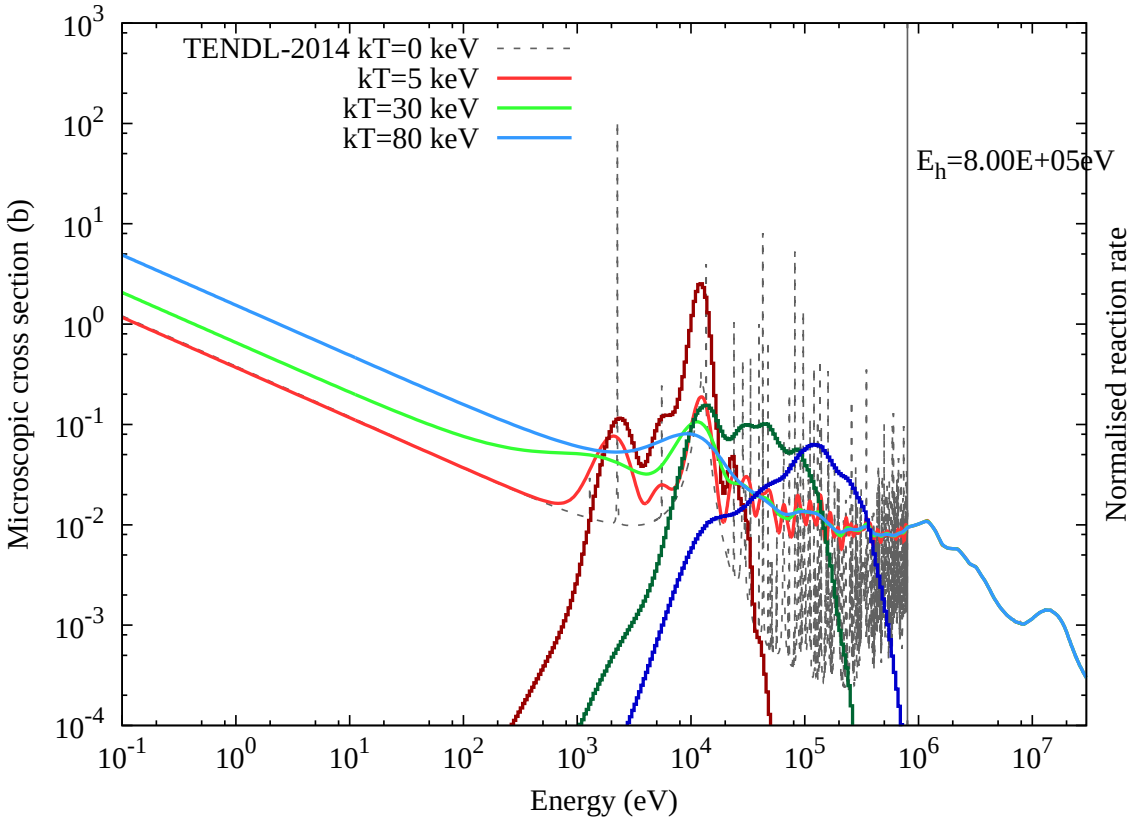


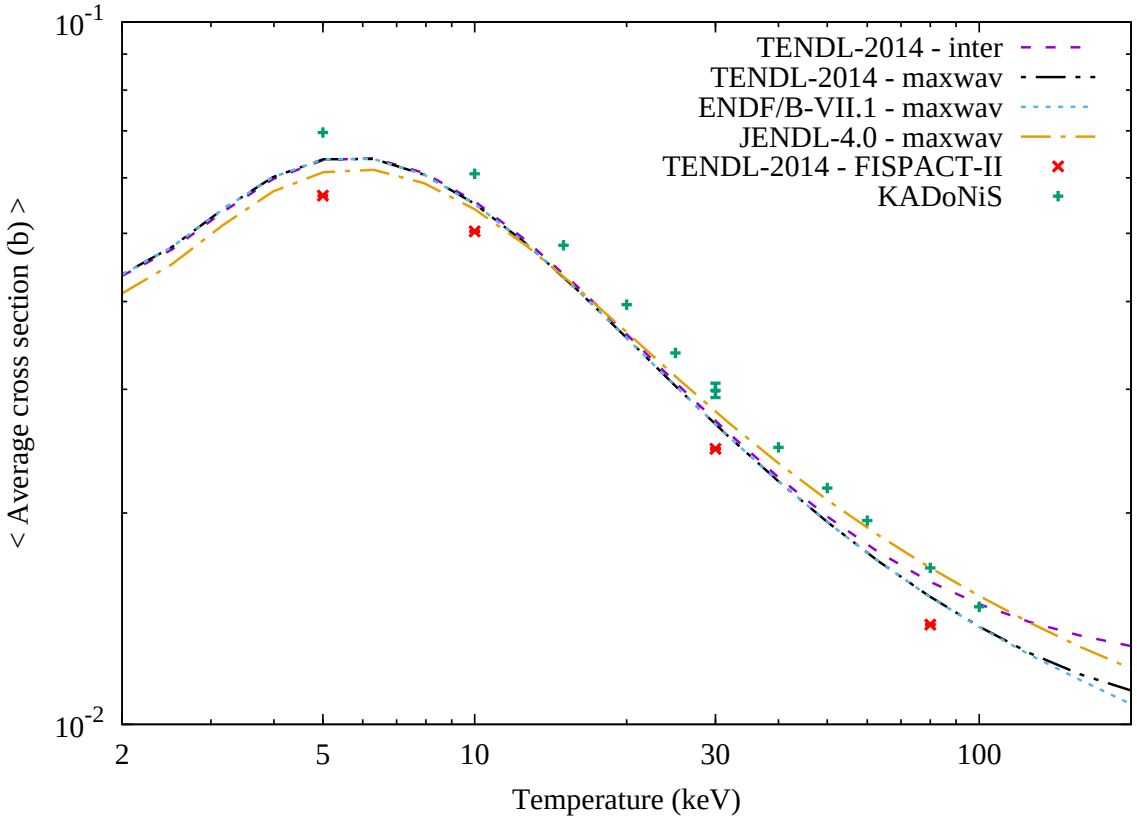
$^{59}Ni_{28}$ $[T_{1/2} = 7.60 \times 10^4$ years] (KADoNiS=SMC)



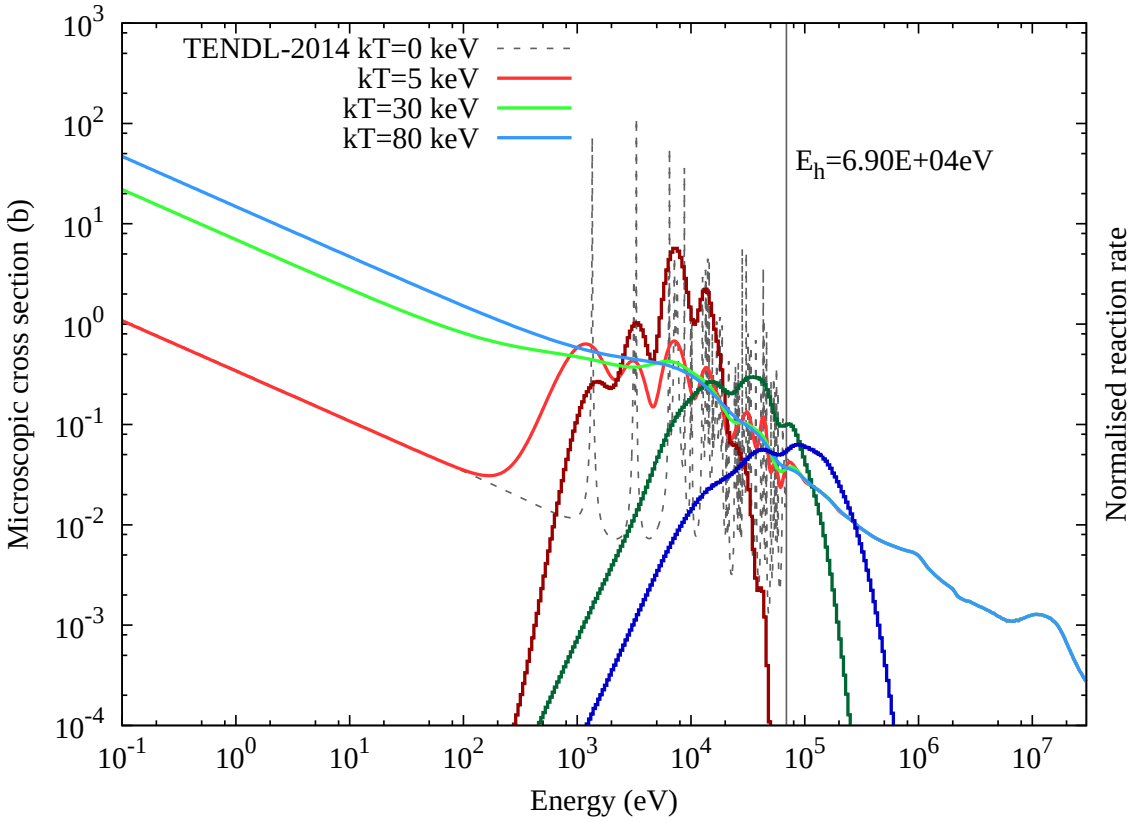


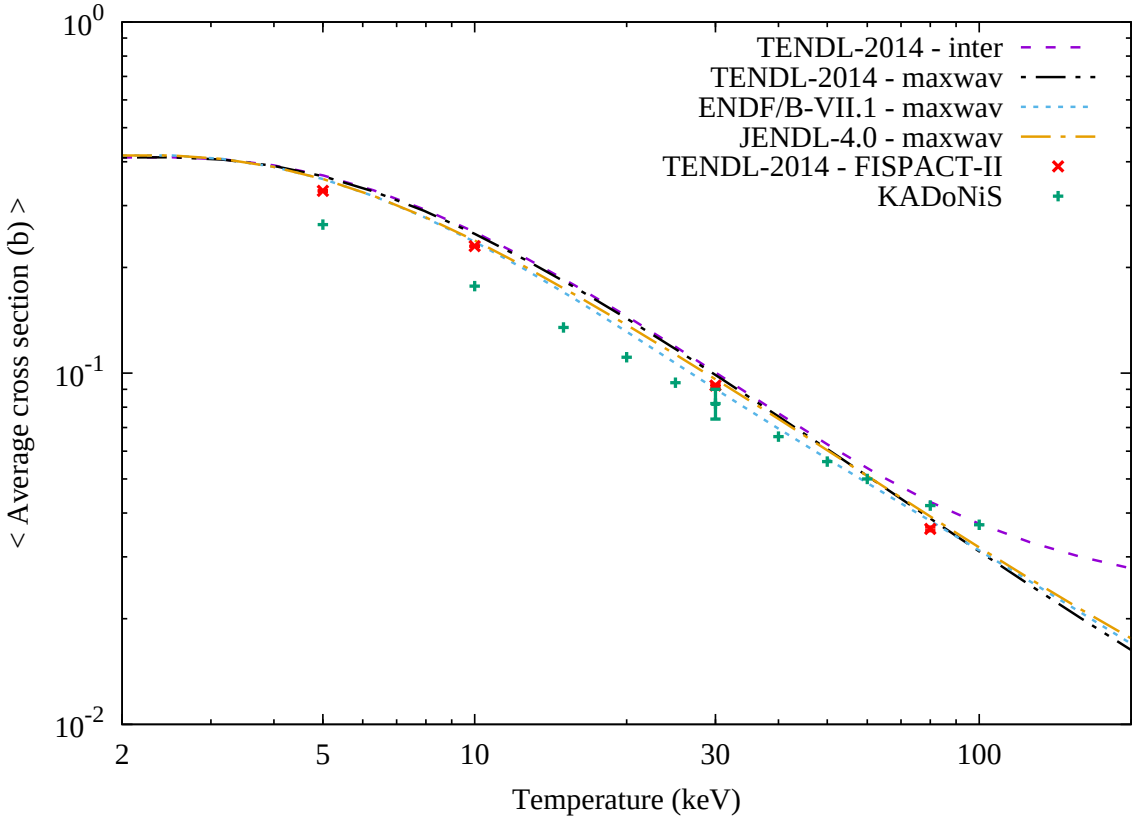
$^{60}Ni_{28}$ [Stable]



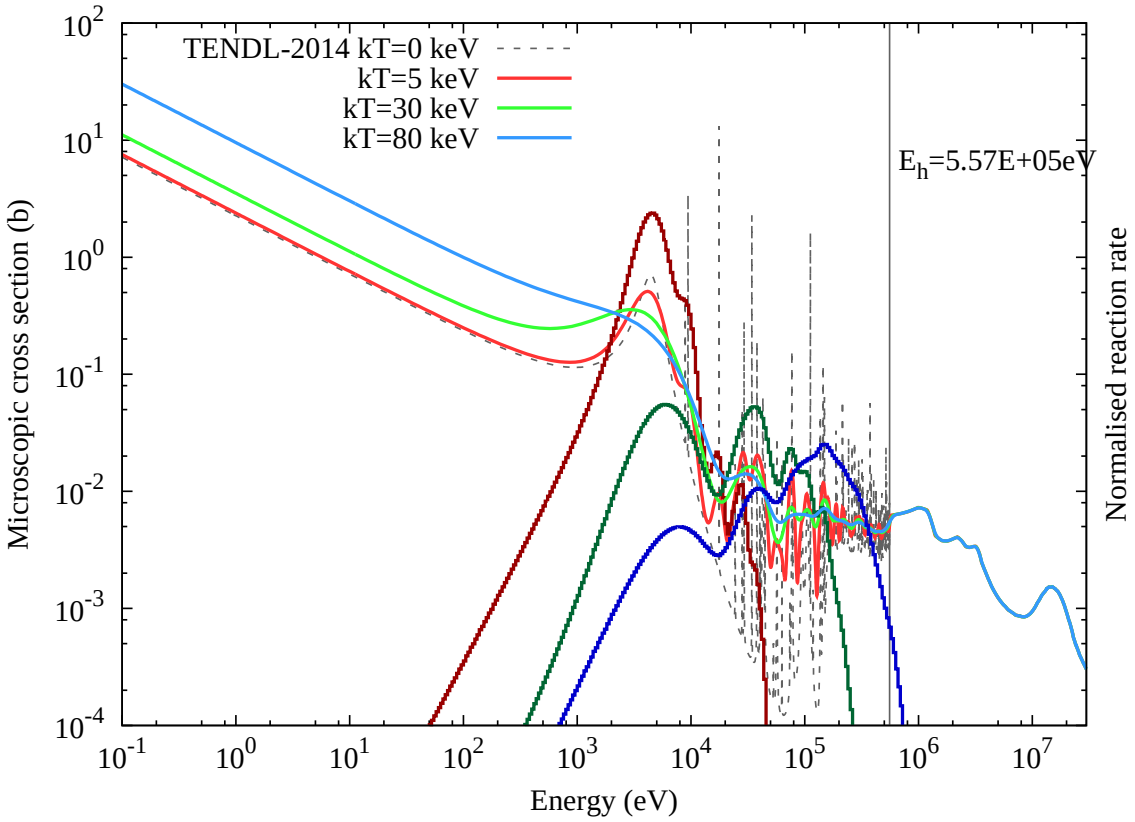


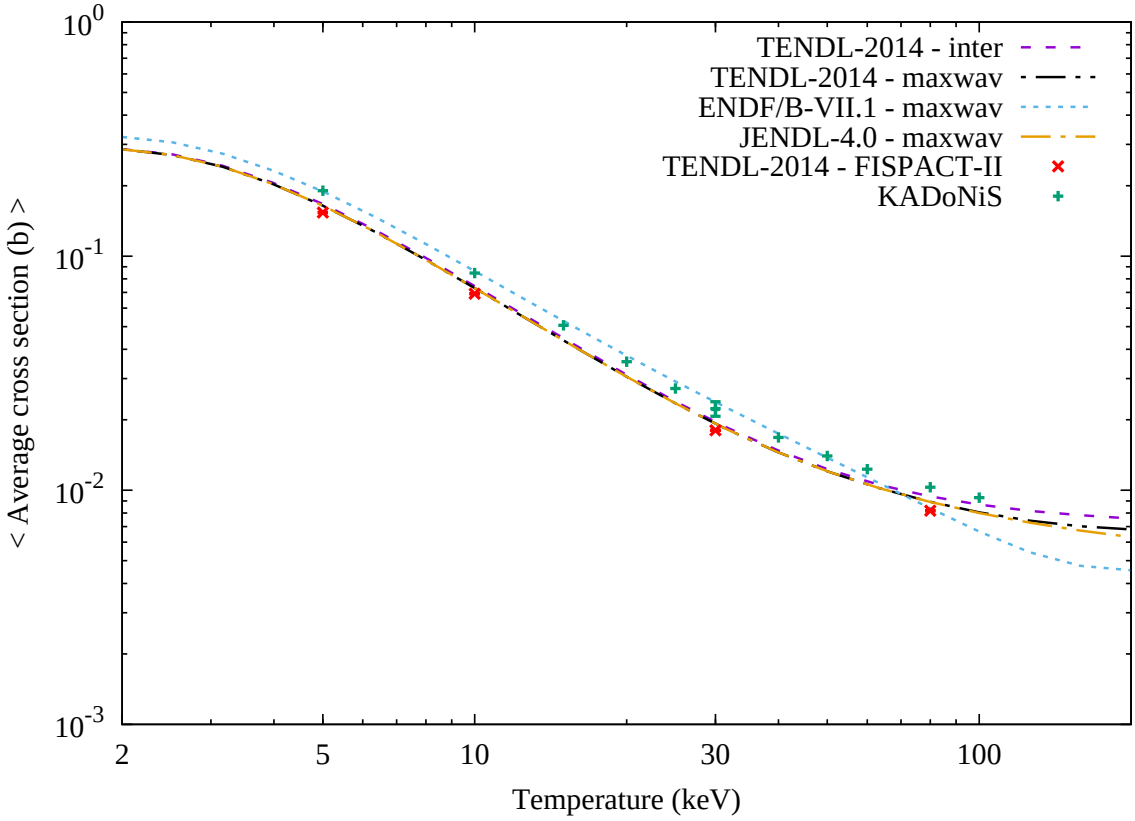
$^{61}Ni_{28}$ [Stable]



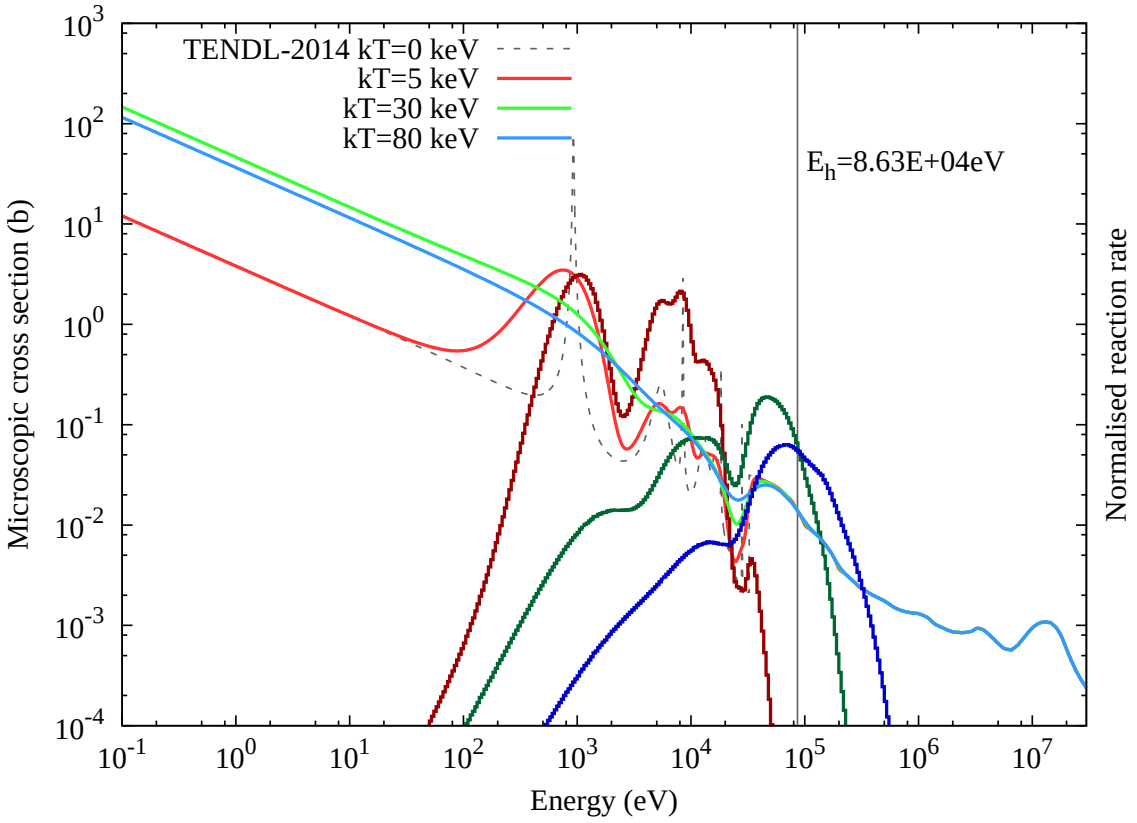


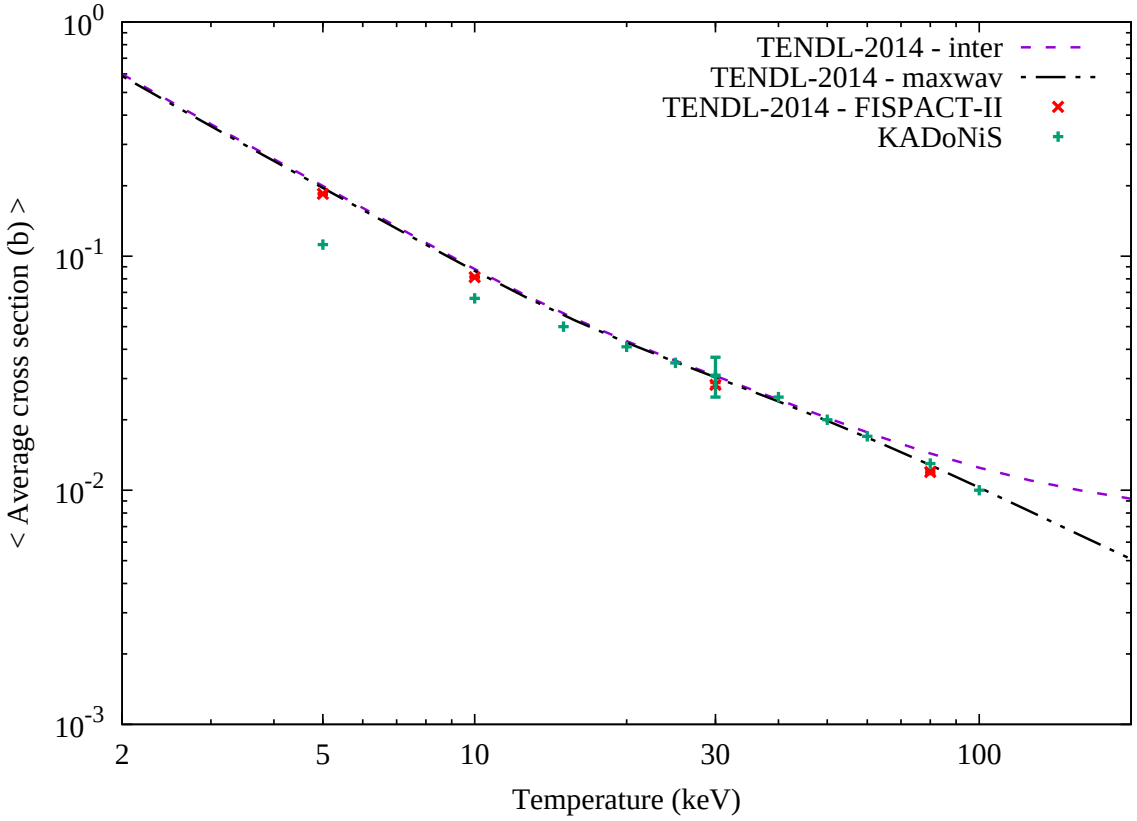
$^{62}Ni_{28}$ [Stable]



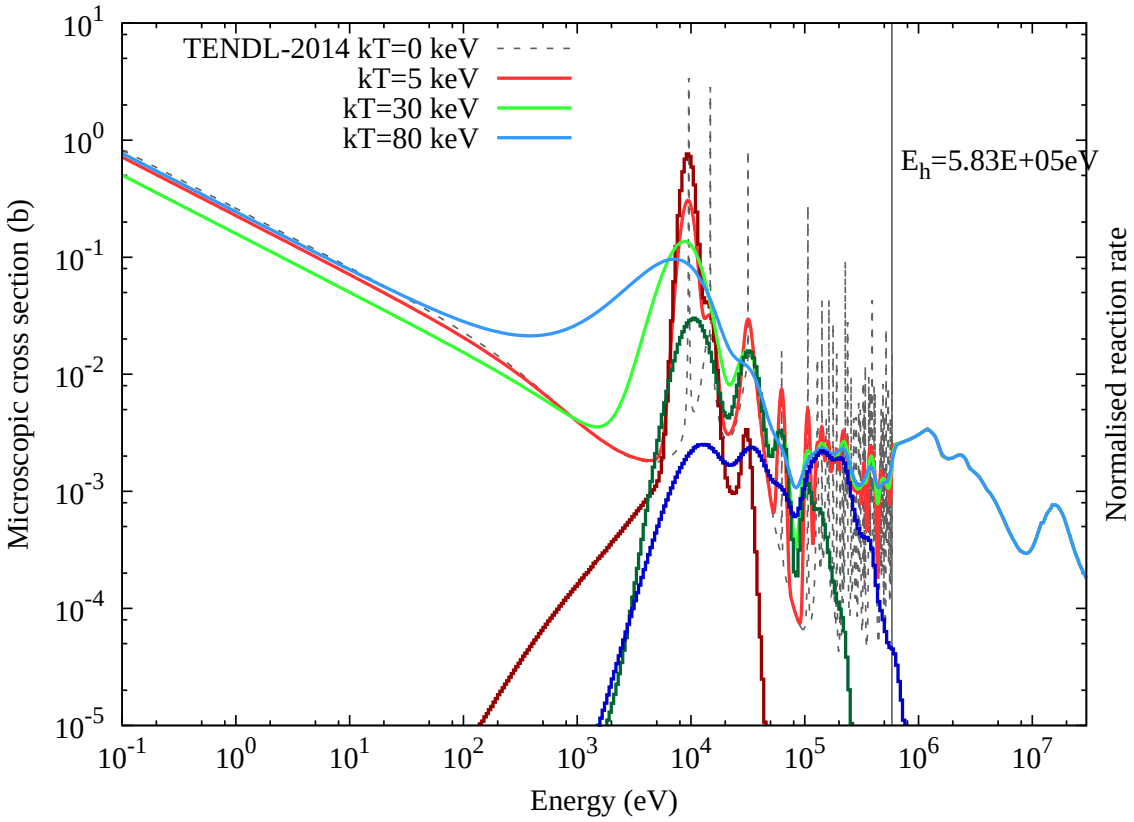


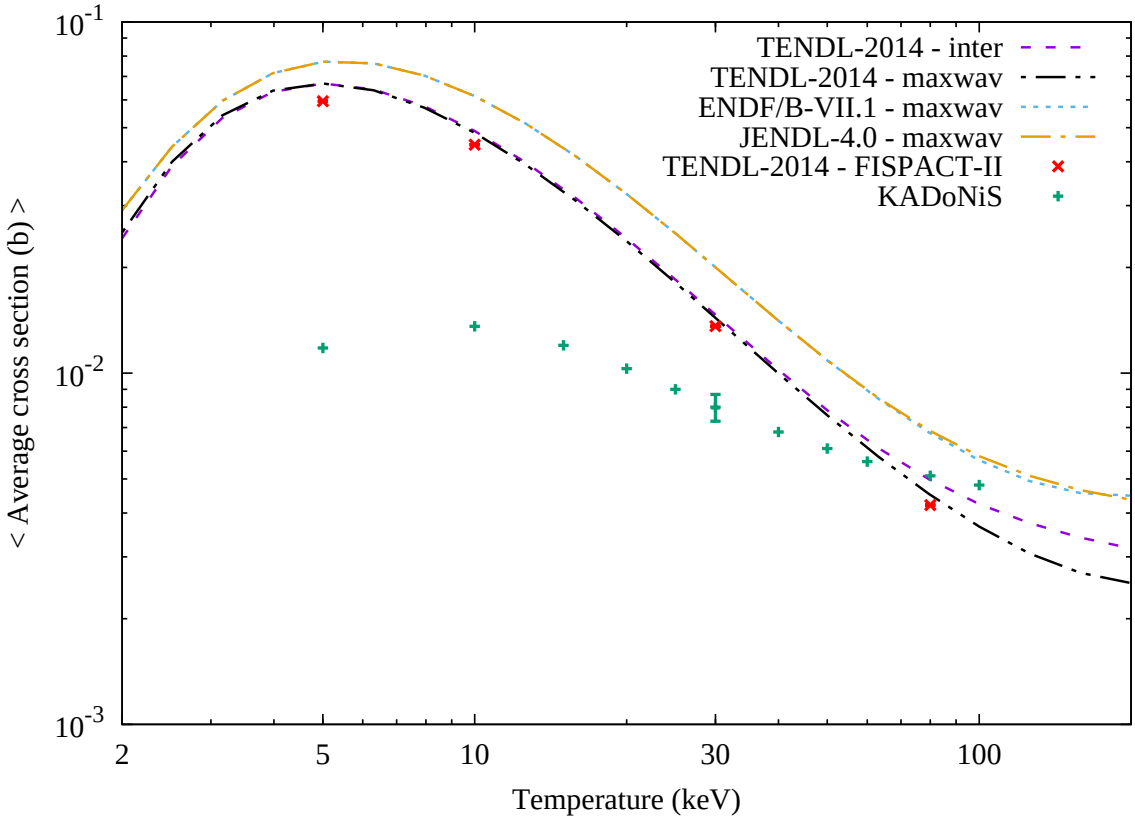
$^{63}Ni_{28}$ $[T_{1/2} = 100.60$ years$]$ (KADoNiS=SMC)



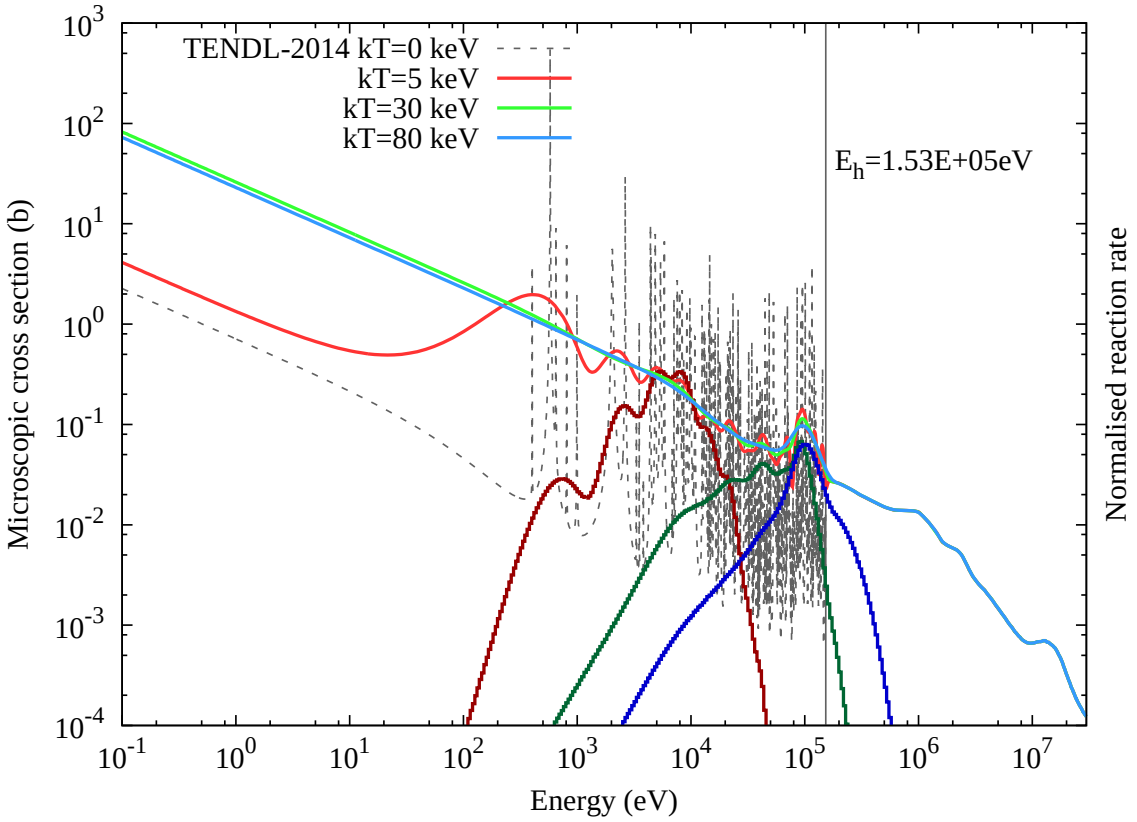


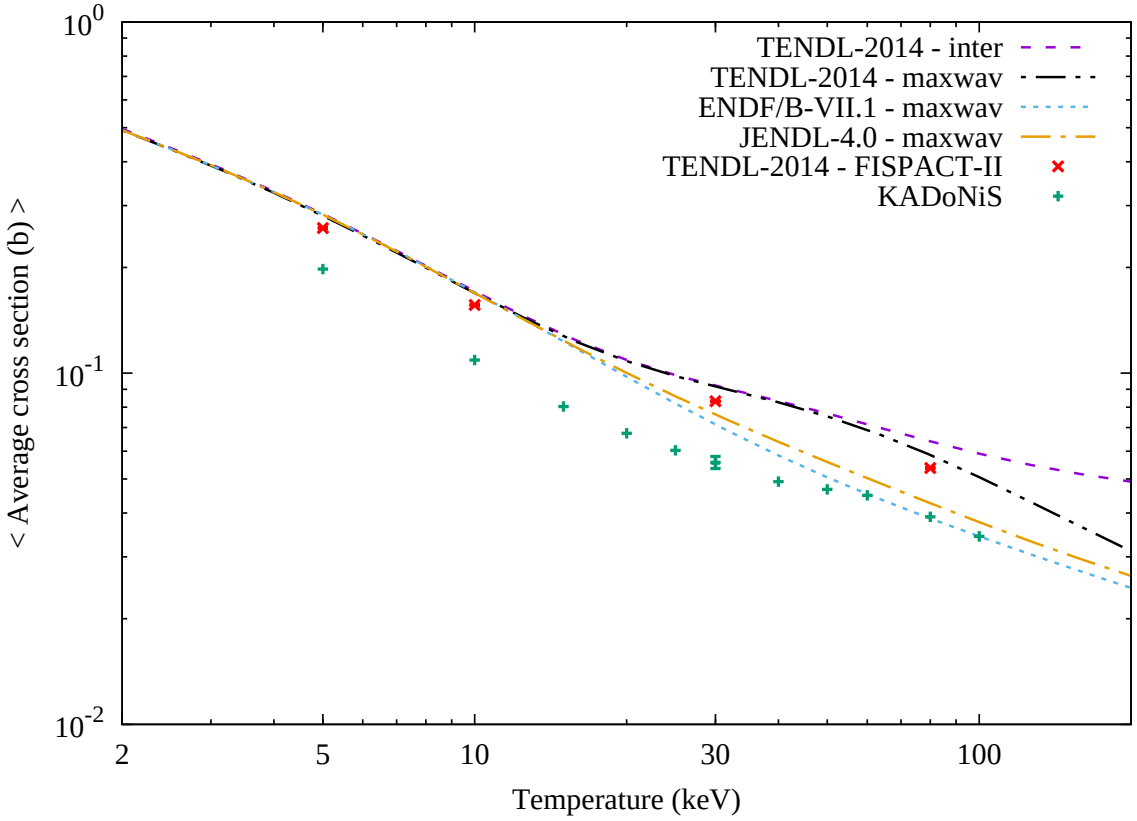
$^{64}Ni_{28}$ [Stable]



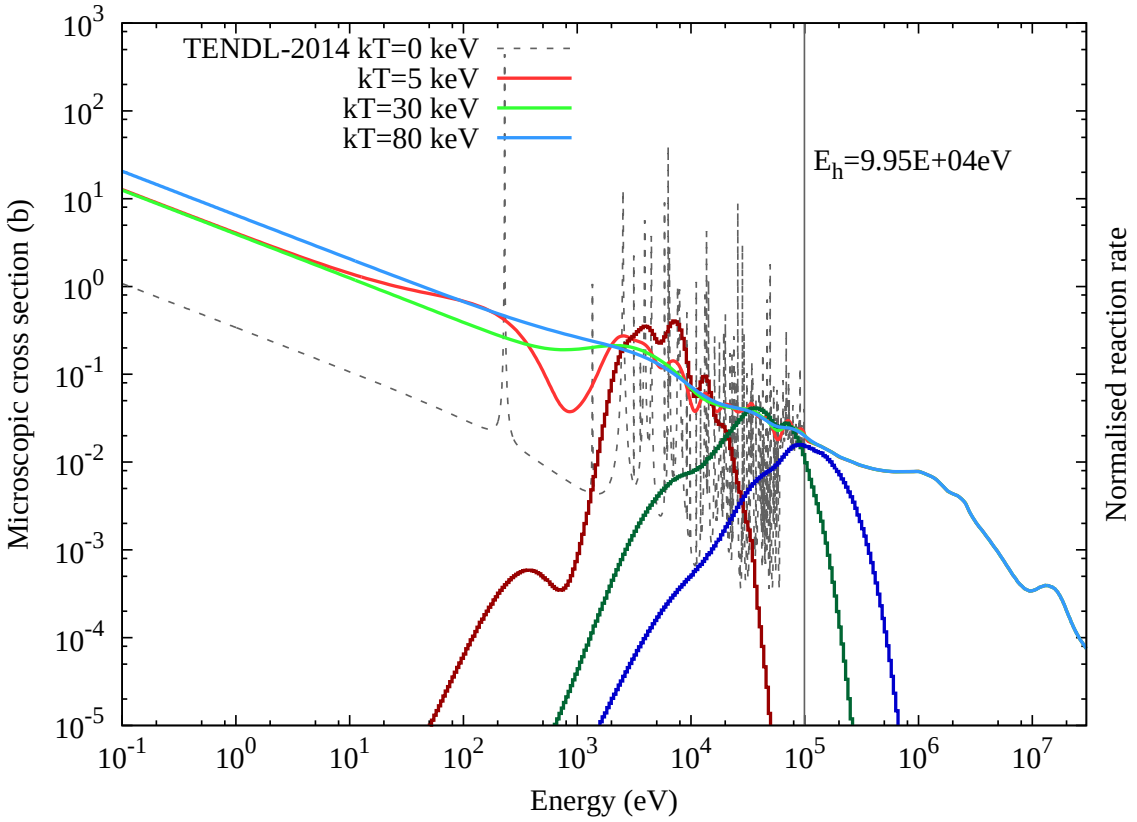


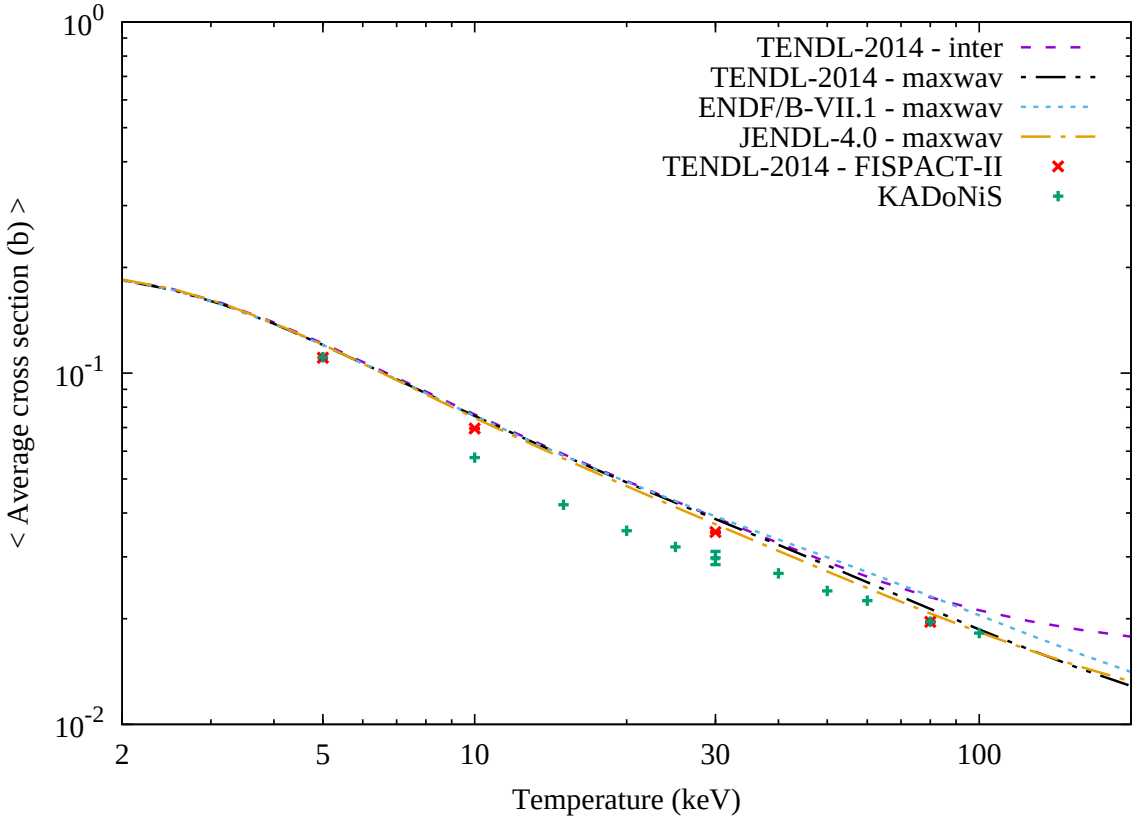
$^{63}Cu_{29}$ [Stable]



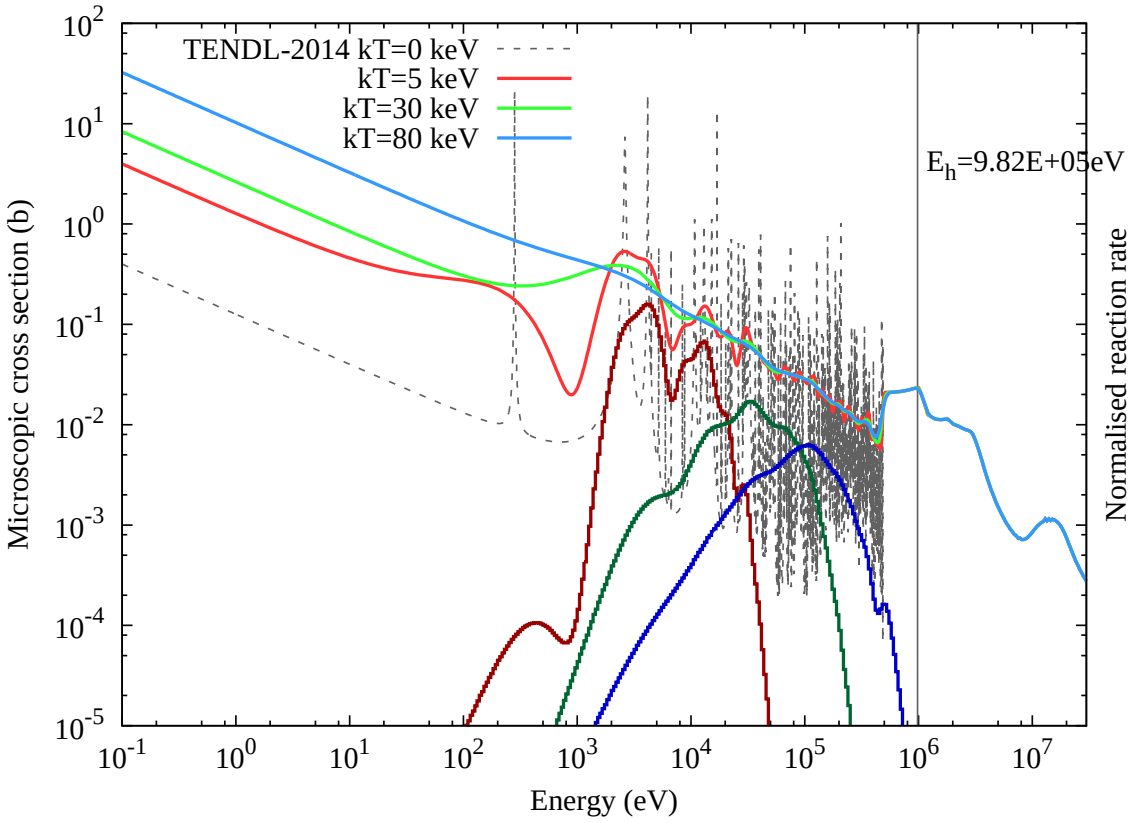


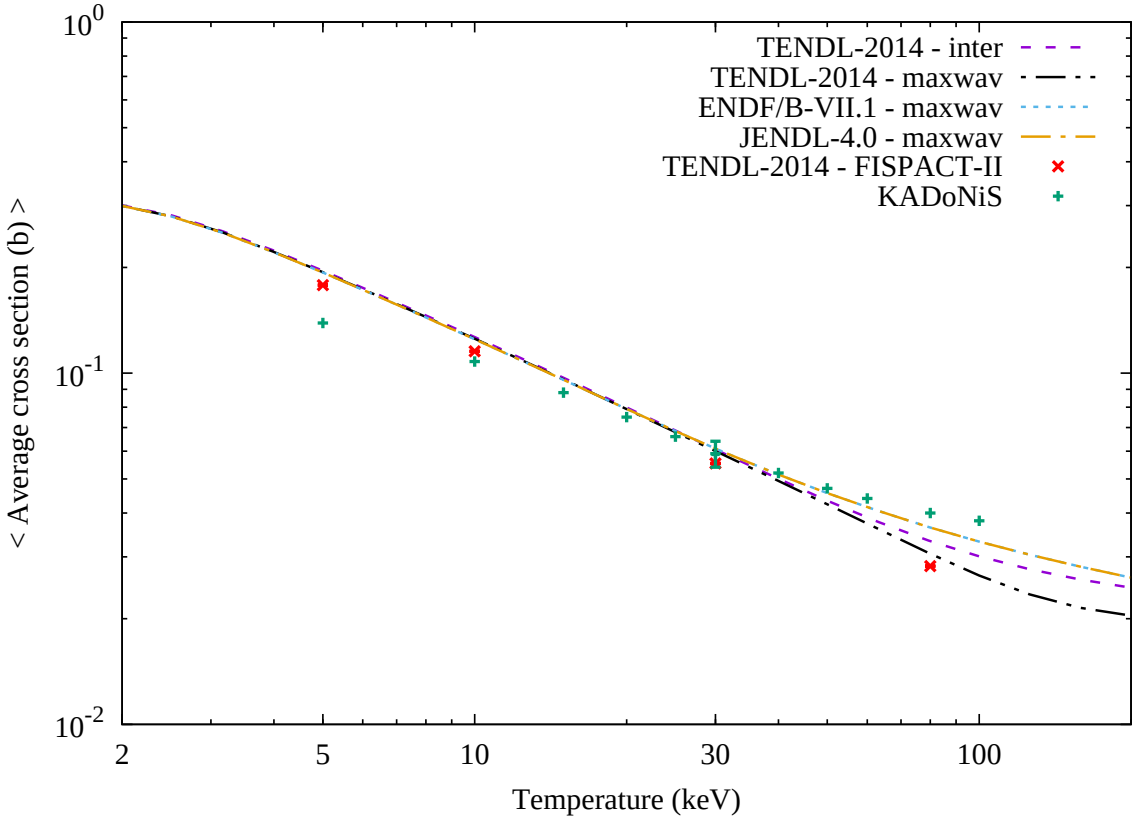
$^{65}Cu_{29}$ [Stable]



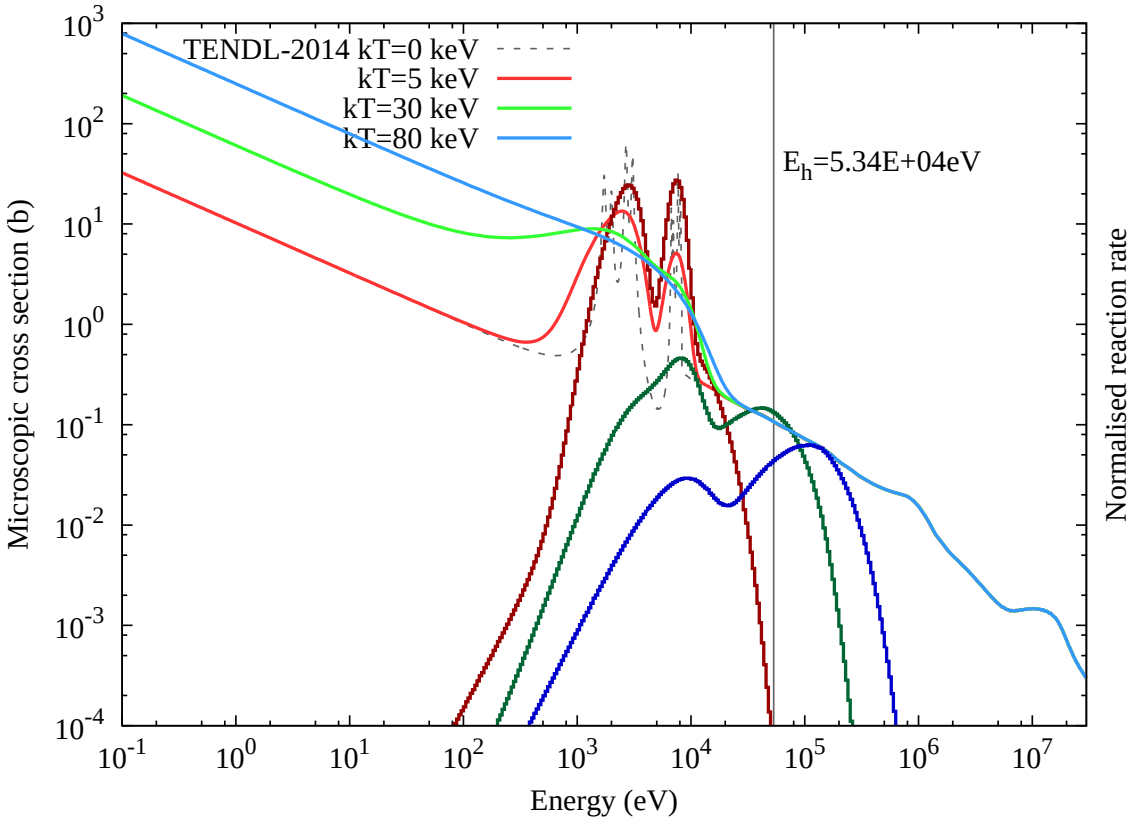


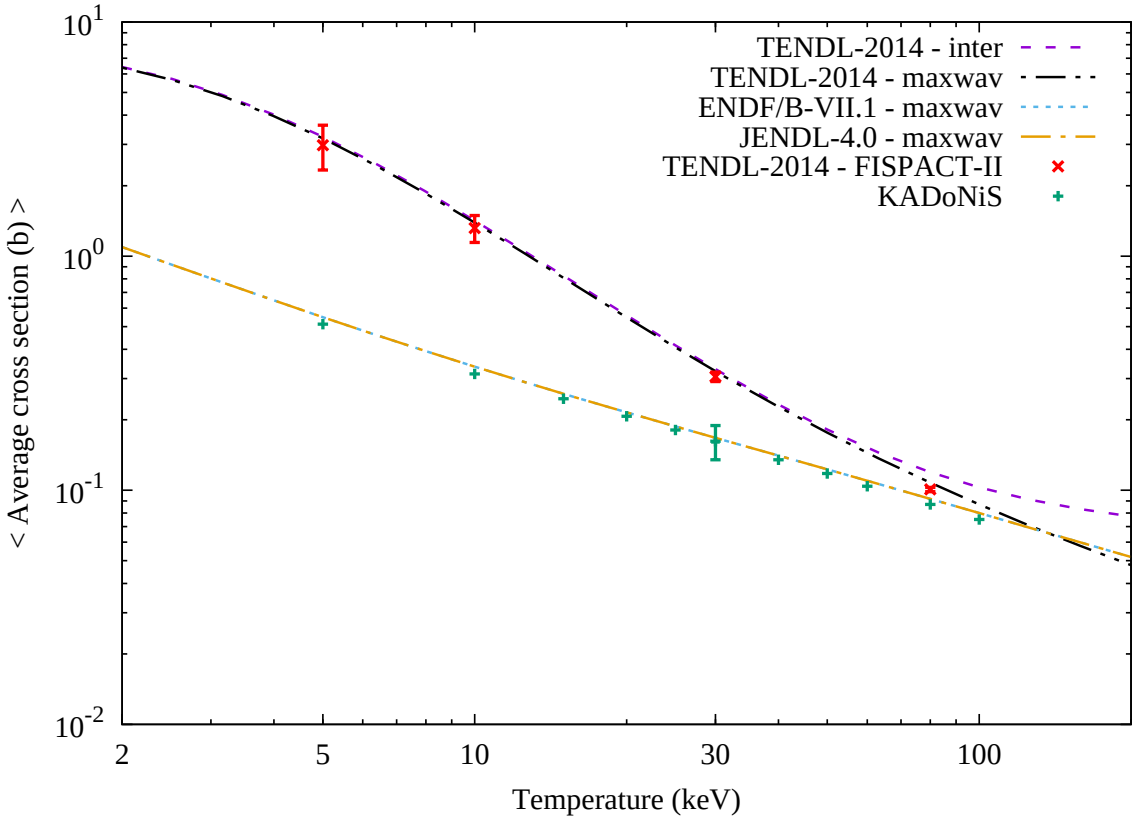
$^{64}Zn_{30}$ $[T_{1/2} = 2.30 \times 10^{18}$ years$]$



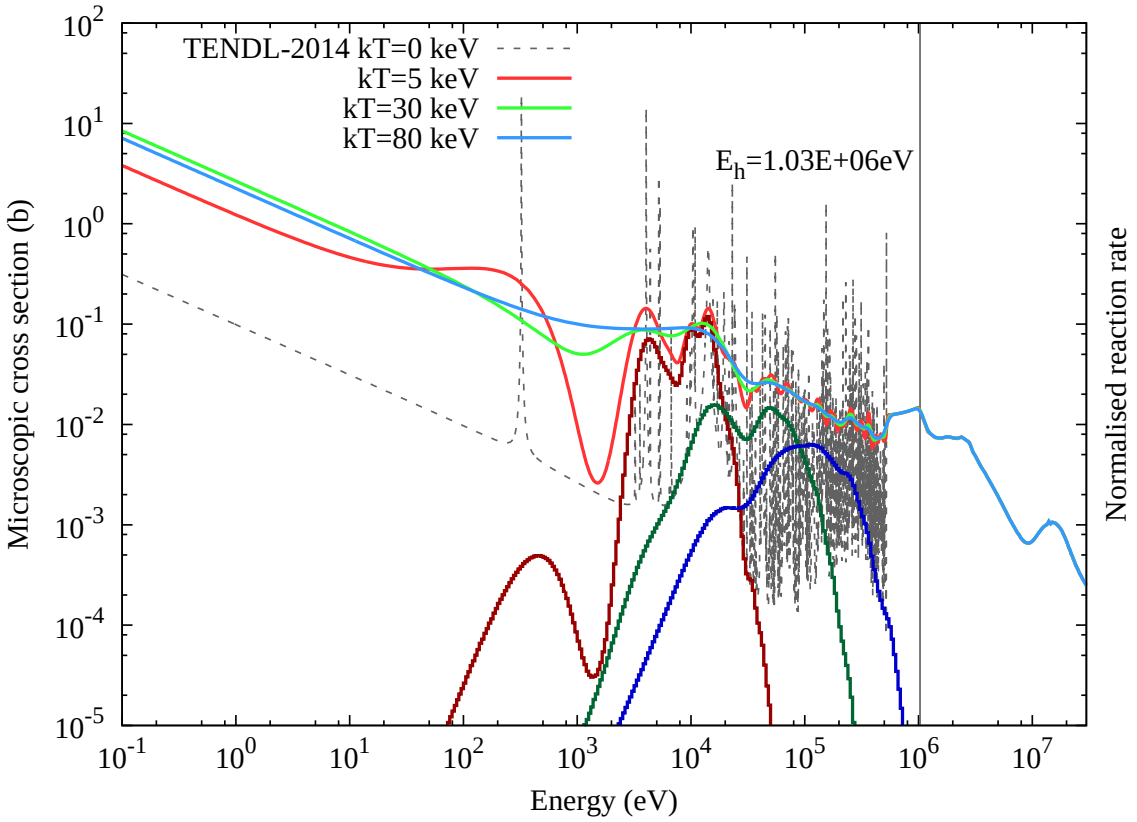


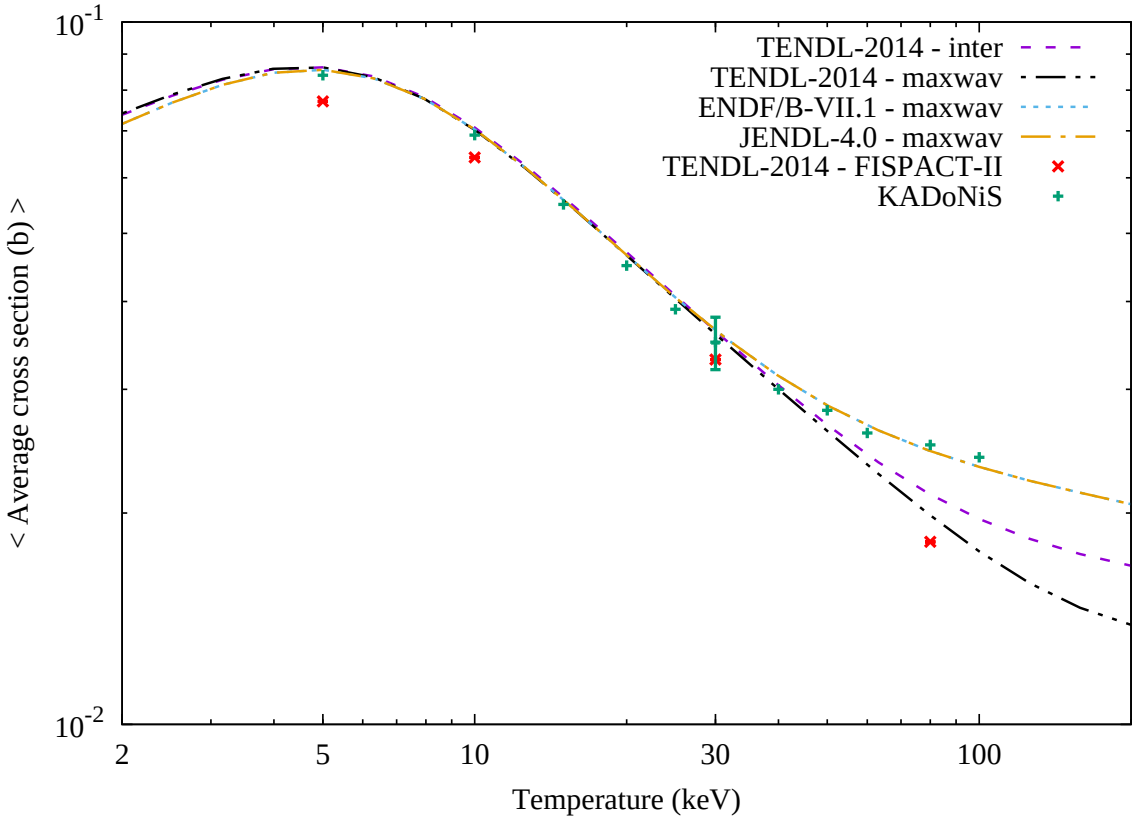
$^{65}Zn_{30}$ $[T_{1/2} = 244.15$ days$]$ (KADoNiS=SMC)



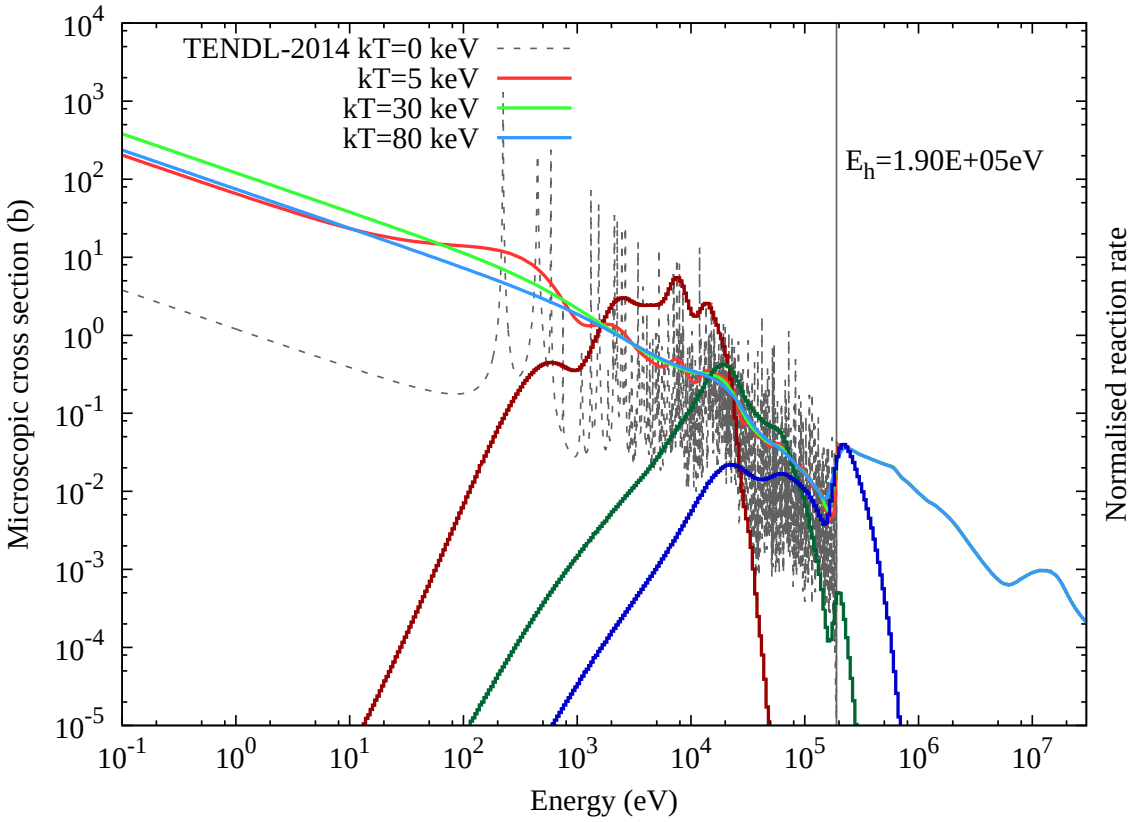


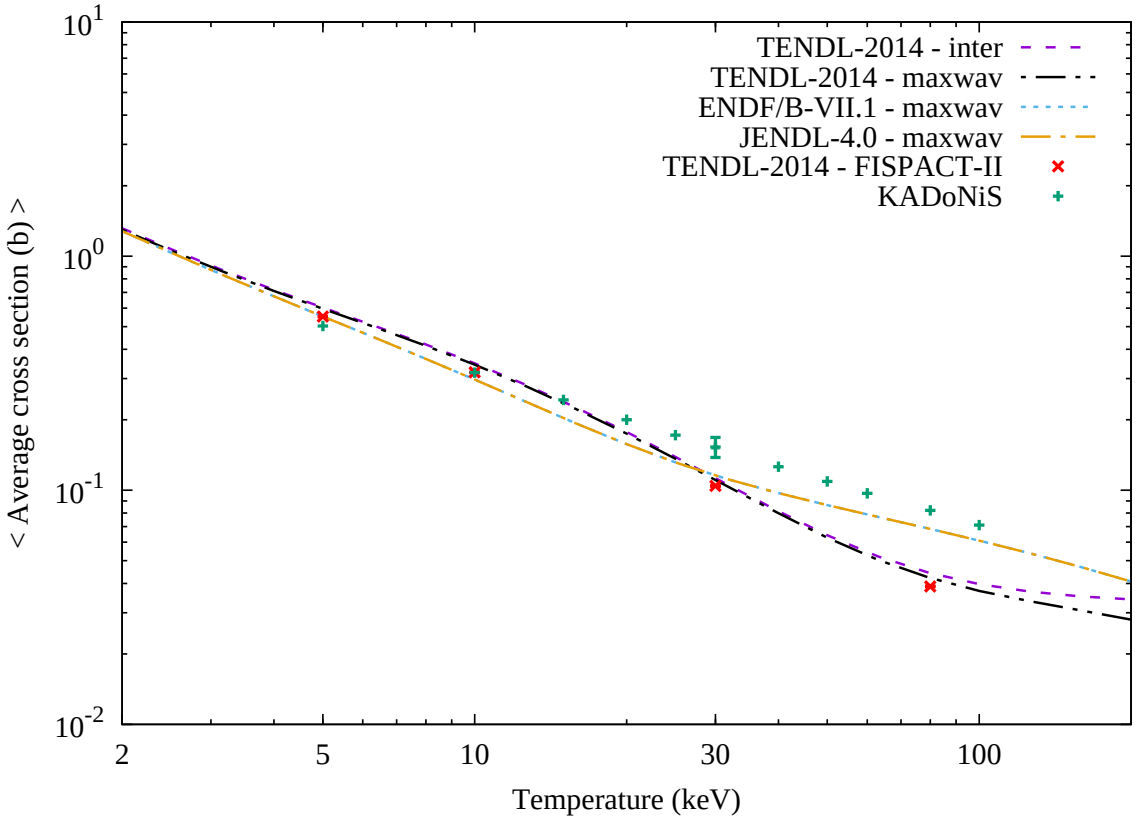
$^{66}Zn_{30}$ [Stable]



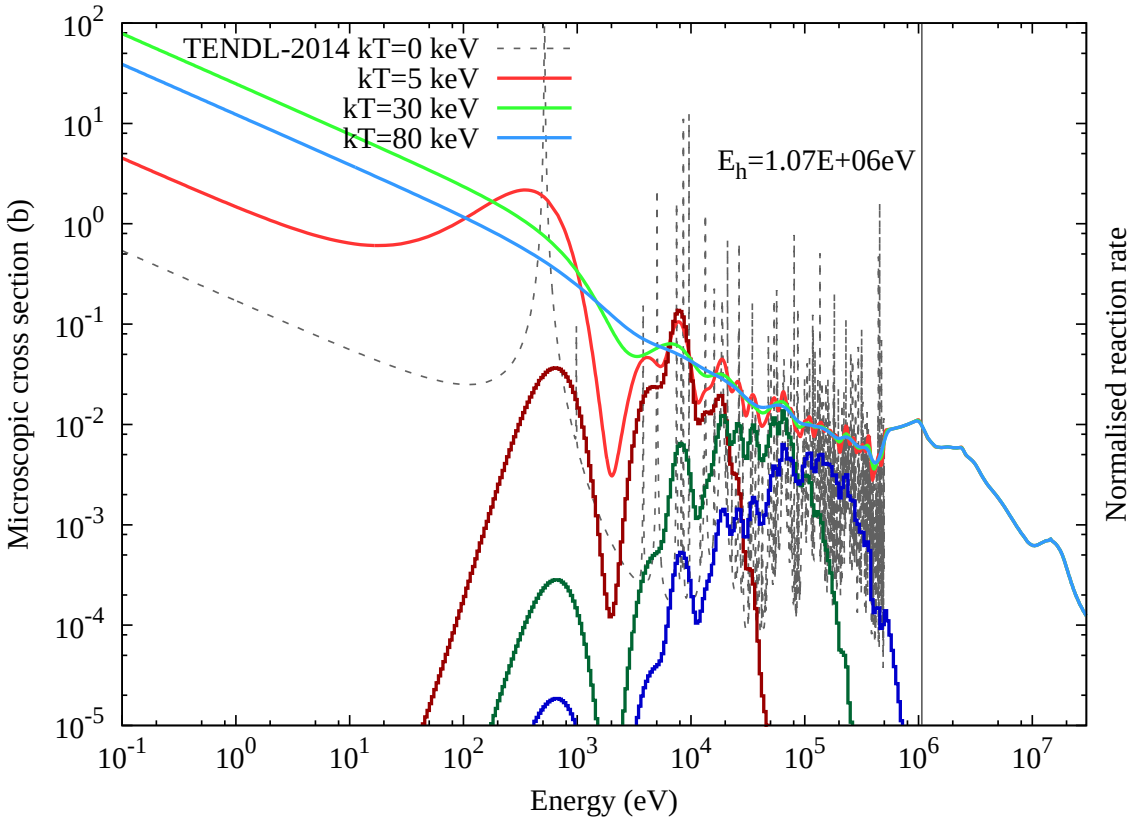


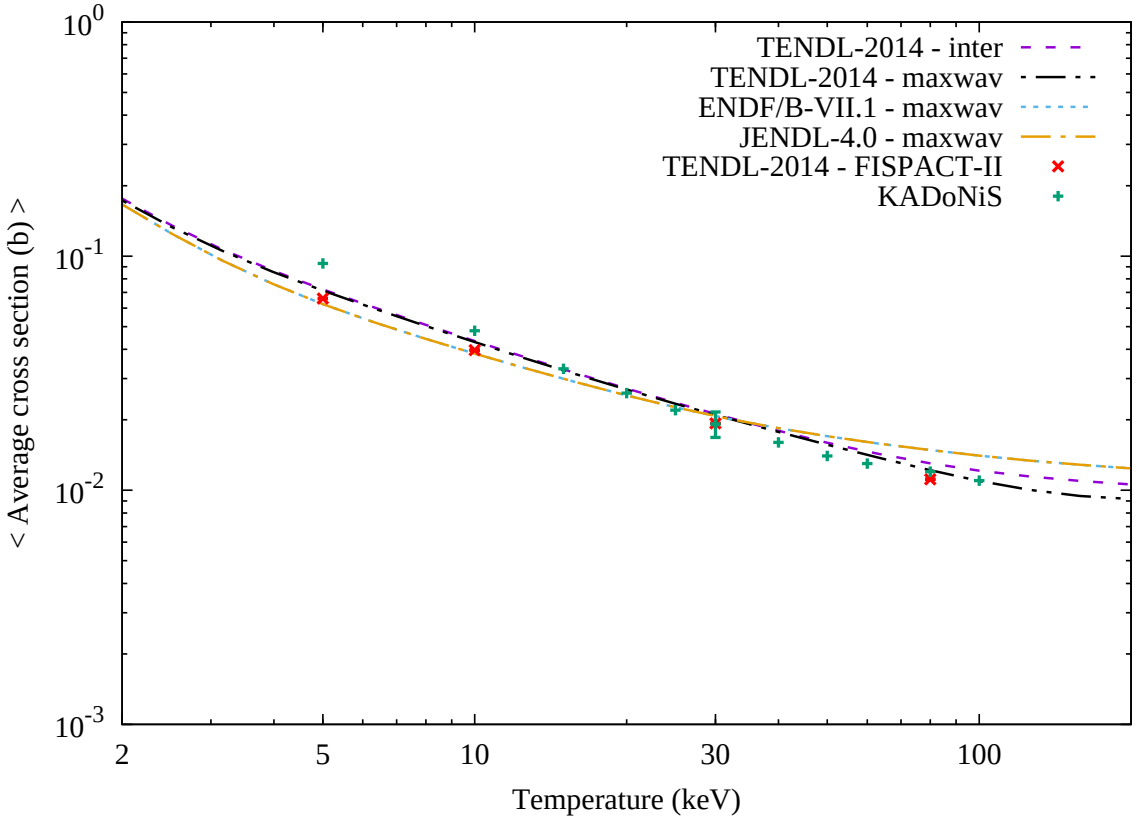
$^{67}Zn_{30}$ [Stable]



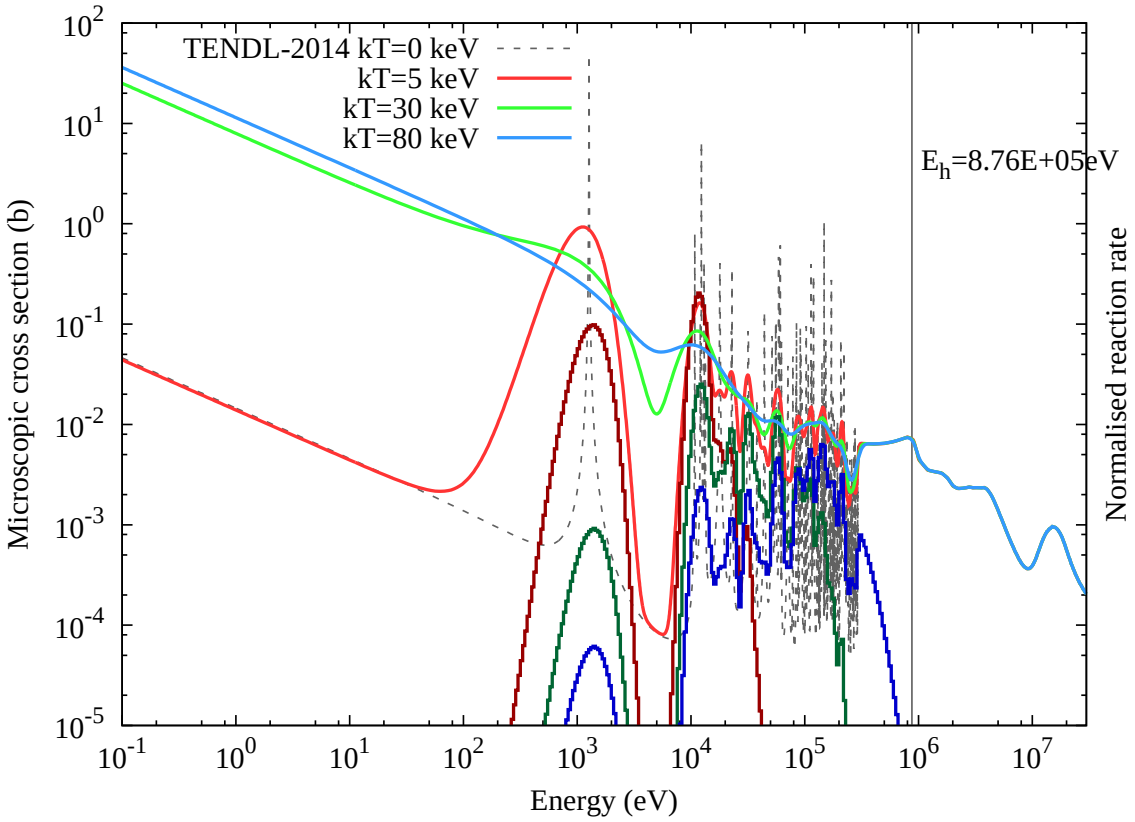


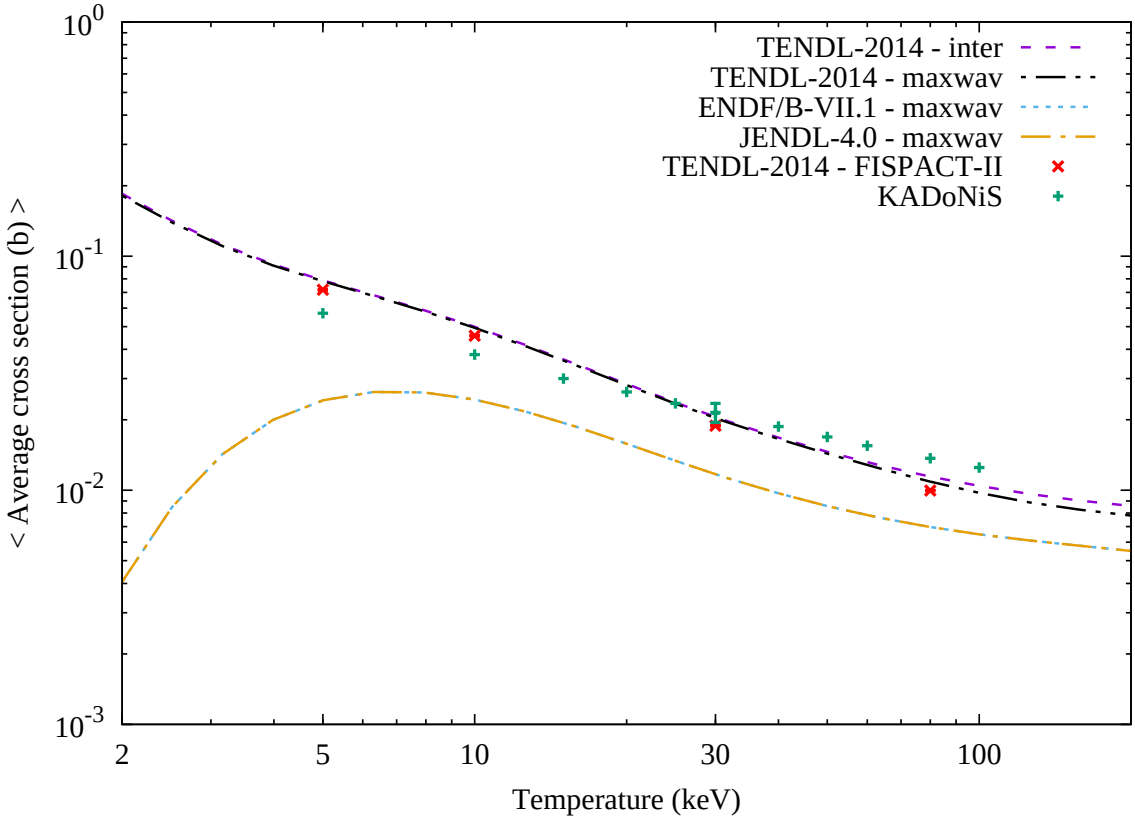
$^{68}Zn_{30}$ [Stable]



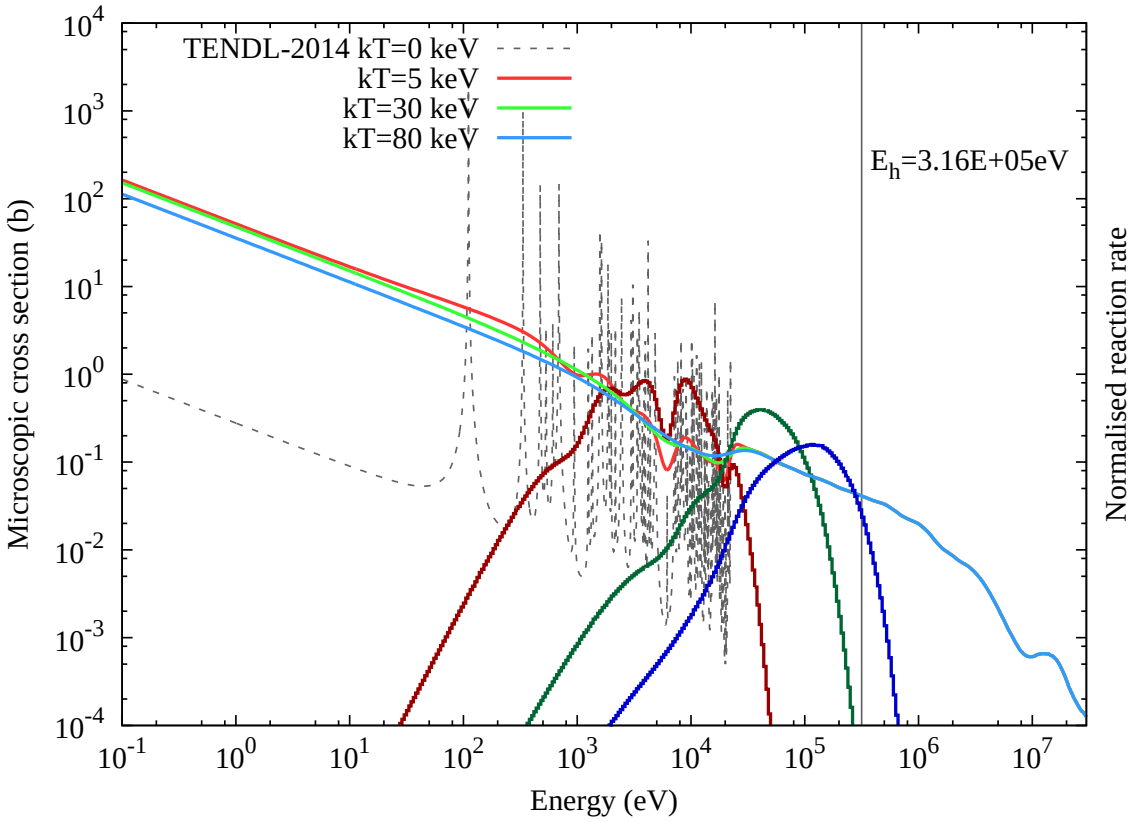


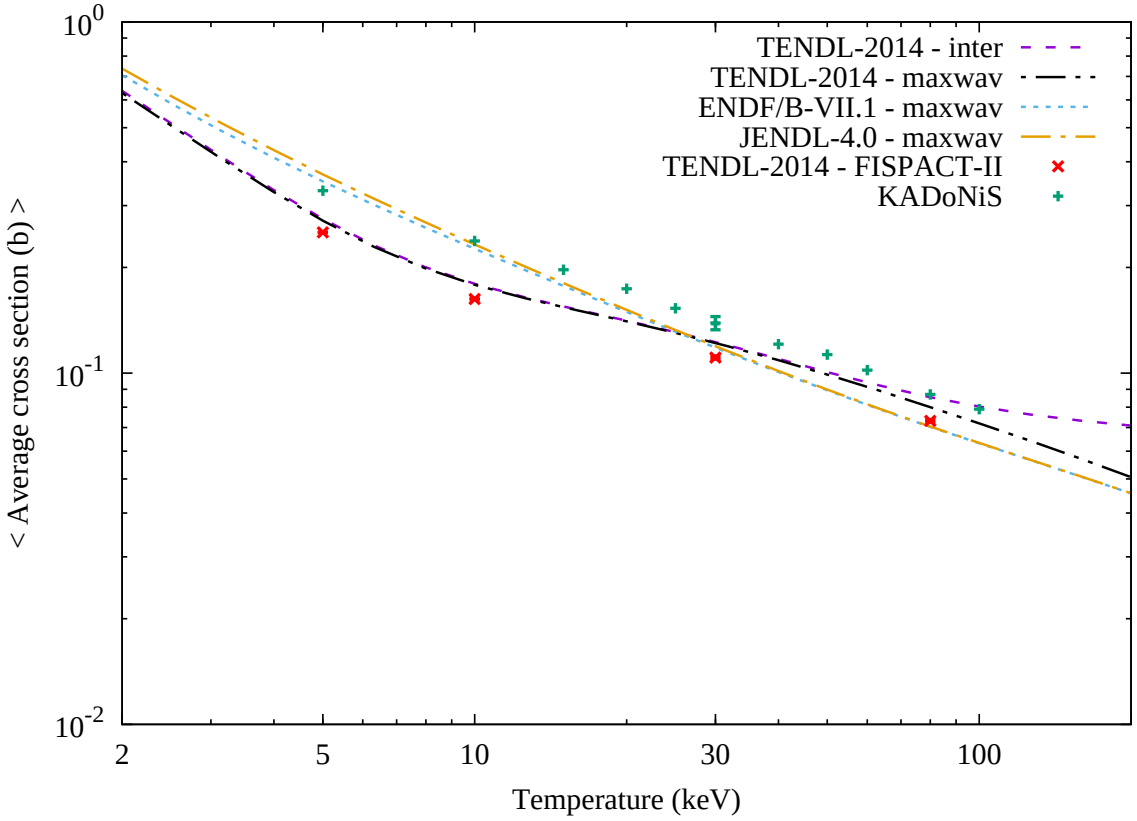
$^{70}Zn_{30}$ [Stable] (KADoNiS=SMC)



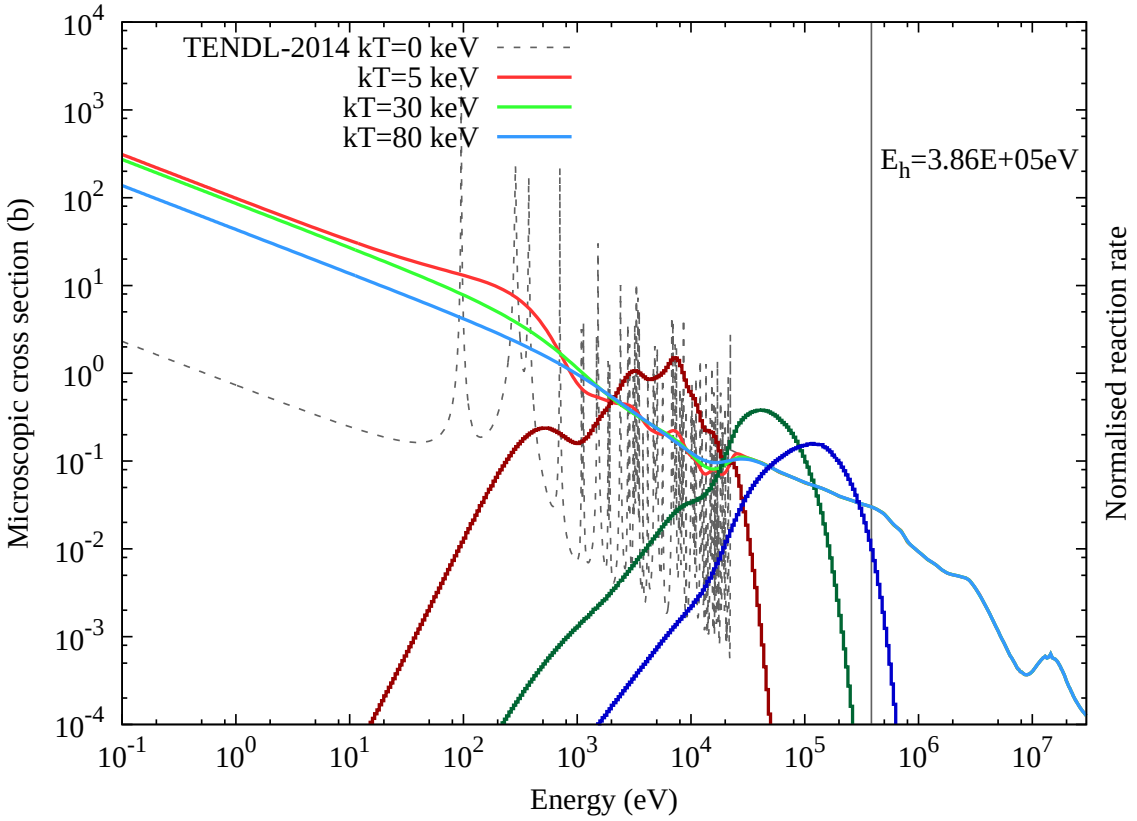


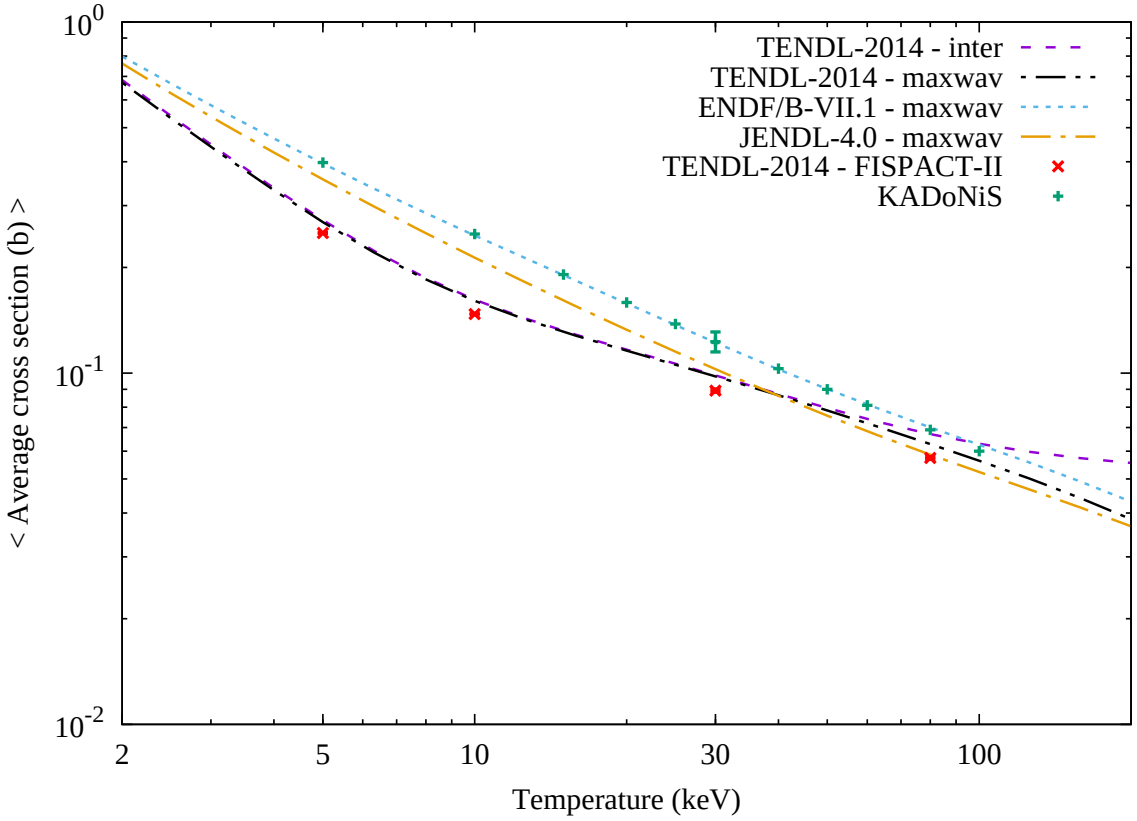
$^{69}Ga_{31}$ [Stable]



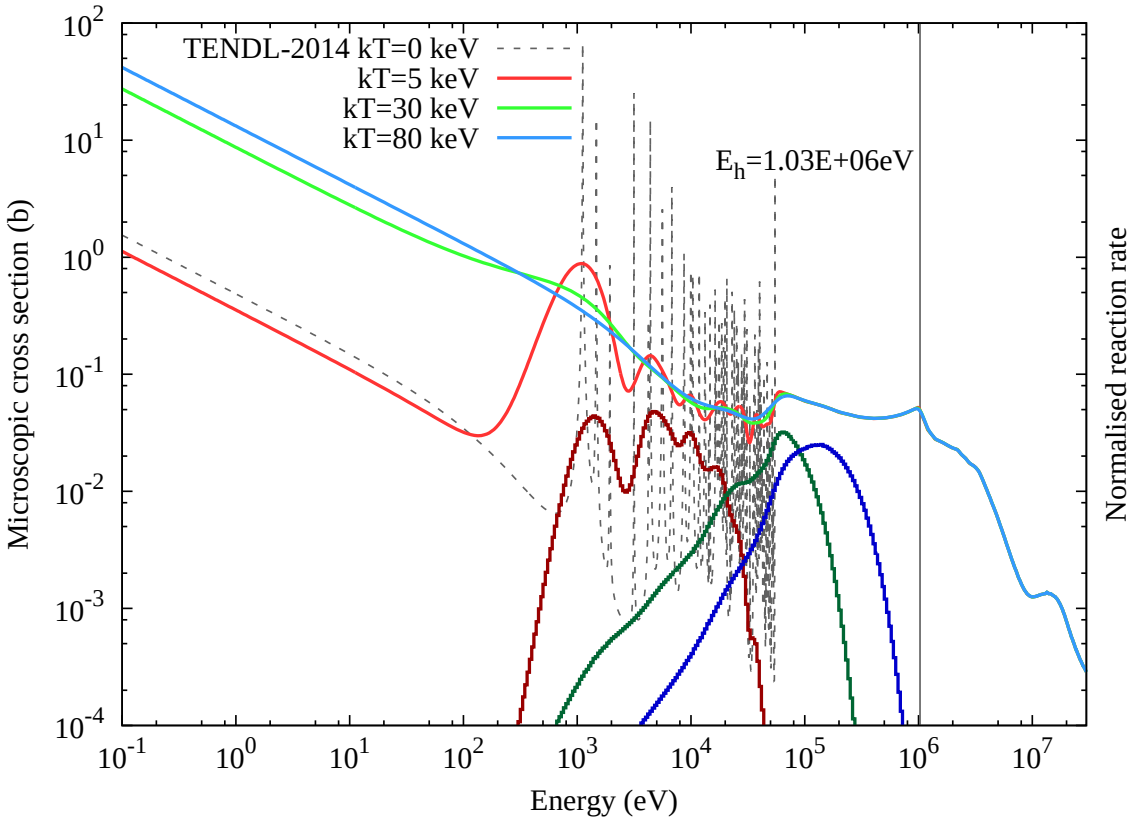


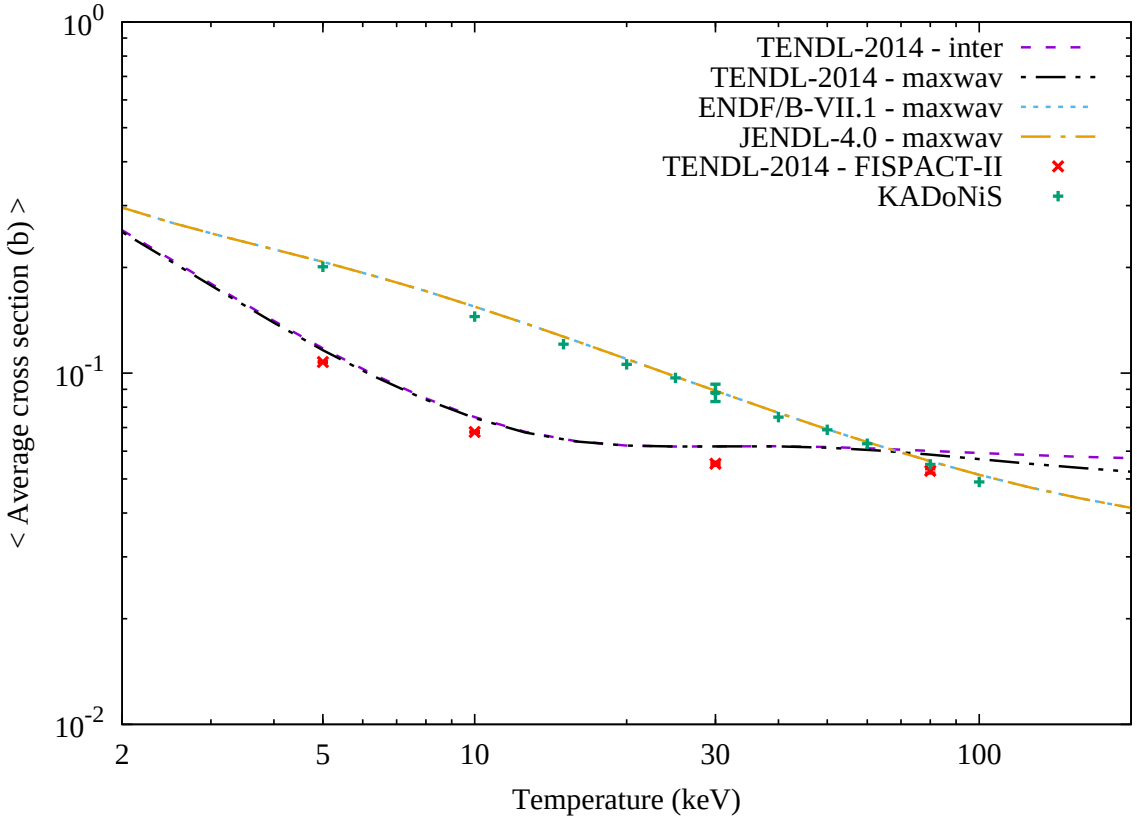
$^{71}Ga_{31}$ [Stable]



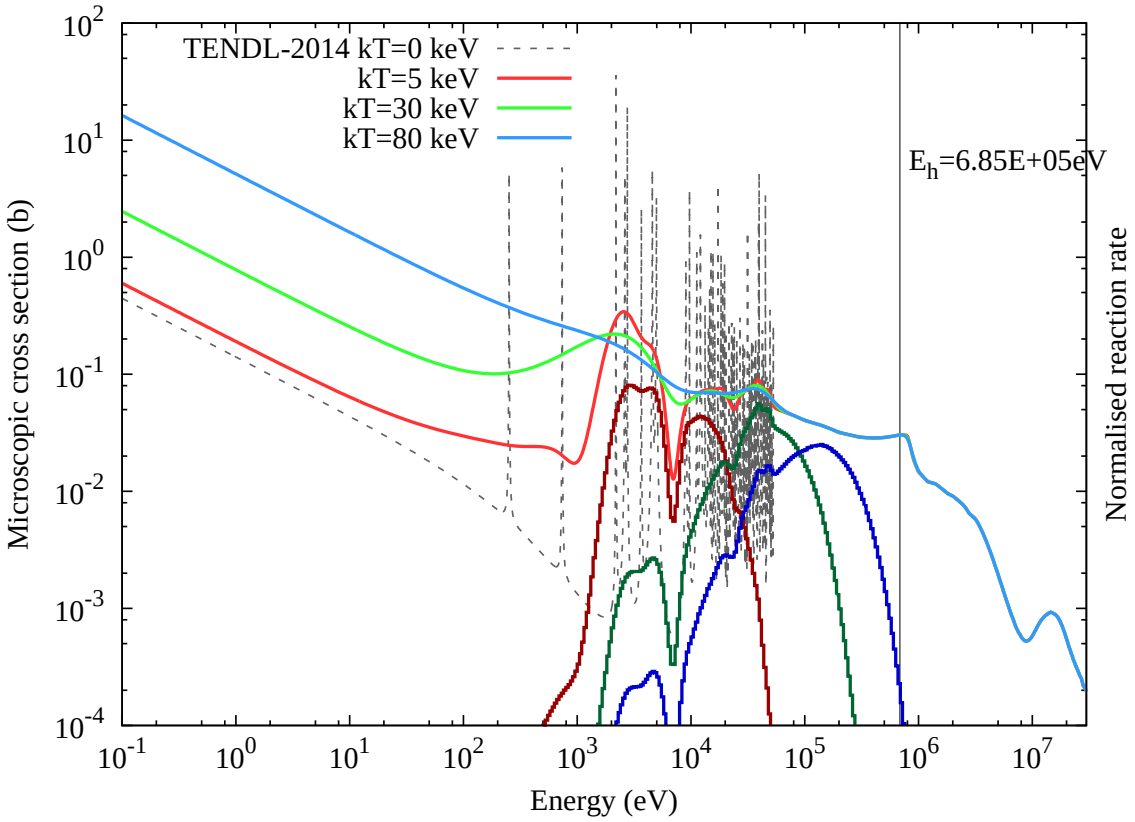


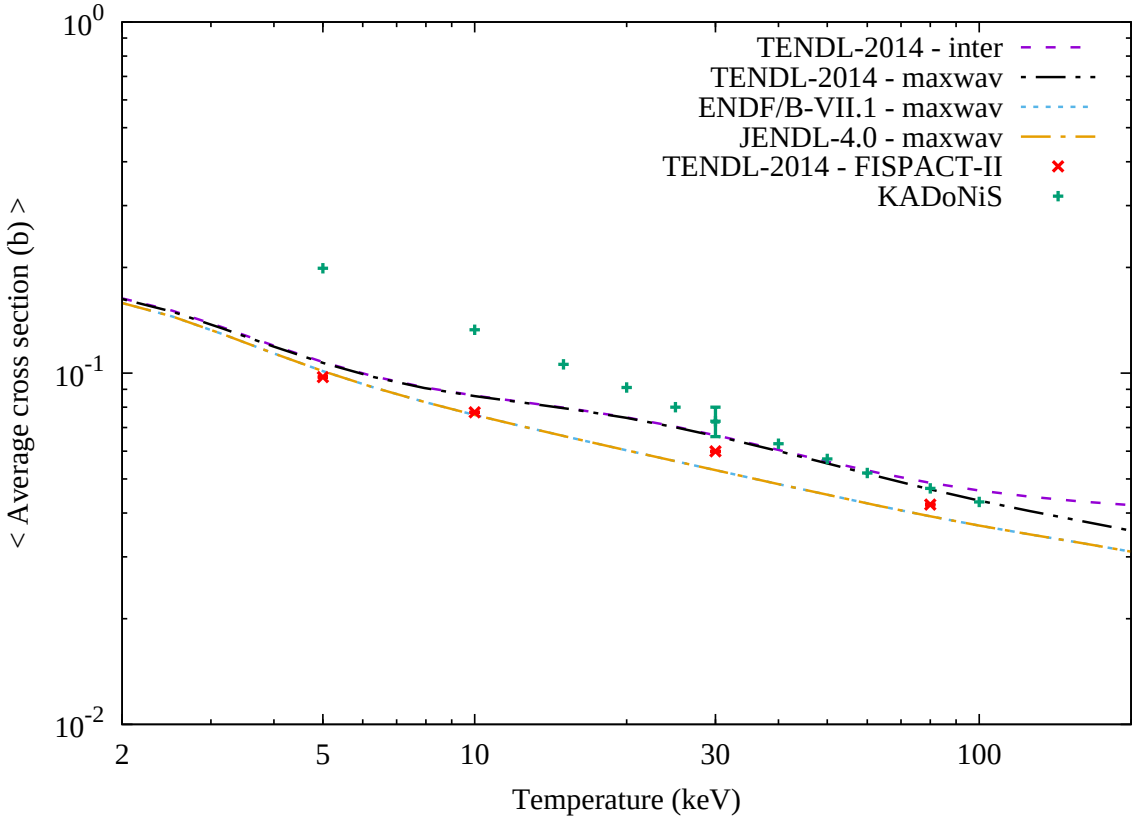
$^{70}Ge_{32}$ [Stable]



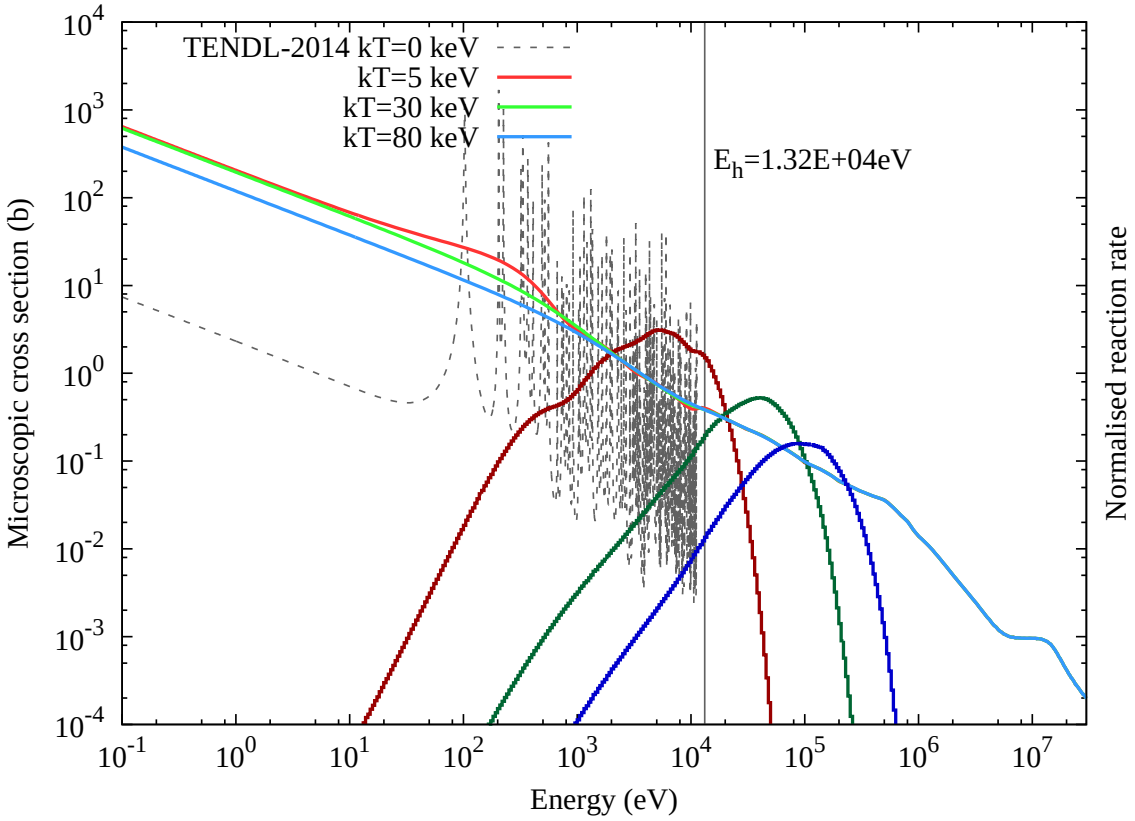


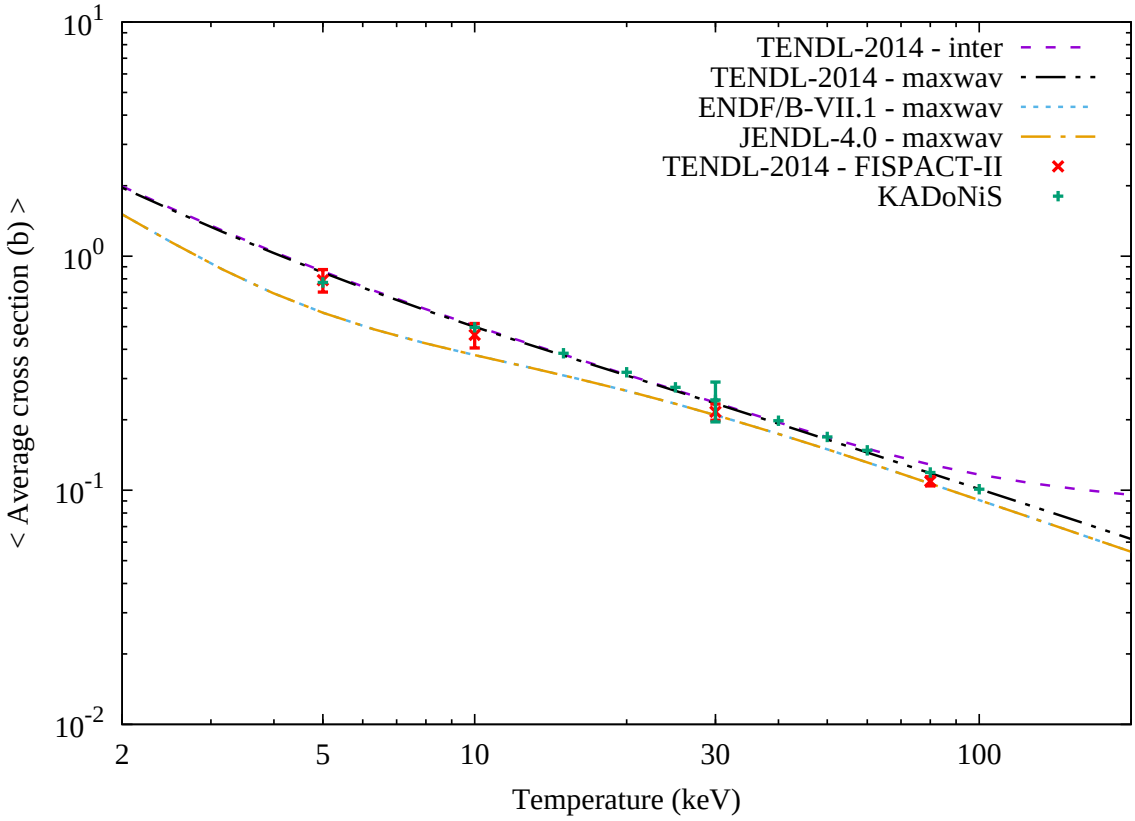
$^{72}Ge_{32}$ [Stable] (KADoNiS=SMC)



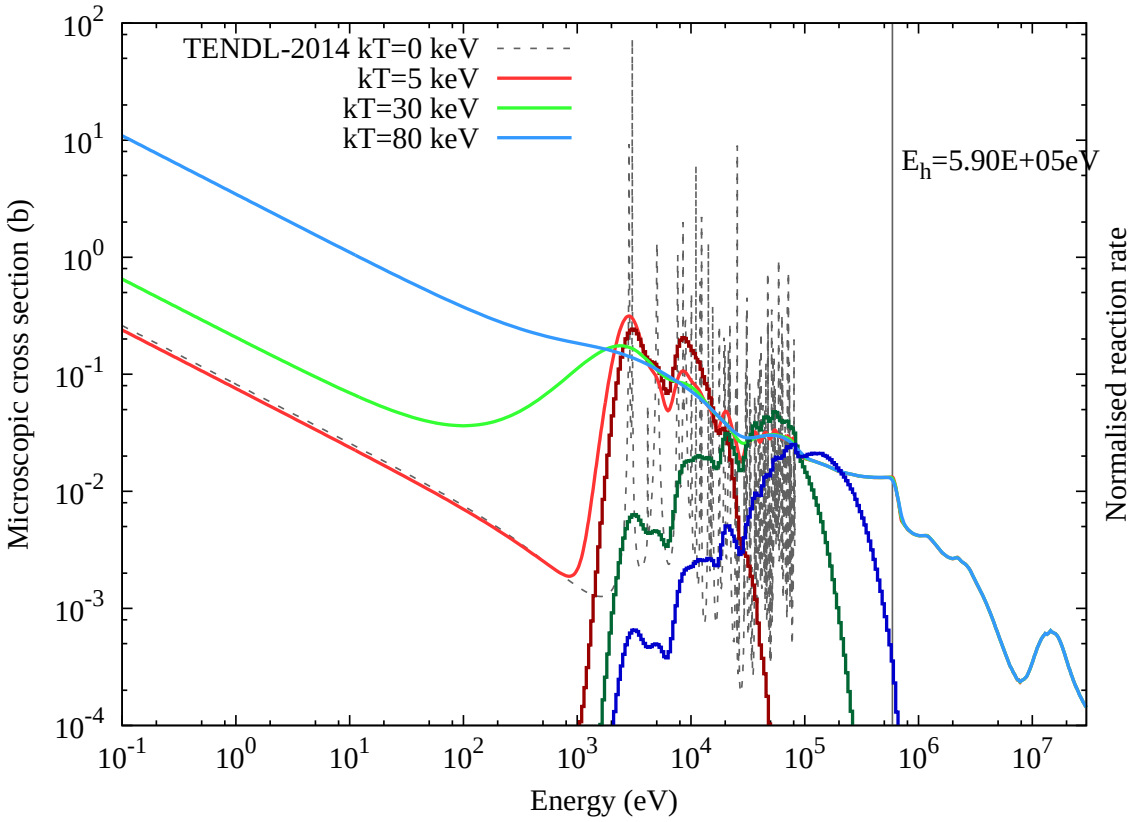


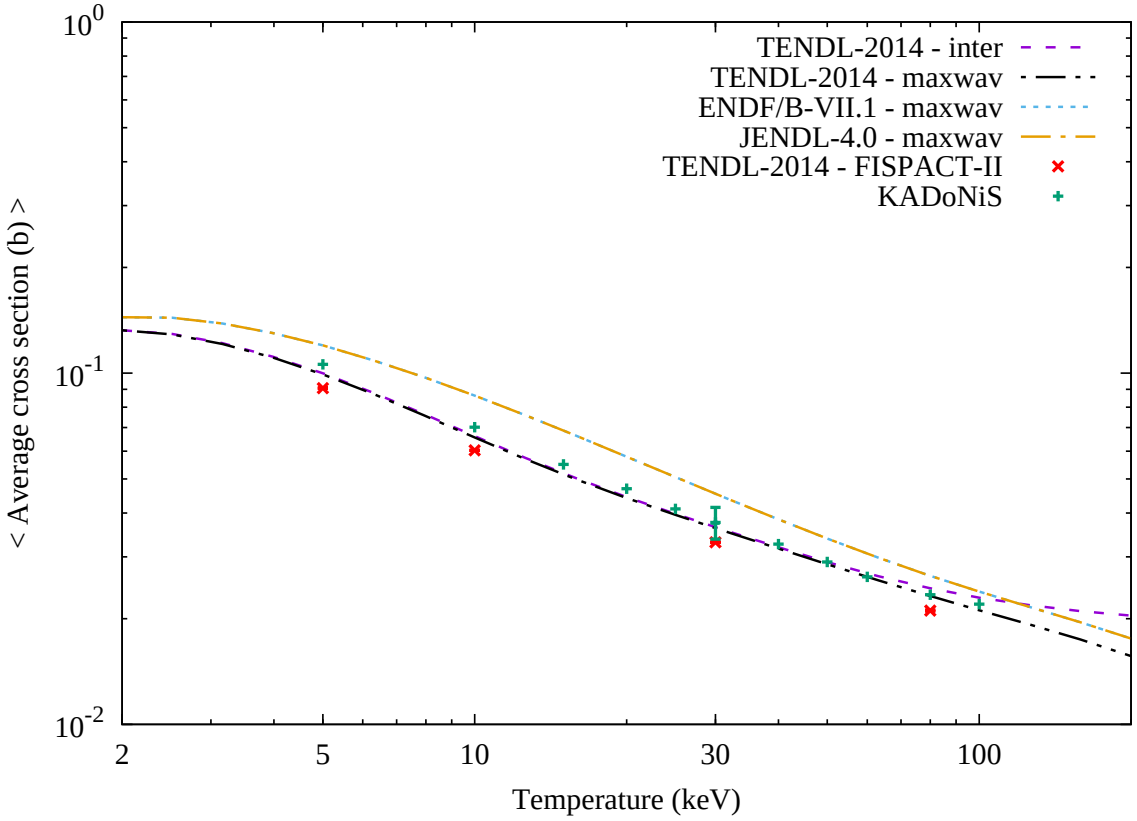
$^{73}Ge_{32}$ [Stable] (KADoNiS=SMC)



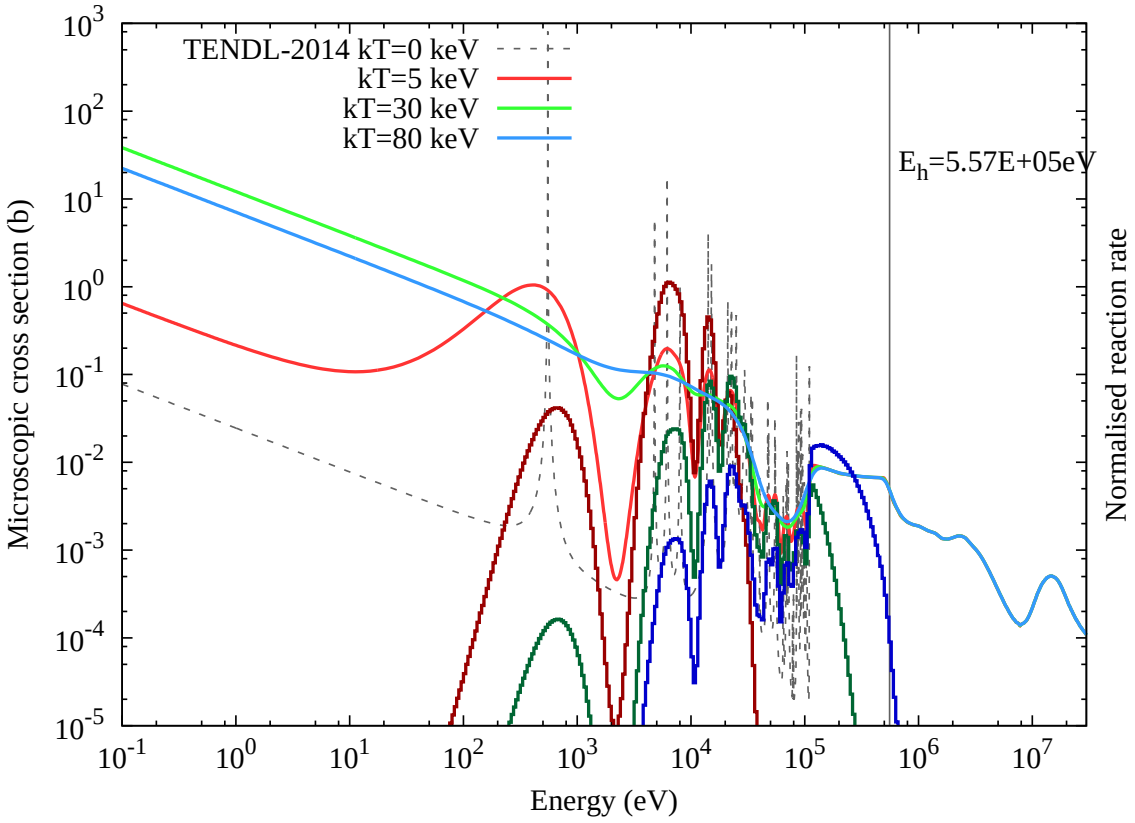


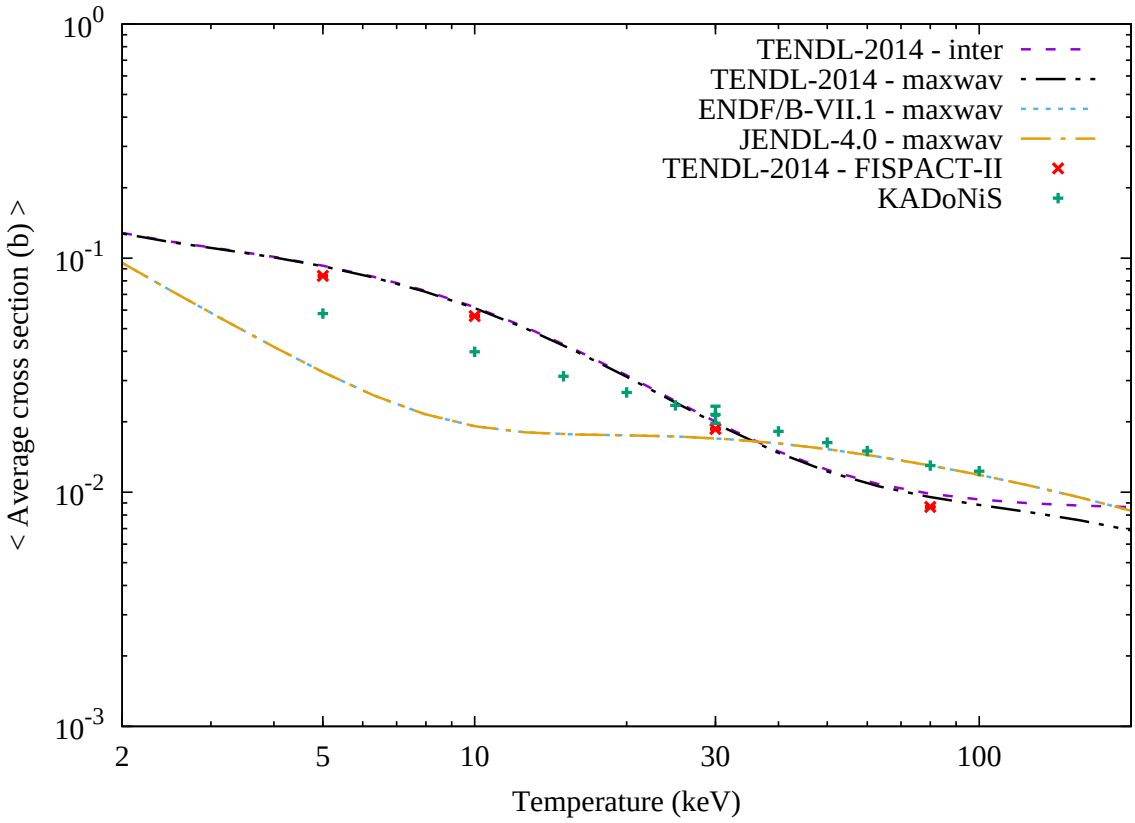
$^{74}Ge_{32}$ [Stable]



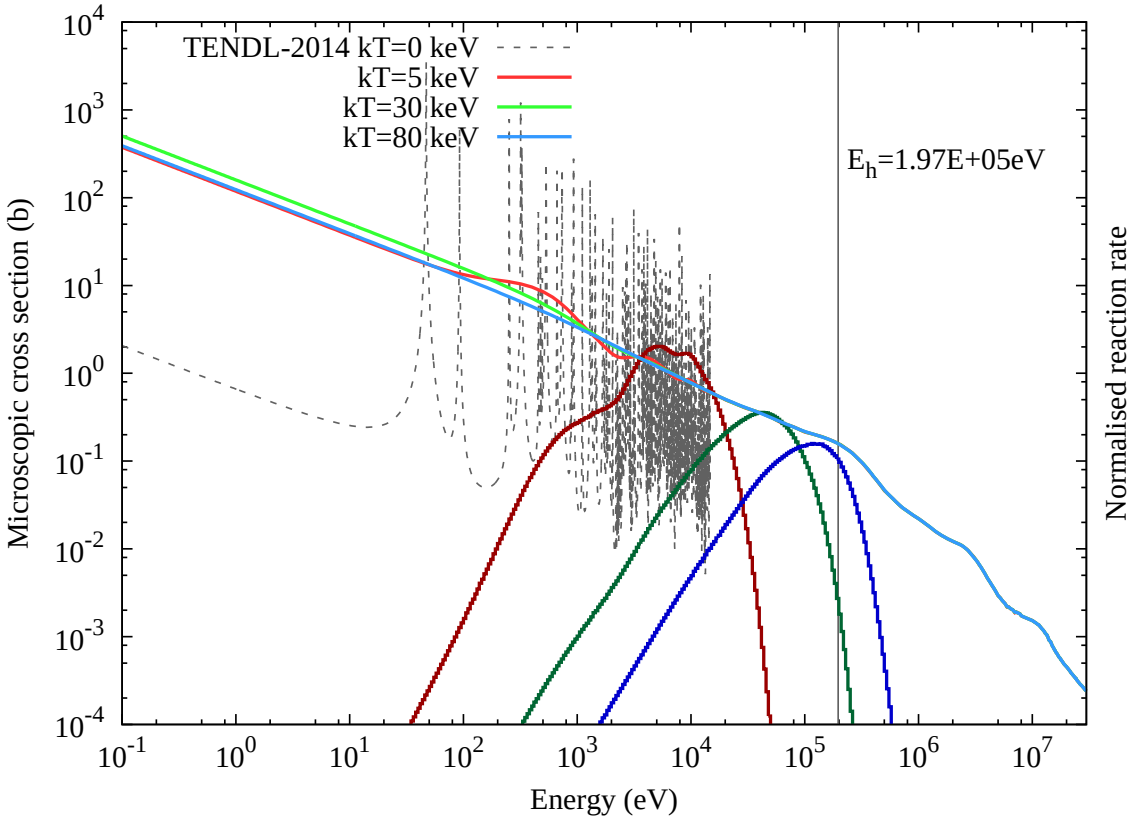


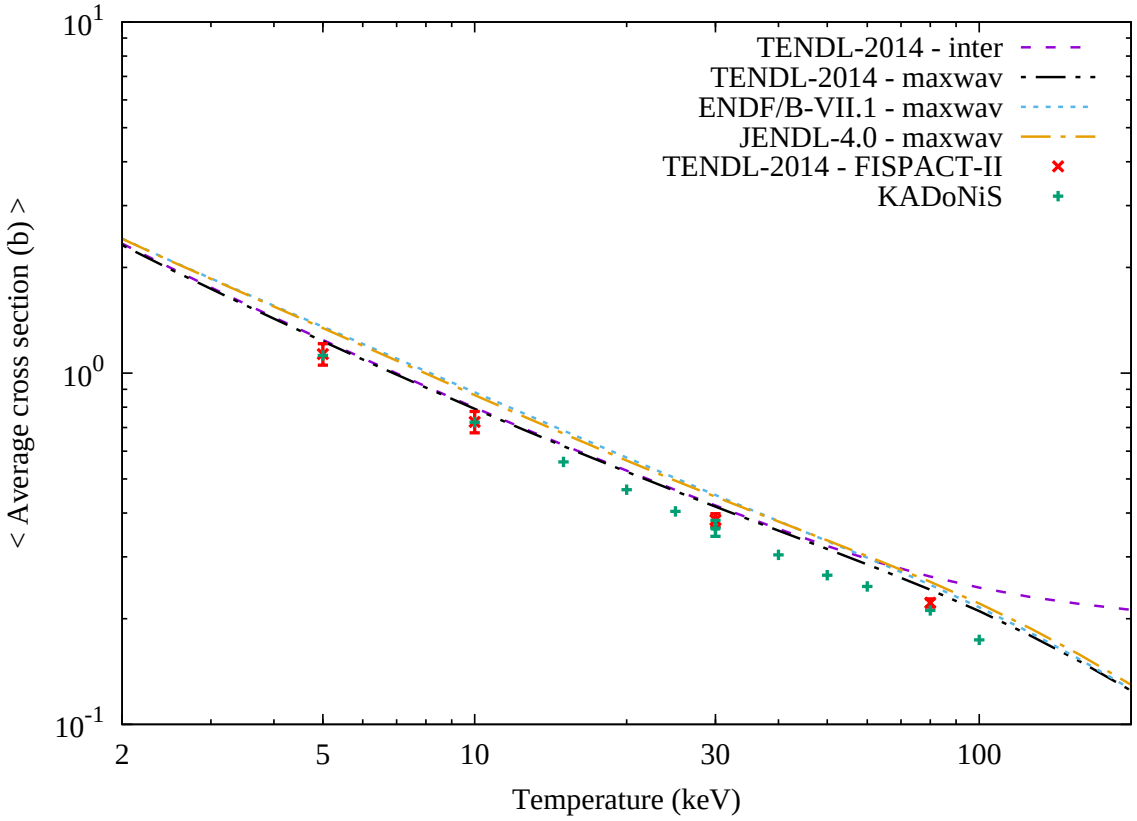
$^{76}Ge_{32}$ $[T_{1/2} = 1.58 \times 10^{21}$ years$]$



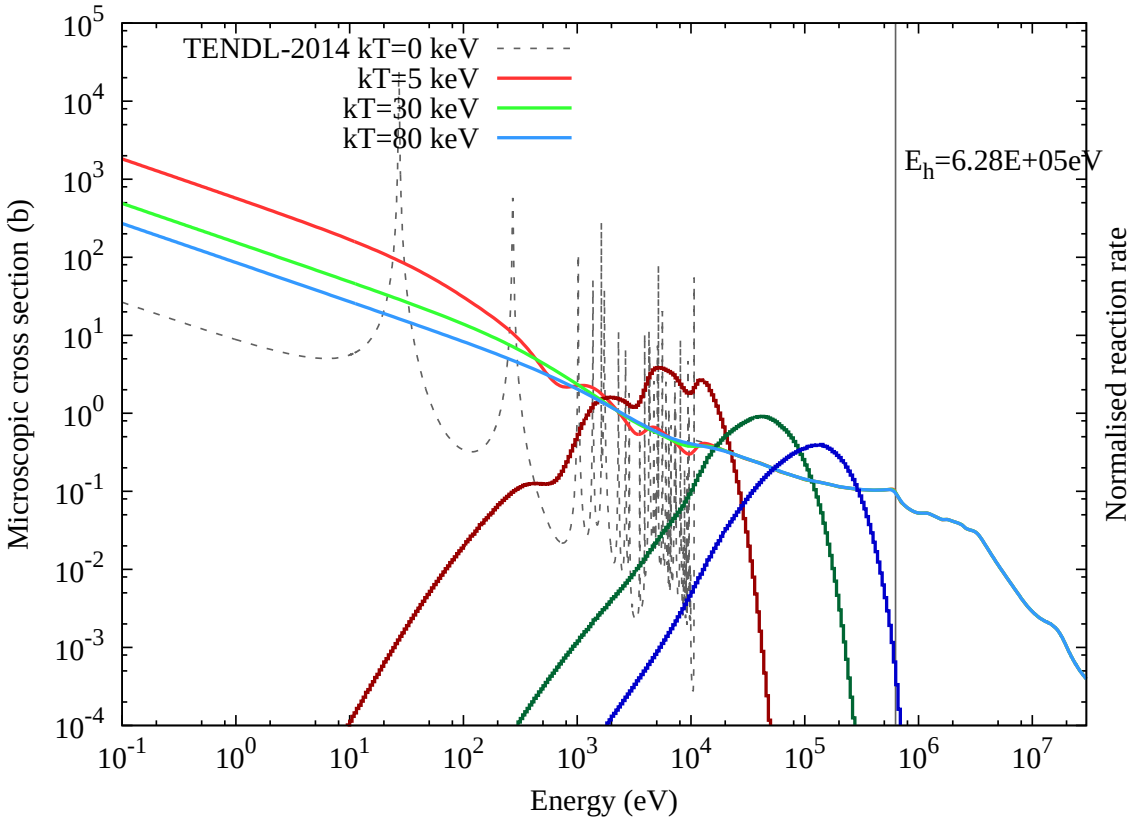


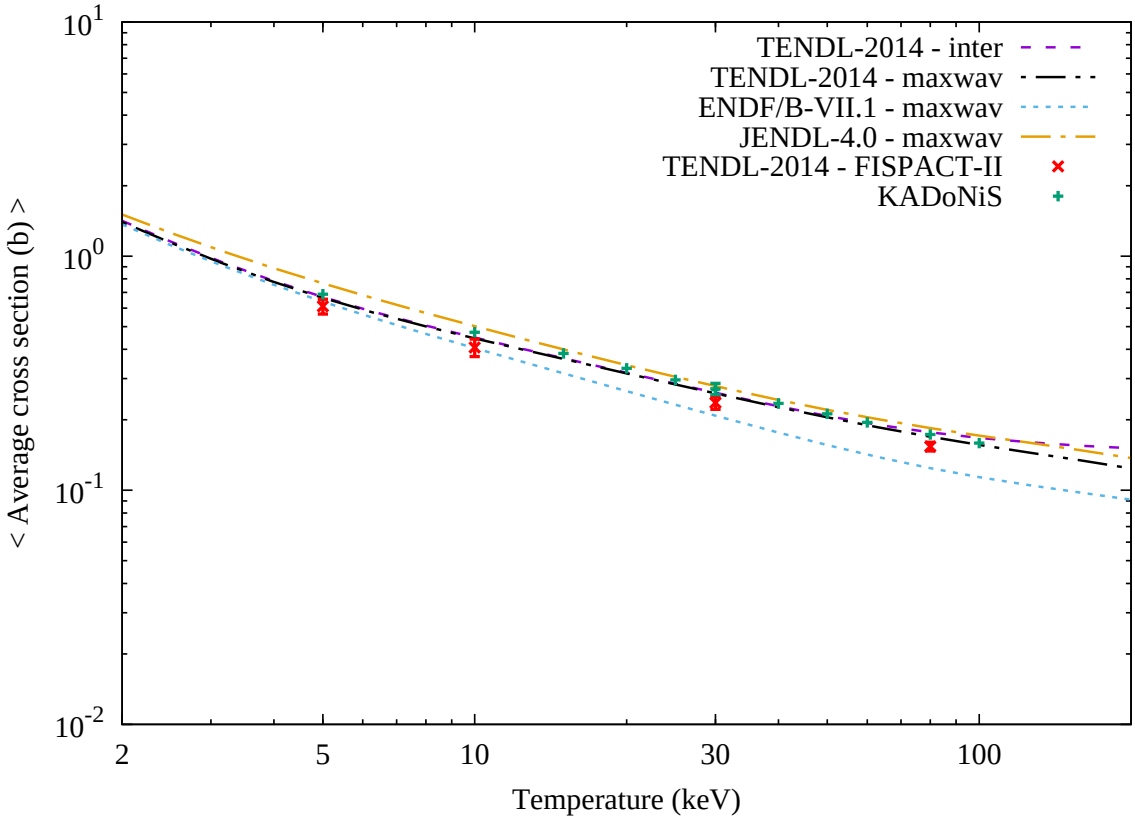
$^{75}As_{33}$ [Stable]



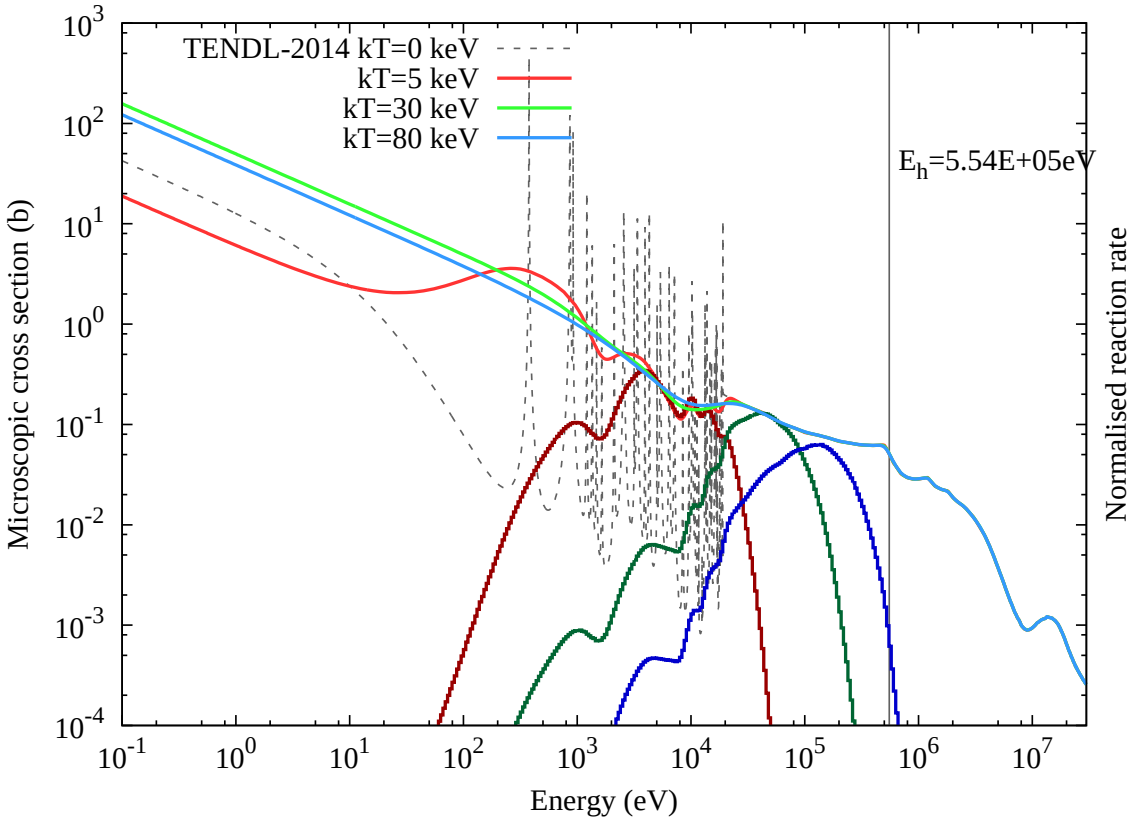


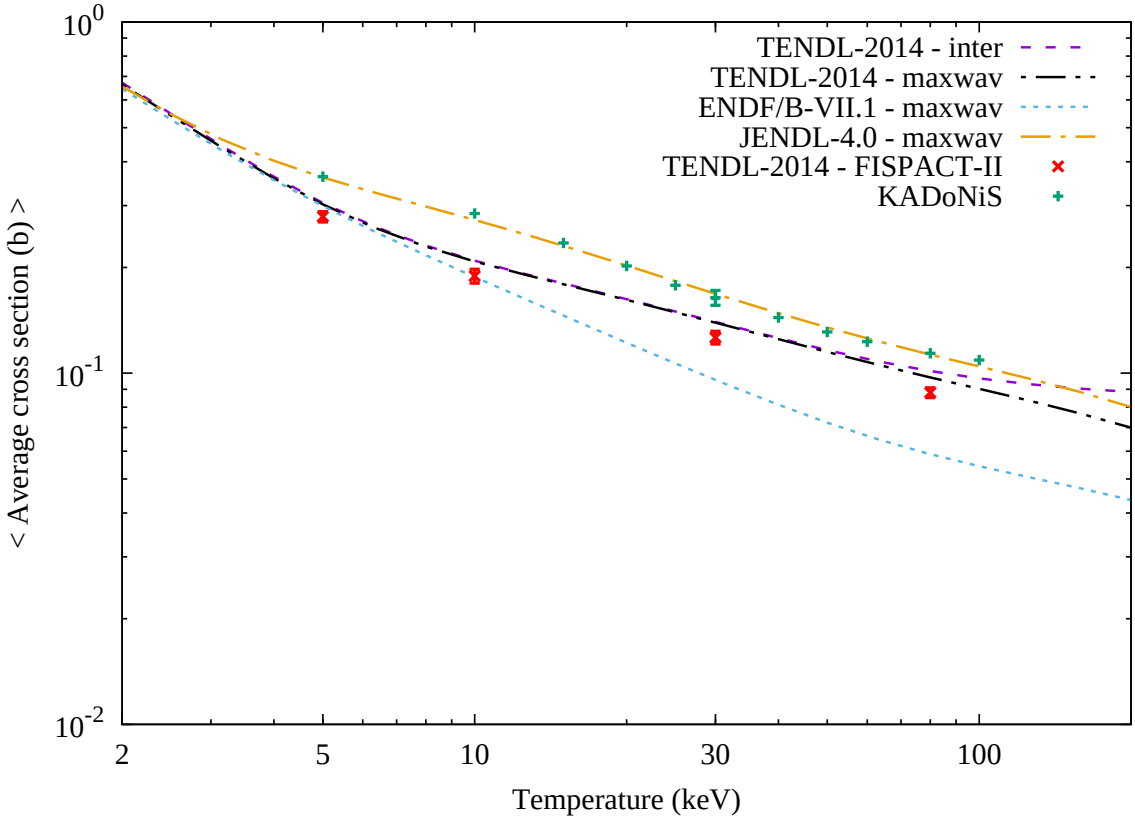
$^{74}Se_{34}$ [Stable]



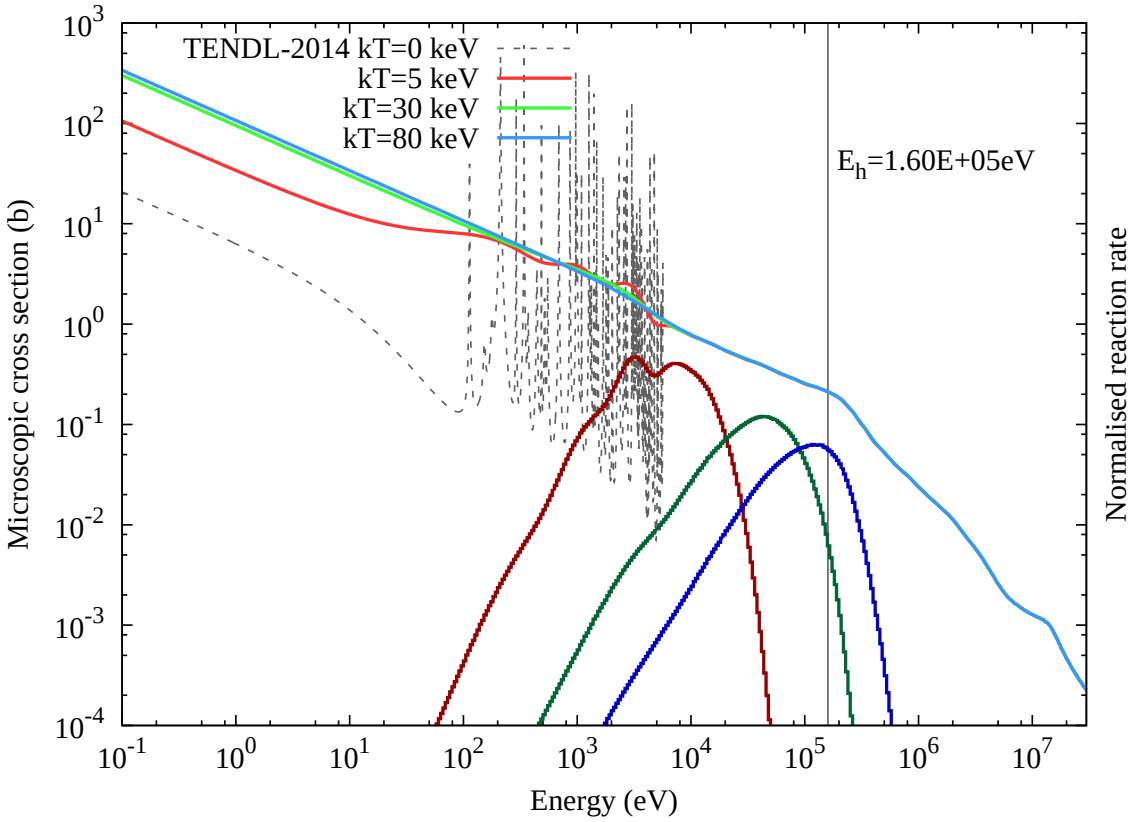


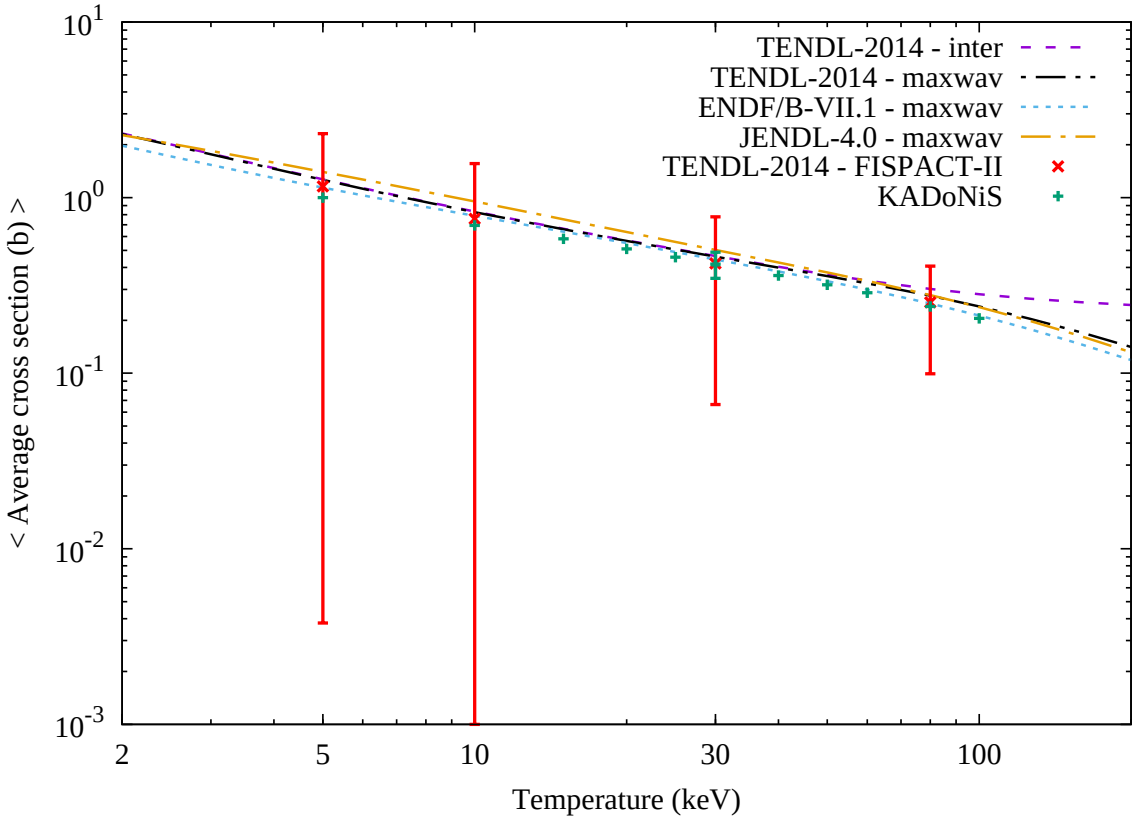
$^{76}Se_{34}$ [Stable]



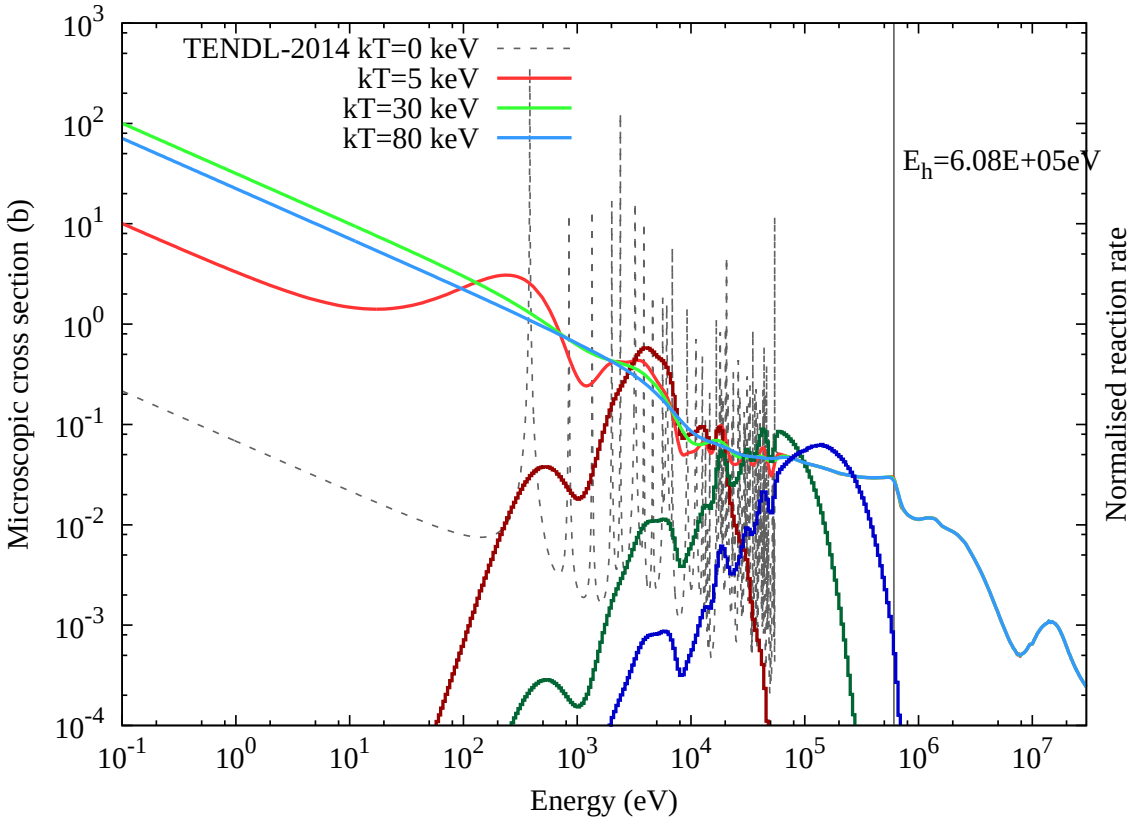


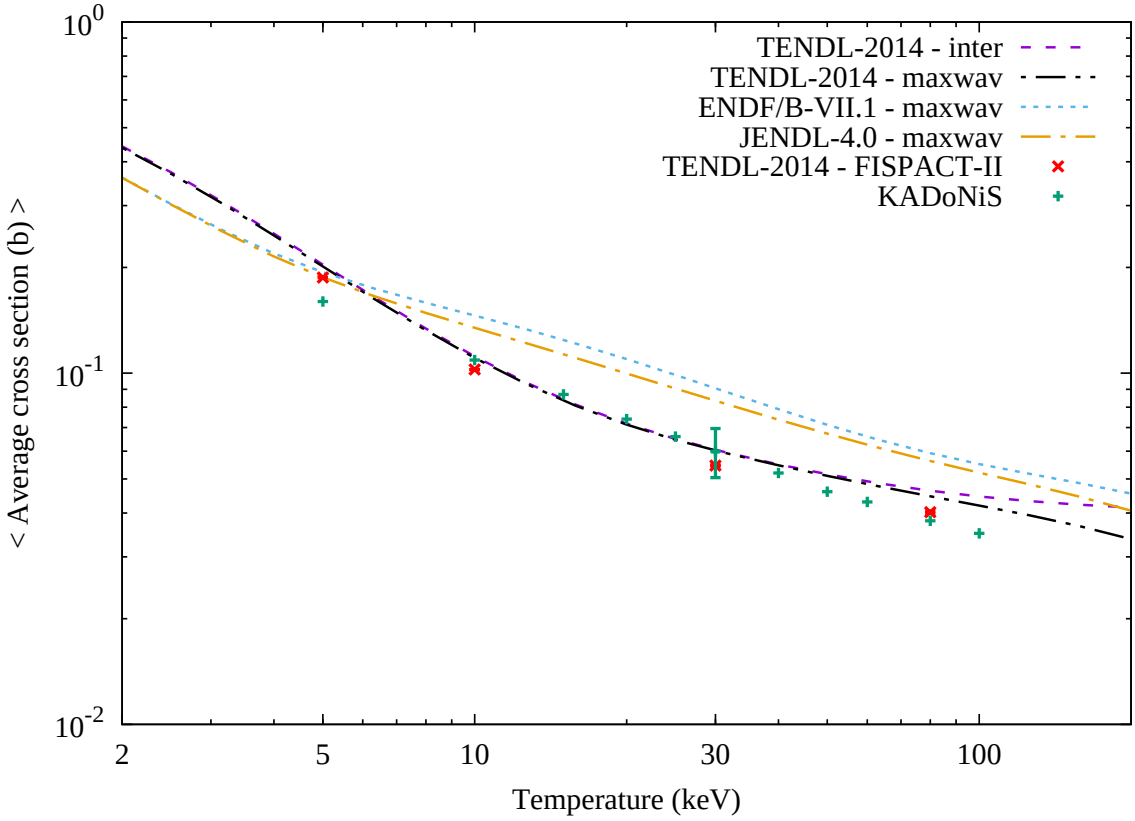
$^{77}Se_{34}$ [Stable] (KADoNiS=SMC)



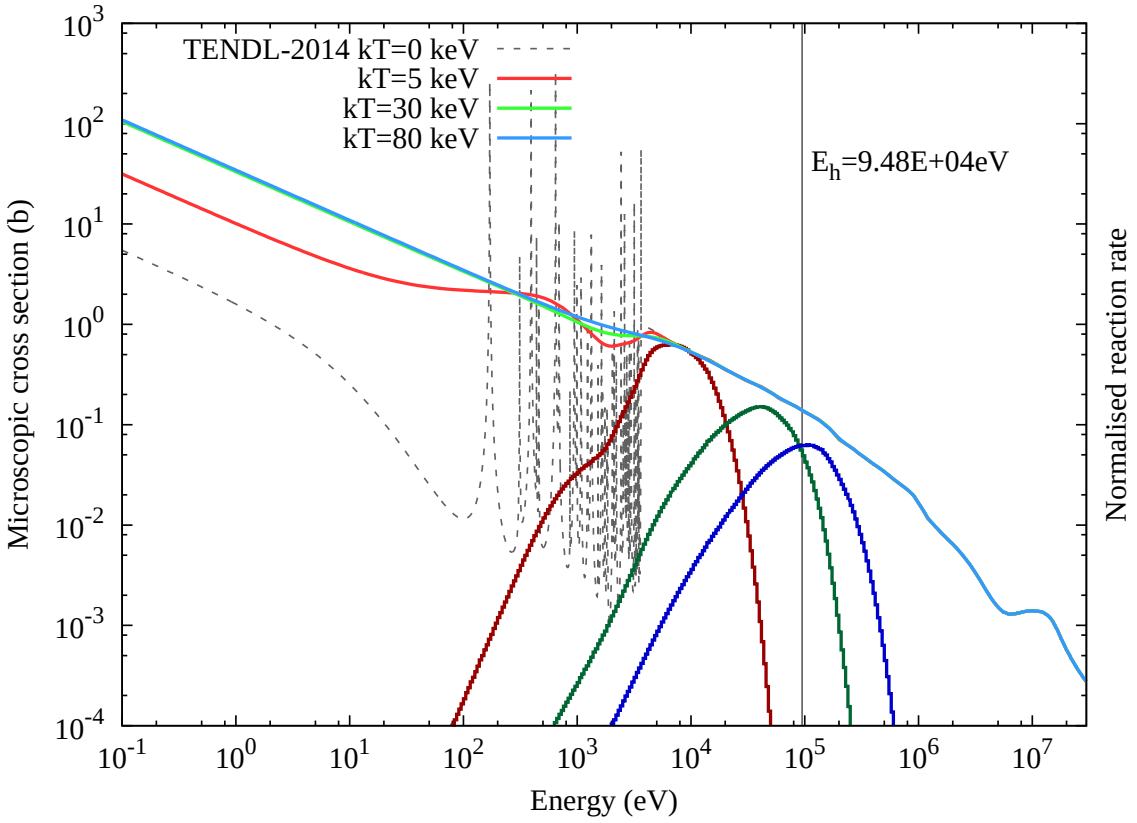


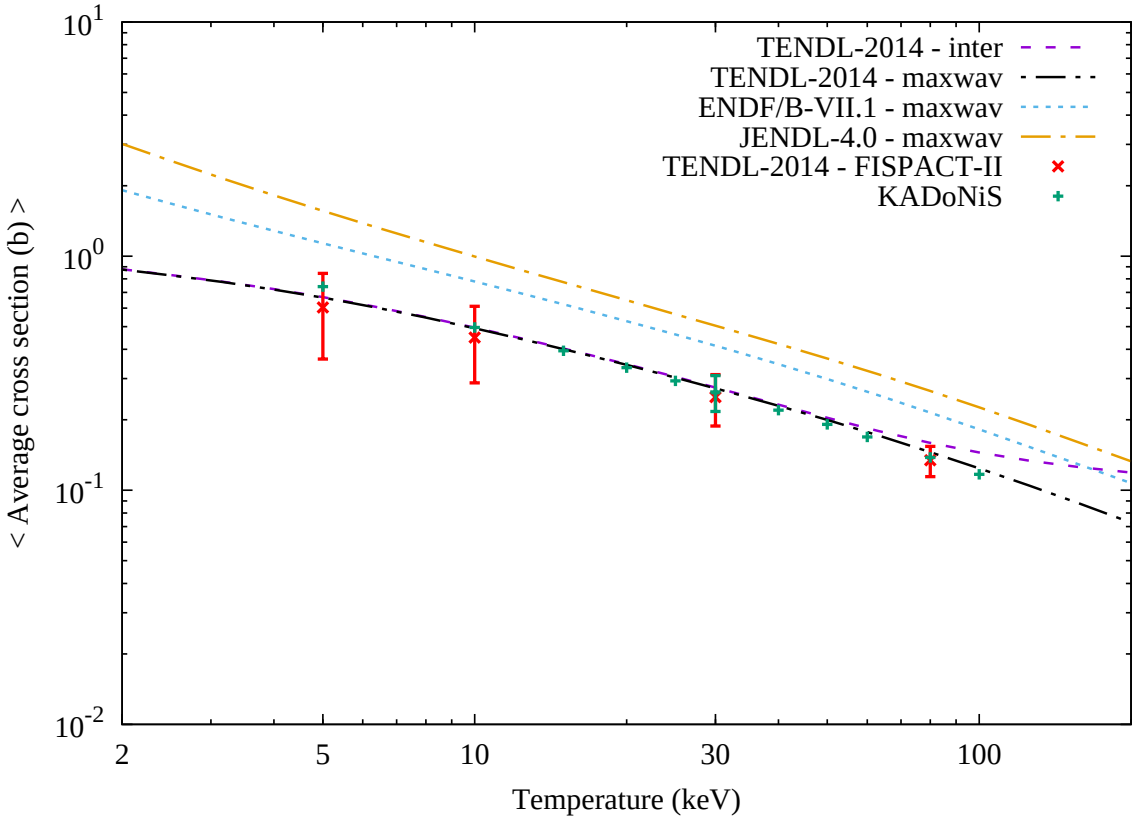
$^{78}Se_{34}$ [Stable]



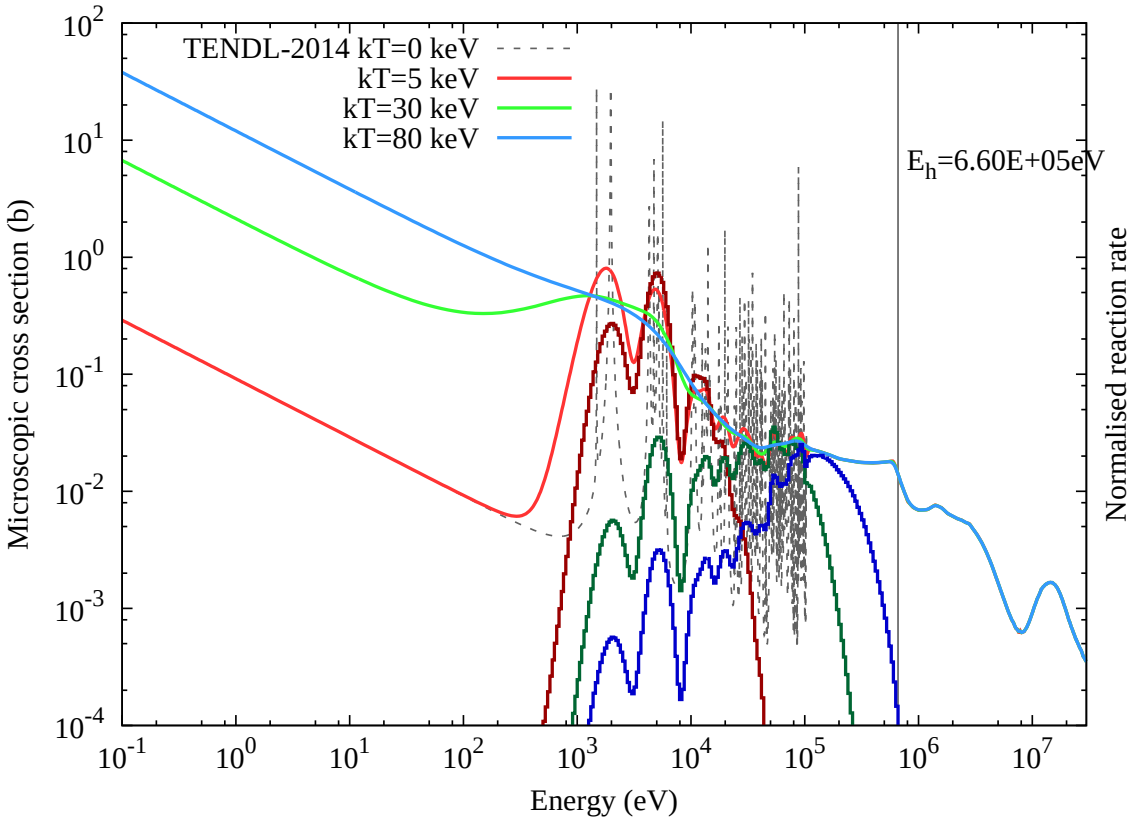


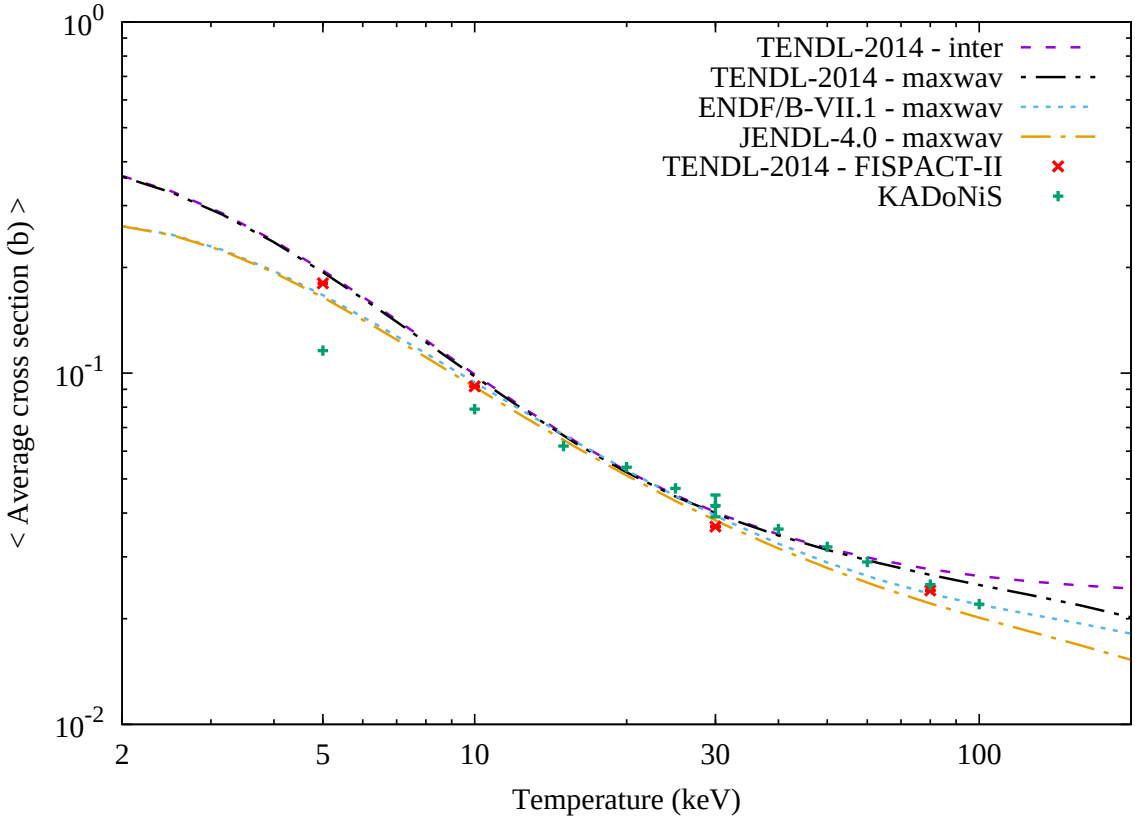
$^{79}Se_{34}$ $[T_{1/2} = 3.77 \times 10^5$ years] (KADoNiS=SMC)



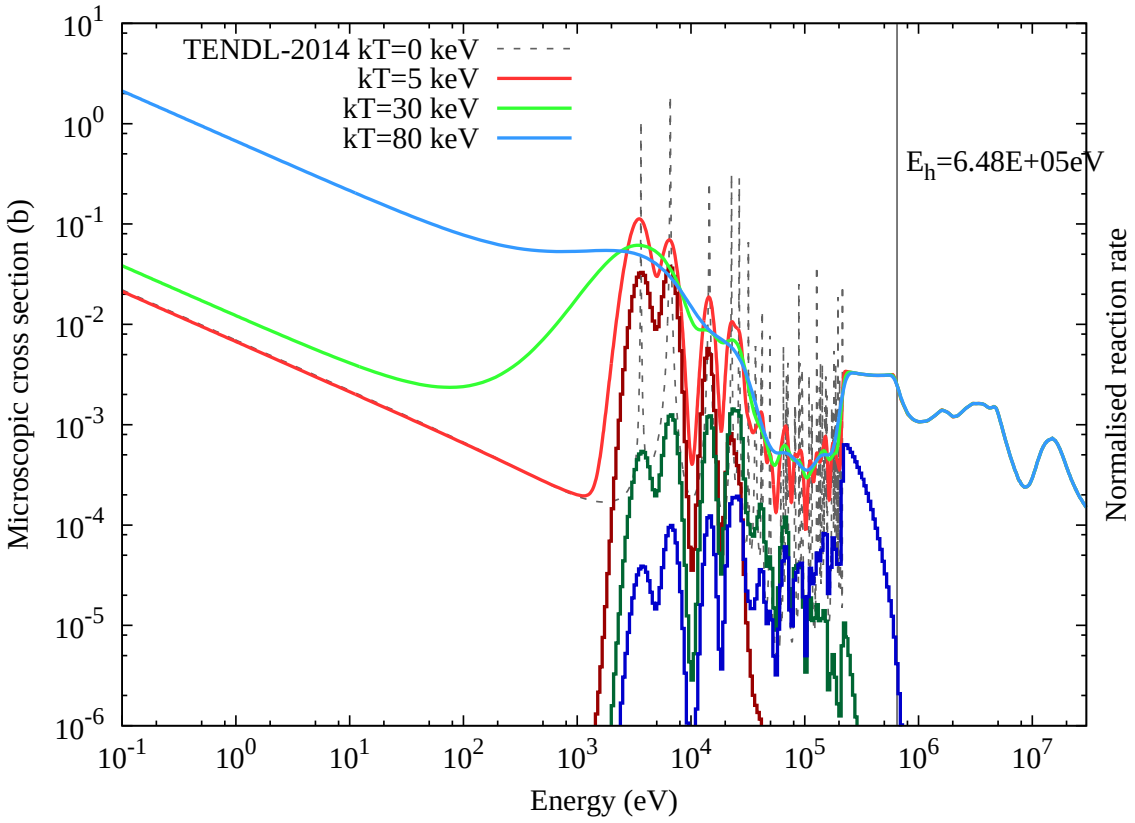


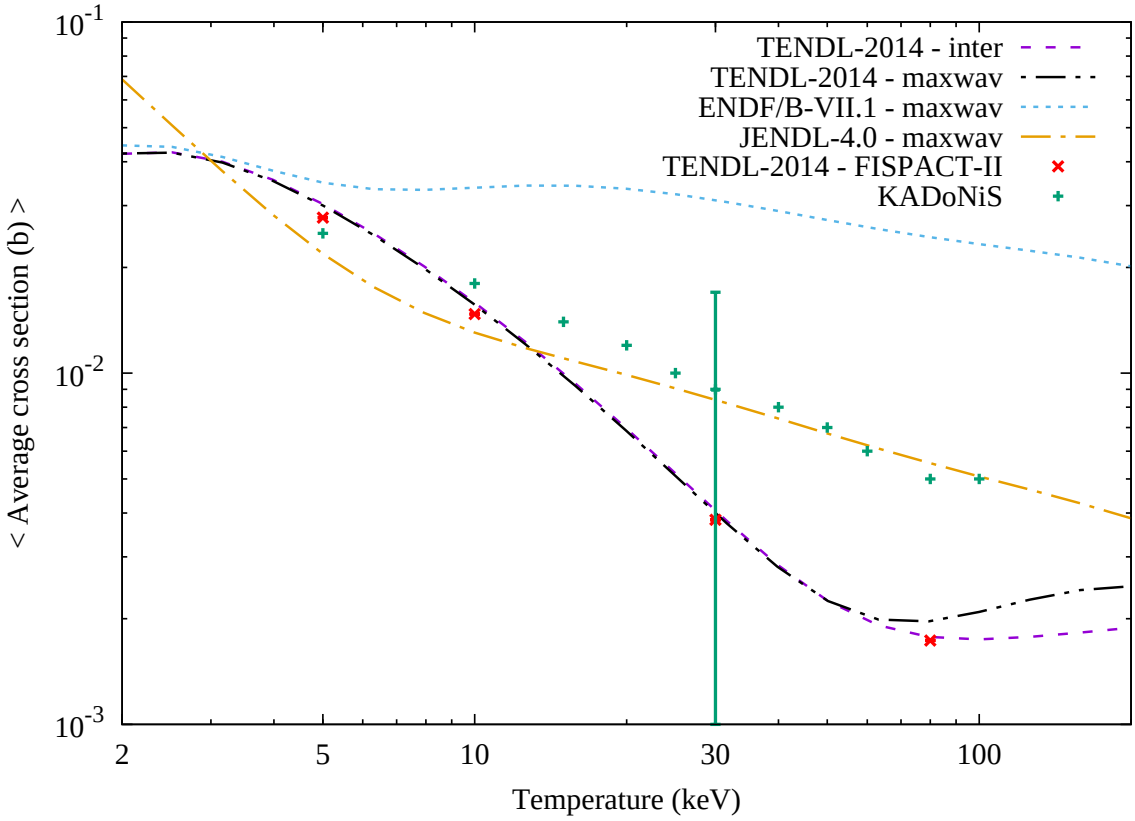
$^{80}Se_{34}$ [Stable]



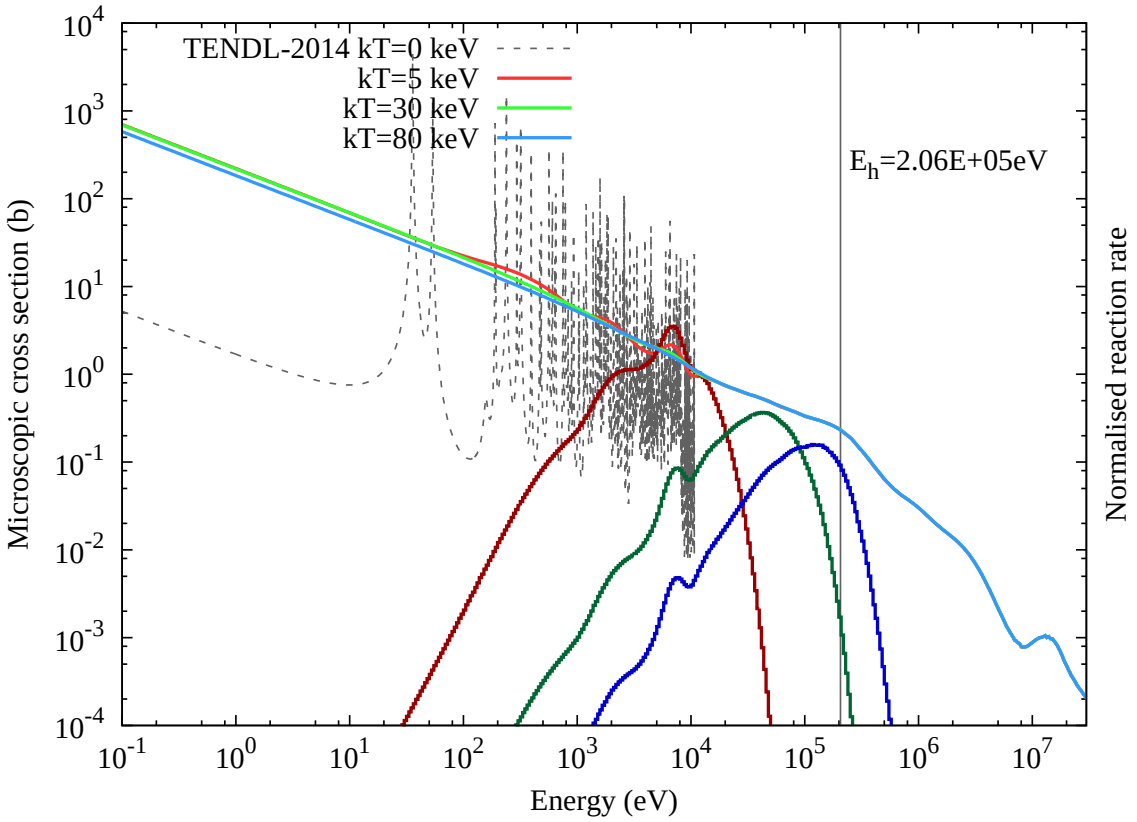


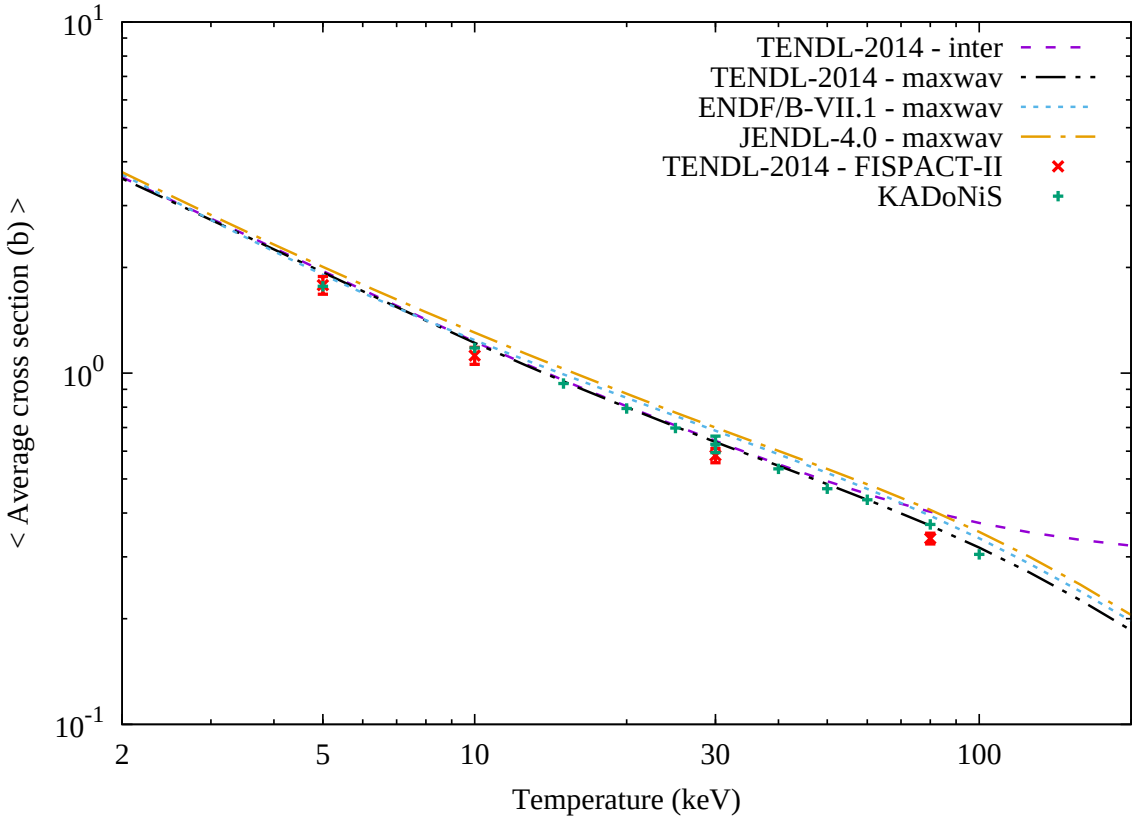
$^{82}Se_{34}$ $[T_{1/2} = 1.21 \times 10^{20}$ years] (KADoNiS=SMC)



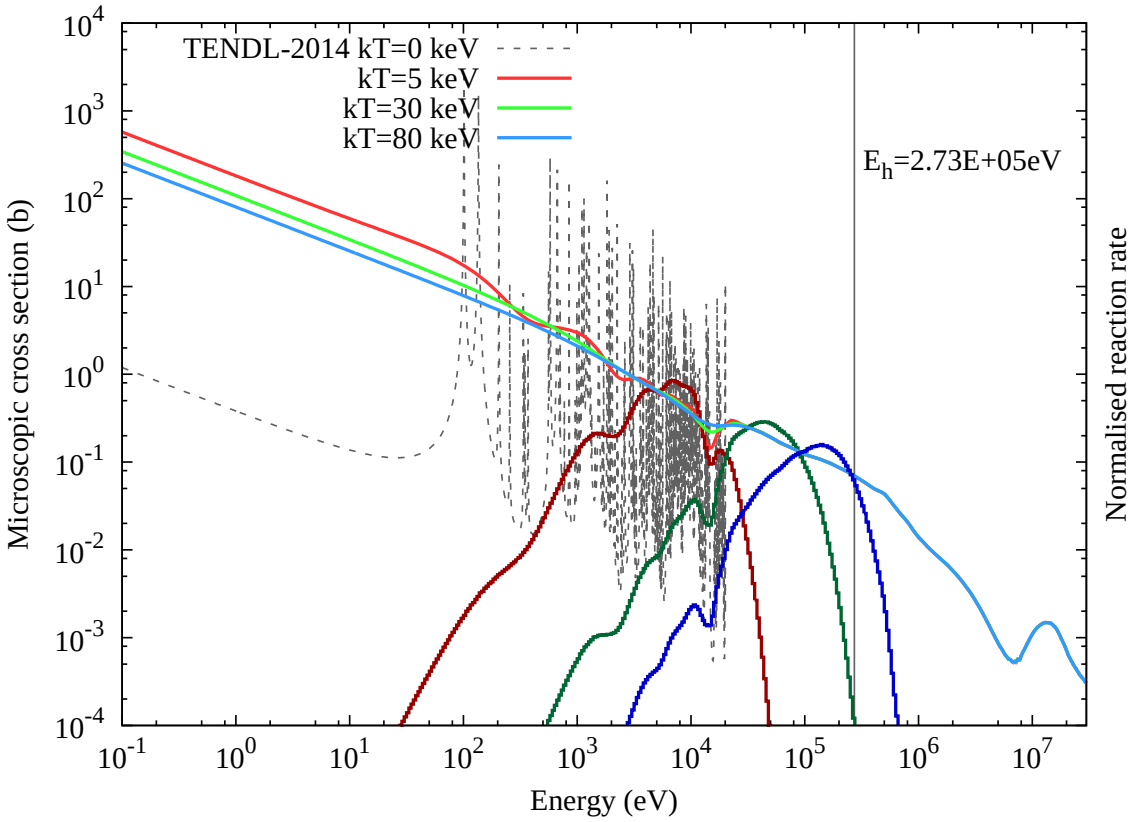


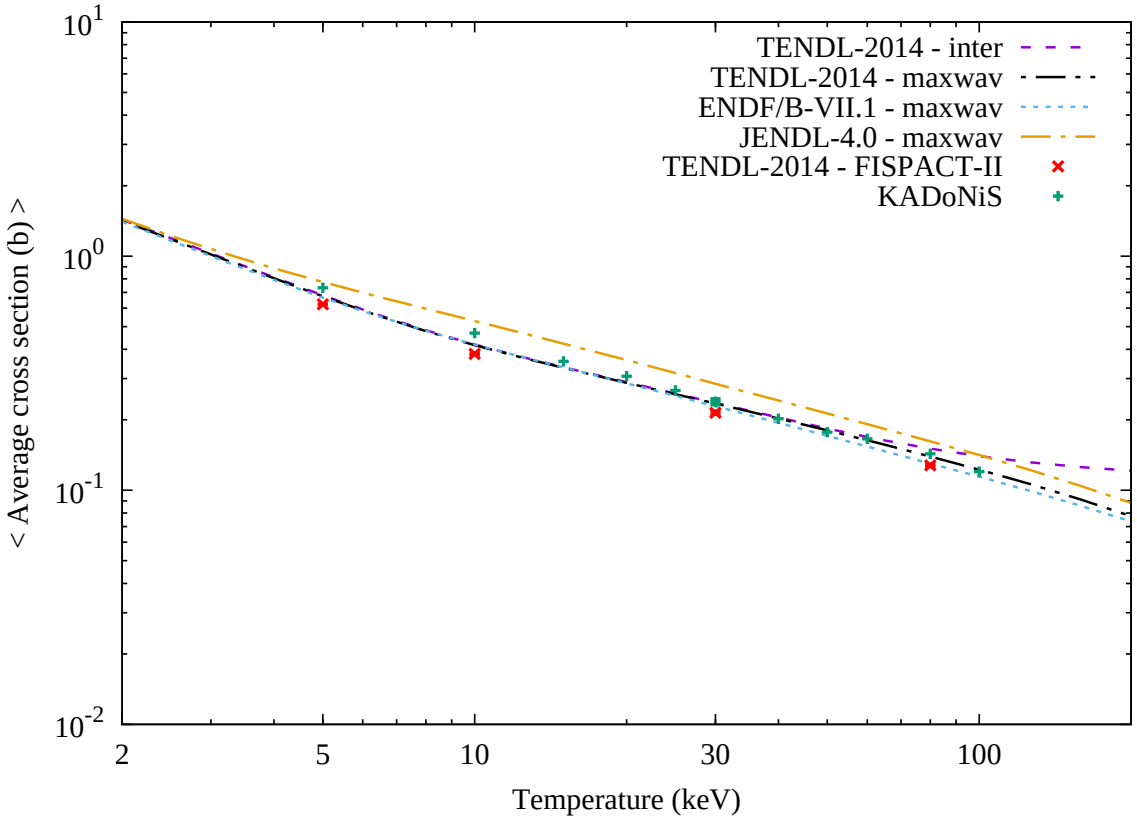
$^{79}Br_{35}$ [Stable]



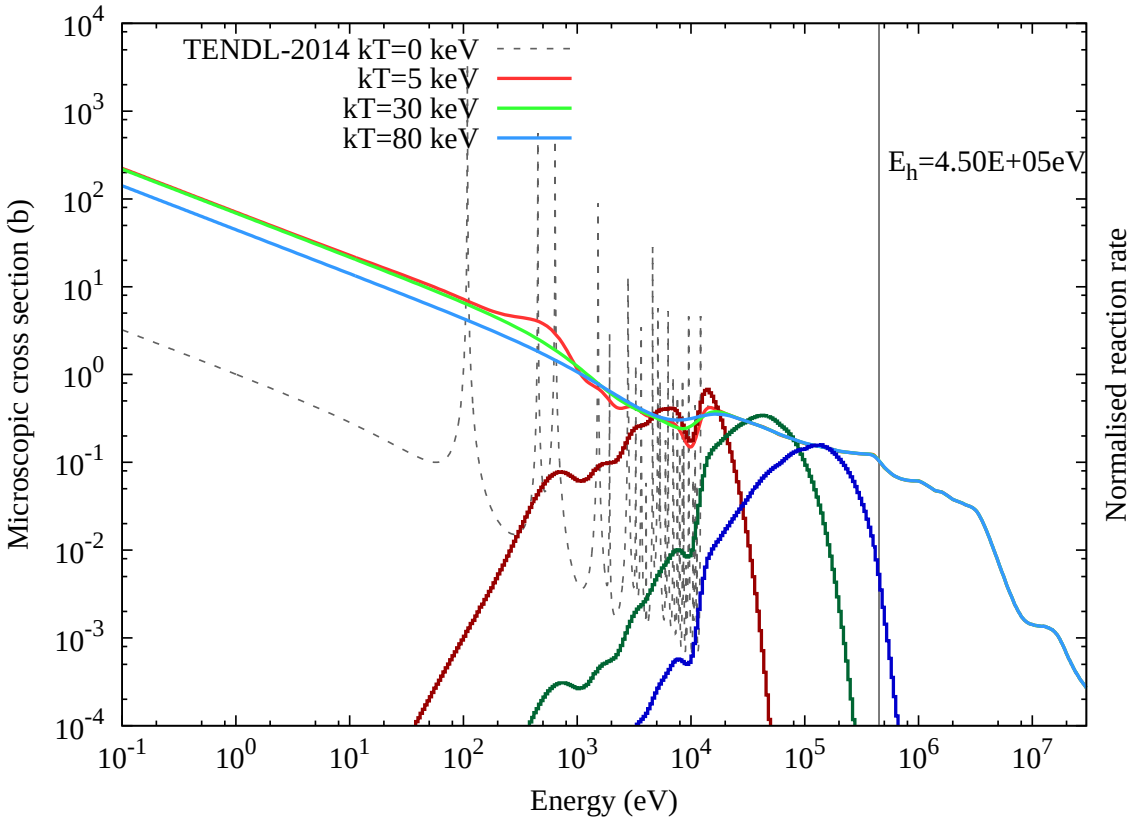


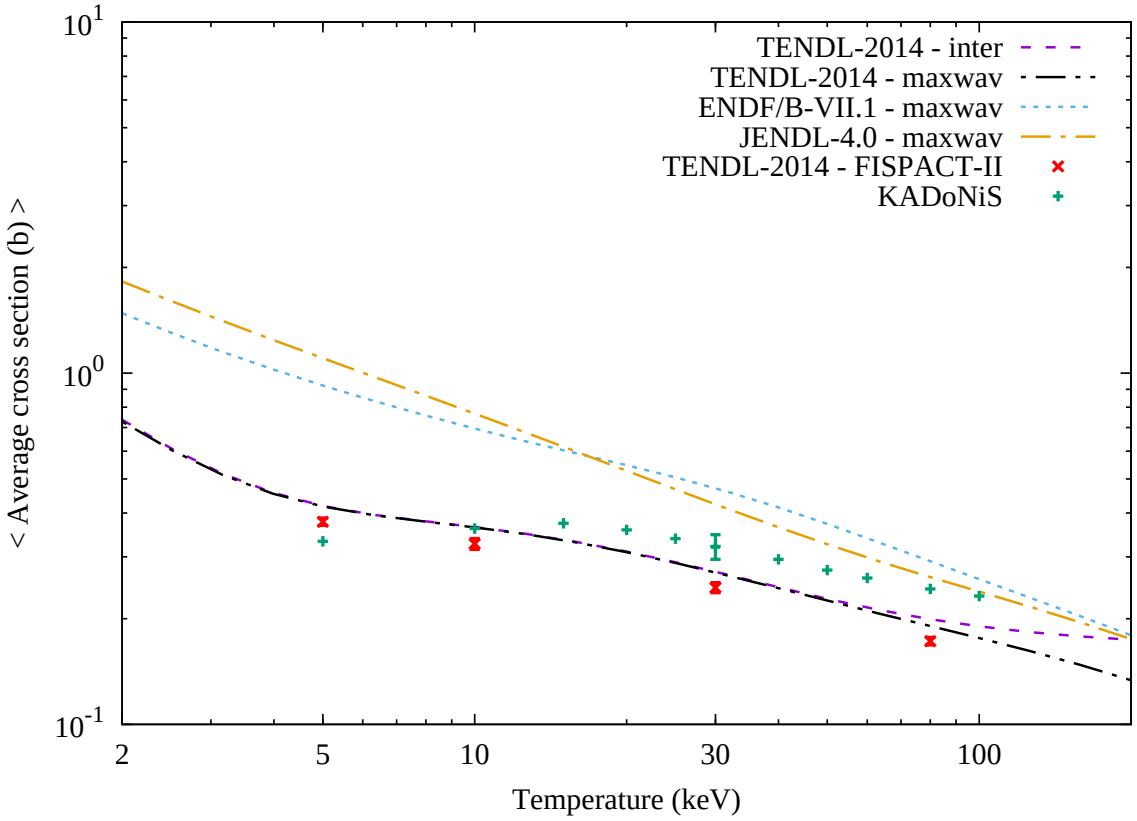
$^{81}Br_{35}$ [Stable]



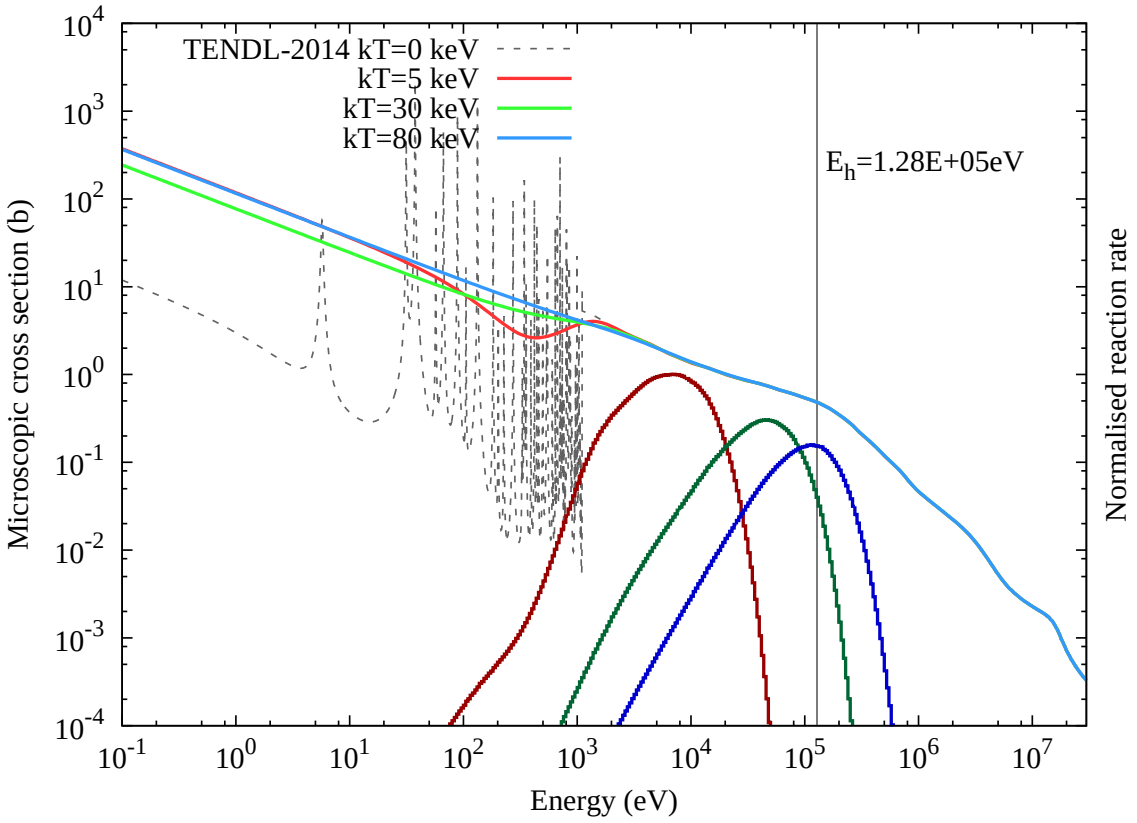


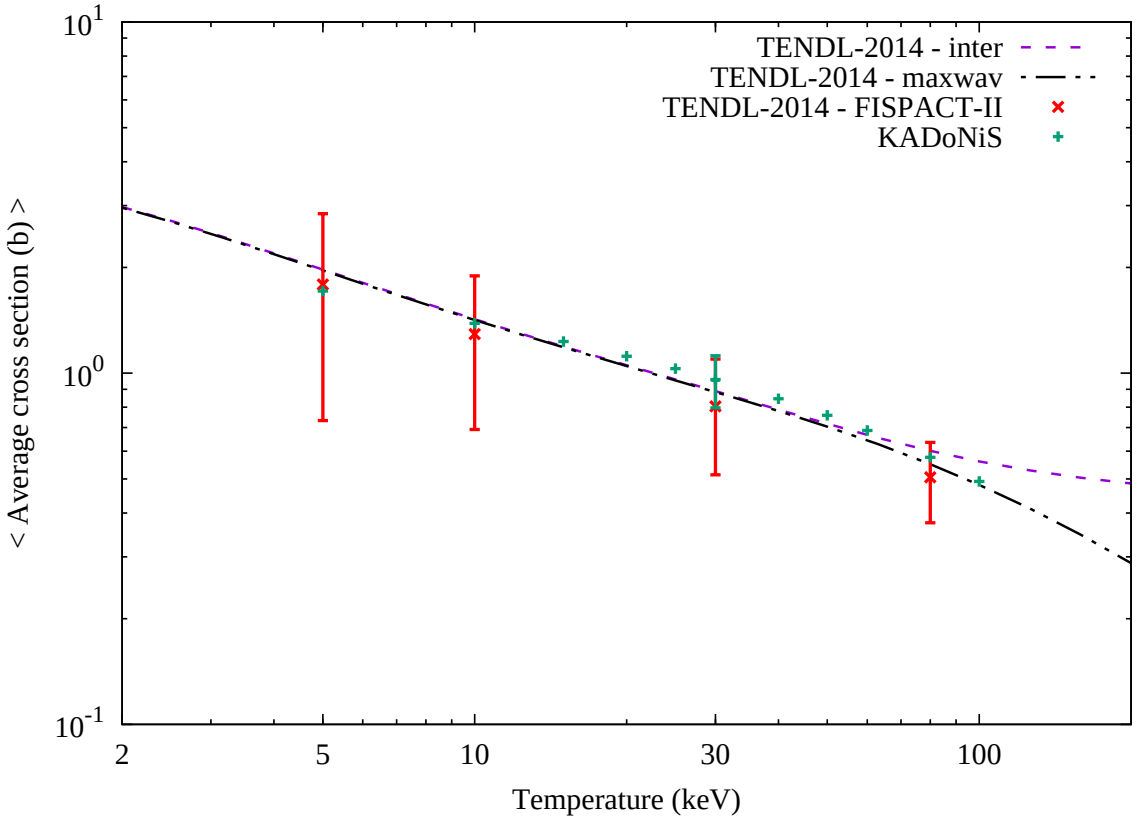
$^{78}Kr_{36}$ $[T_{1/2} = 1.10 \times 10^{20}$ years$]$



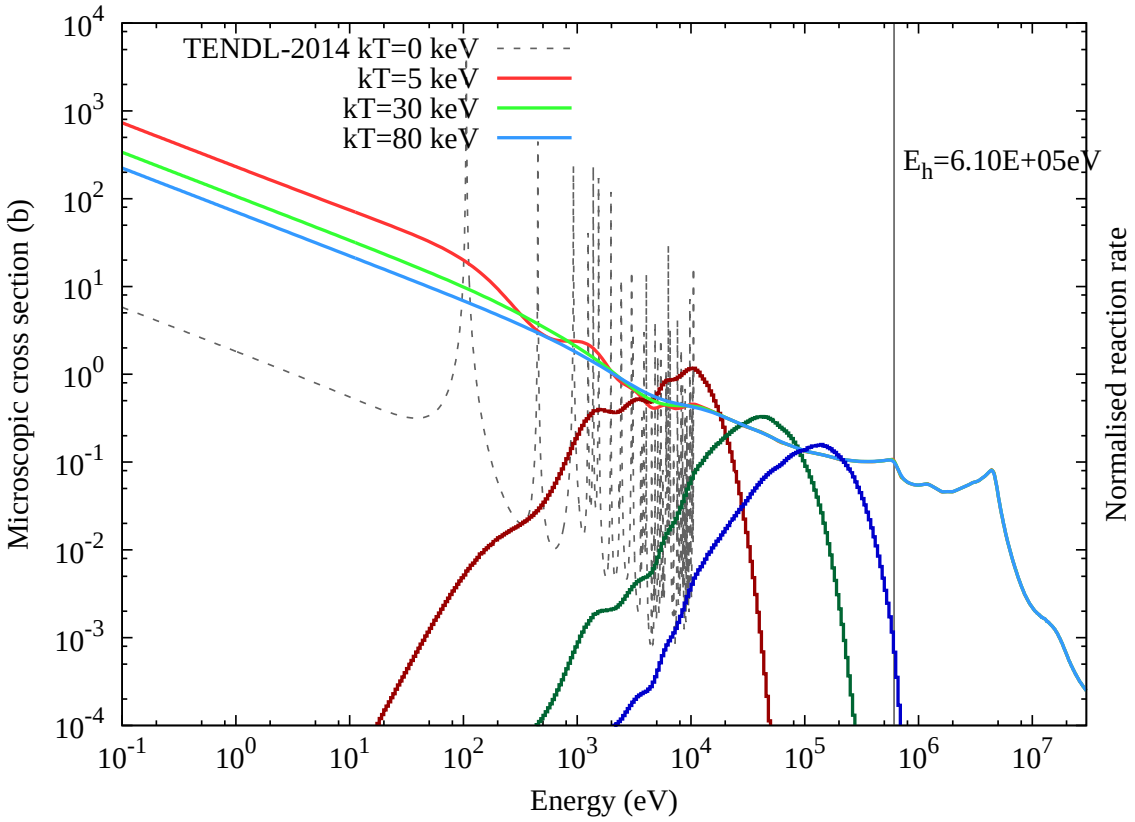


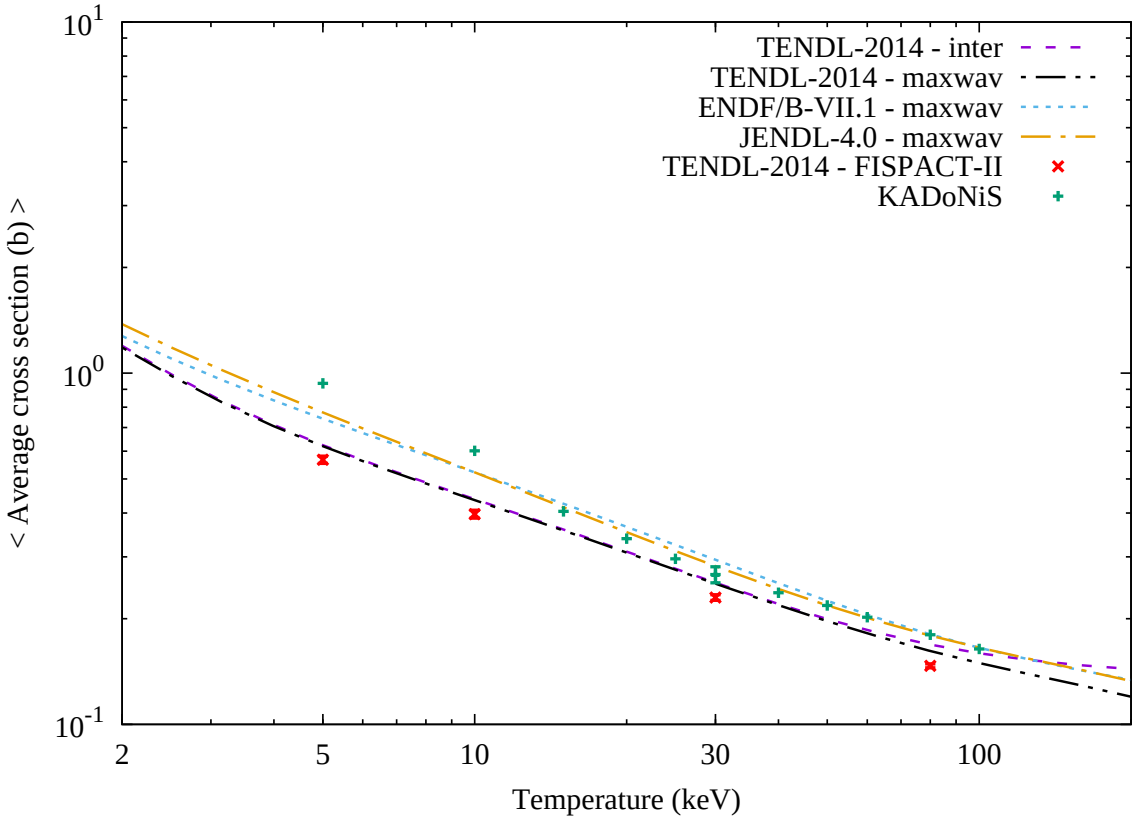
$^{79}Kr_{36}$ [$T_{1/2}$ = 1.46 days] (KADoNiS=SMC)



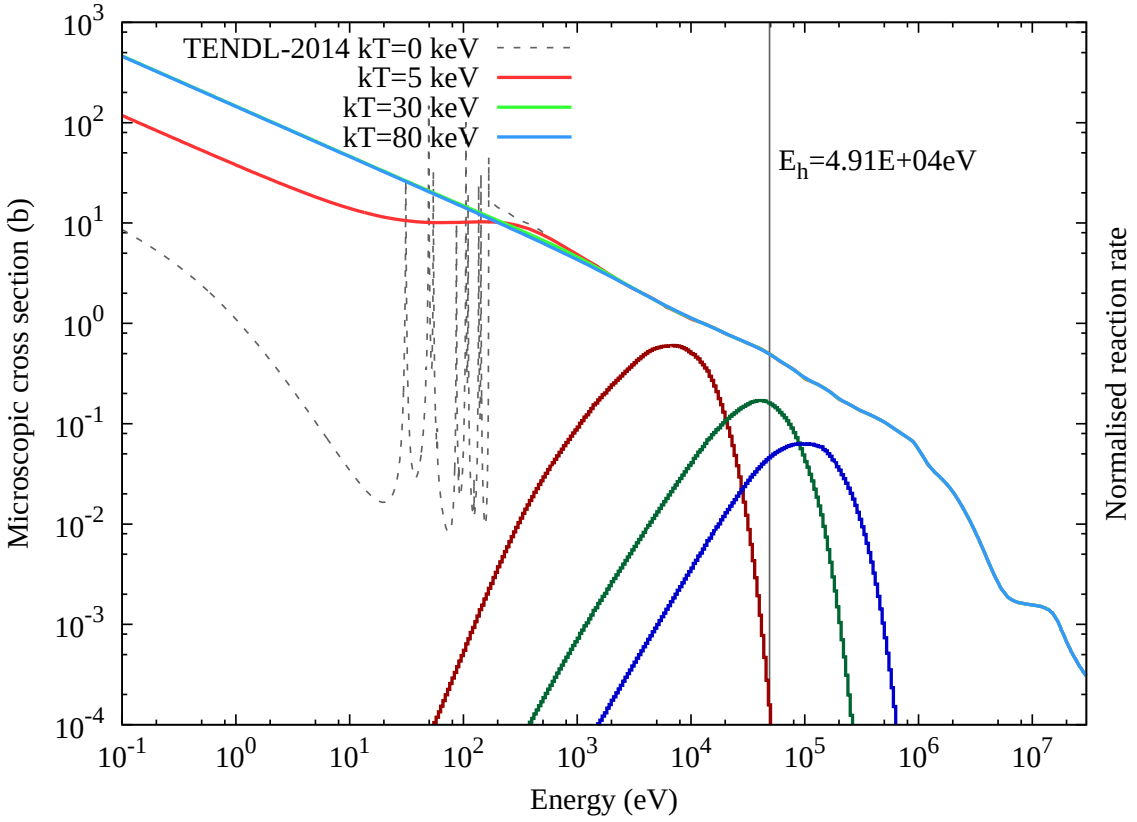


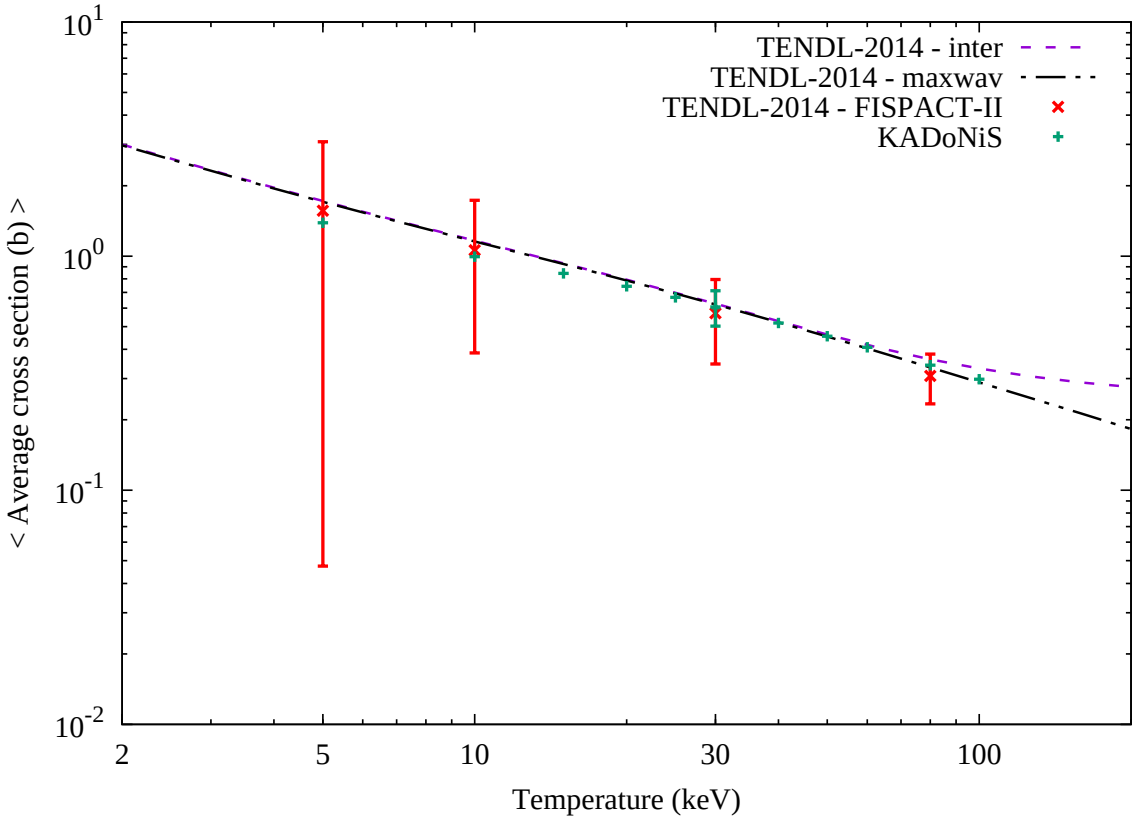
$^{80}Kr_{36}$ [Stable]



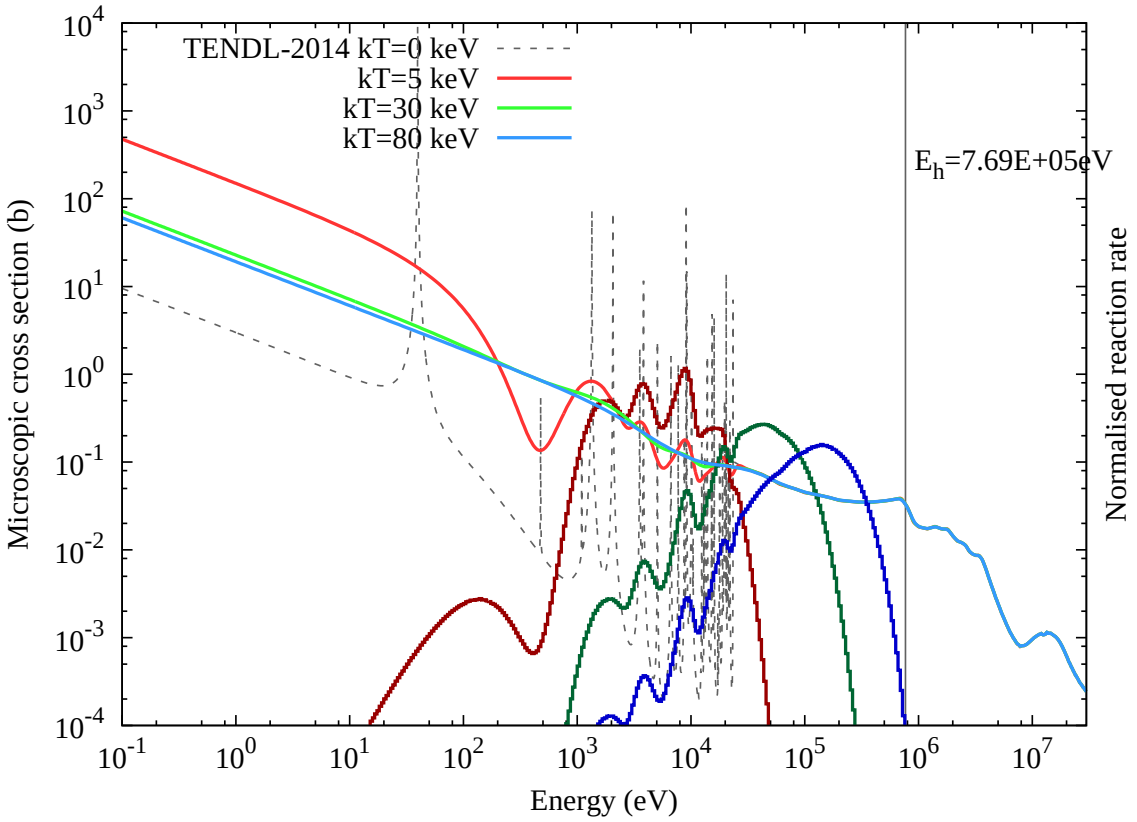


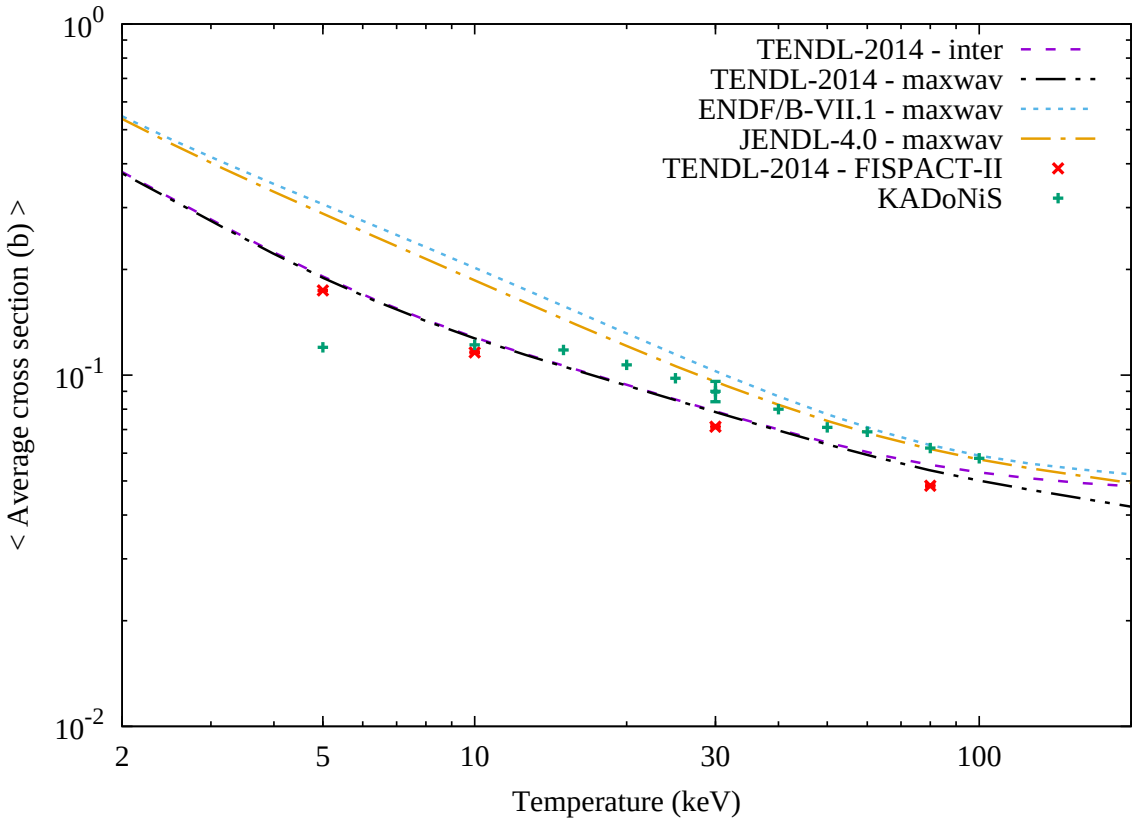
$^{81}Kr_{36}$ $[T_{1/2} = 2.10 \times 10^5$ years] (KADoNiS=SMC)



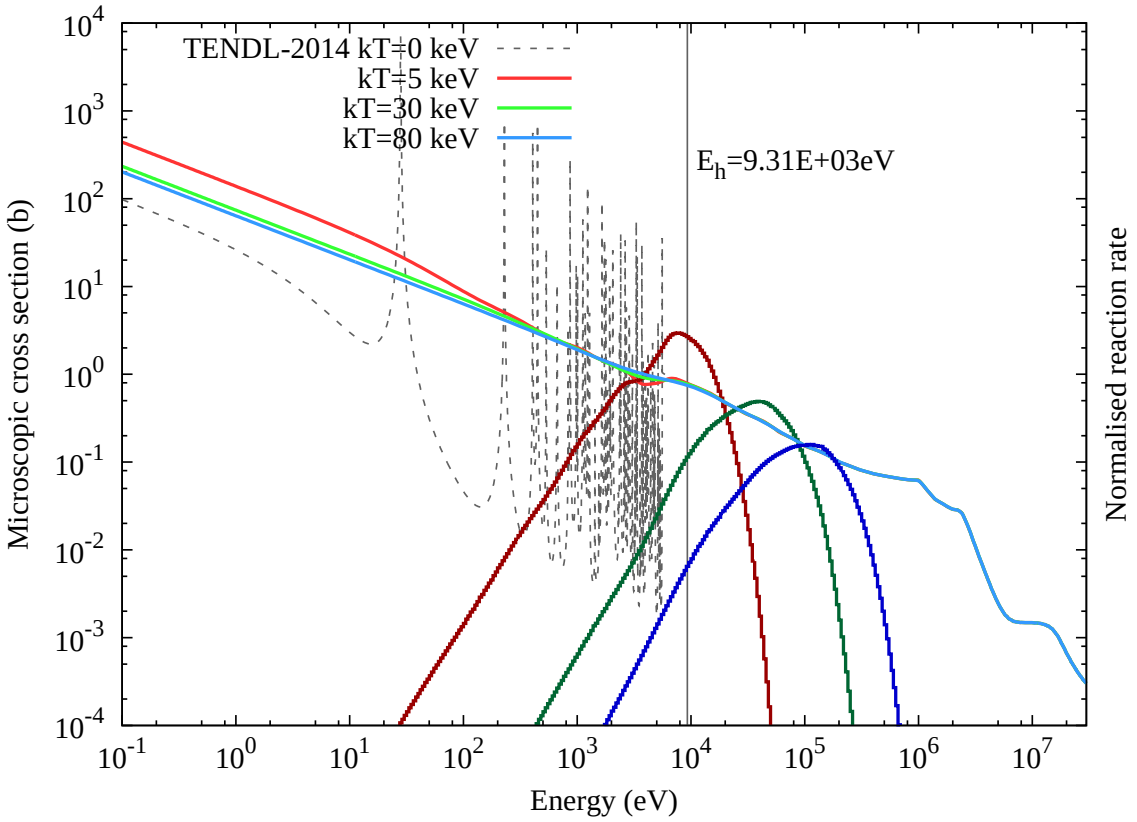


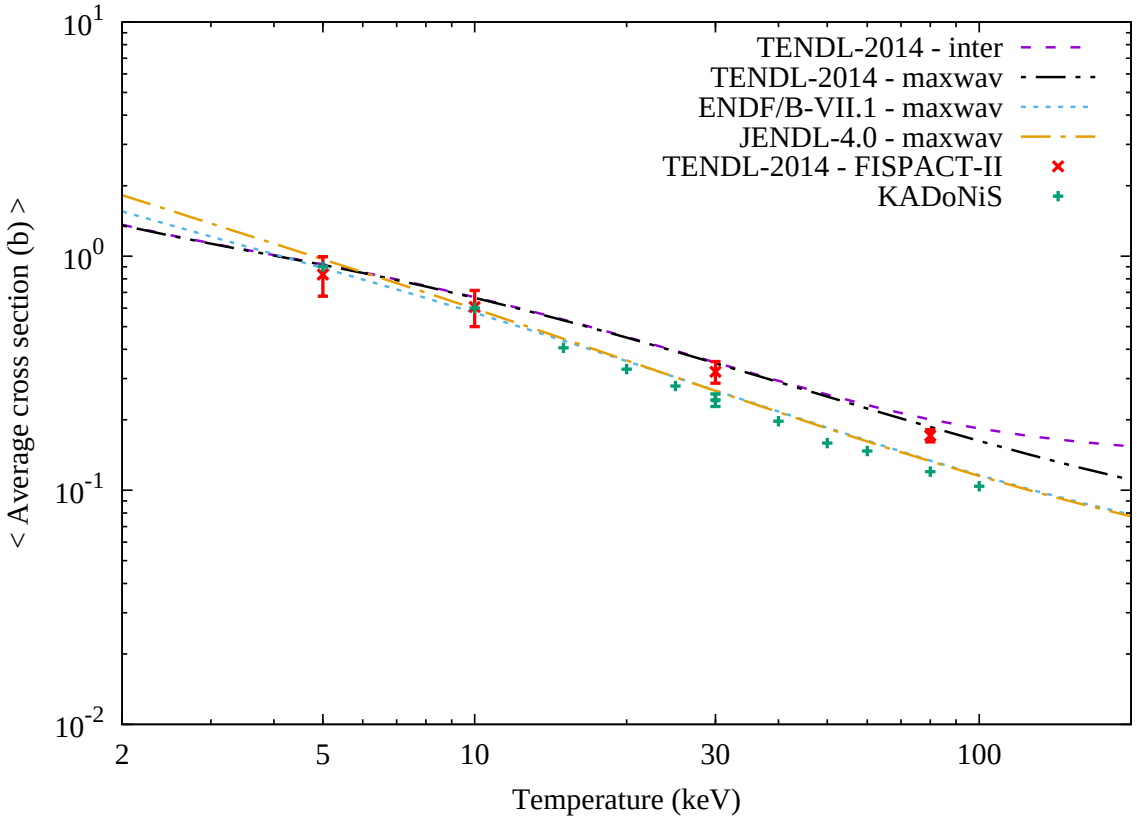
$^{82}Kr_{36}$ [Stable]



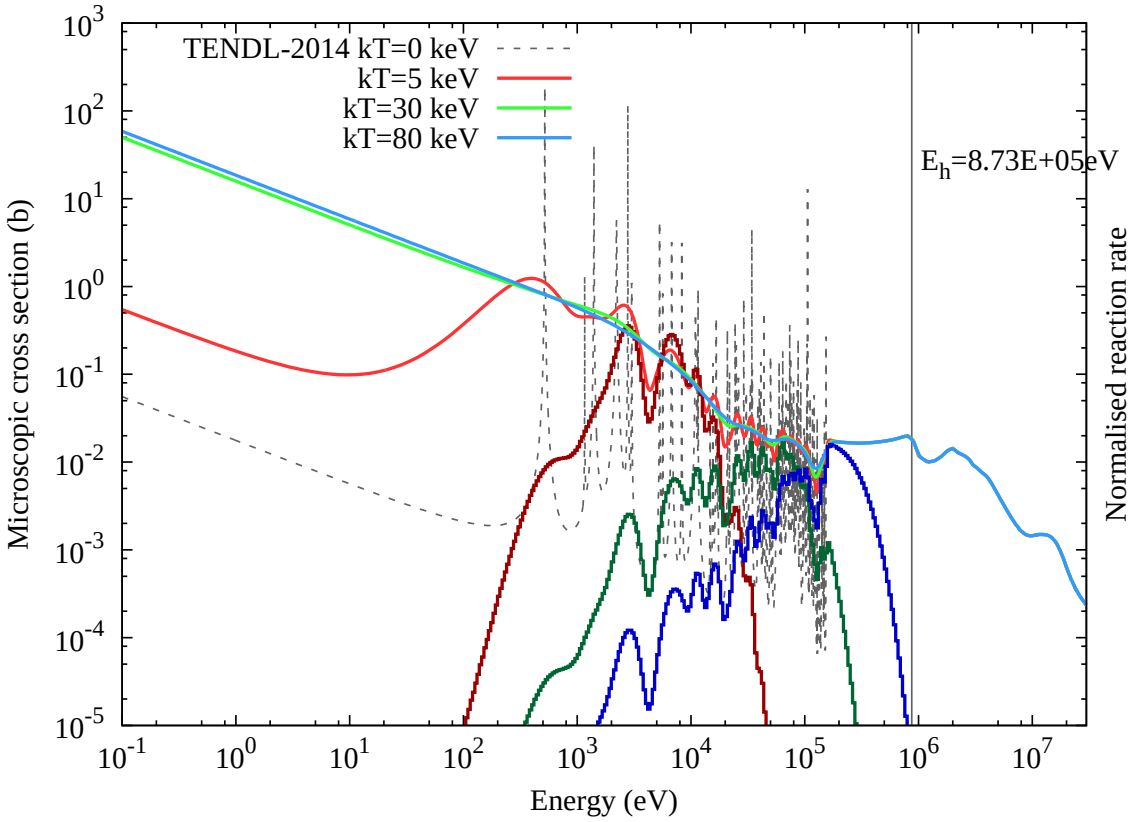


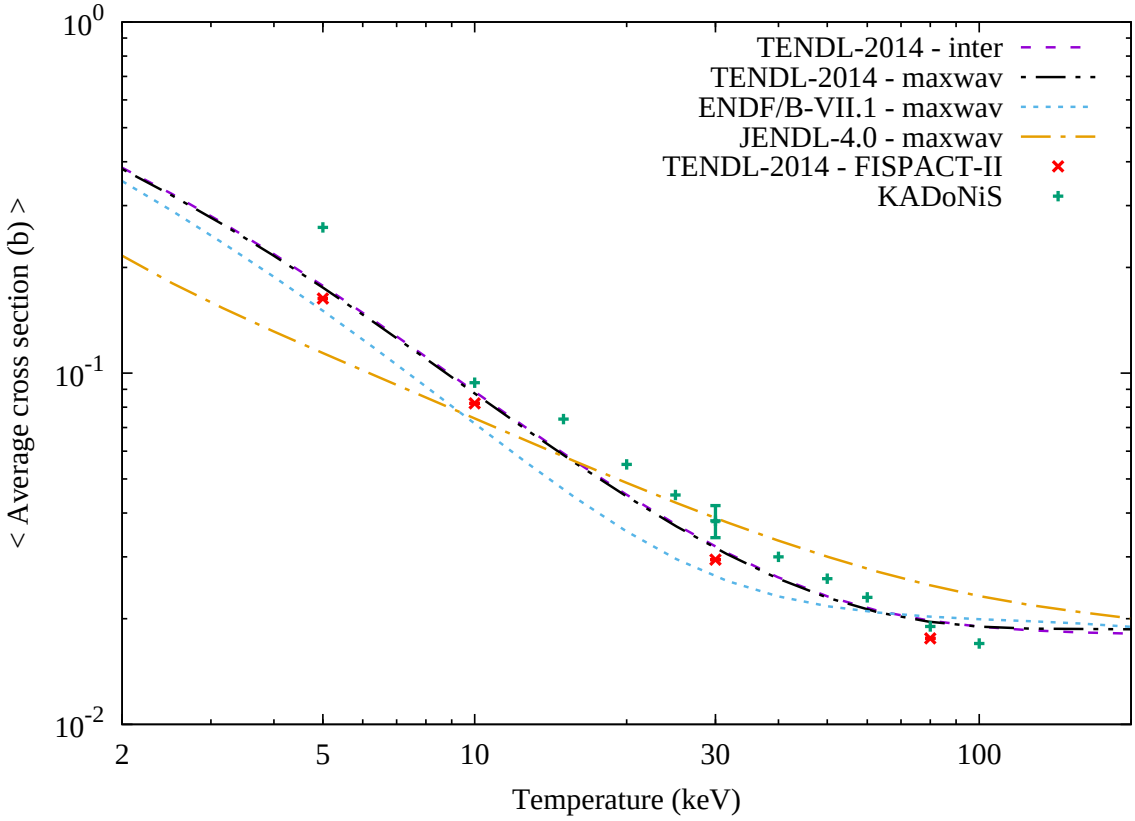
$^{83}Kr_{36}$ [Stable]



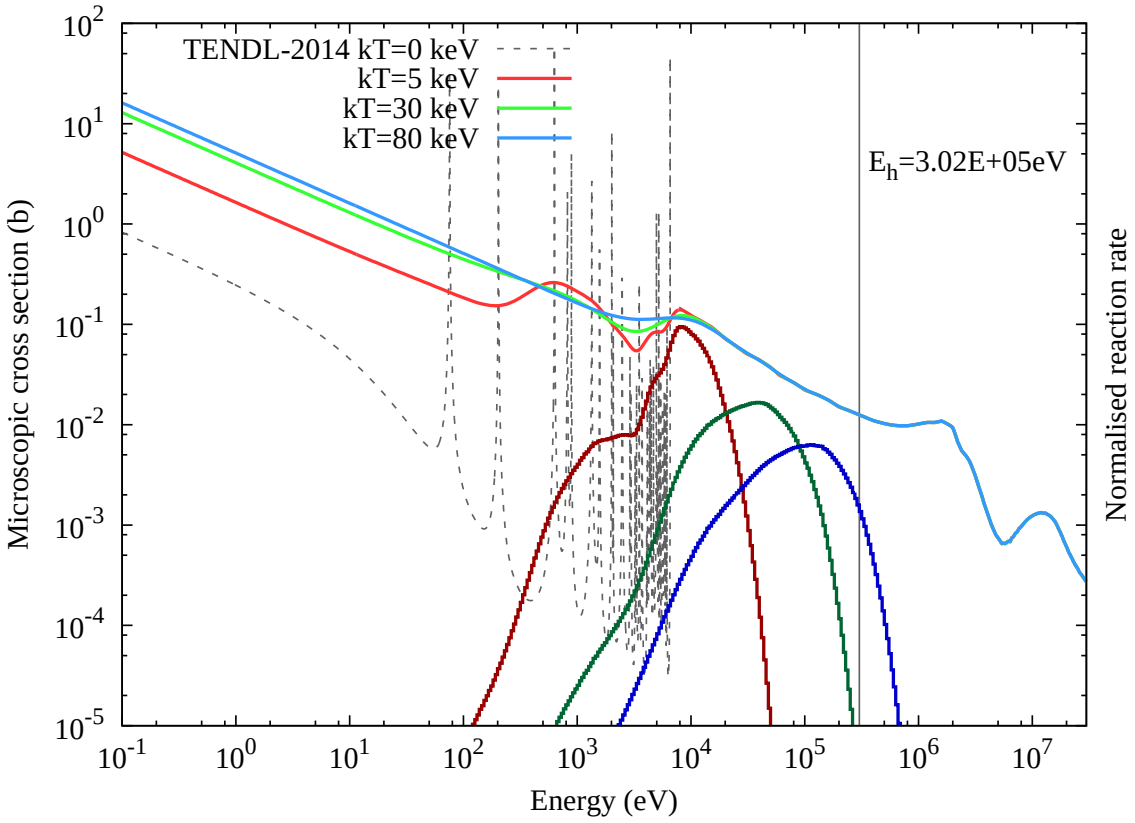


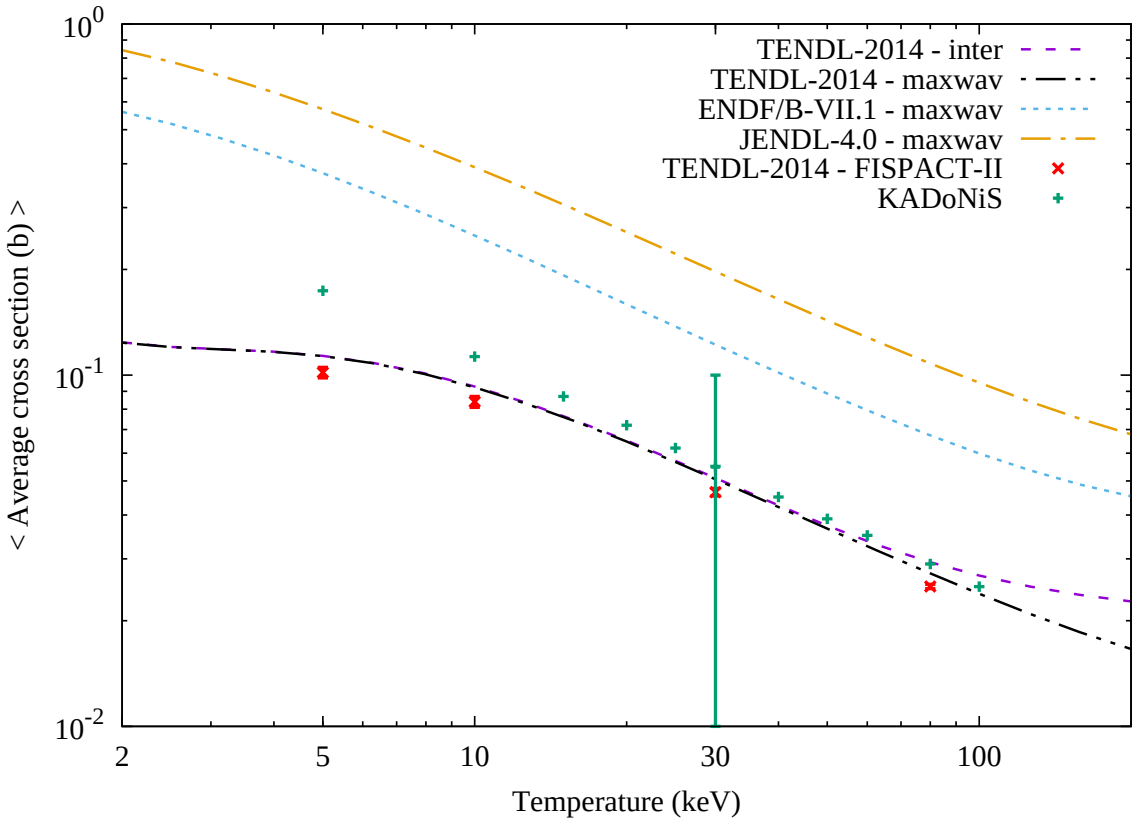
$^{84}Kr_{36}$ [Stable]



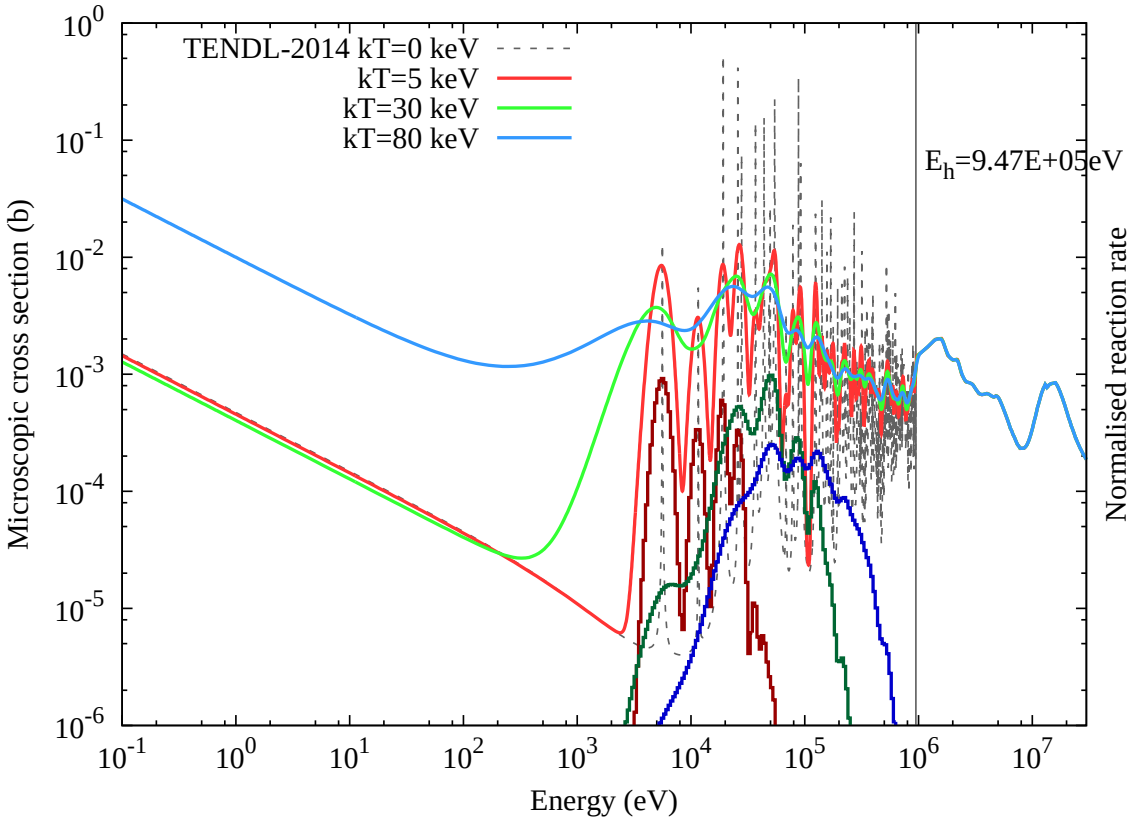


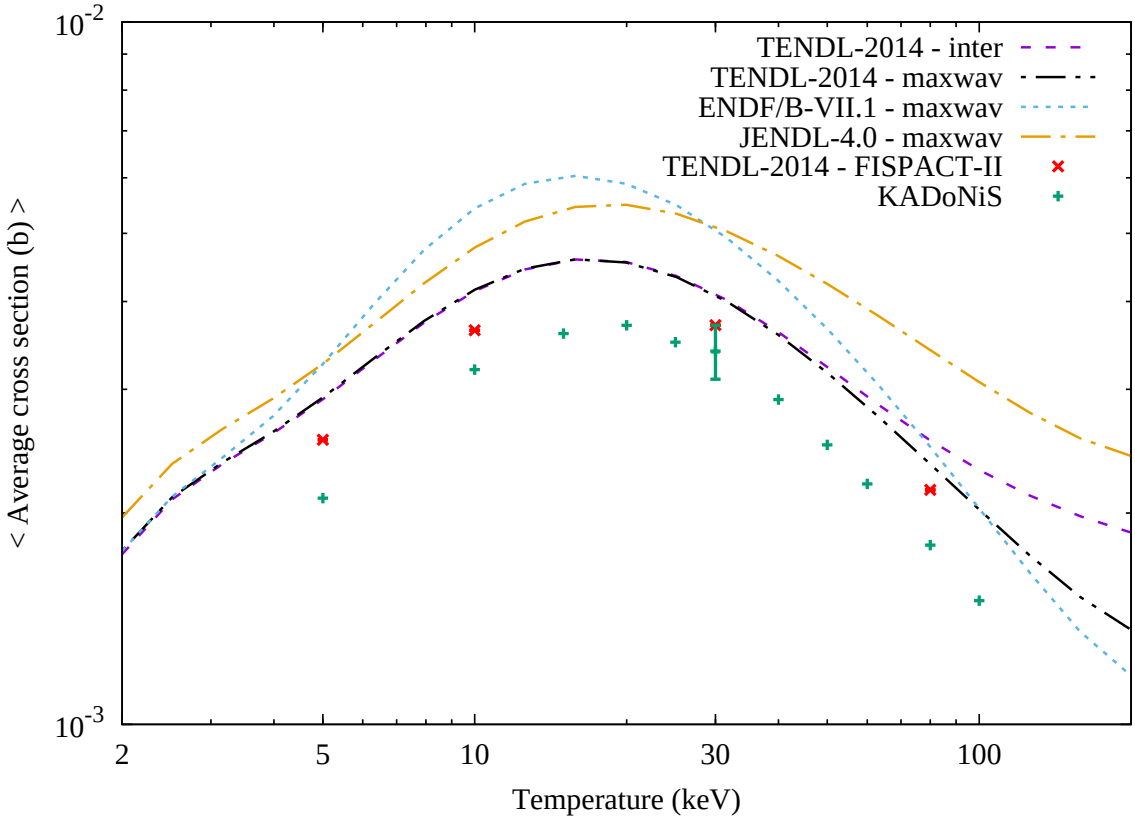
$^{85}Kr_{36}$ [$T_{1/2}$ = 10.75 years] (KADoNiS=SMC)



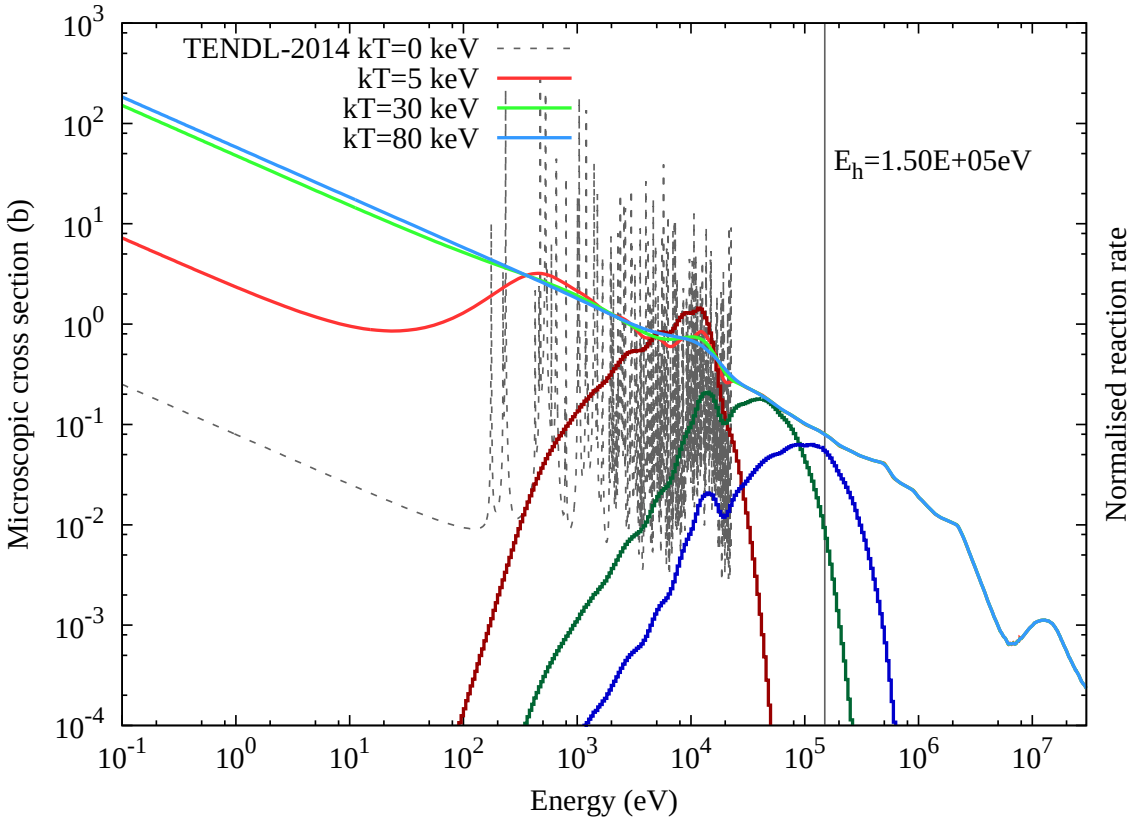


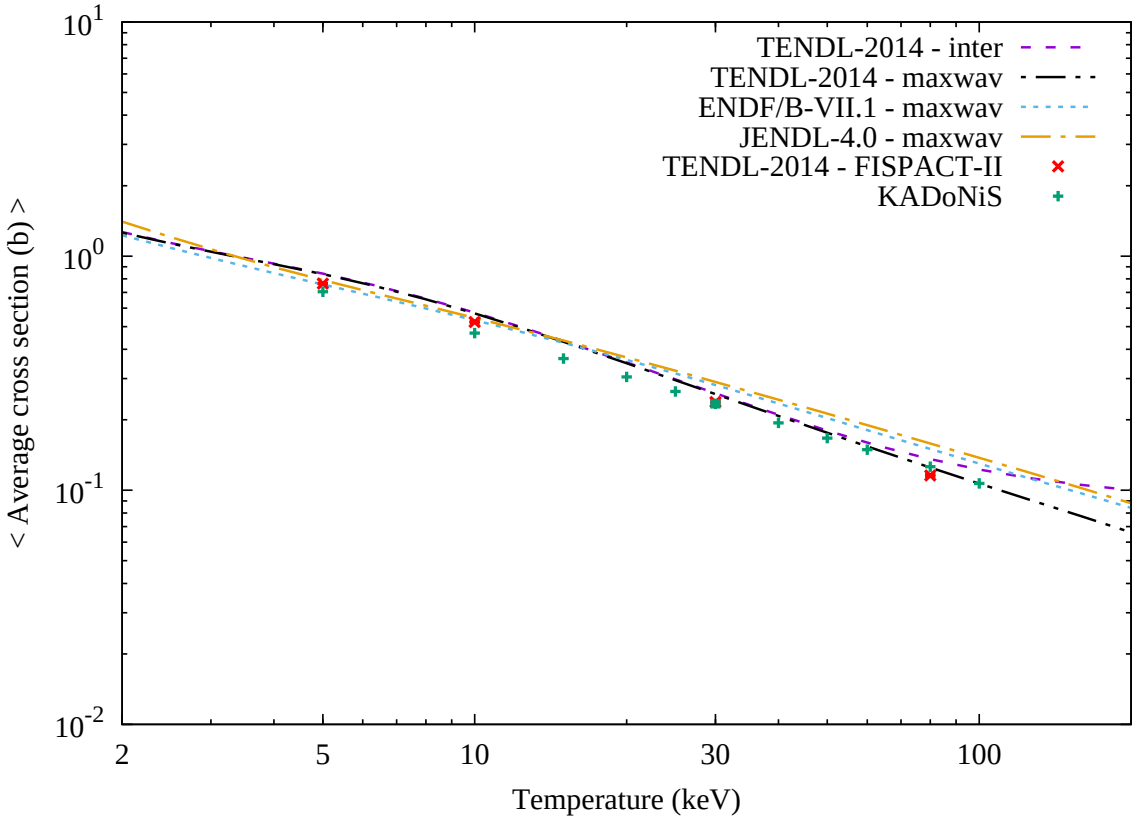
$^{86}Kr_{36}$ [Stable]



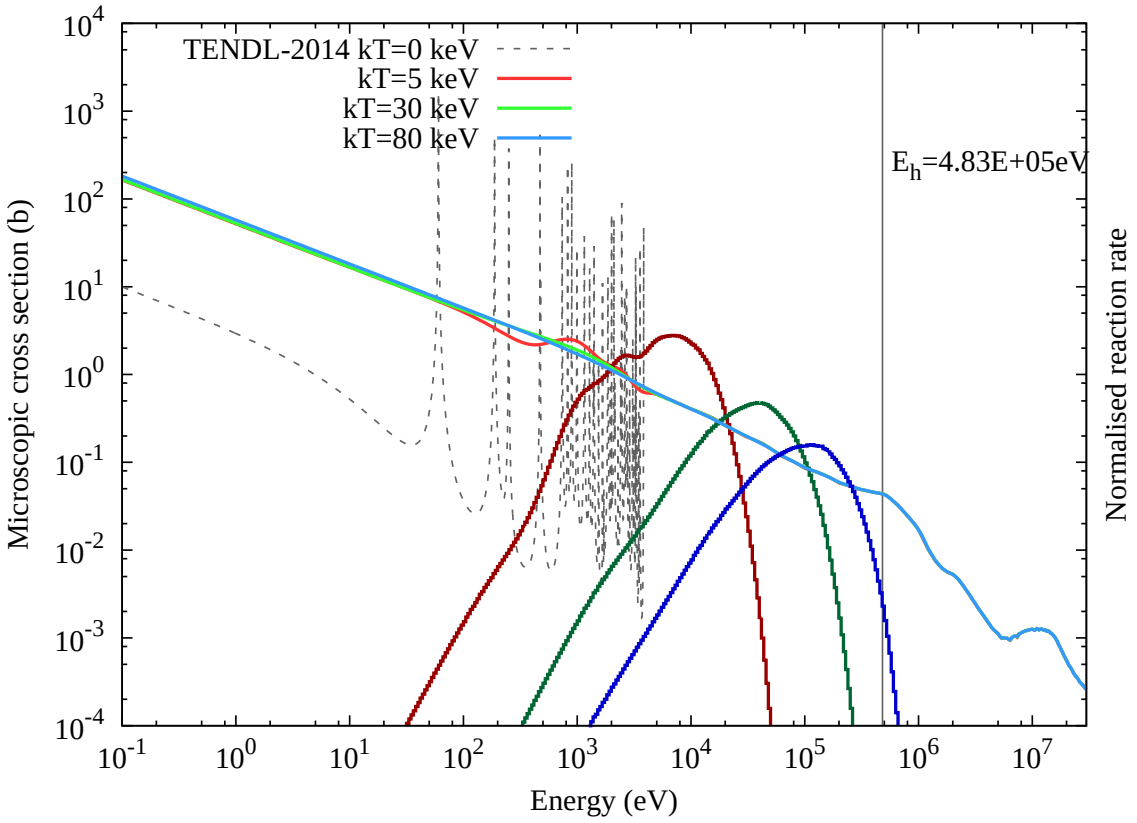


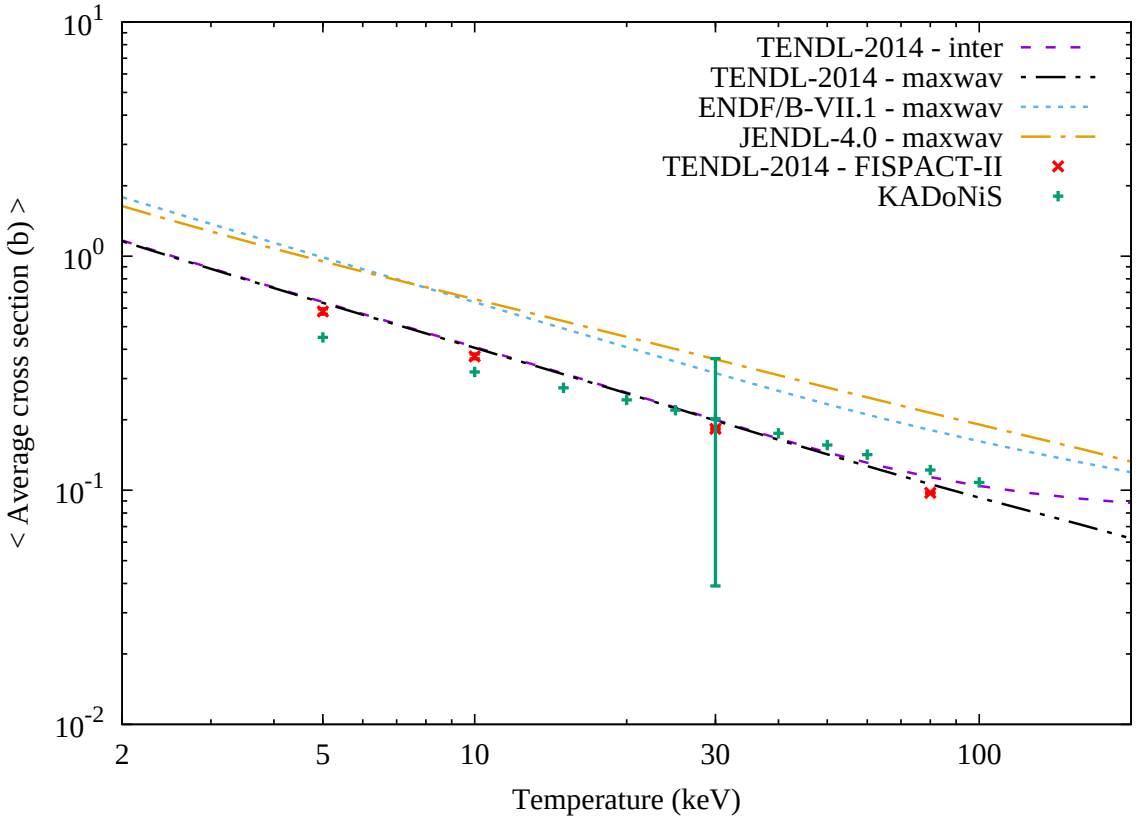
$^{85}Rb_{37}$ [Stable]



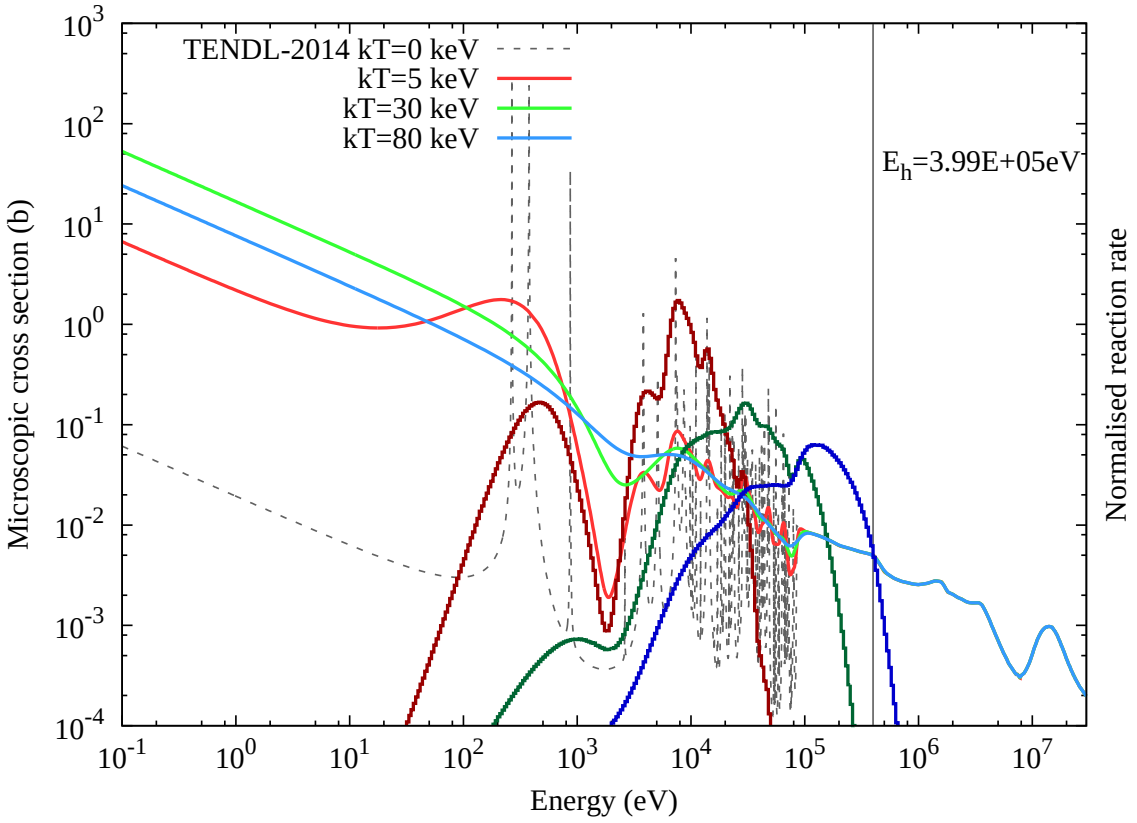


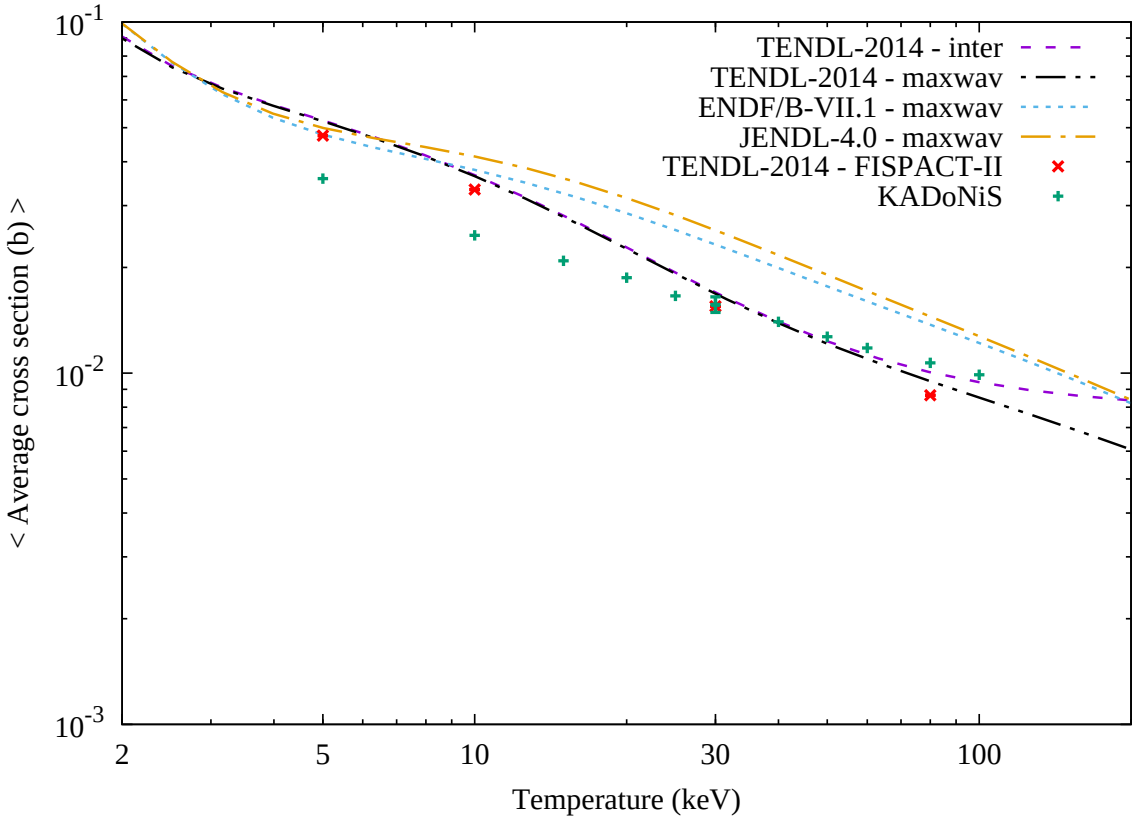
$^{86}Rb_{37}$ $[T_{1/2} = 18.64 \text{ days}]$ (KADoNiS=SMC)



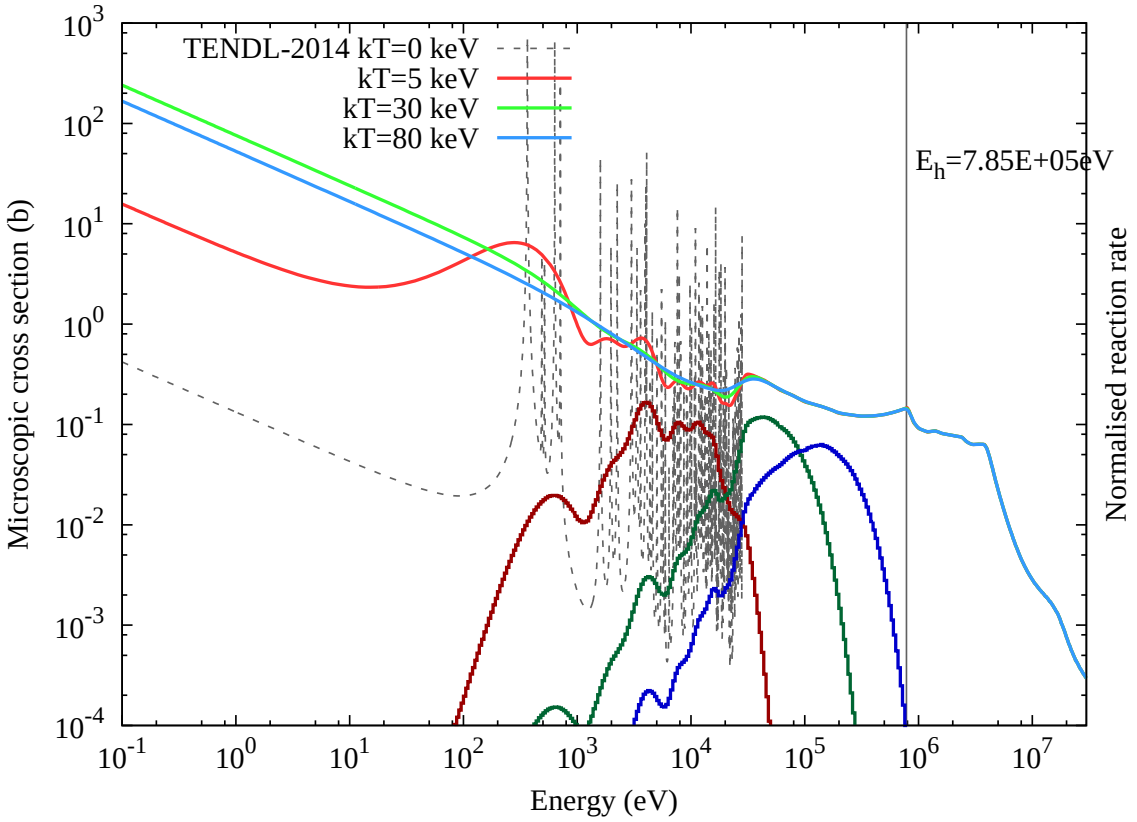


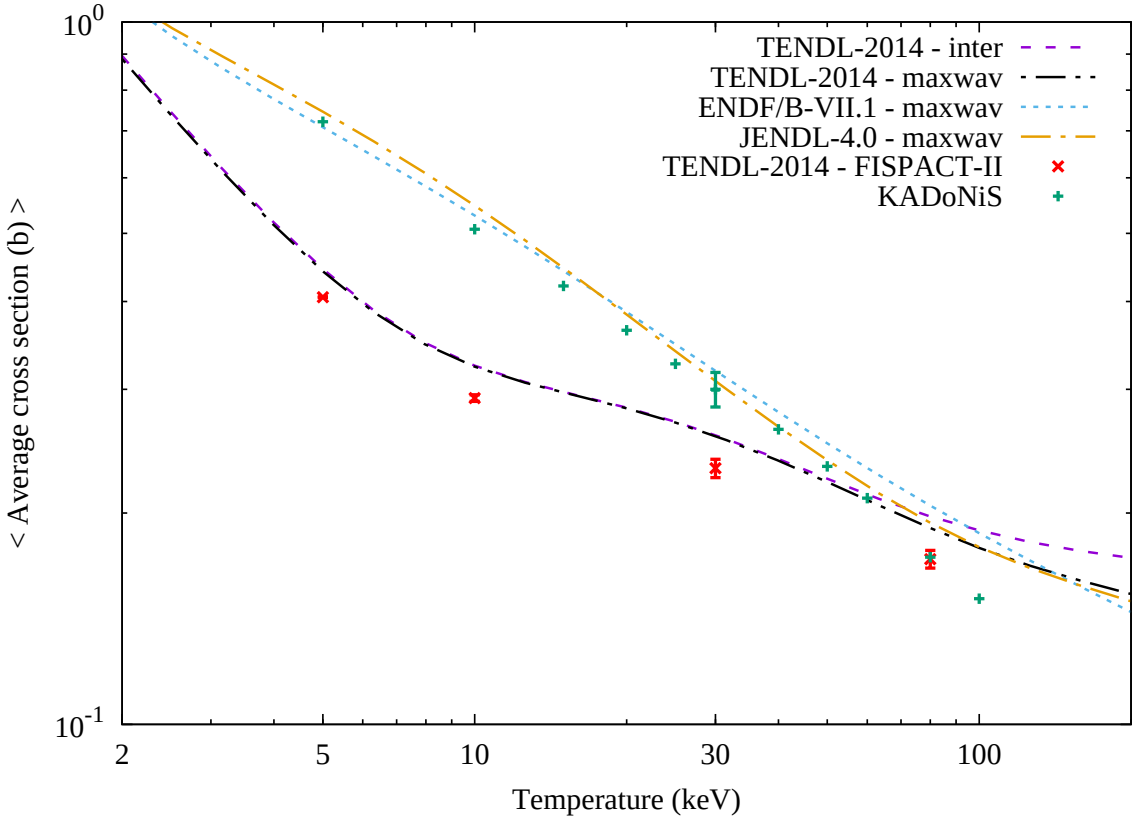
$^{87}Rb_{37}$ $[T_{1/2} = 4.81 \times 10^{10}$ years$]$



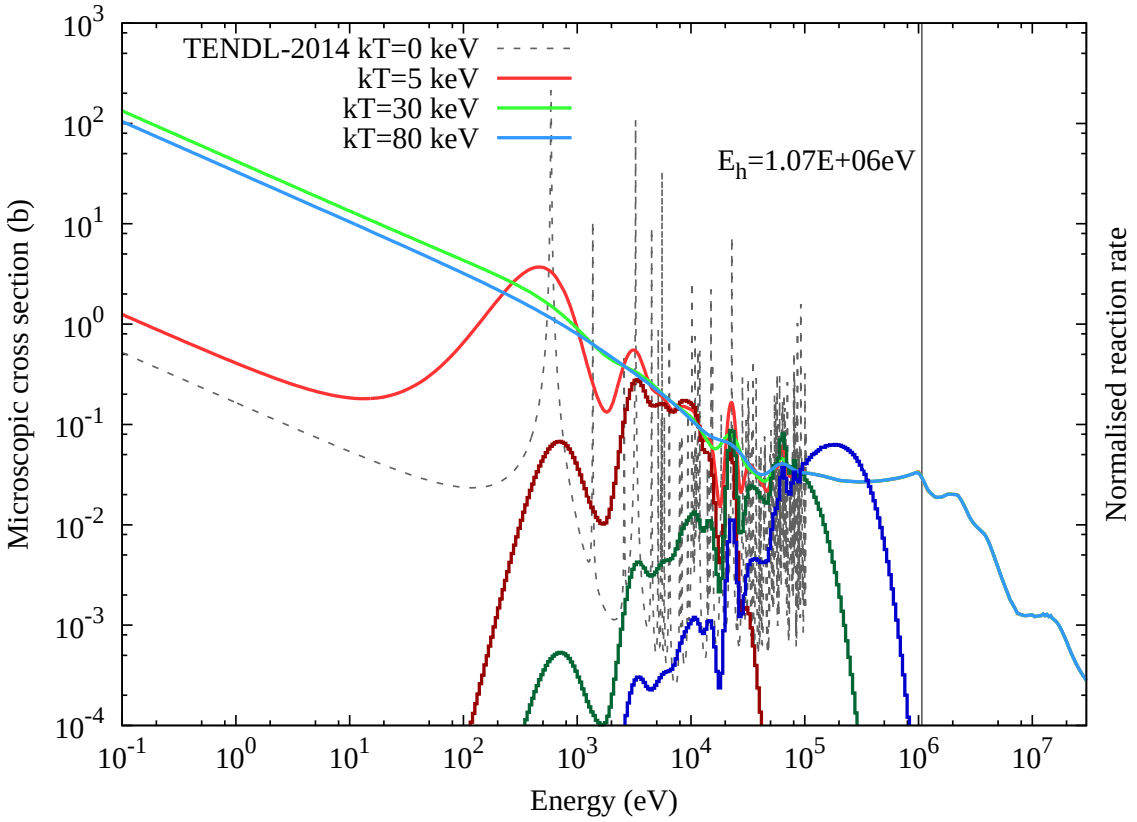


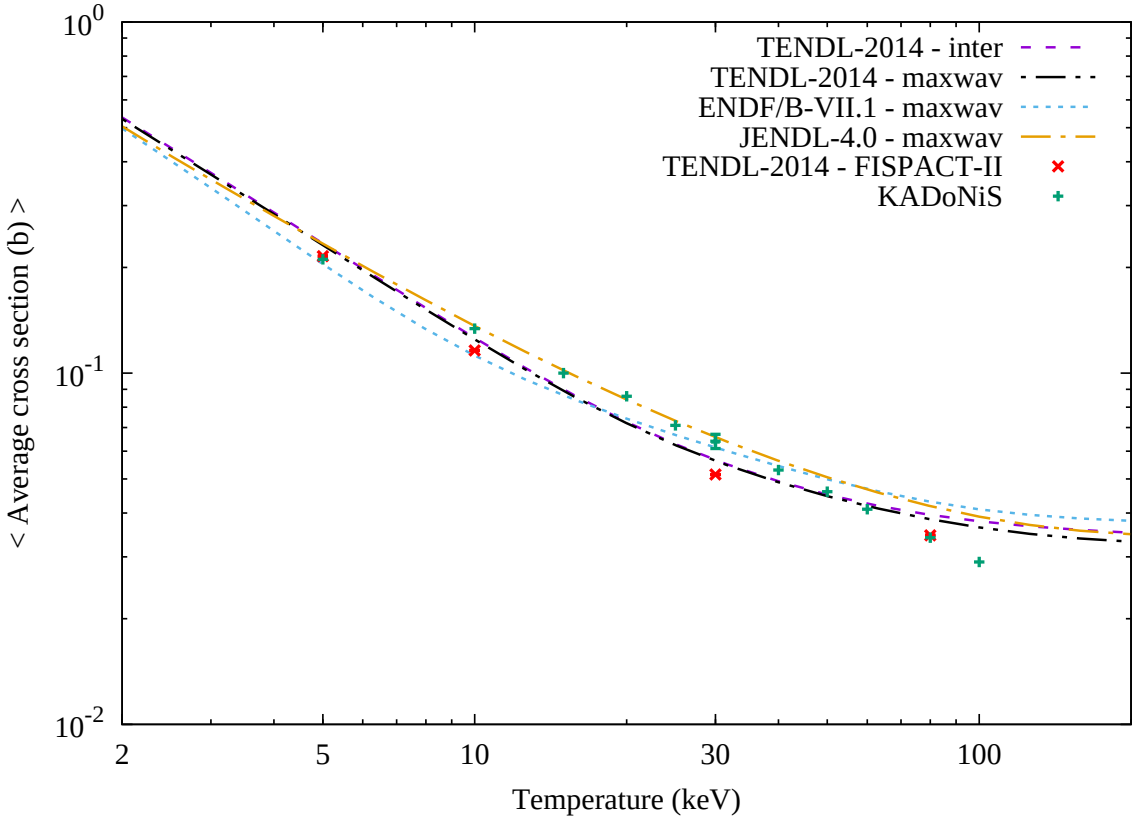
$^{84}Sr_{38}$ [Stable]



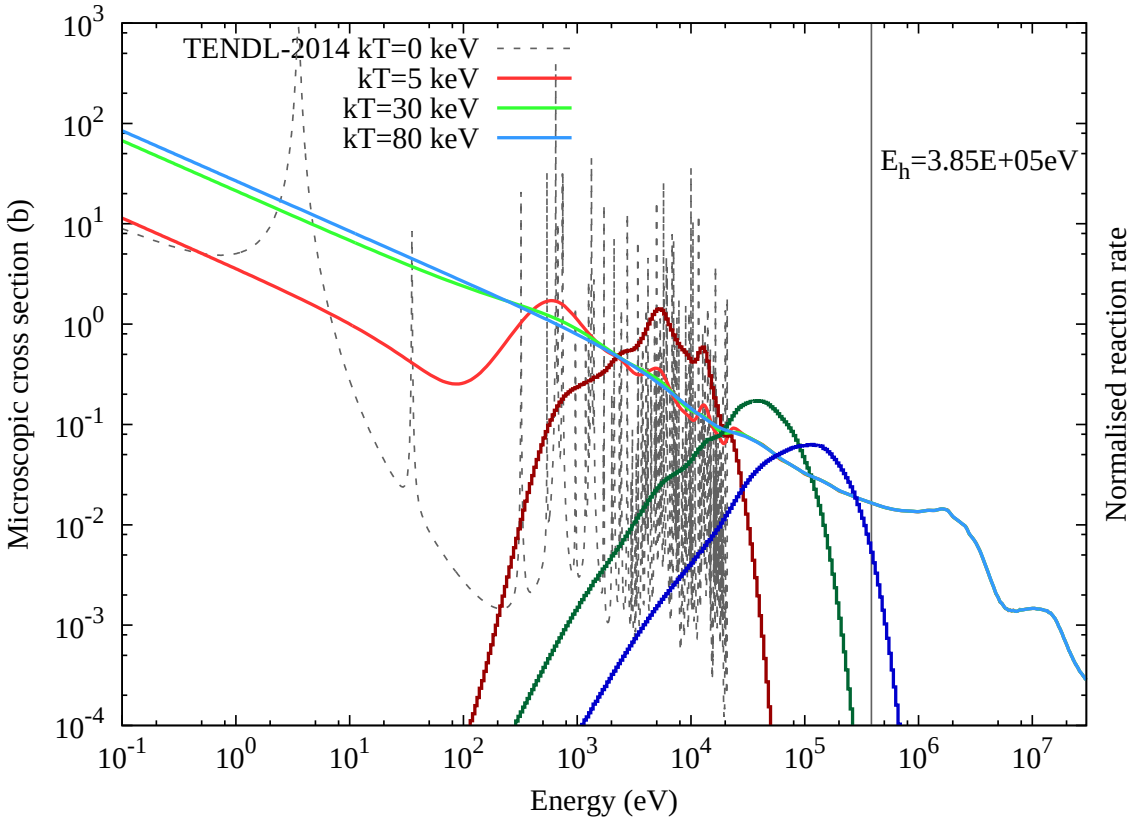


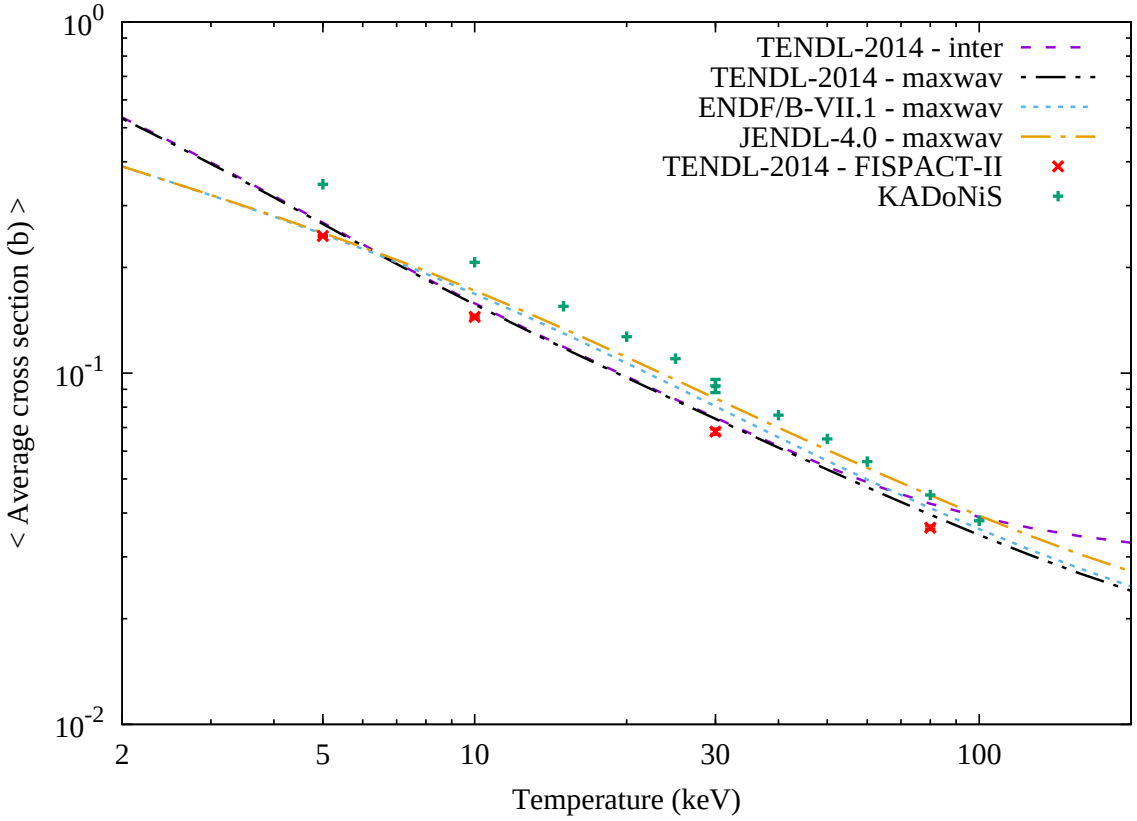
$^{86}Sr_{38}$ [Stable]



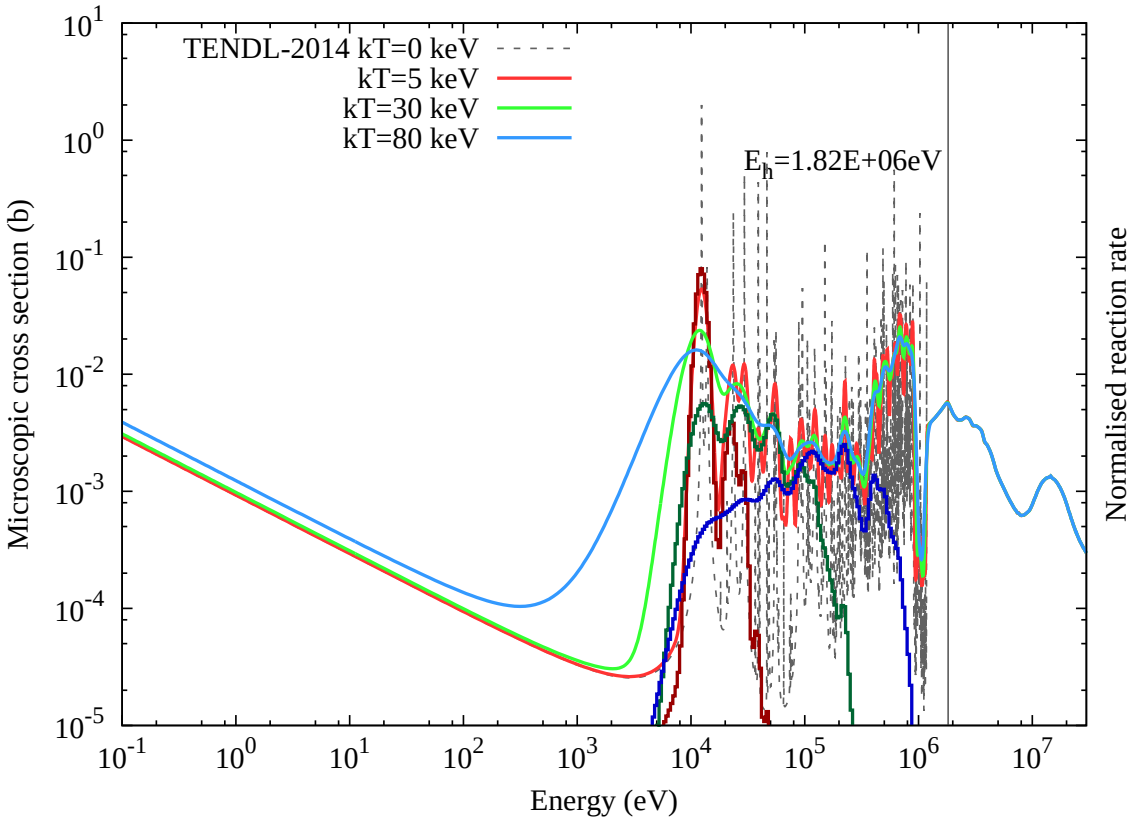


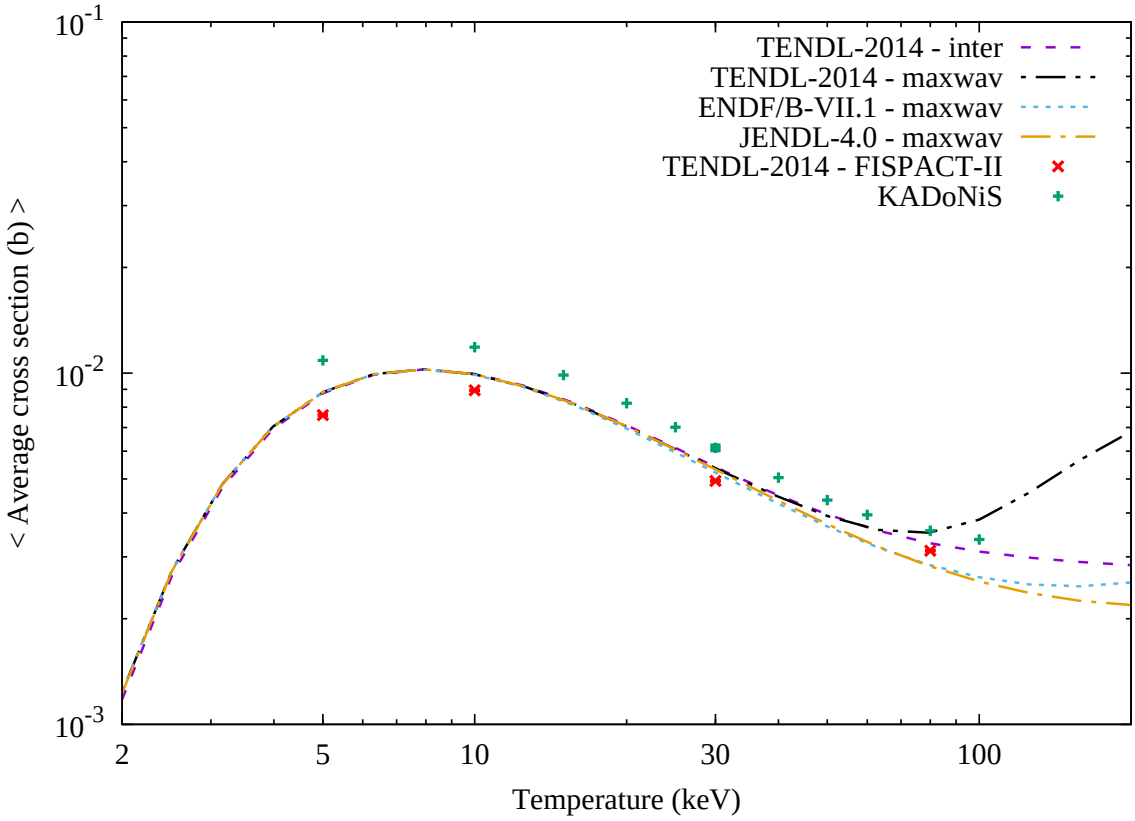
$^{87}Sr_{38}$ [Stable]



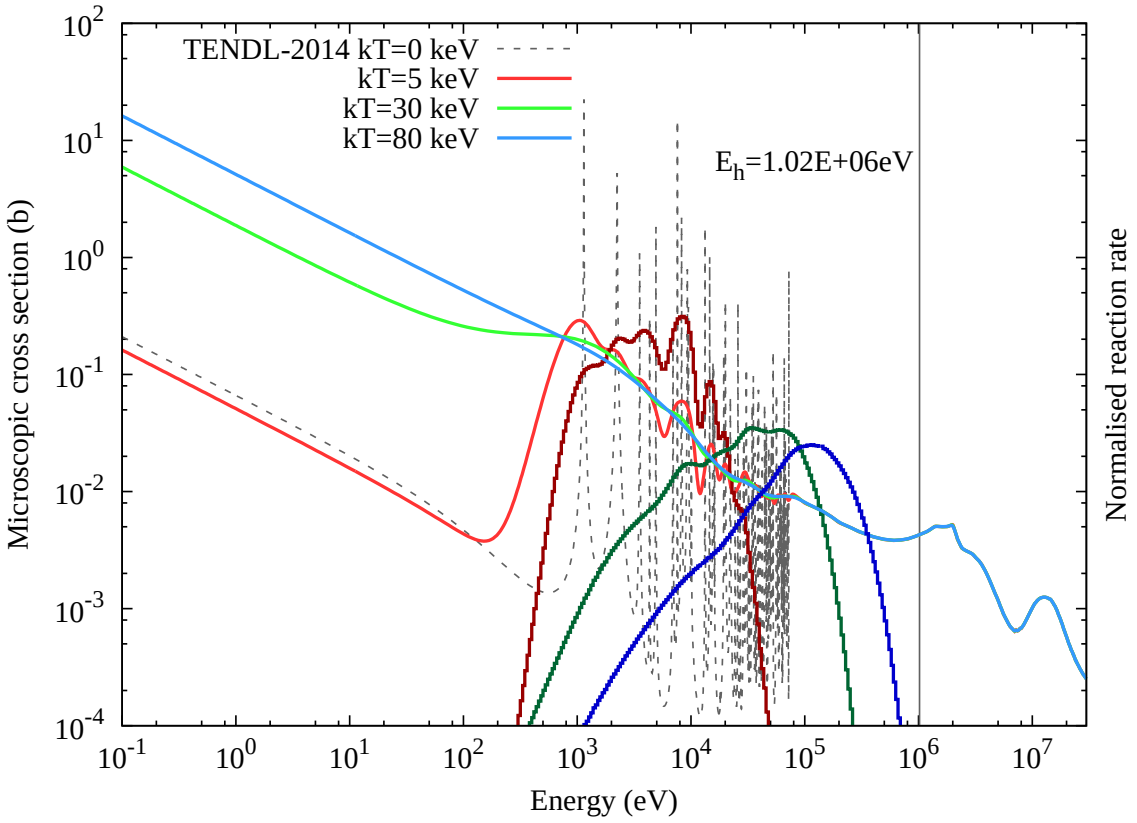


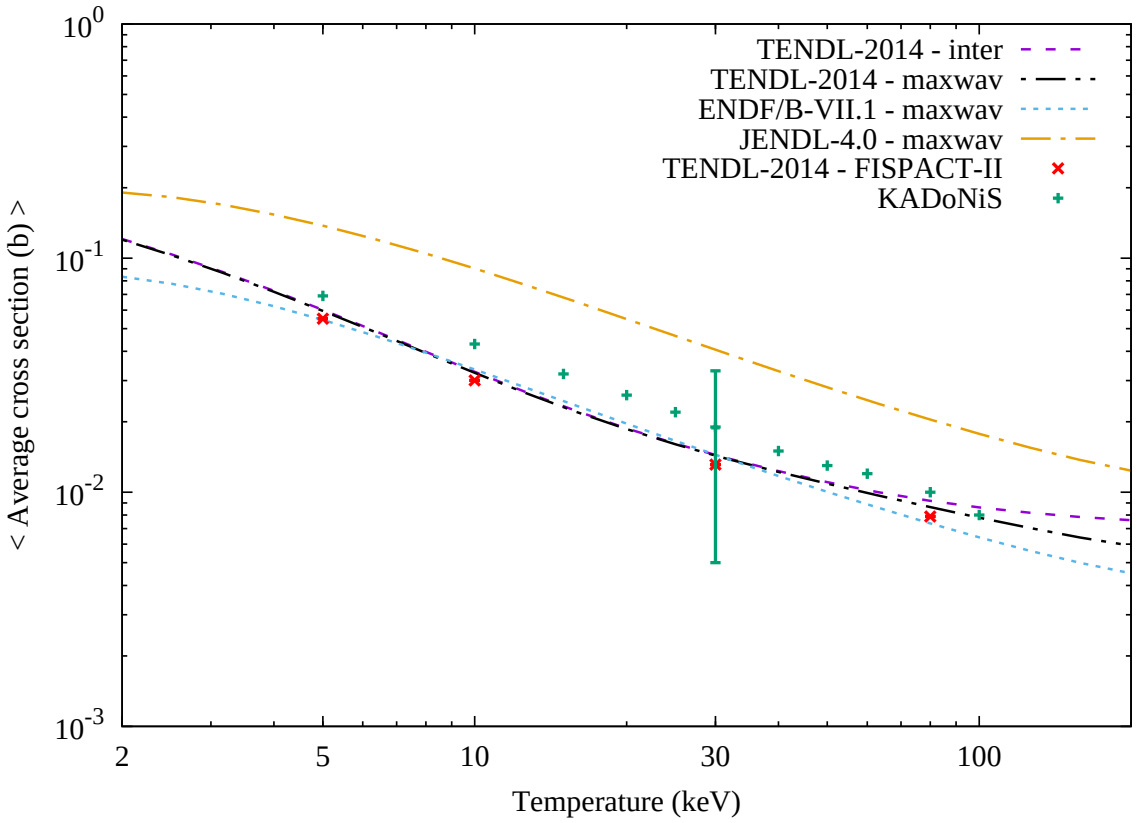
$^{88}Sr_{38}$ [Stable]



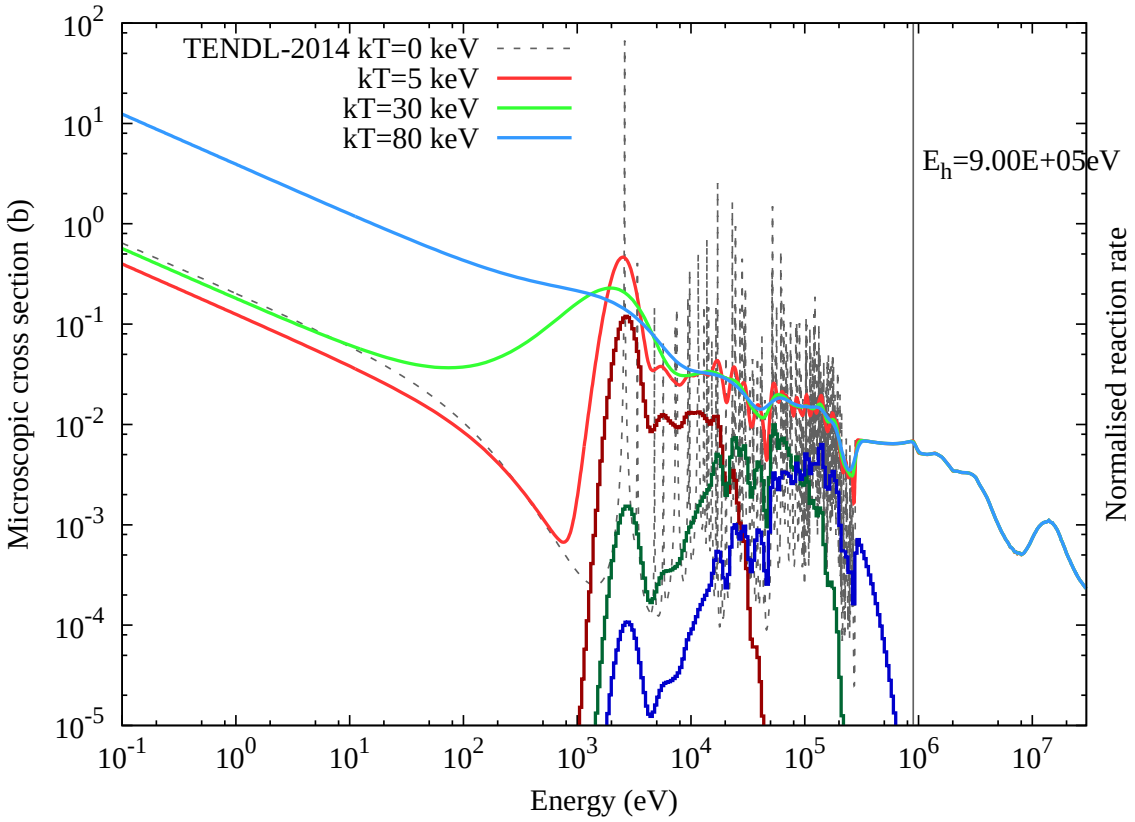


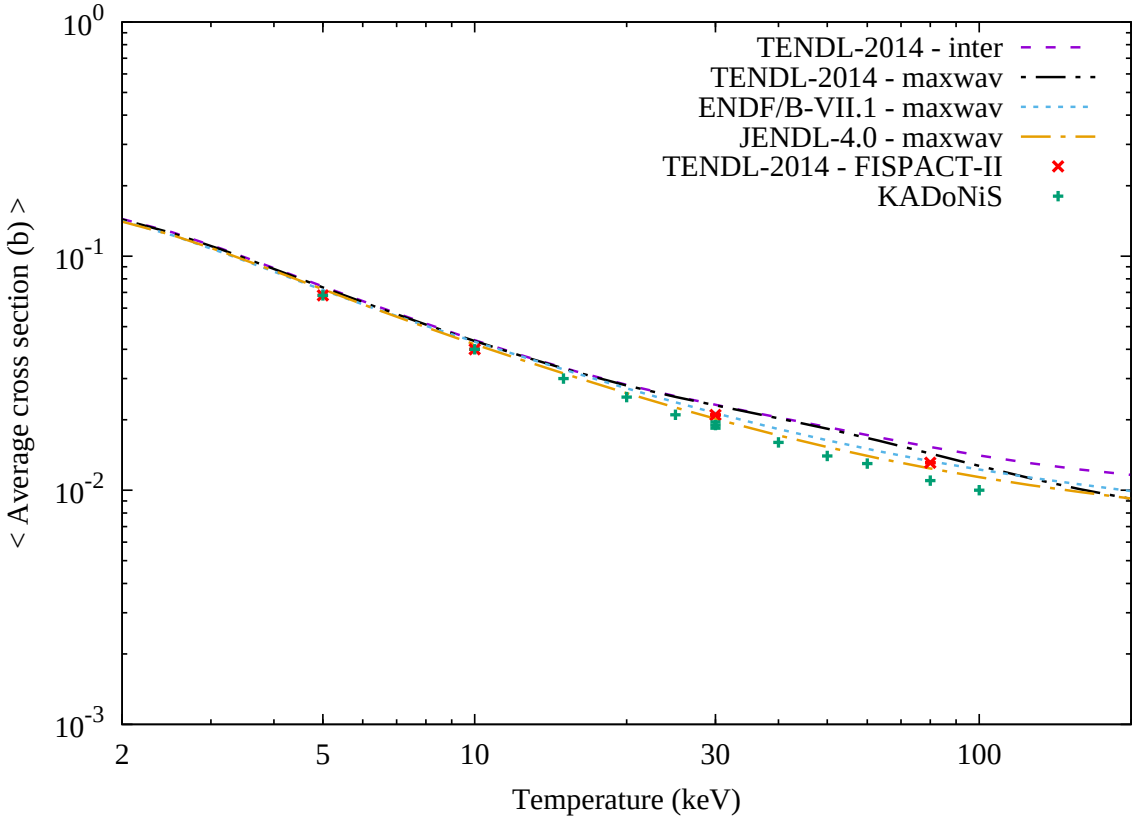
$^{89}Sr_{38}$ $[T_{1/2} = 50.57 \text{ days}]$ (KADoNiS=SMC)



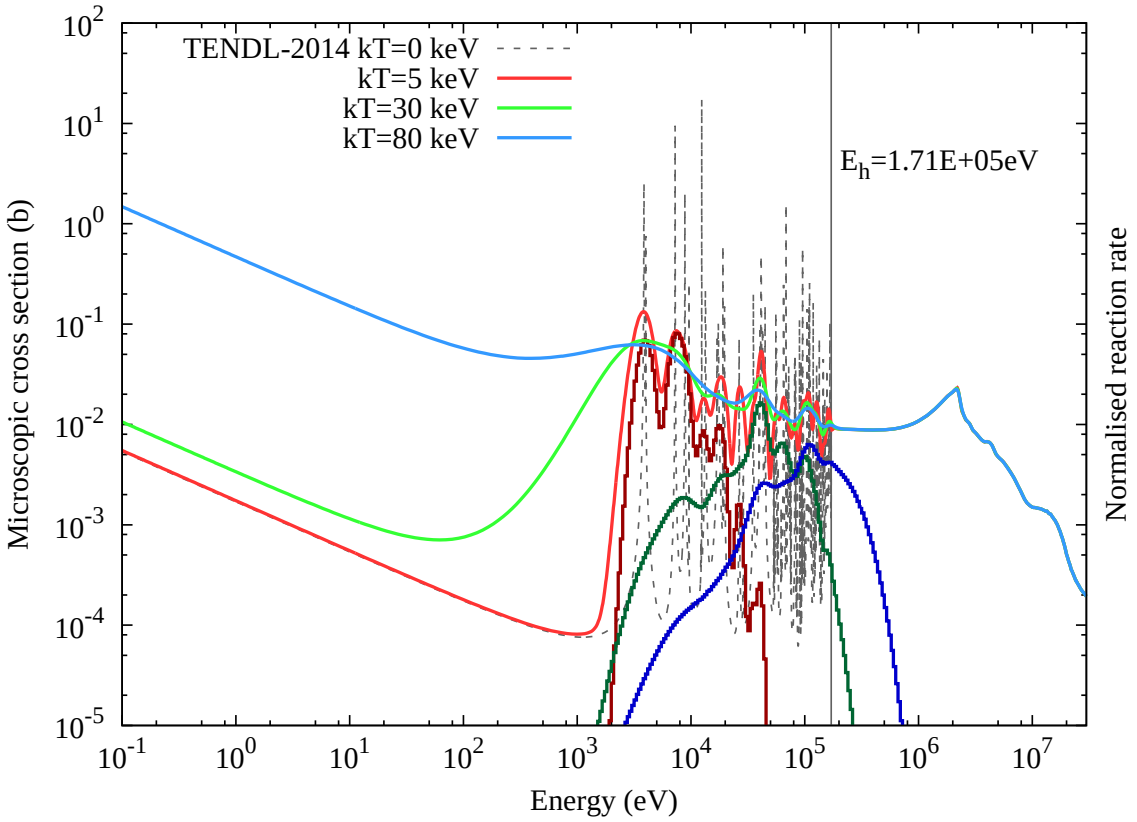


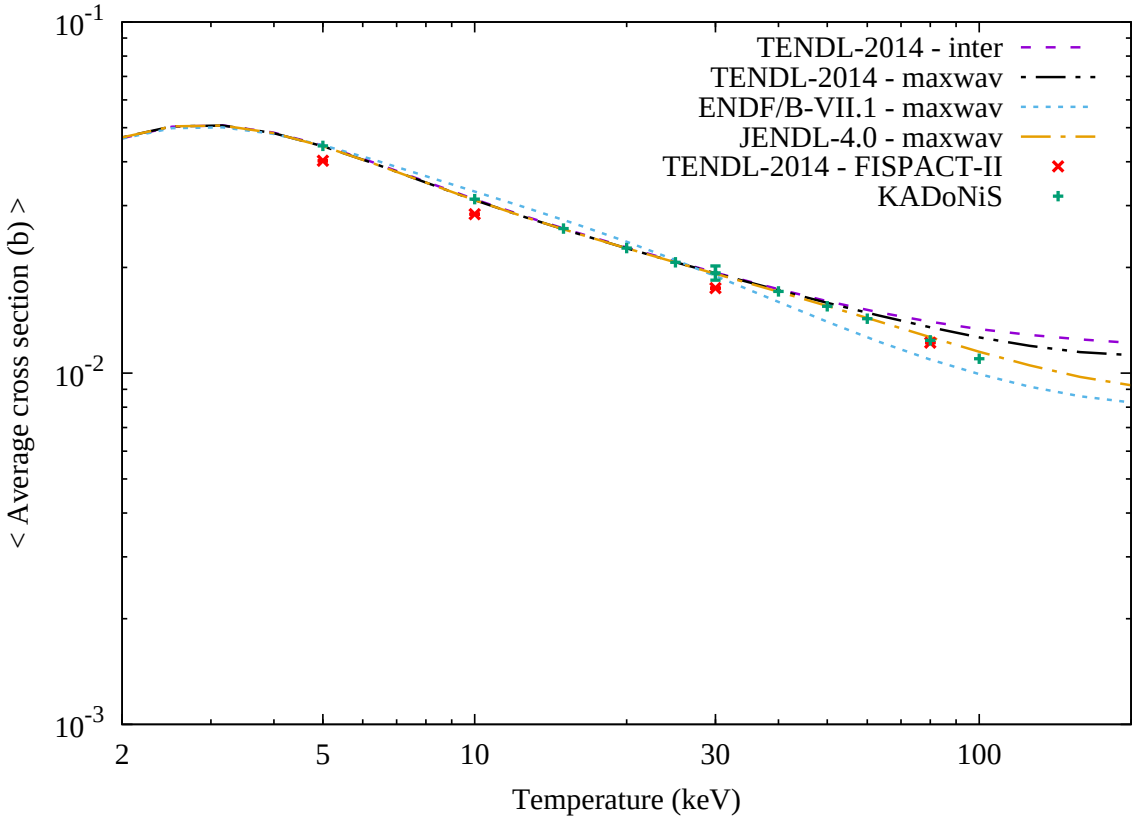
$^{89}Y_{39}$ [Stable]



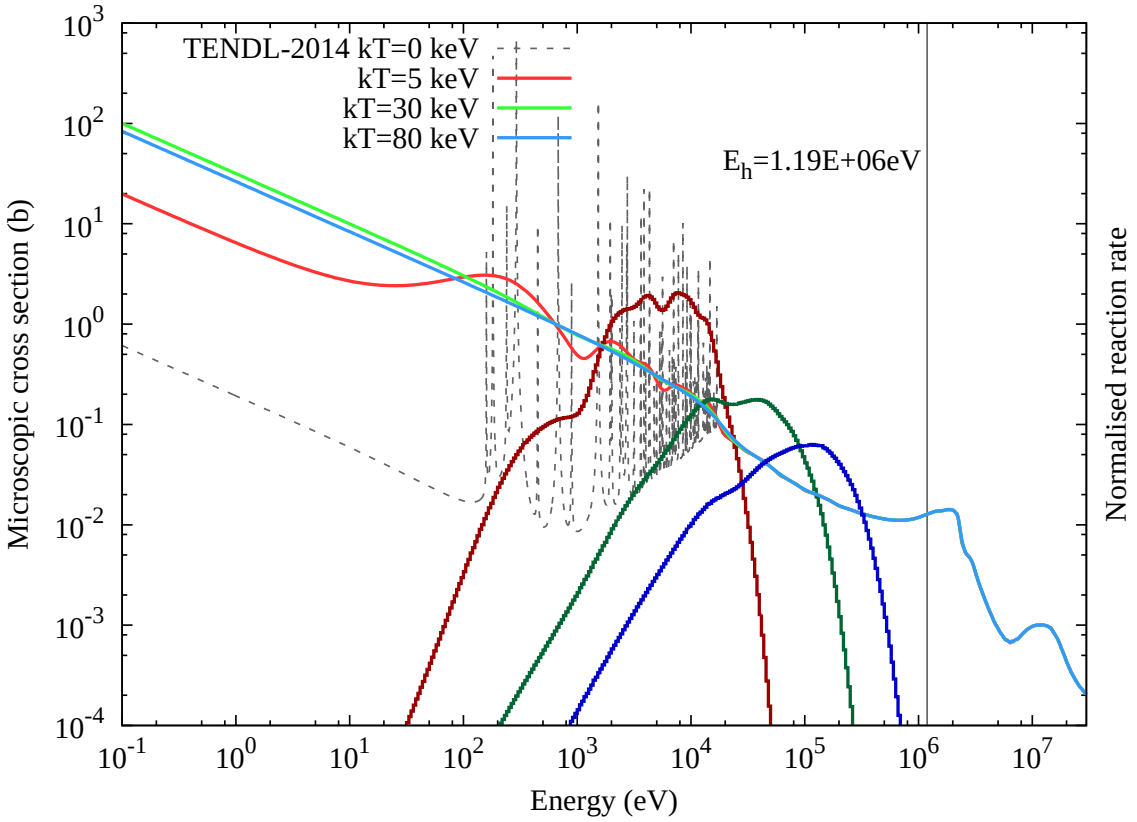


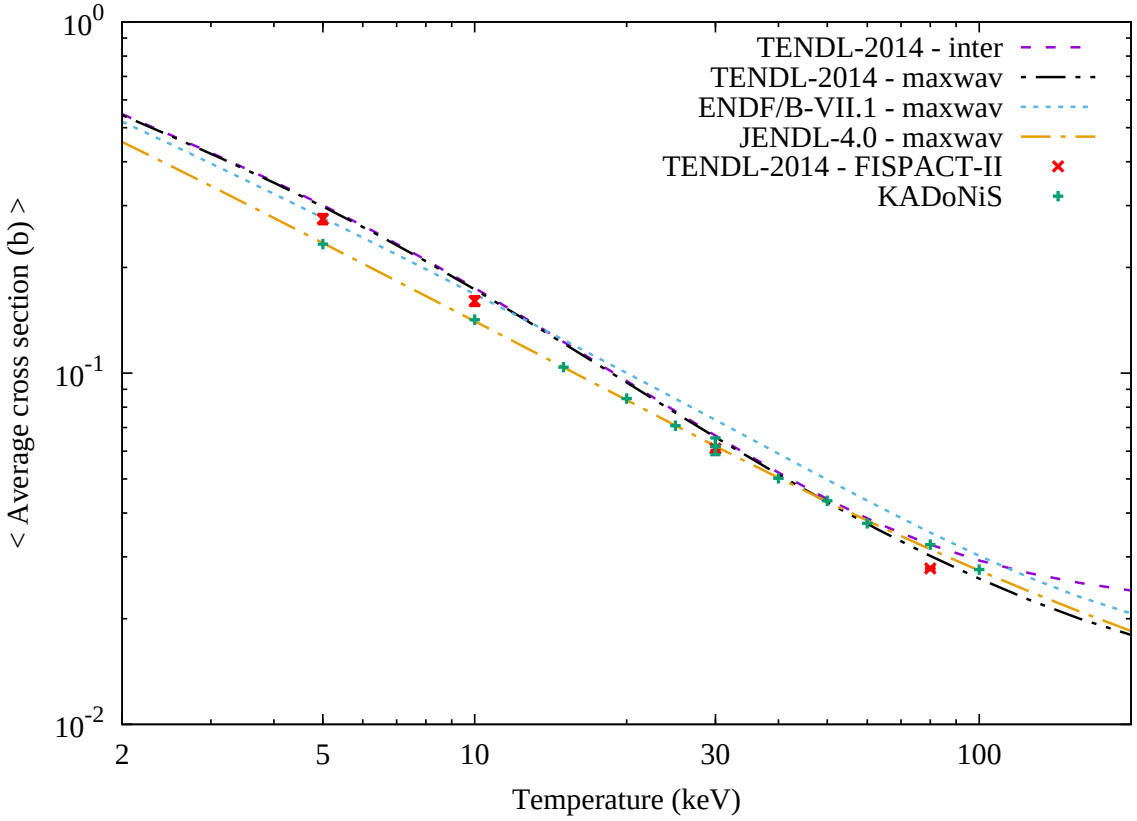
$^{90}Zr_{40}$ [Stable]



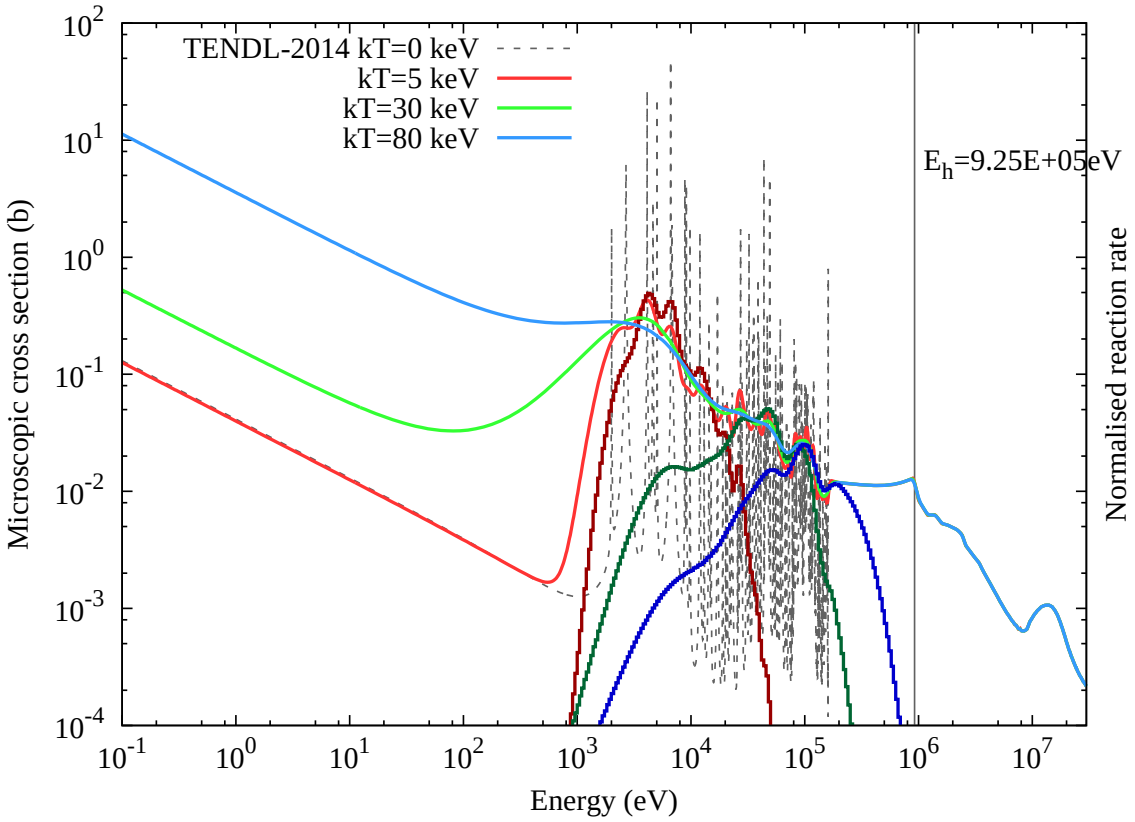


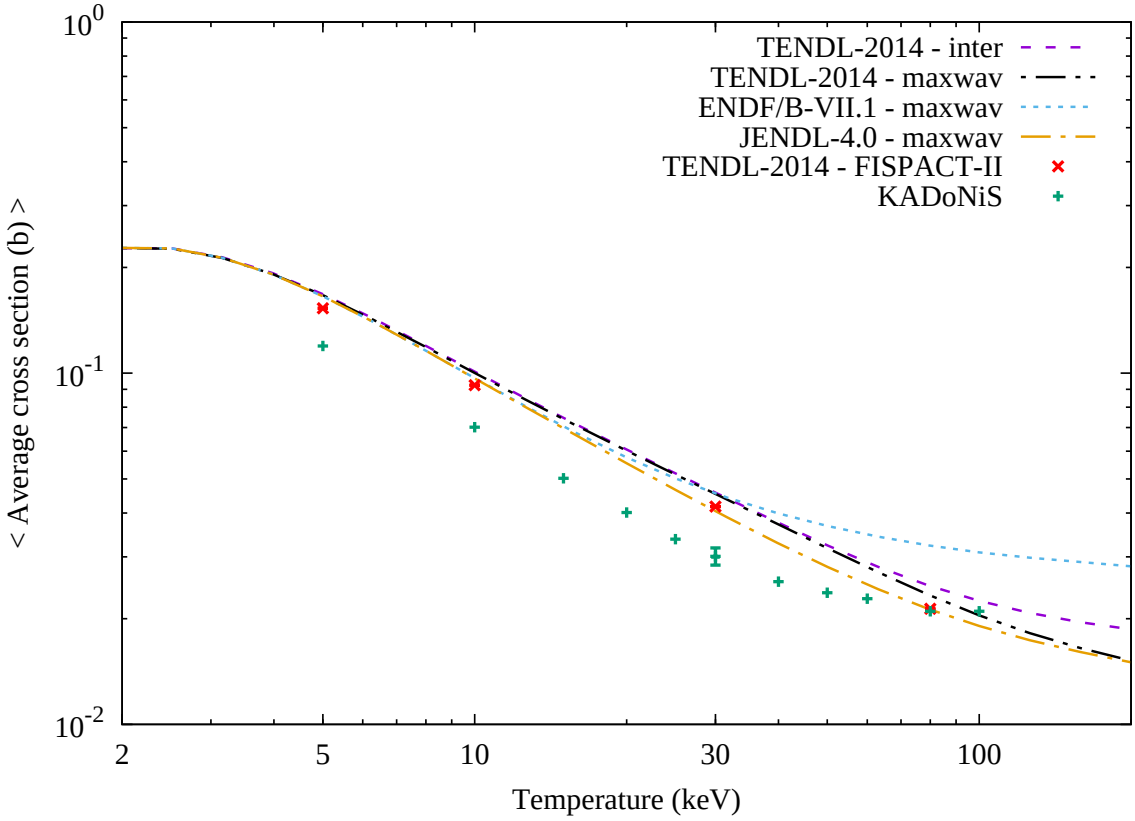
$^{91}Zr_{40}$ [Stable]



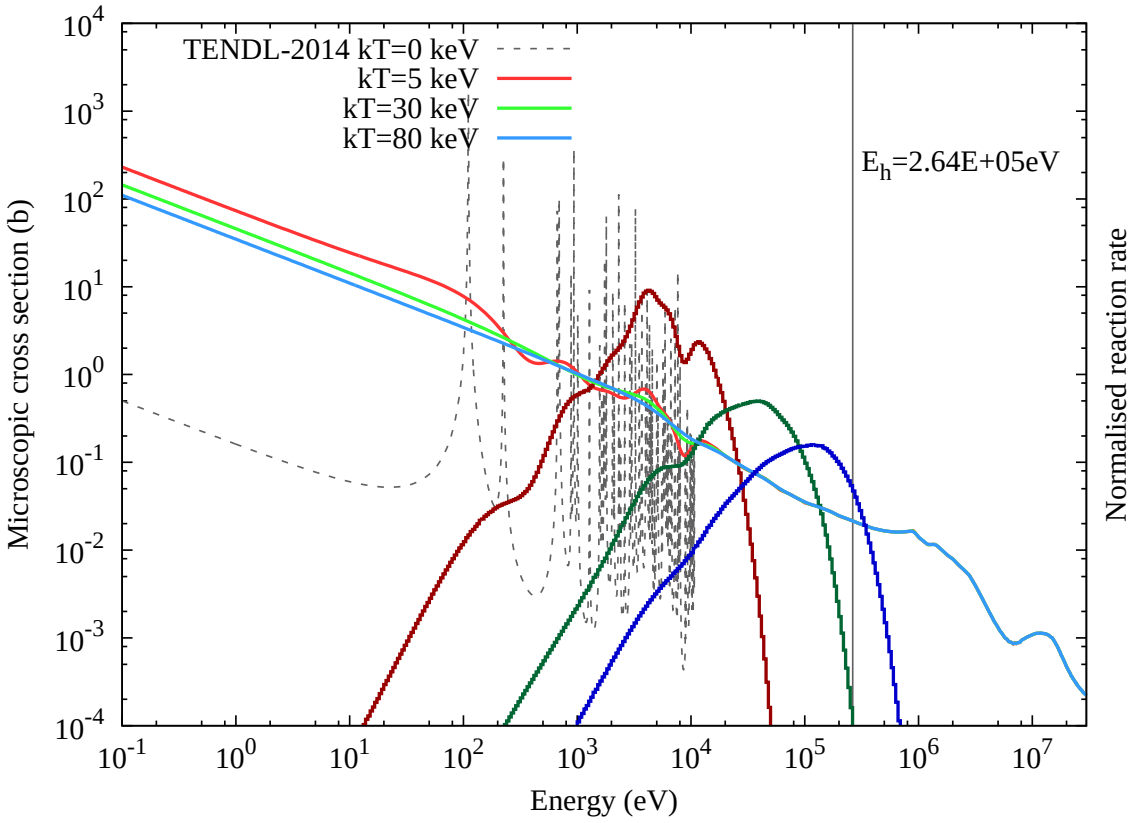


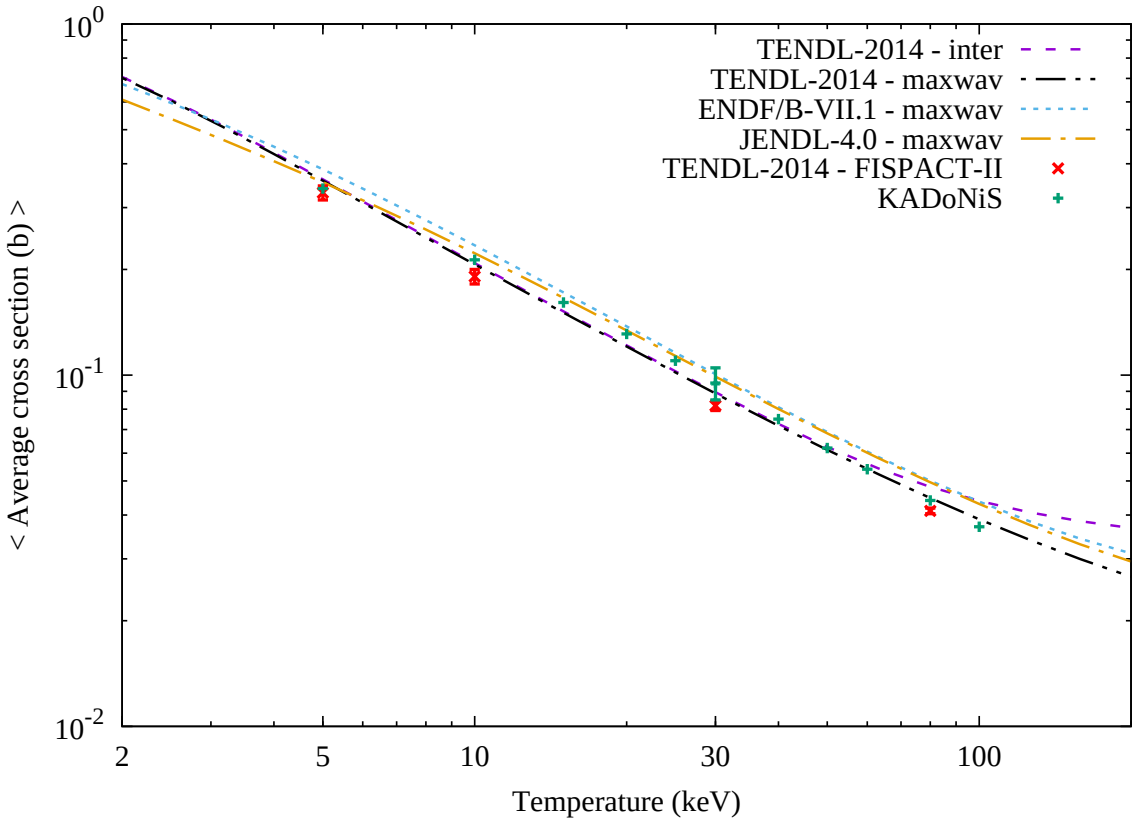
$^{92}Zr_{40}$ [Stable]



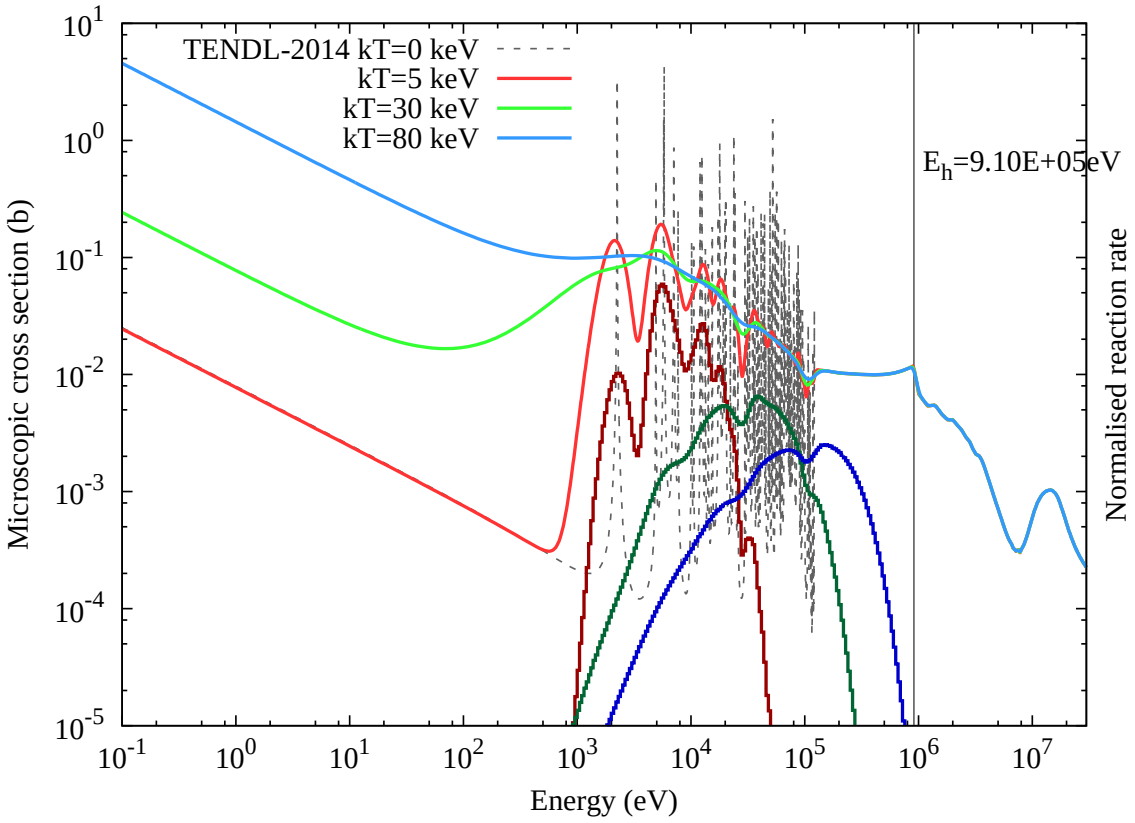


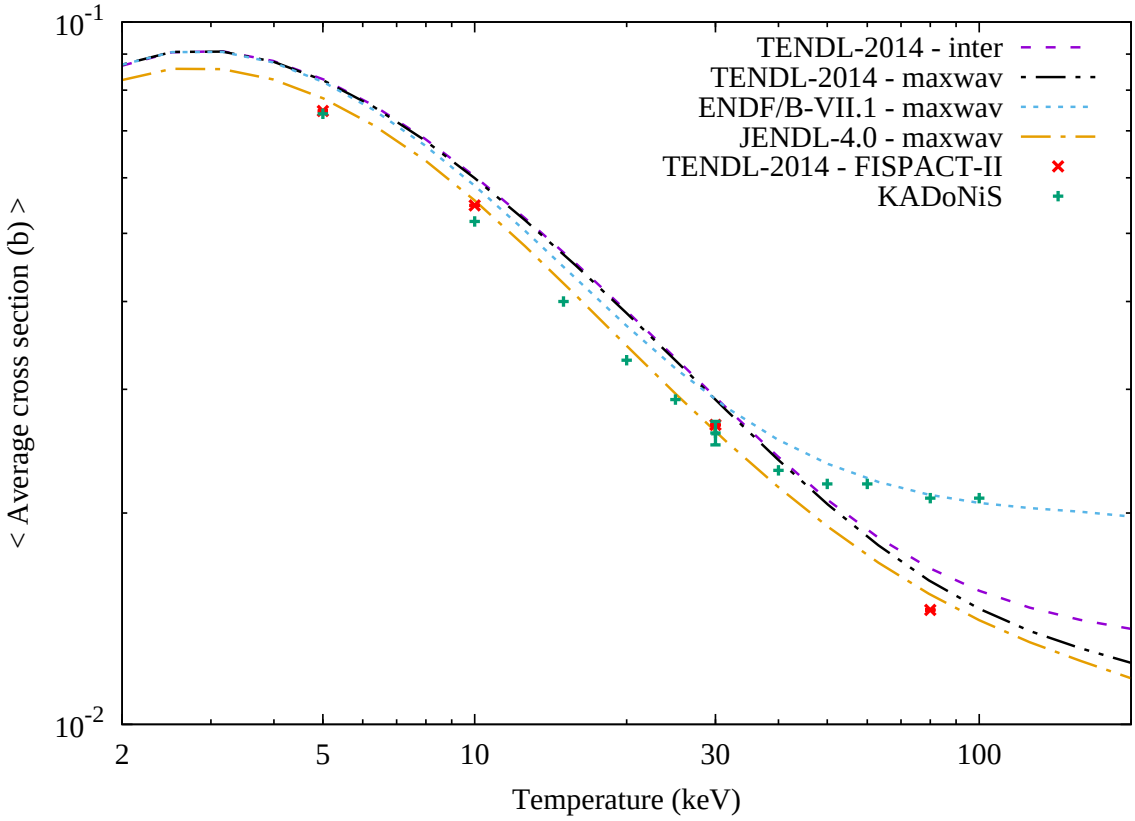
$^{93}Zr_{40}$ $[T_{1/2} = 1.53 \times 10^6$ years$]$



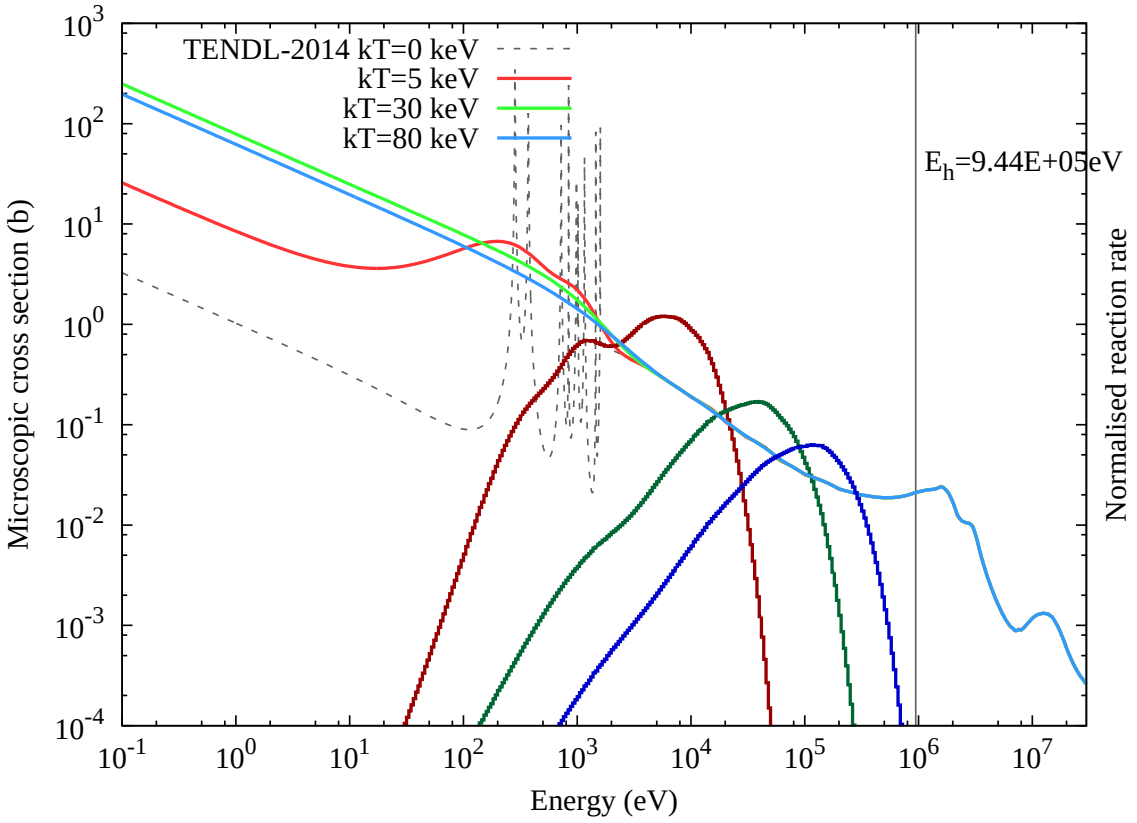


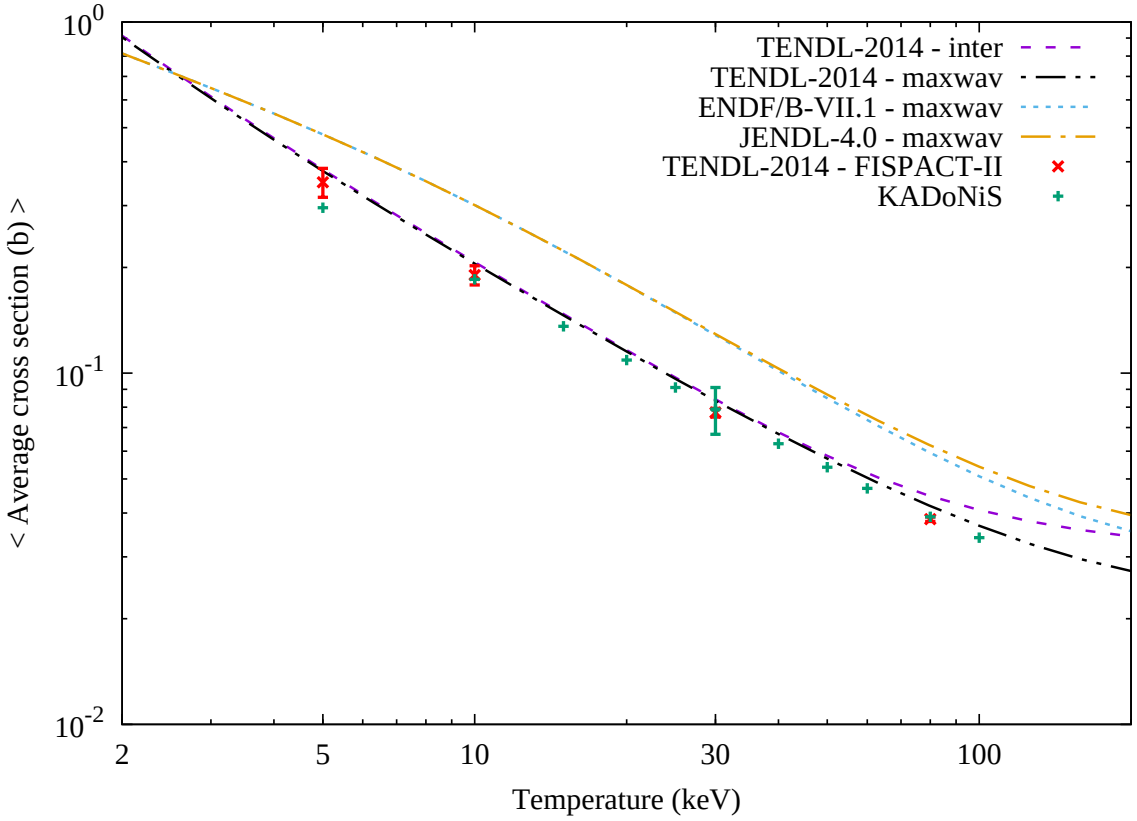
$^{94}Zr_{40}$ $[T_{1/2} = 6.00 \times 10^{15}$ years$]$



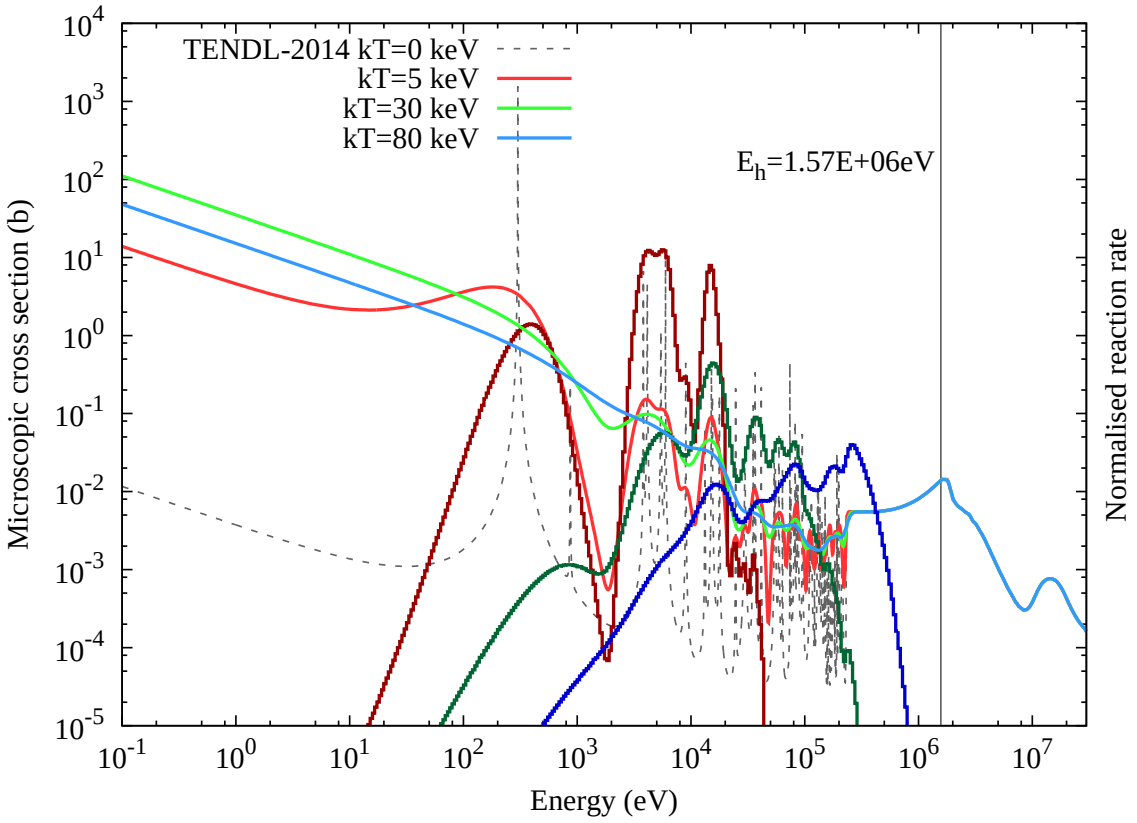


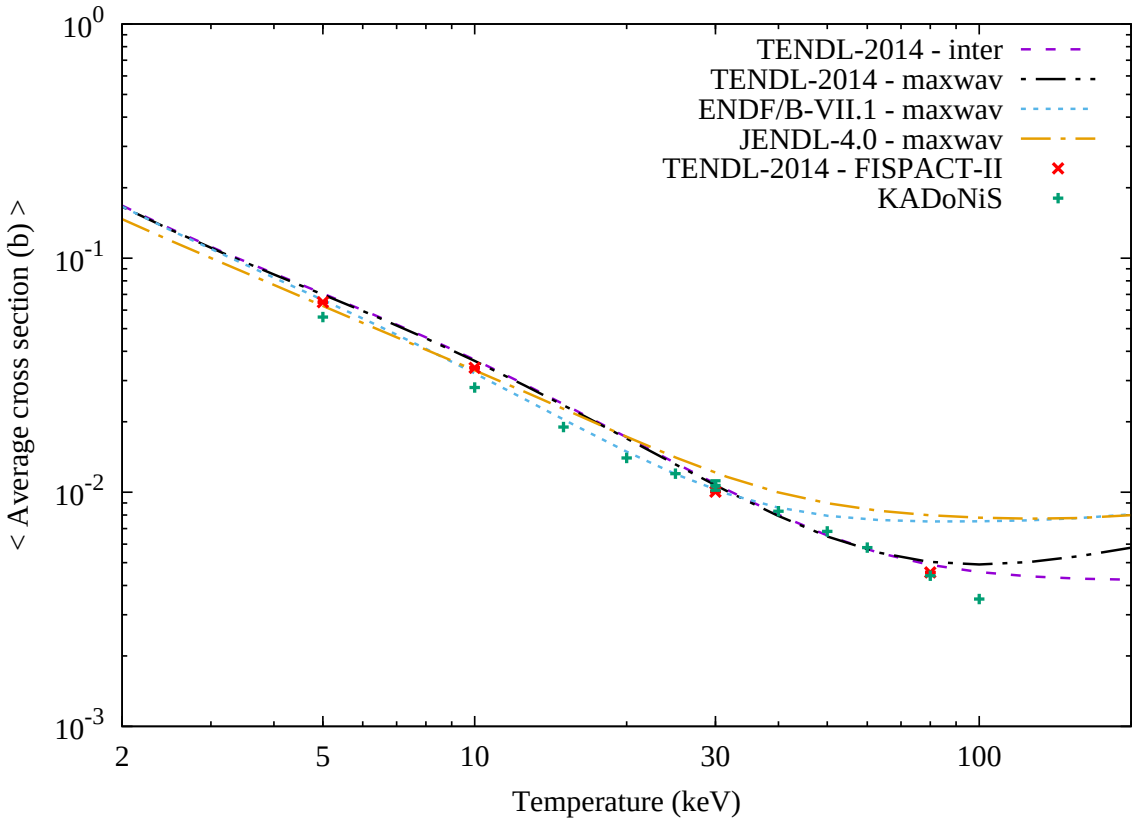
$^{95}Zr_{40}$ $[T_{1/2} = 64.03$ days$]$ (KADoNiS=SMC)



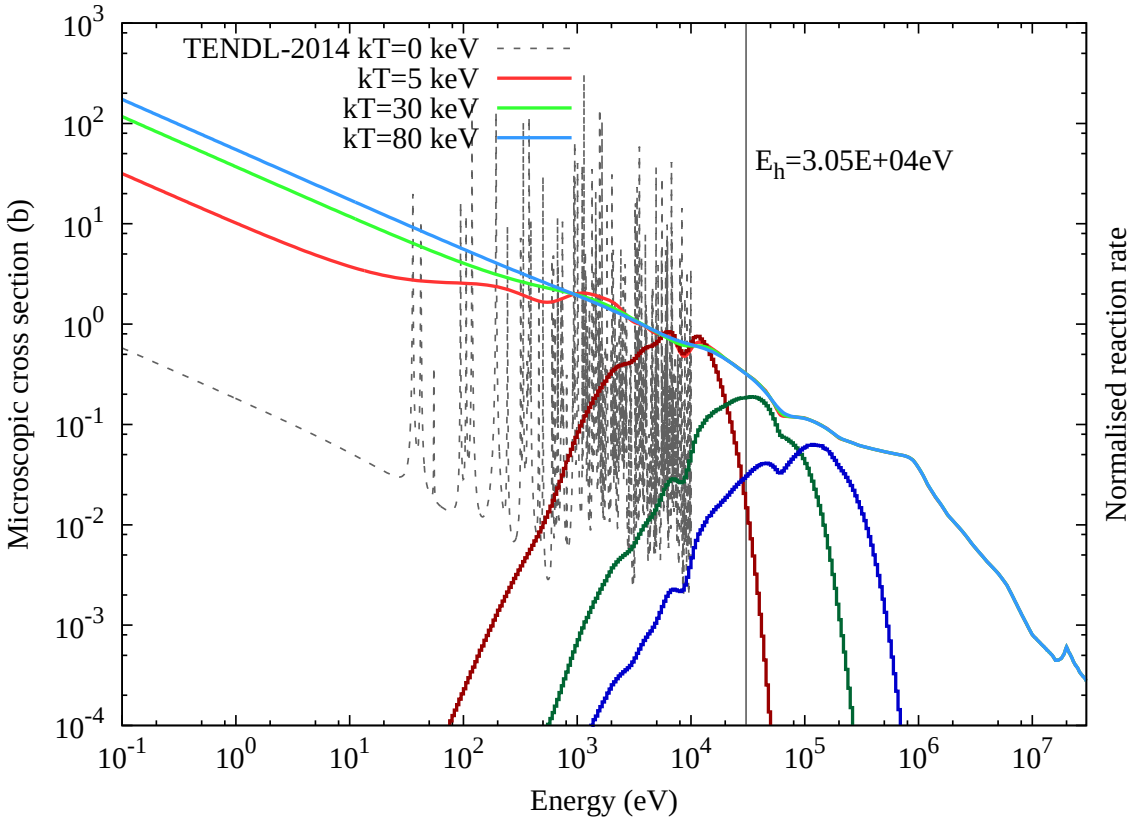


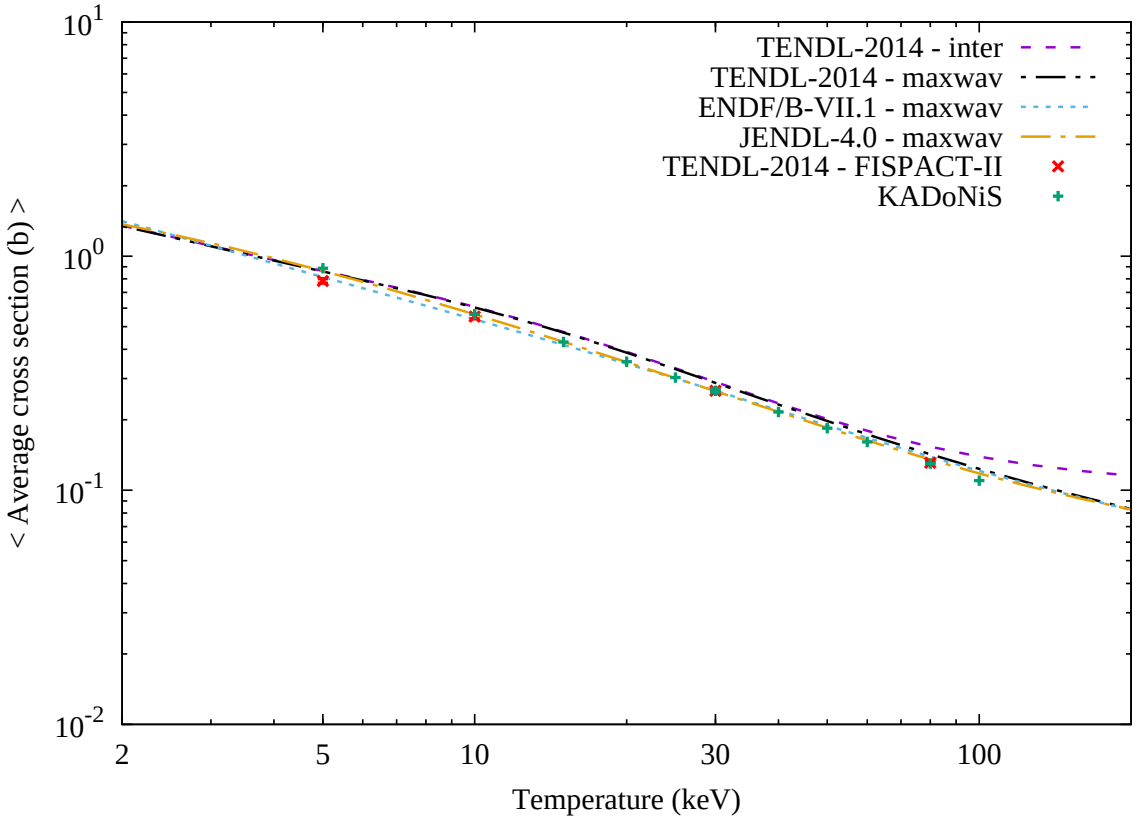
$^{96}Zr_{40}$ $[T_{1/2} = 3.90 \times 10^{19}$ years$]$



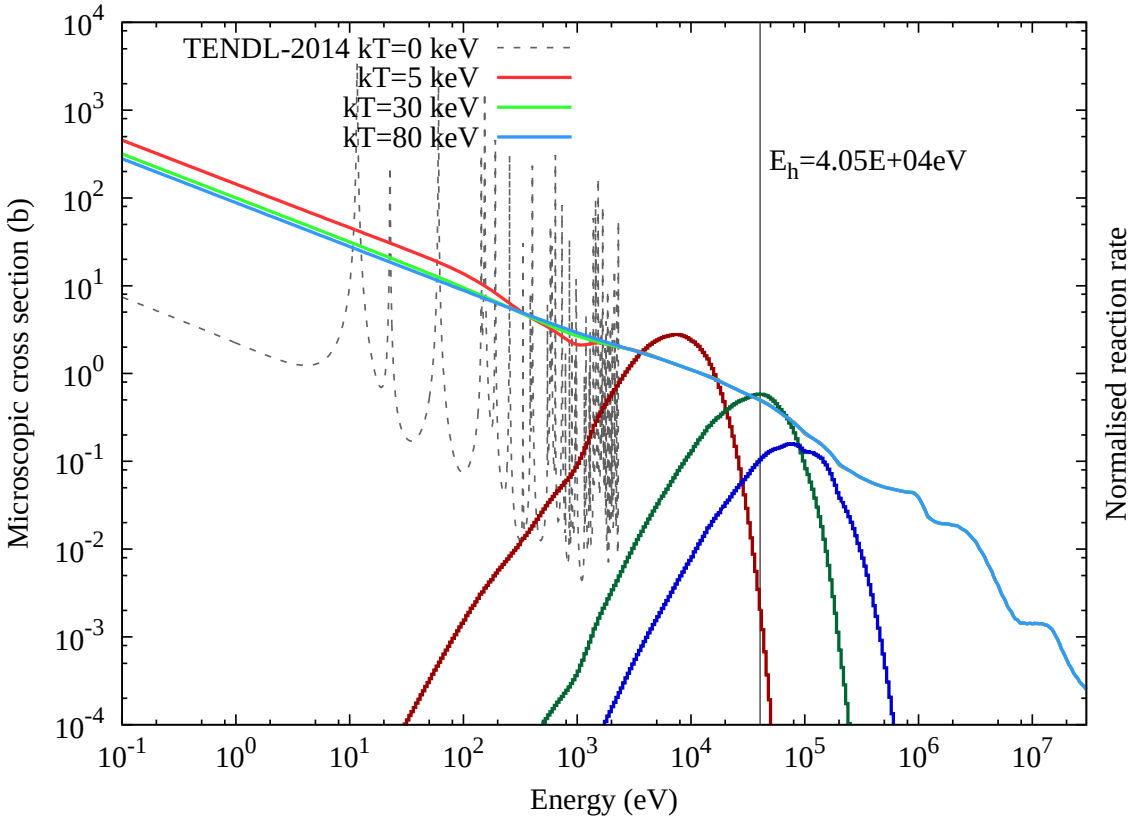


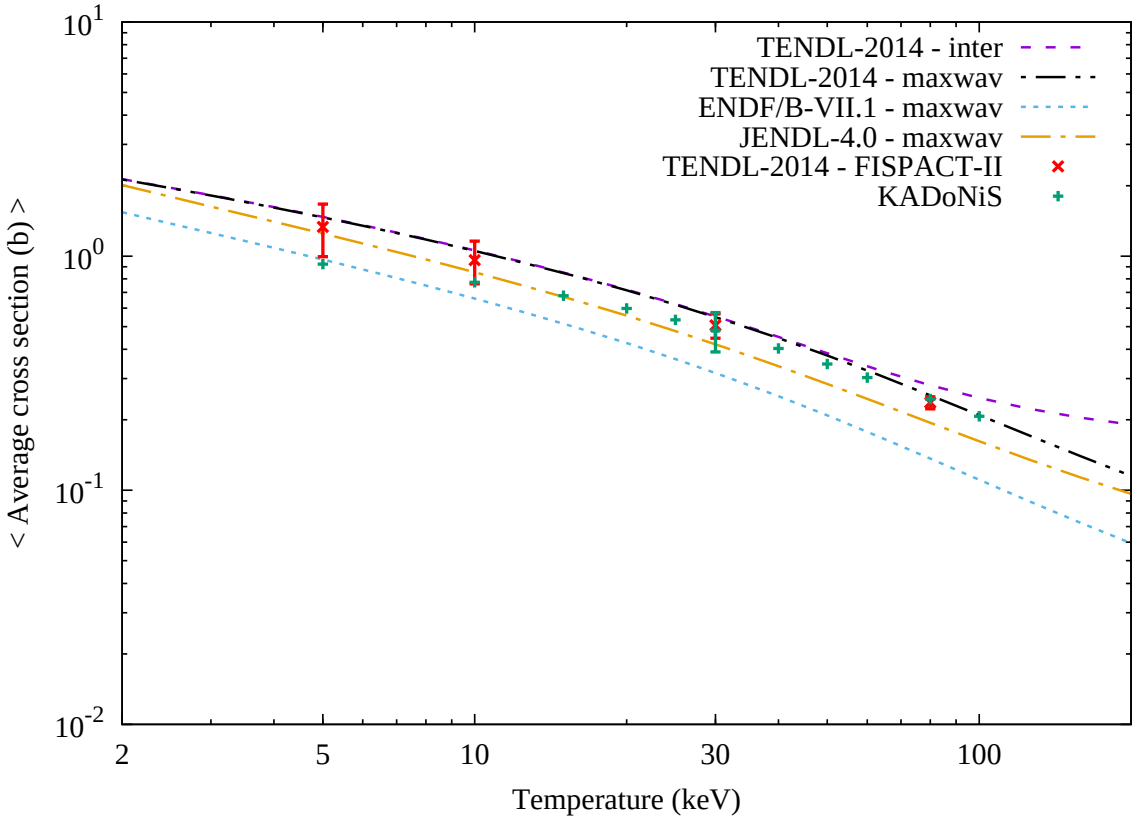
$^{93}Nb_{41}$ [Stable]



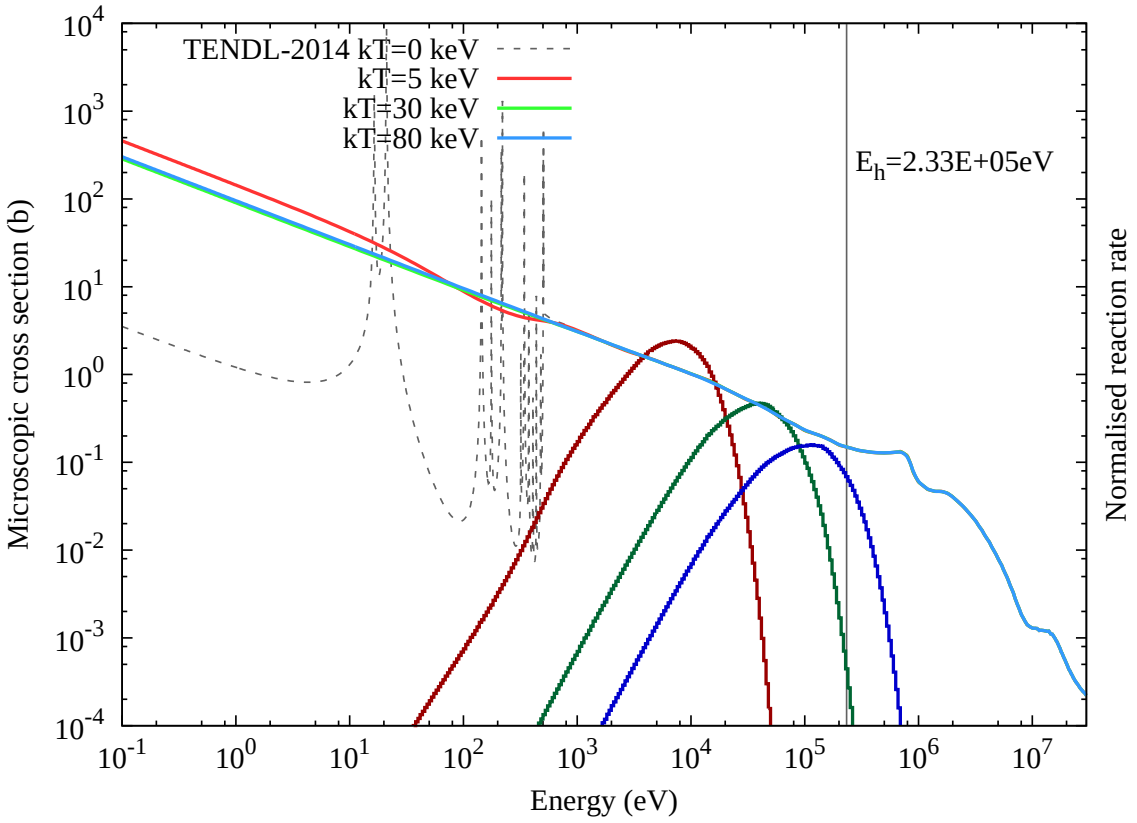


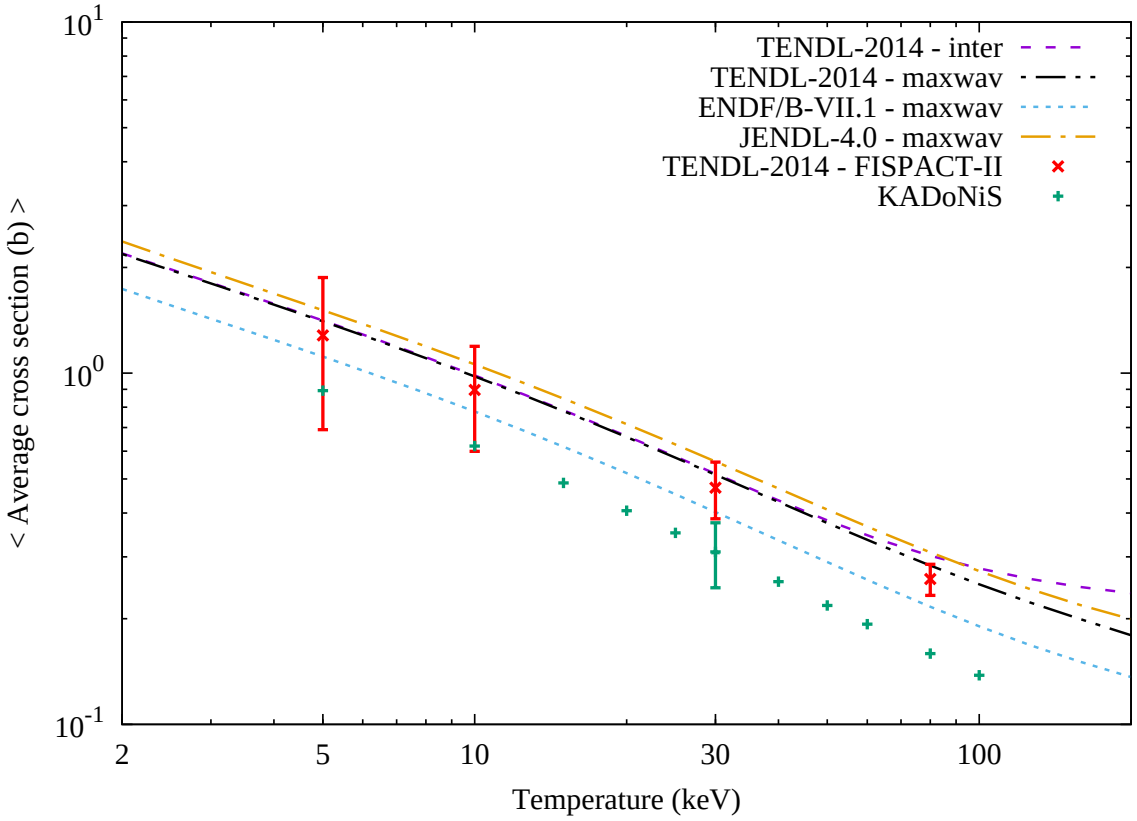
$^{94}Nb_{41}$ $[T_{1/2} = 2.00 \times 10^4$ years] (KADoNiS=SMC)



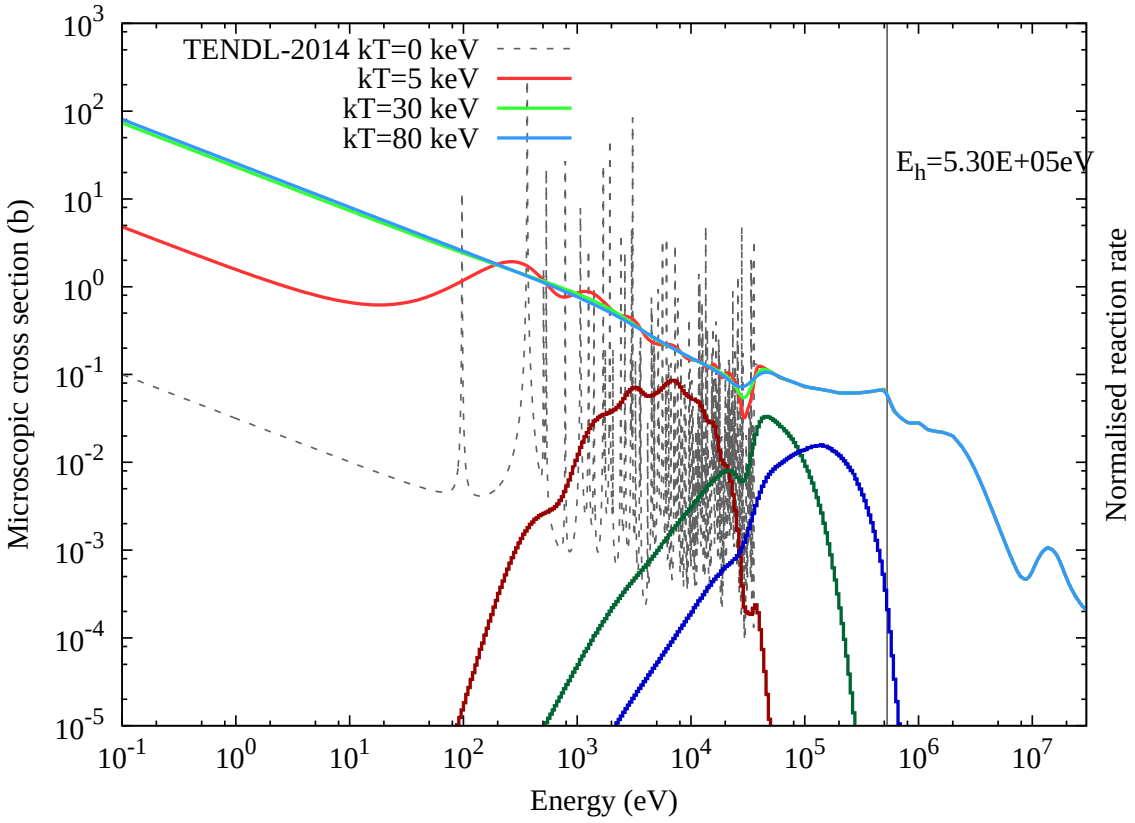


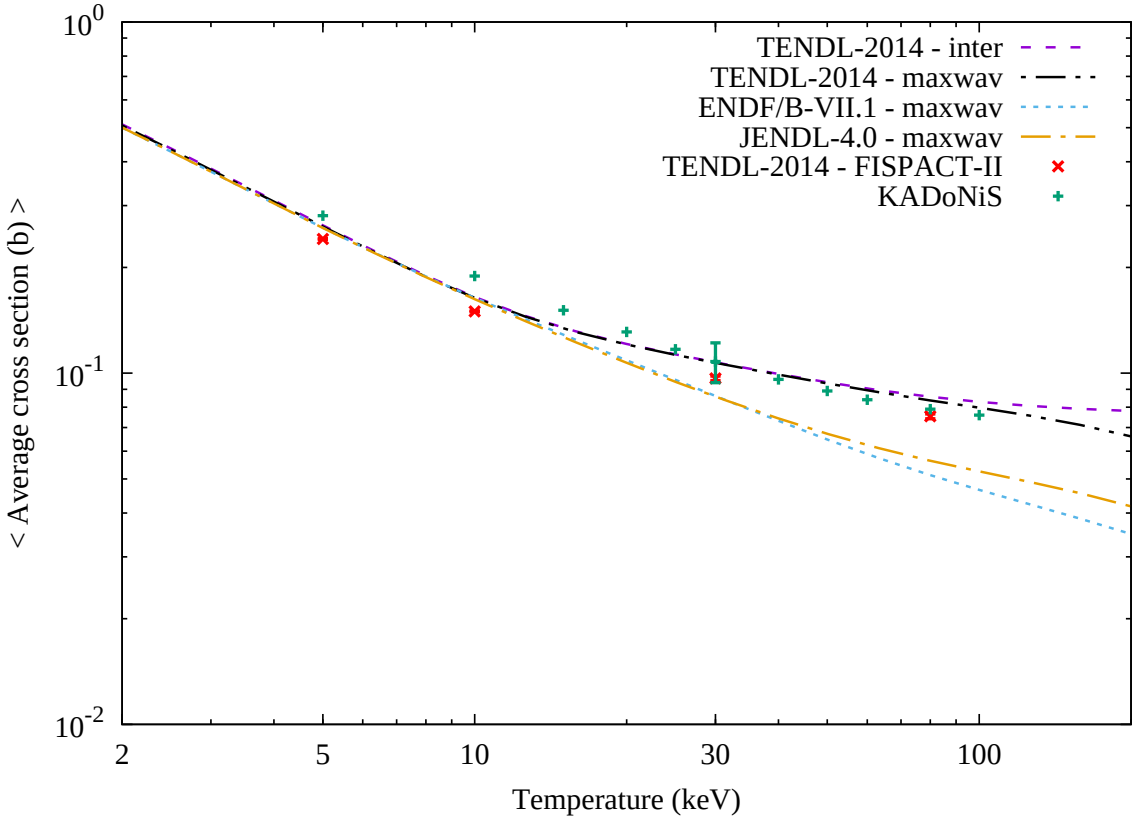
$^{95}Nb_{41}$ [$T_{1/2}$ = 34.99 days] (KADoNiS=SMC)



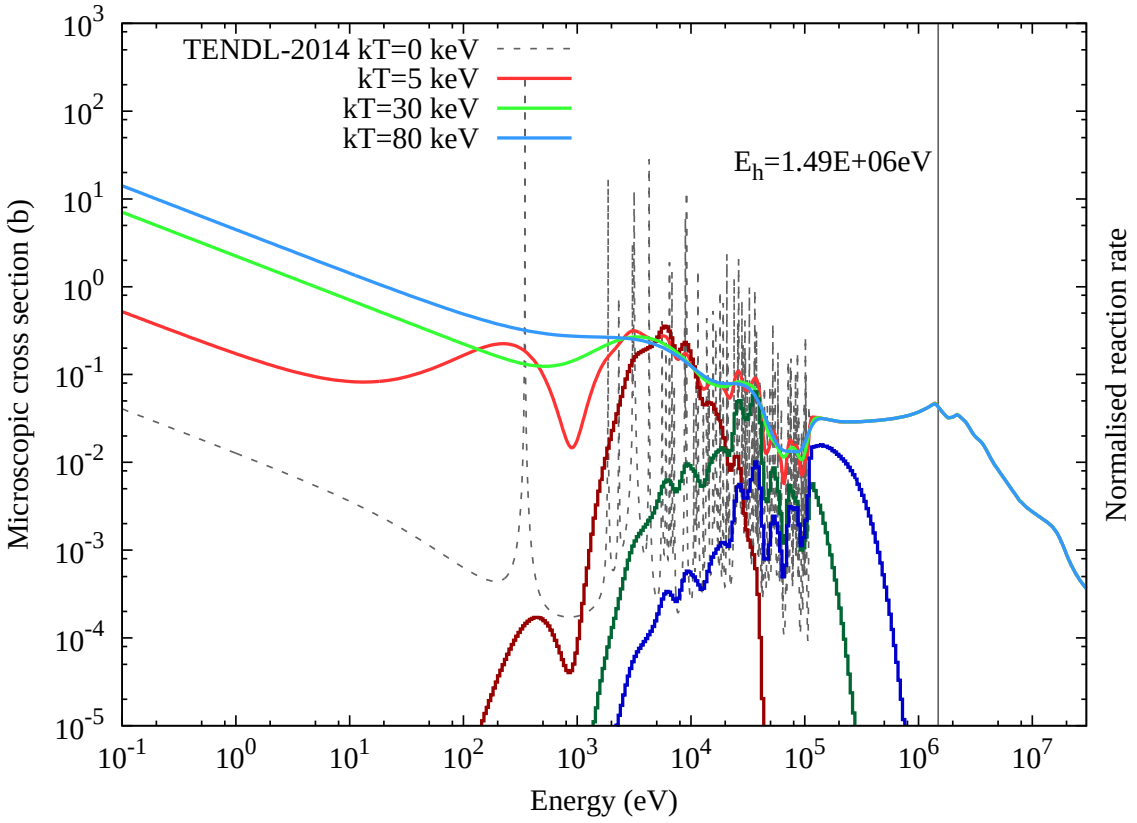


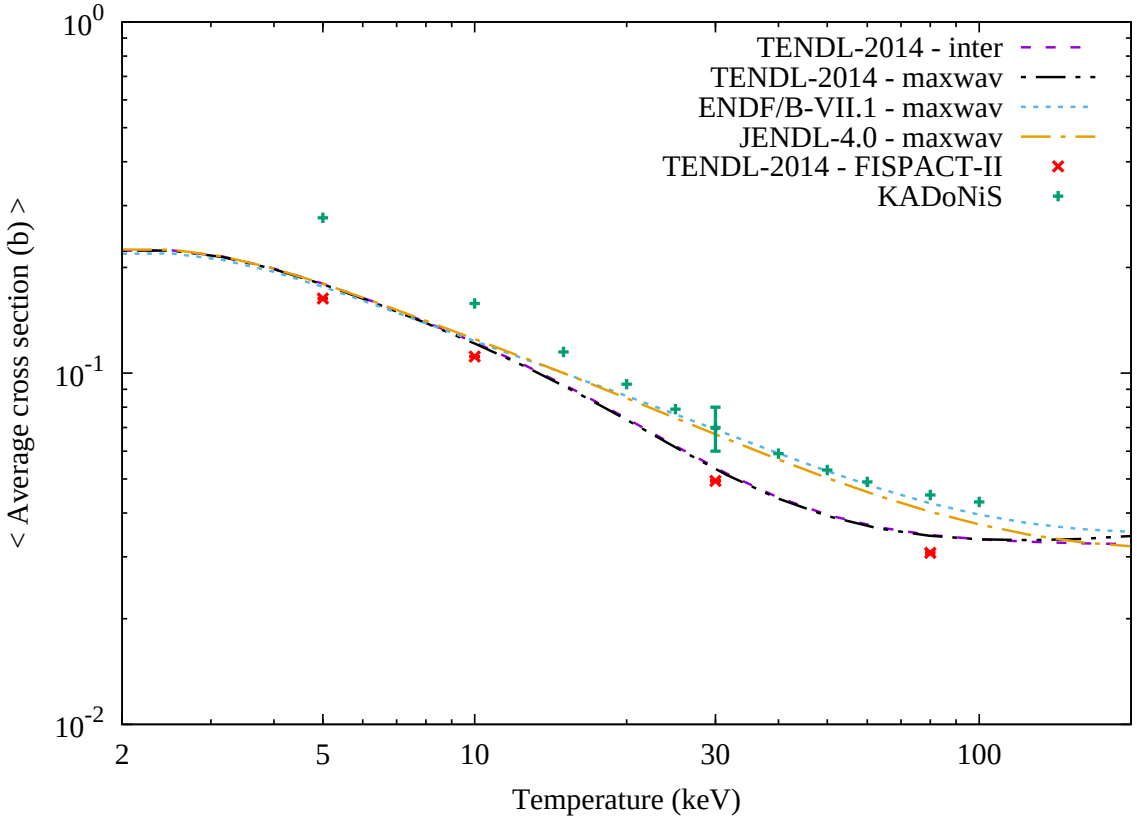
$^{100}Mo_{42}$ $[T_{1/2} = 9.90 \times 10^{18}$ years$]$



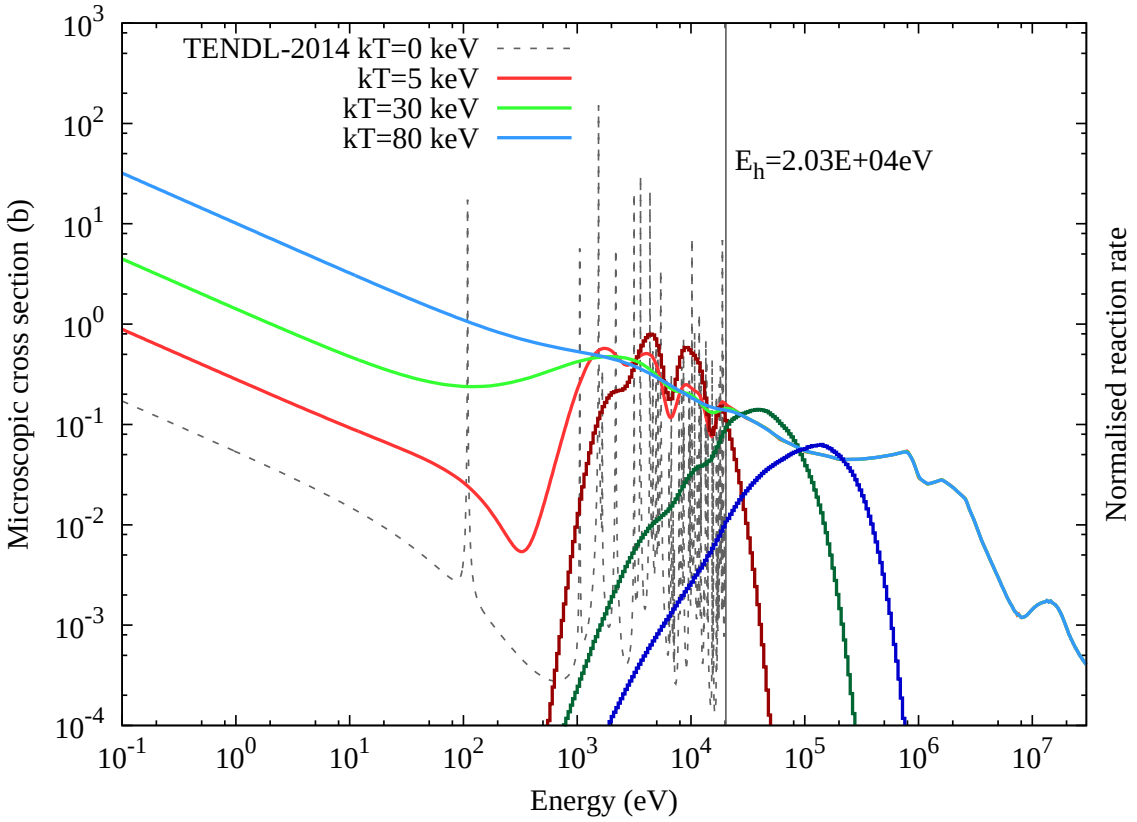


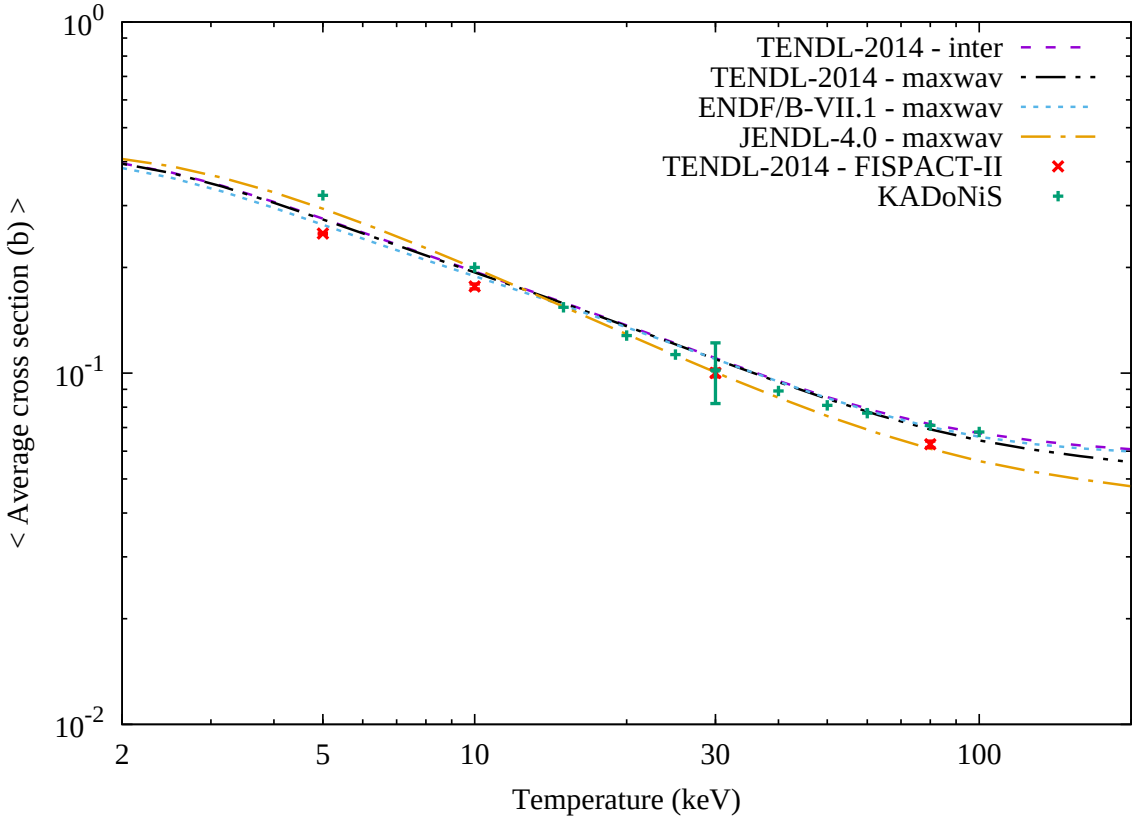
$^{92}Mo_{42}$ $[T_{1/2} = 1.90 \times 10^{20}$ years$]$



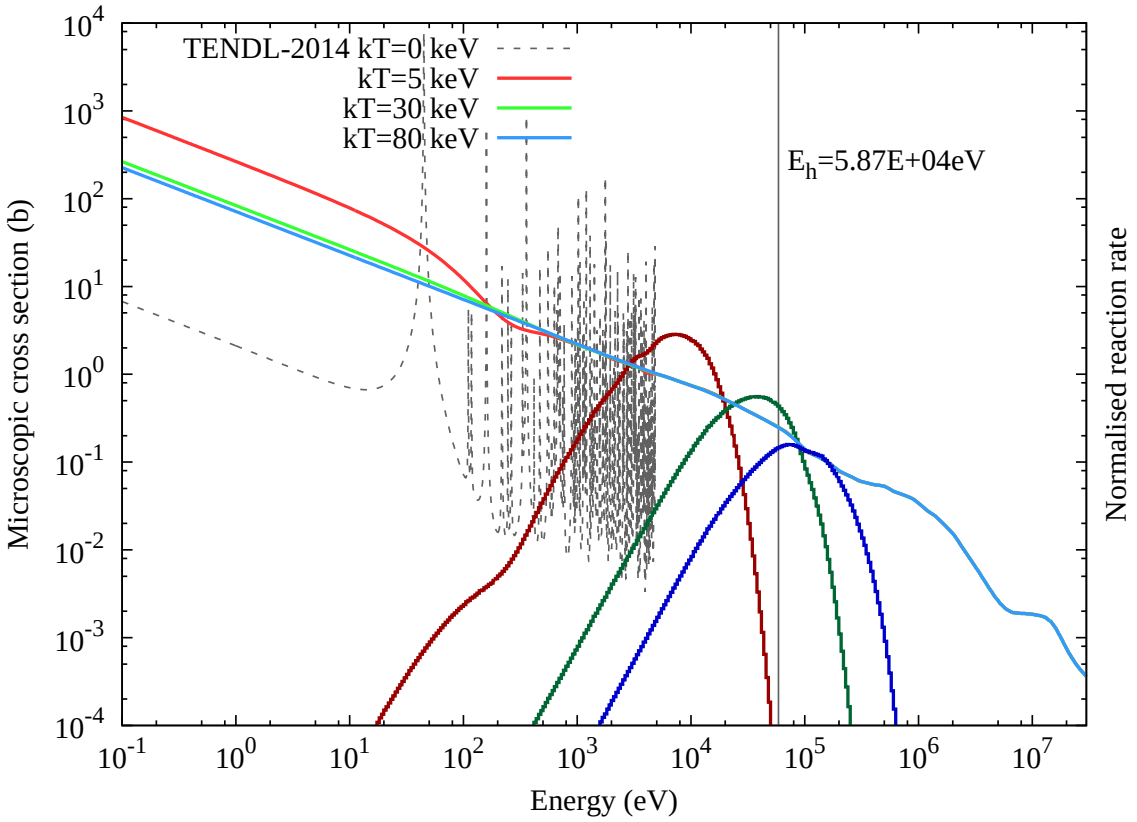


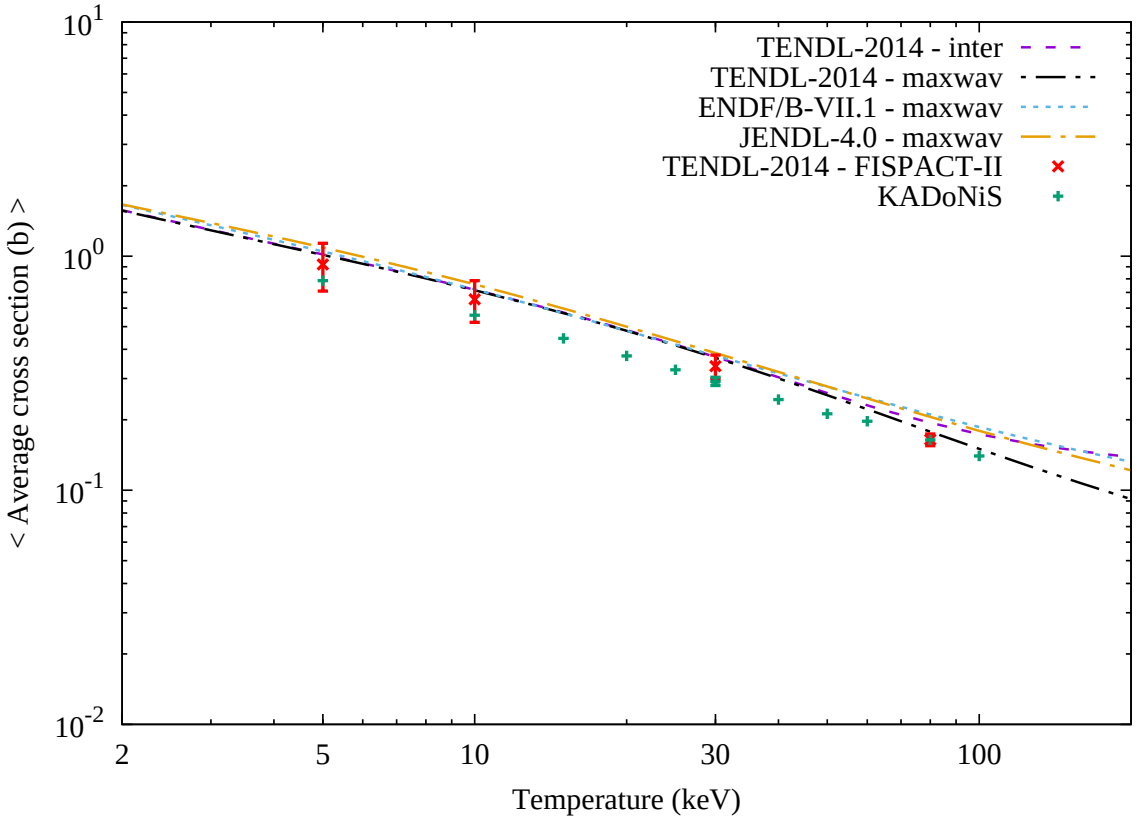
$^{94}Mo_{42}$ [Stable]



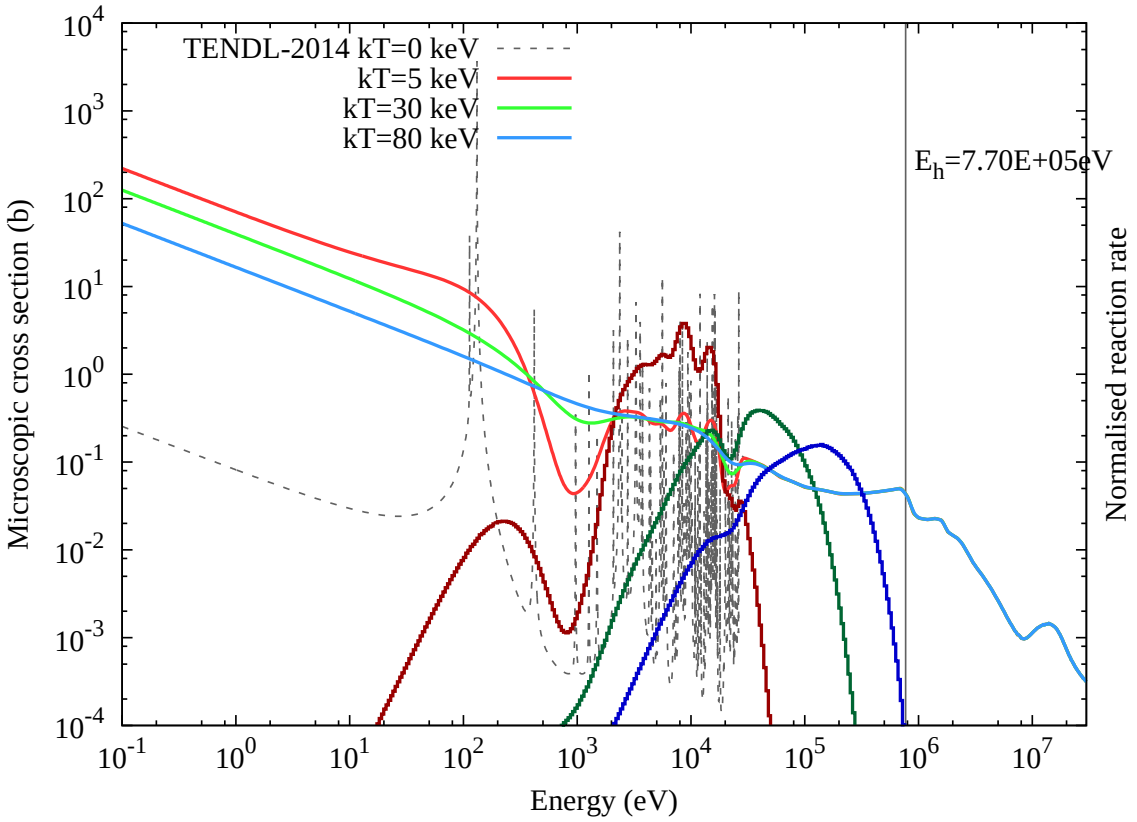


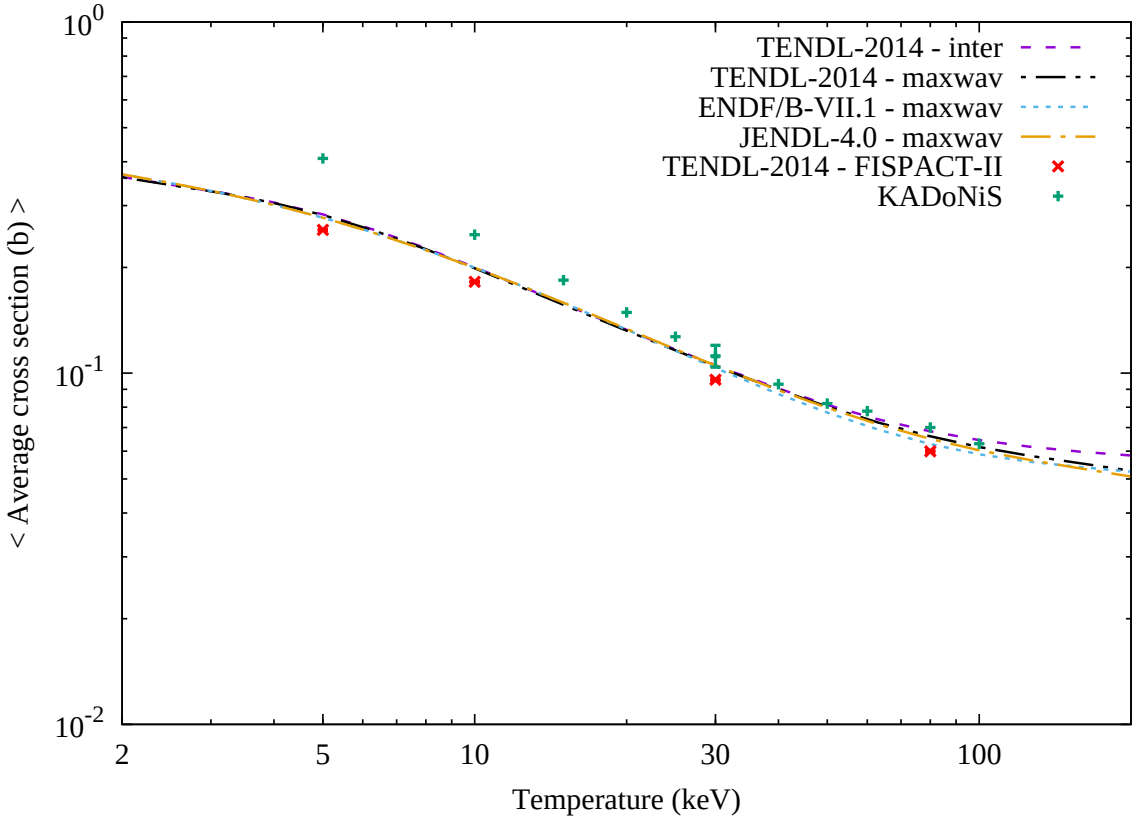
$^{95}Mo_{42}$ [Stable]



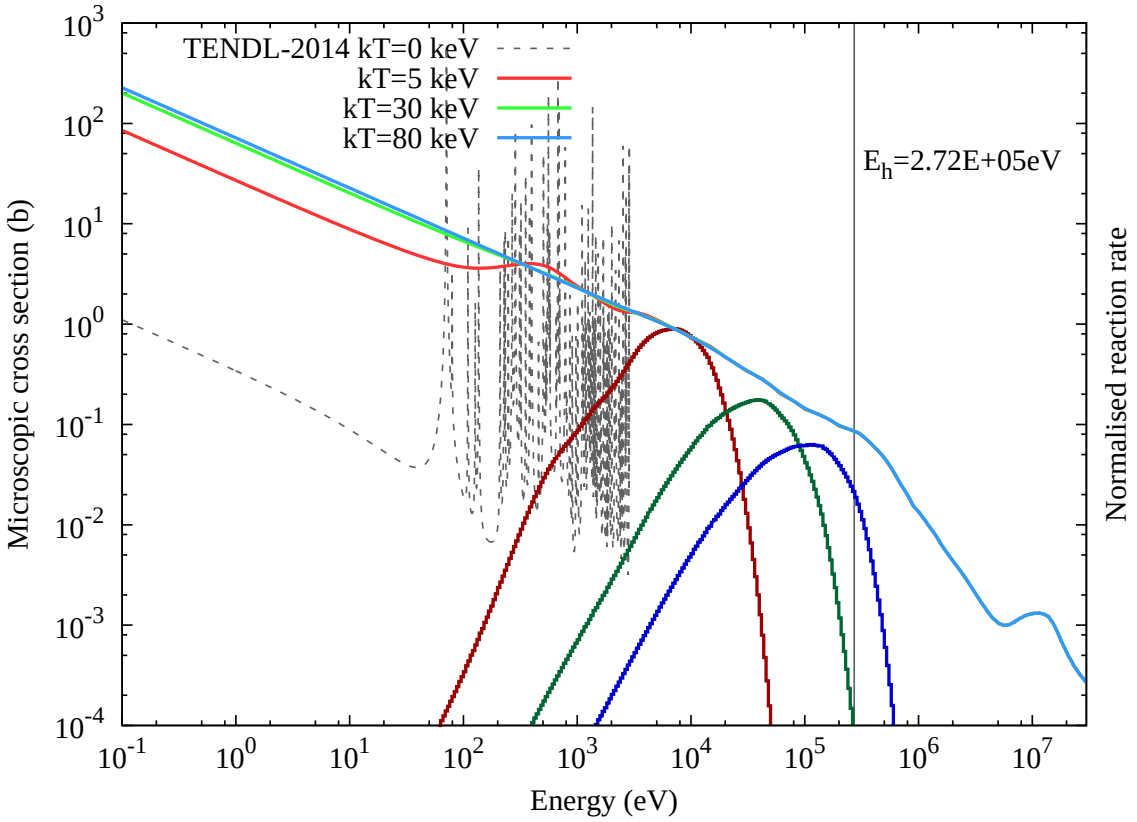


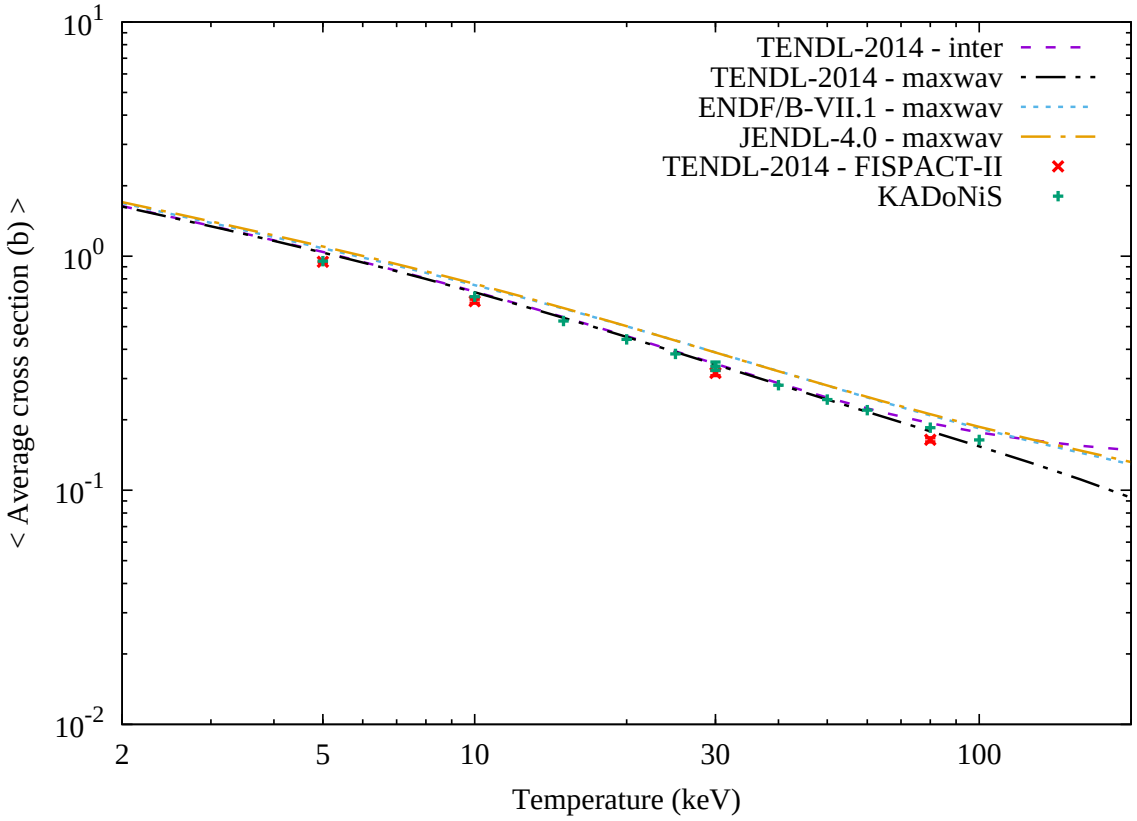
$^{96}Mo_{42}$ [Stable]



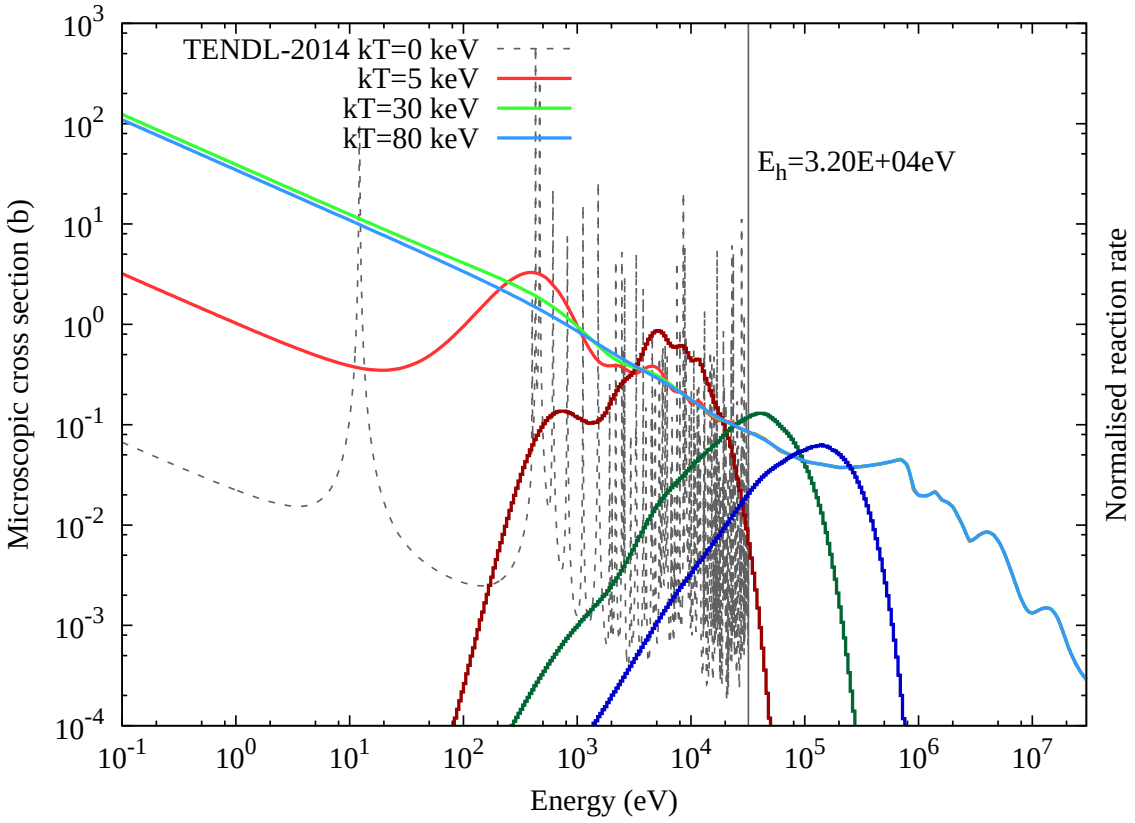


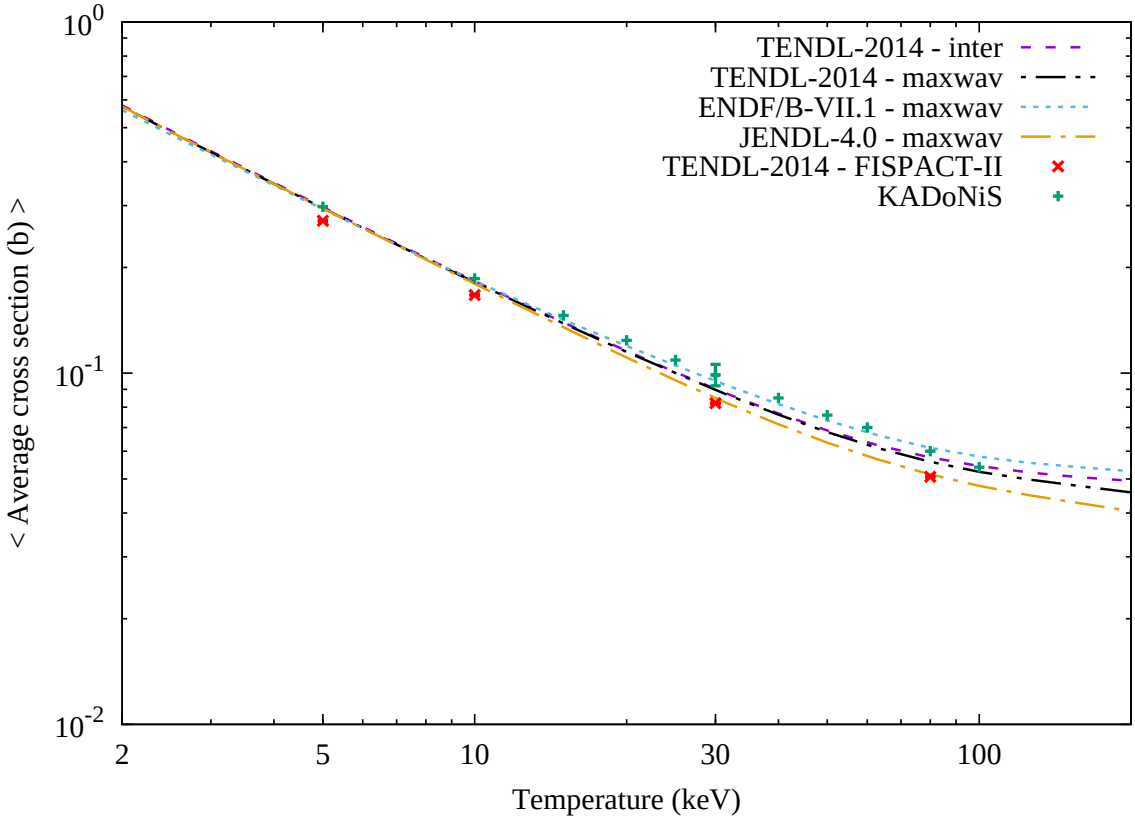
$^{97}Mo_{42}$ [Stable]



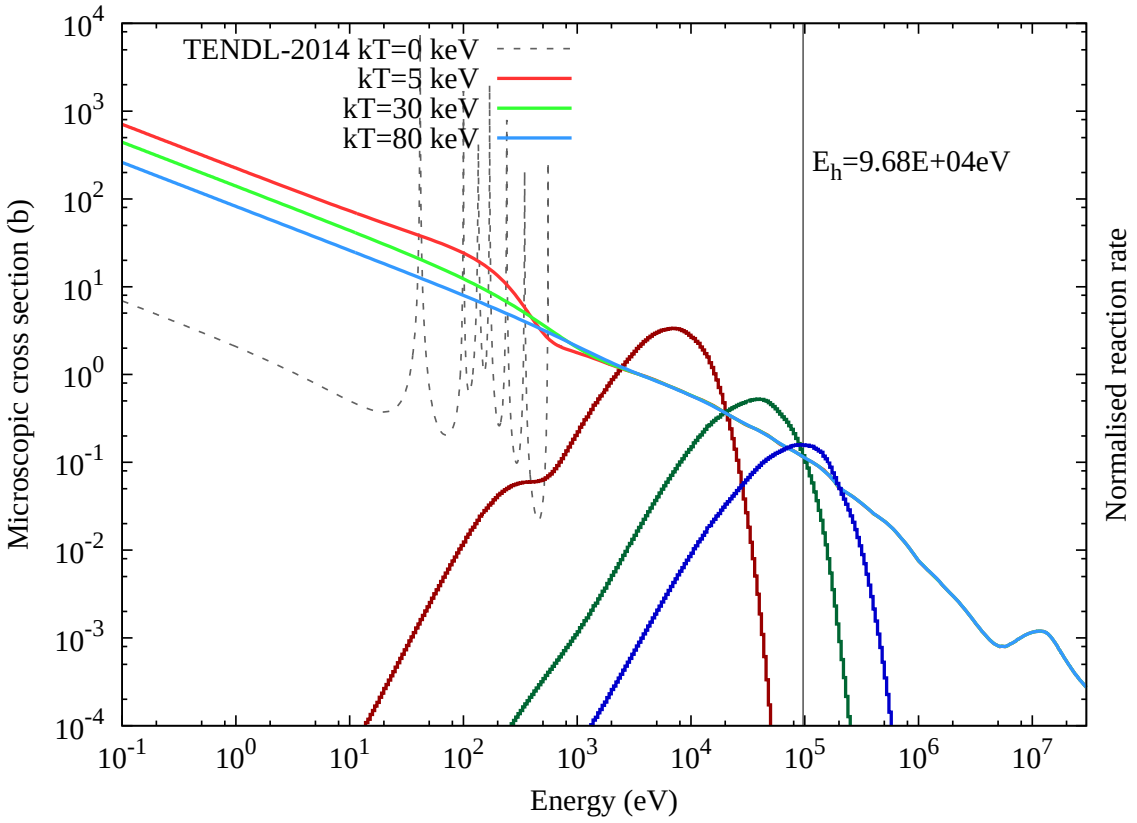


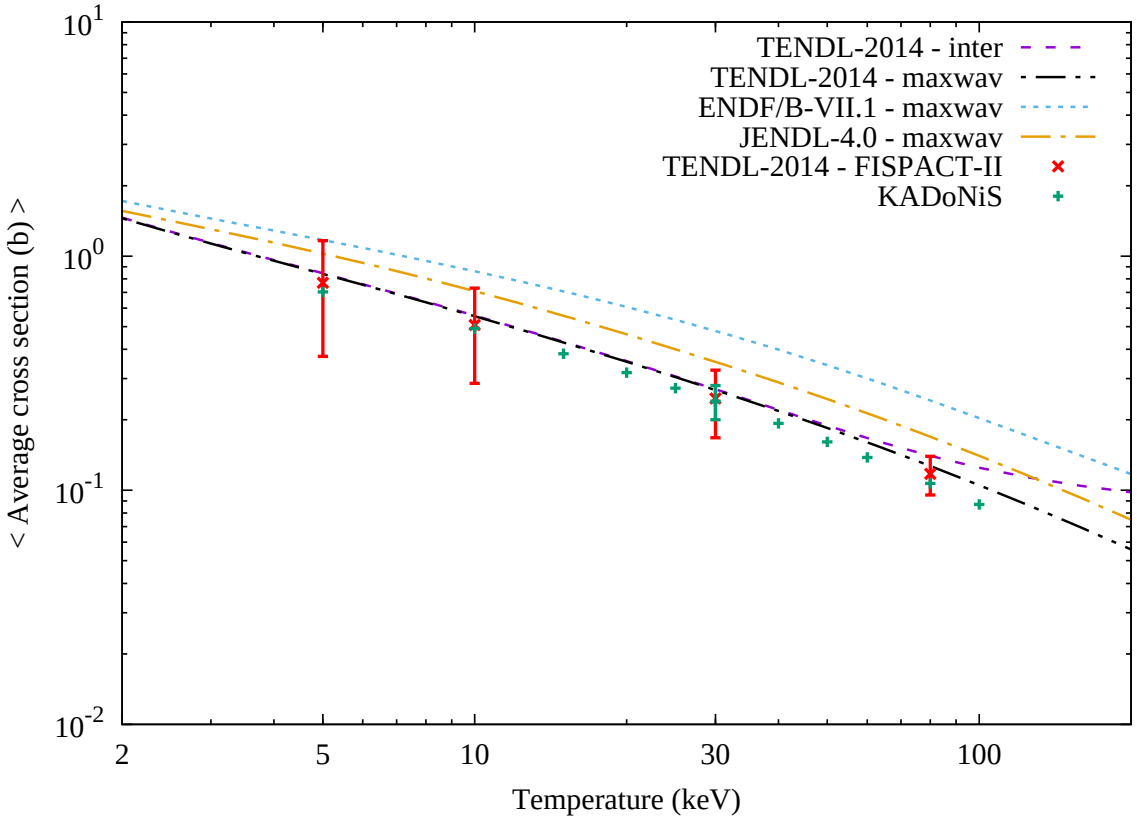
$^{98}Mo_{42}$ $[T_{1/2} = 1.00 \times 10^{14}$ years$]$



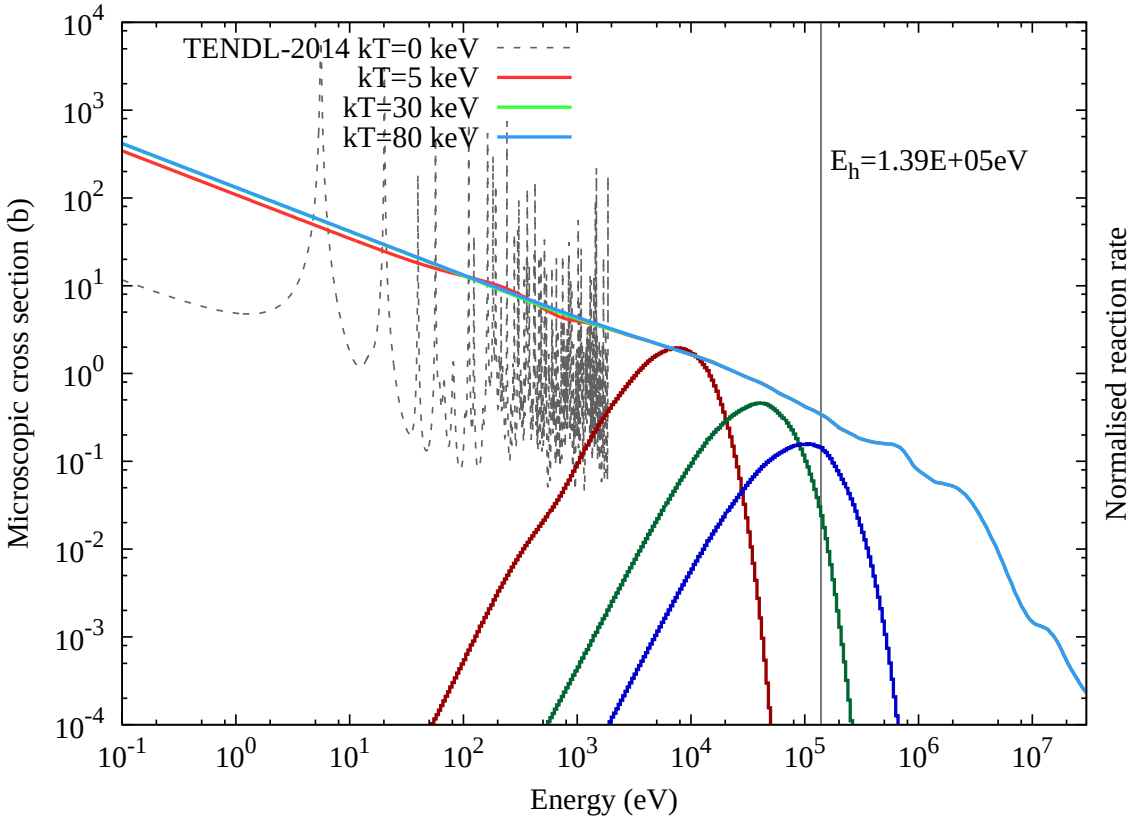


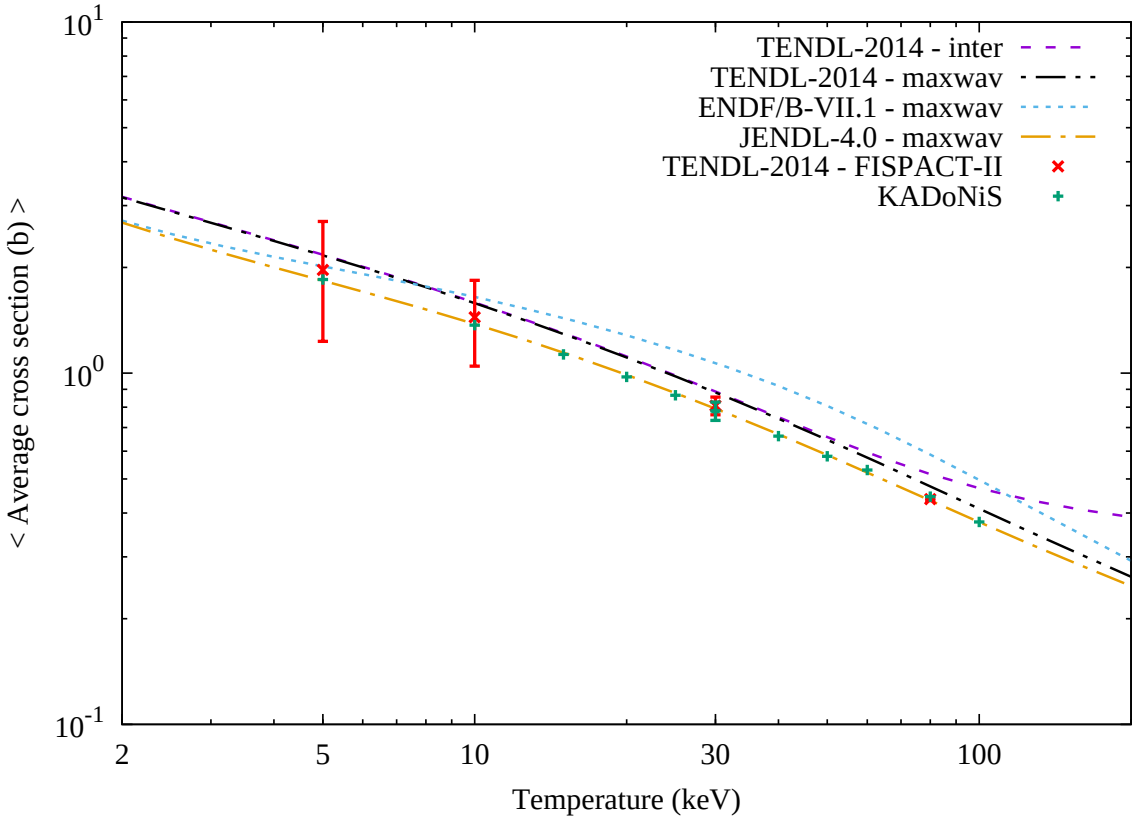
$^{99}Mo_{42}$ $[T_{1/2} = 2.75$ days$]$ (KADoNiS=SMC)



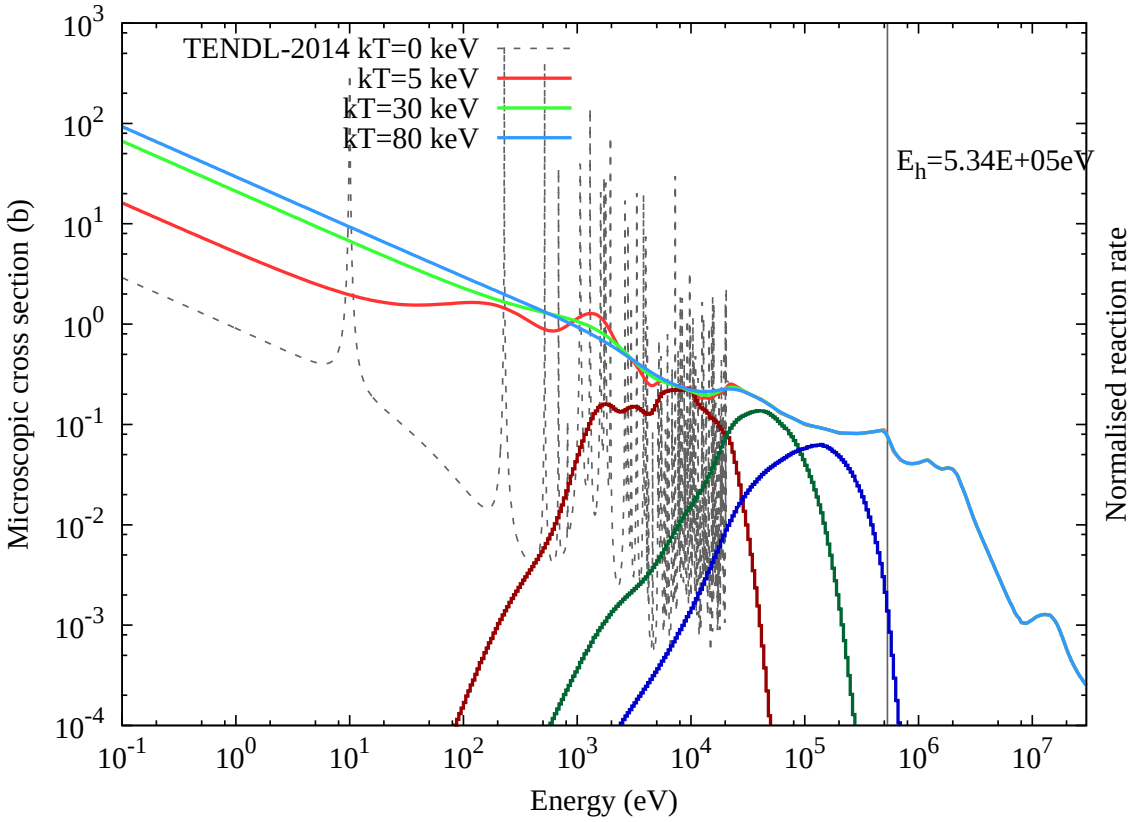


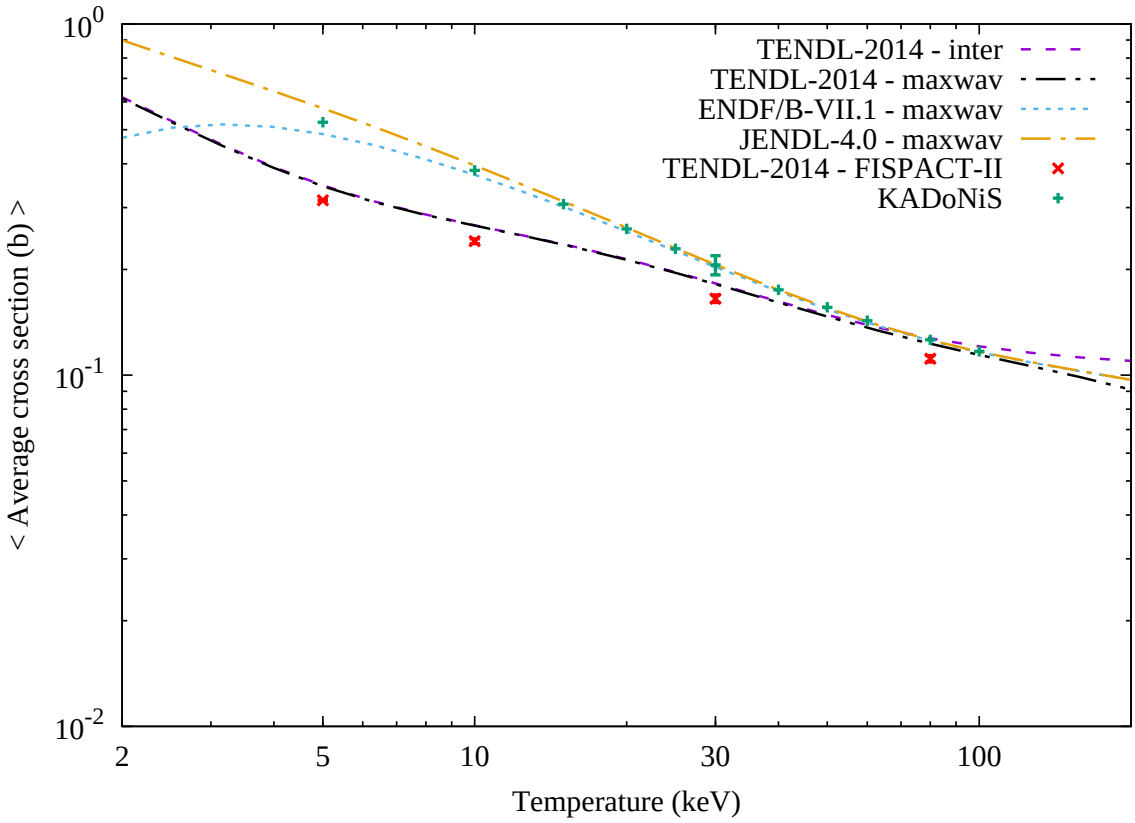
$^{99}Tc_{43}$ $[T_{1/2} = 2.14 \times 10^5$ years$]$



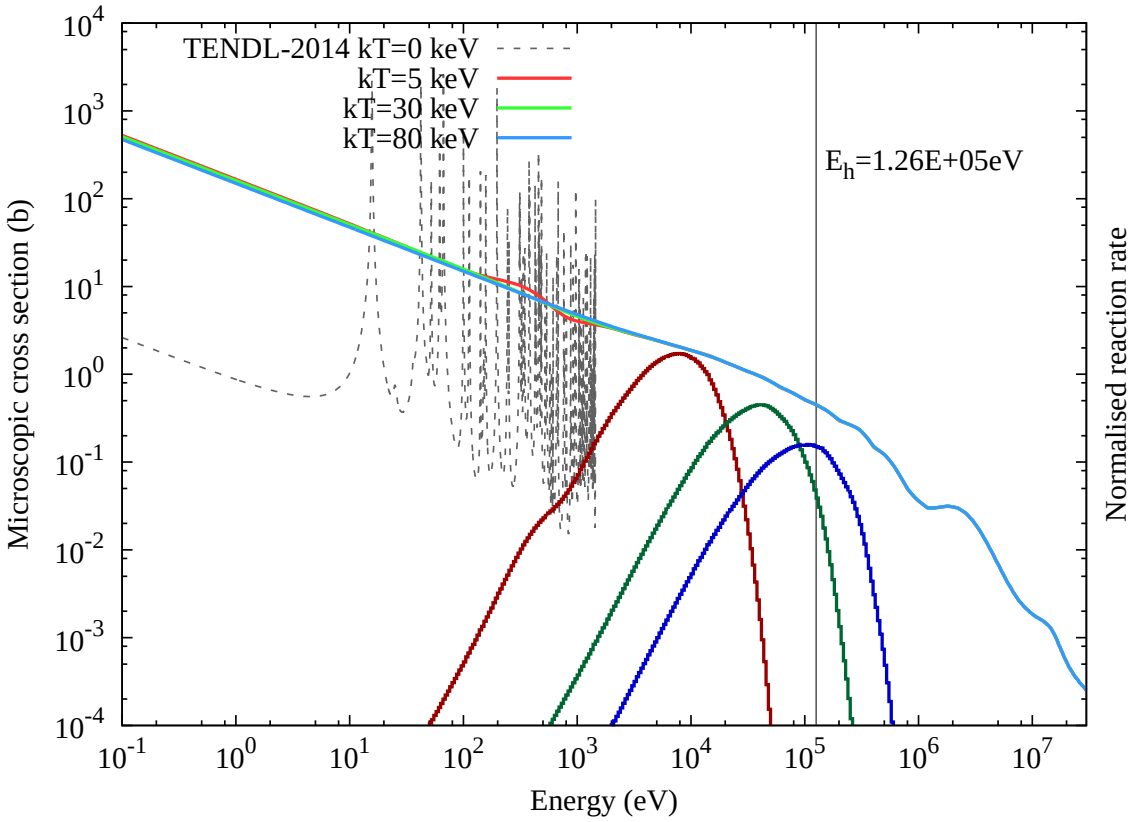


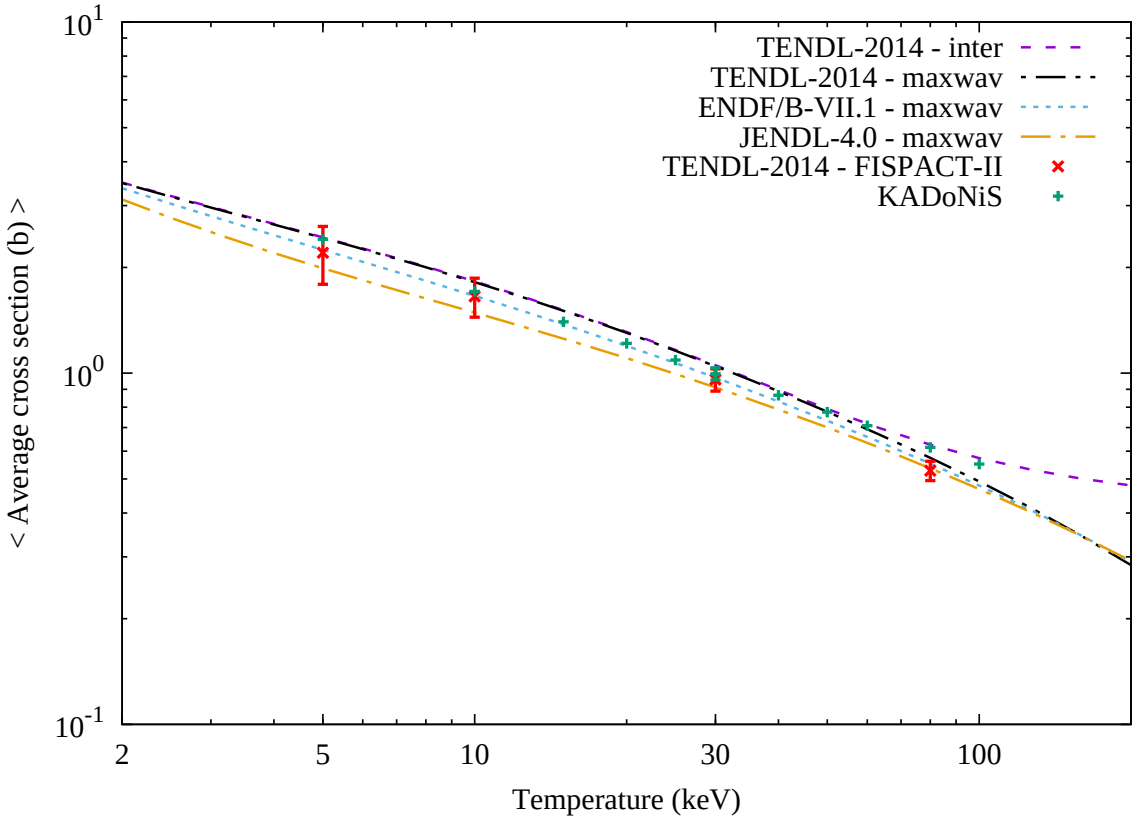
$^{100}Ru_{44}$ [Stable]



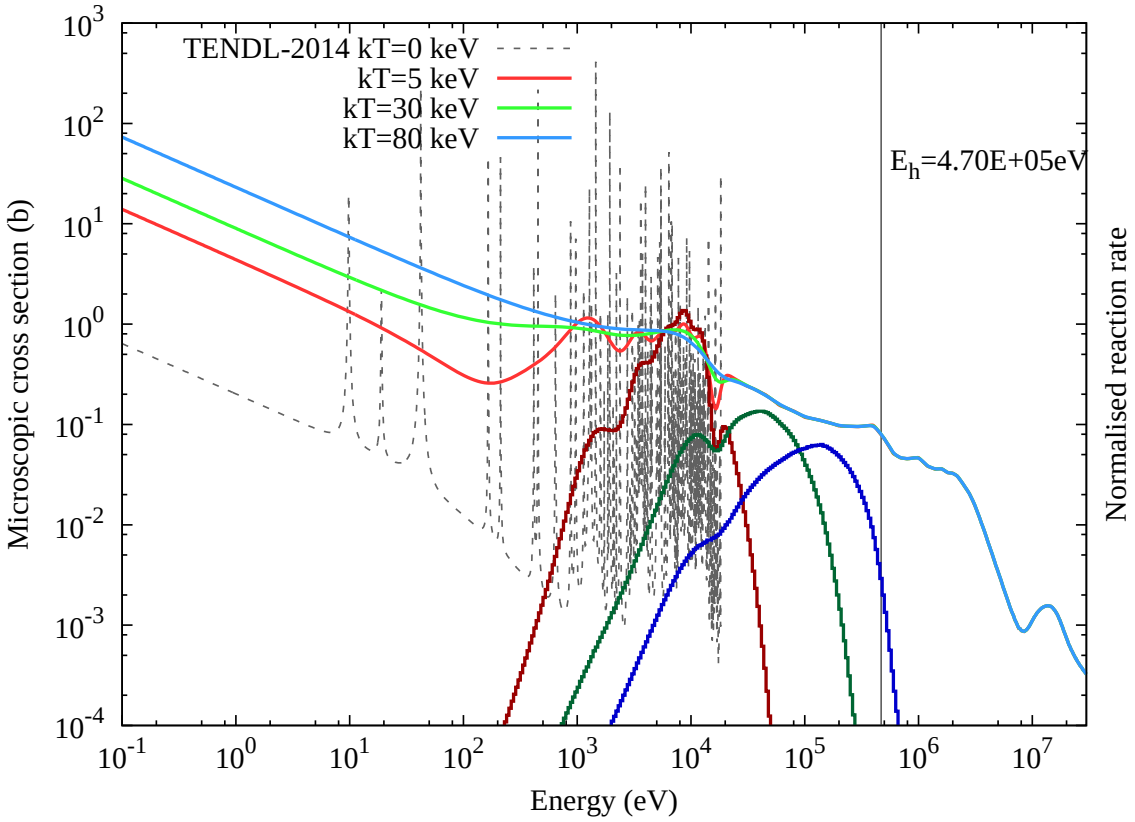


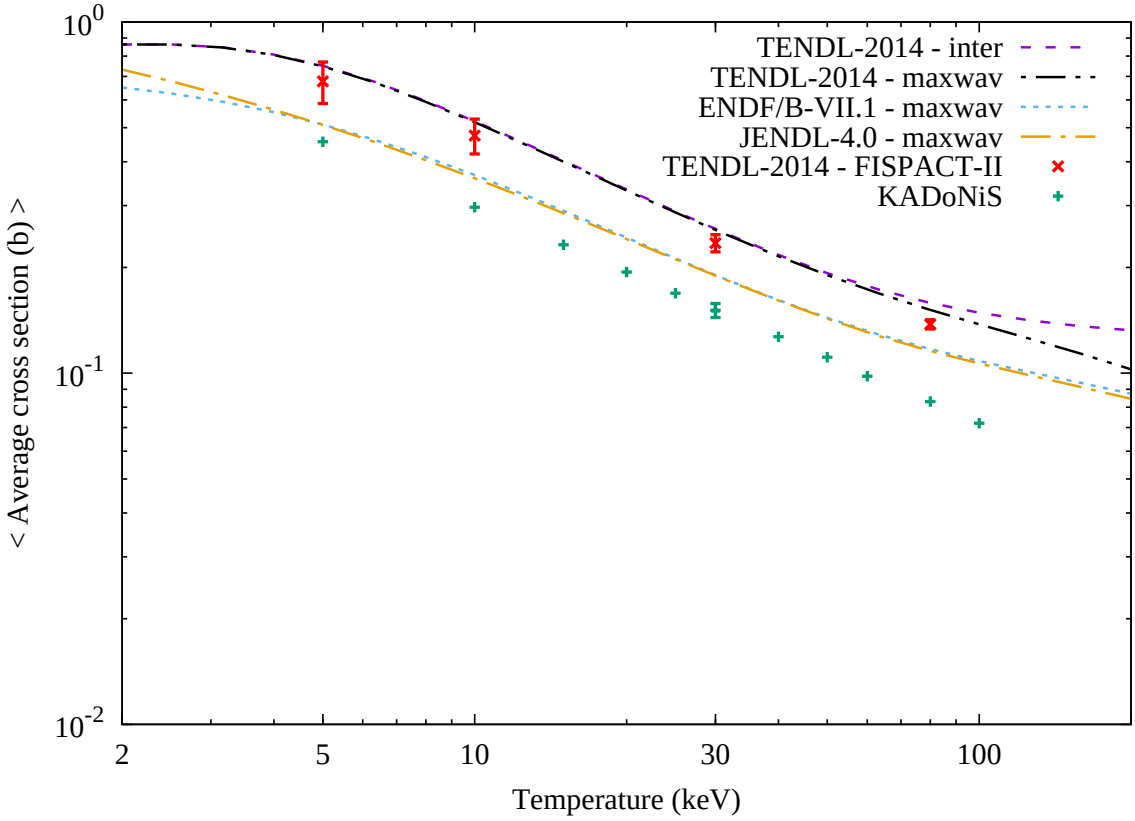
$^{101}Ru_{44}$ [Stable]



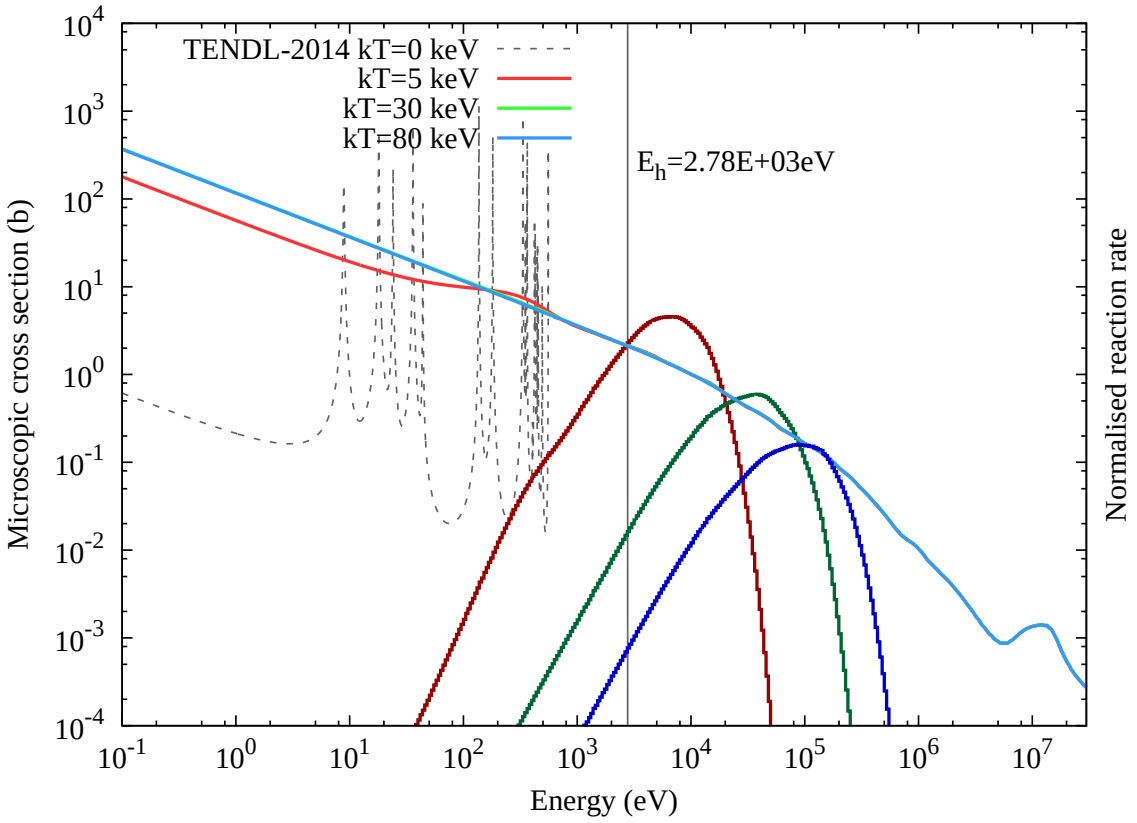


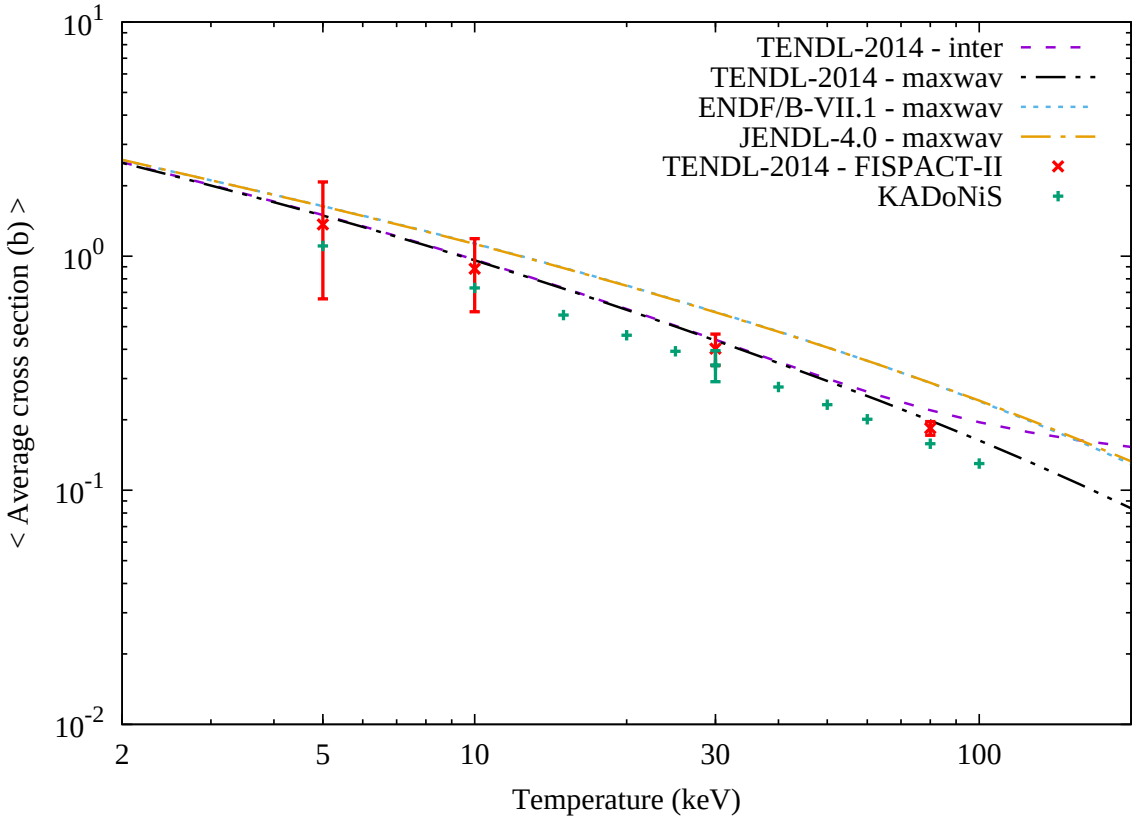
$^{102}Ru_{44}$ [Stable]



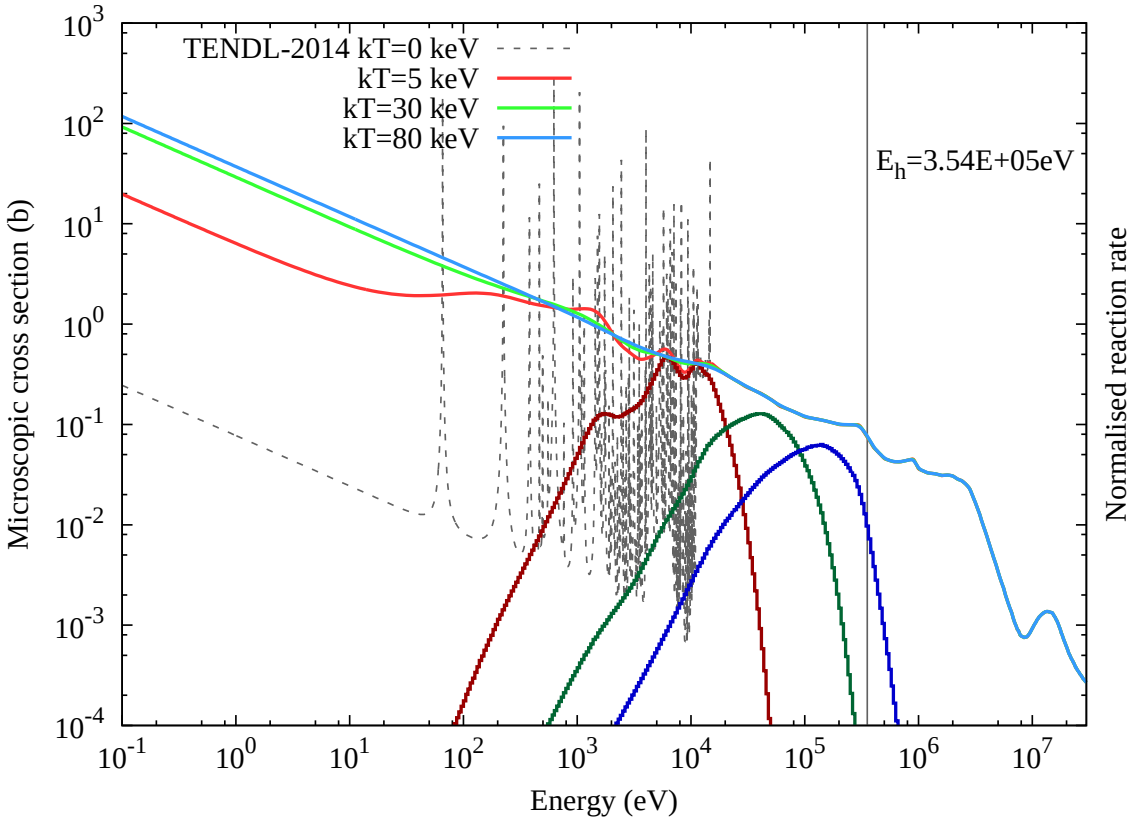


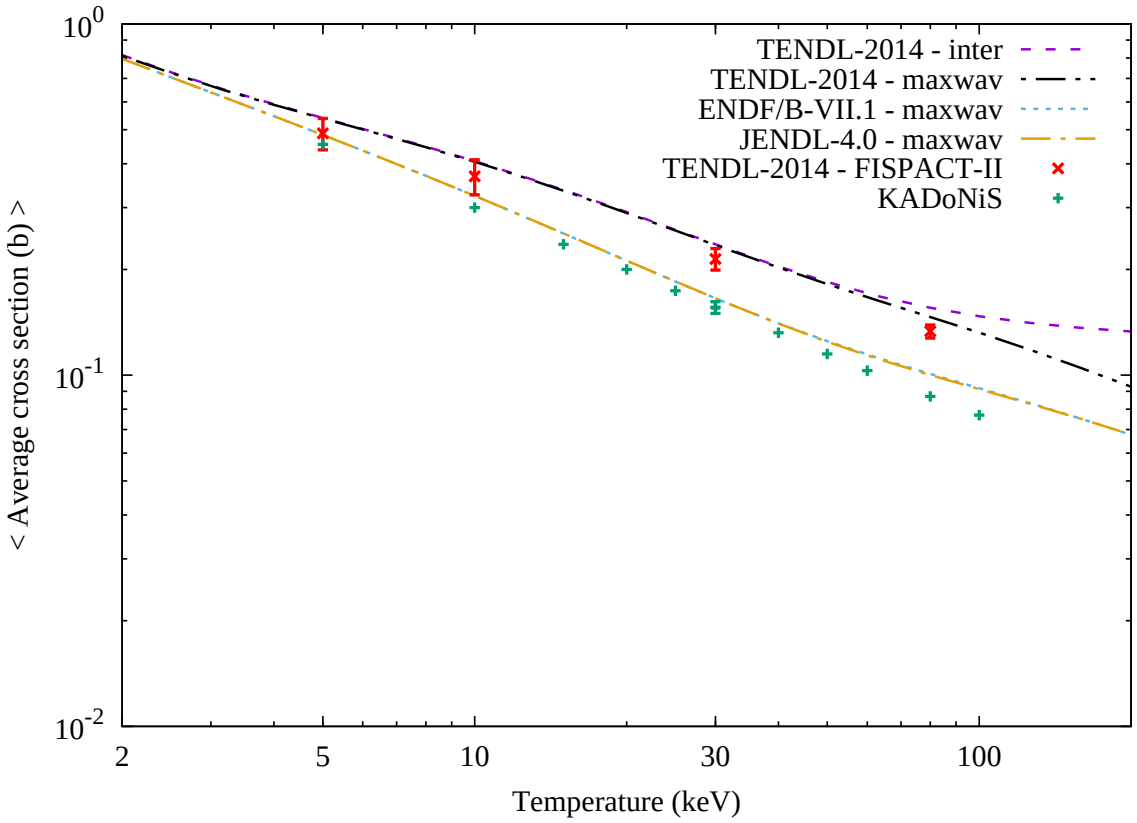
$^{103}Ru_{44}$ $[T_{1/2} = 39.26 \text{ days}]$ (KADoNiS=SMC)



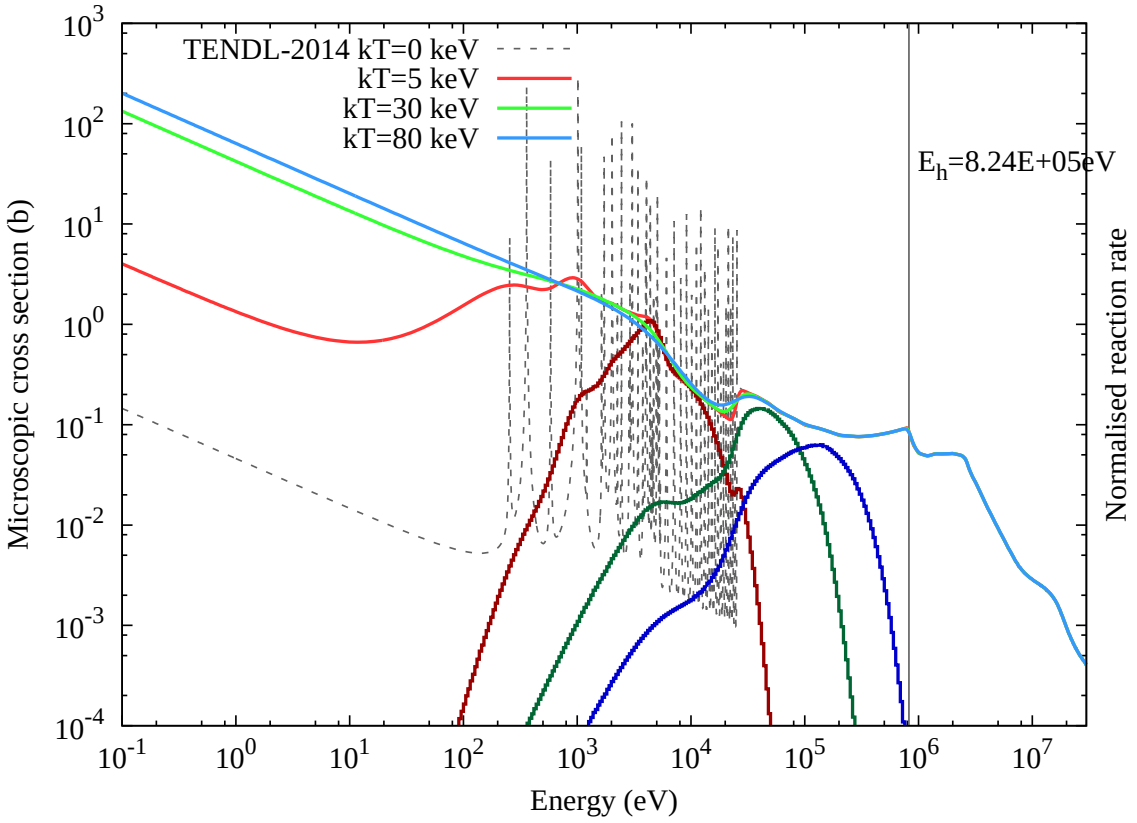


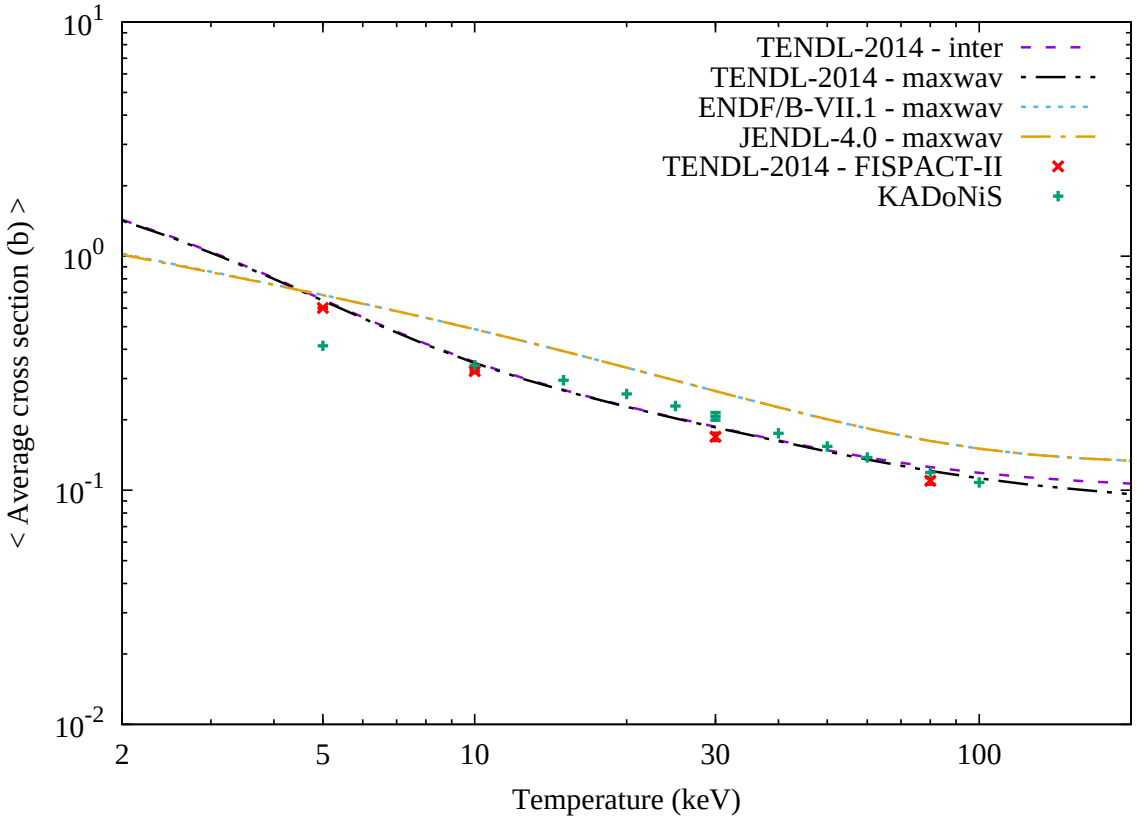
$^{104}Ru_{44}$ [Stable]



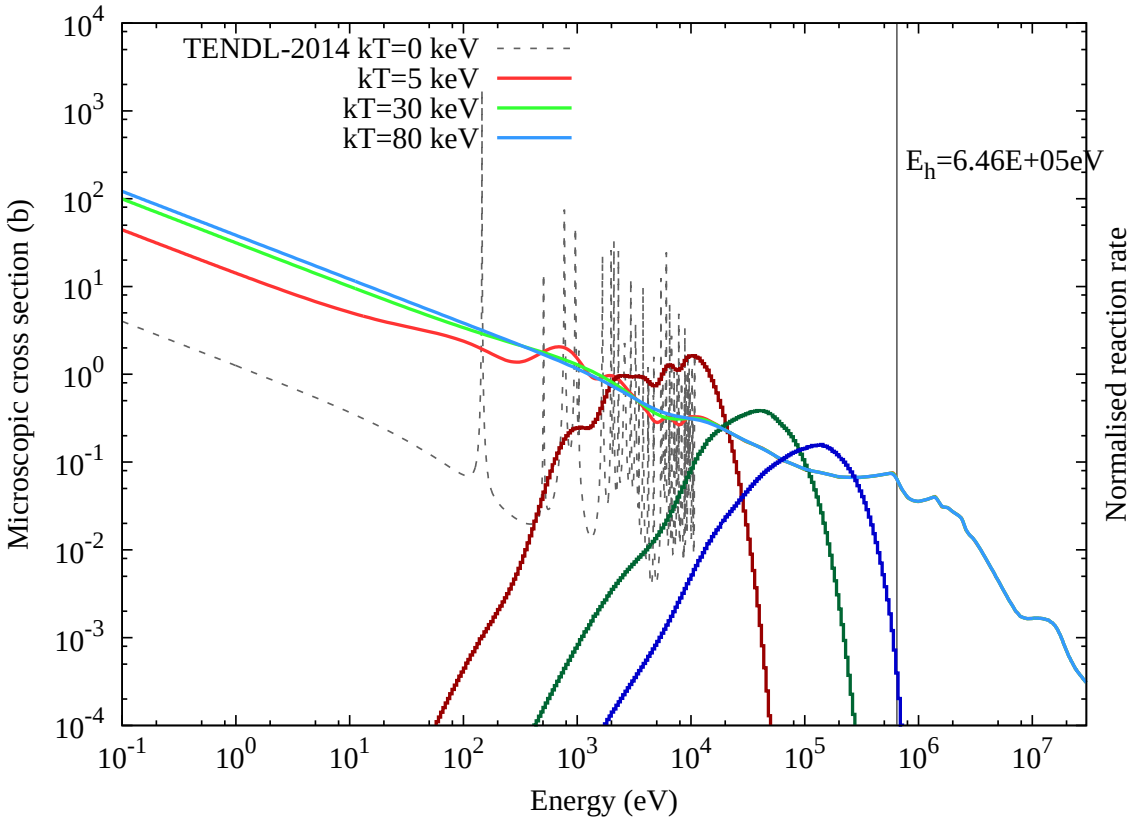


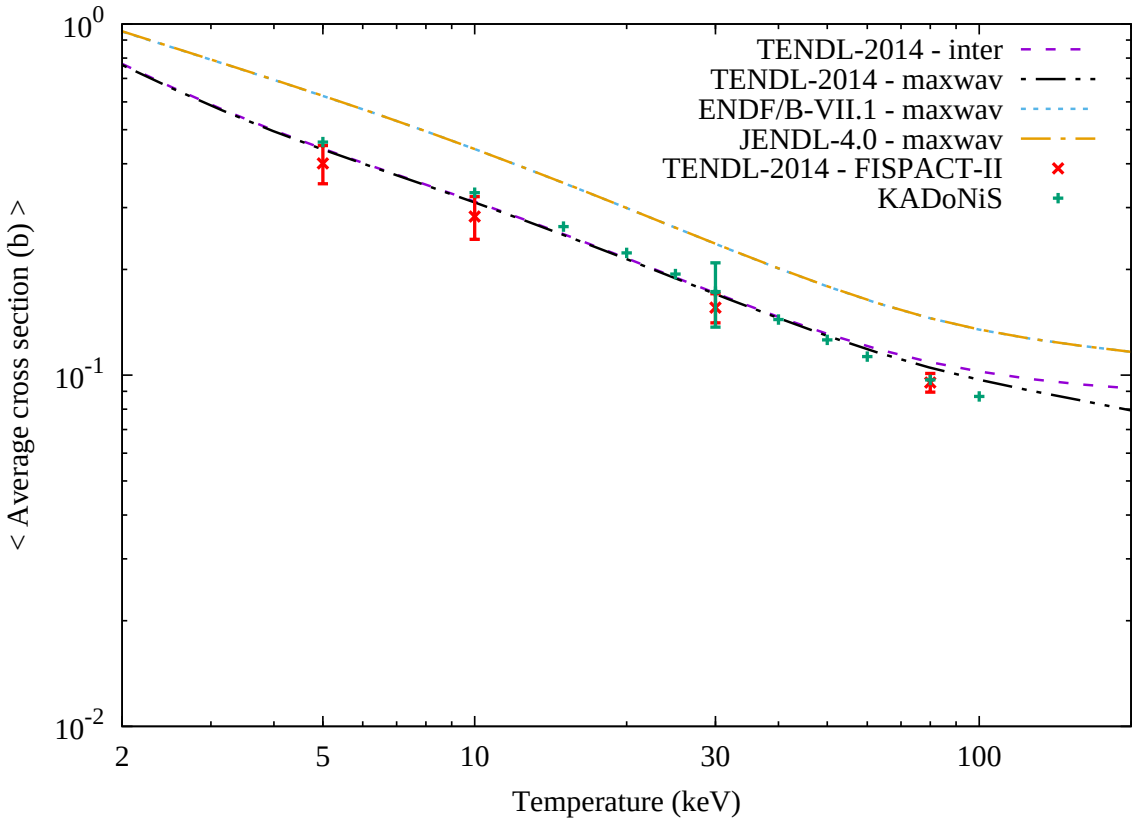
$^{96}Ru_{44}$ $[T_{1/2} = 6.70 \times 10^{16}$ years$]$



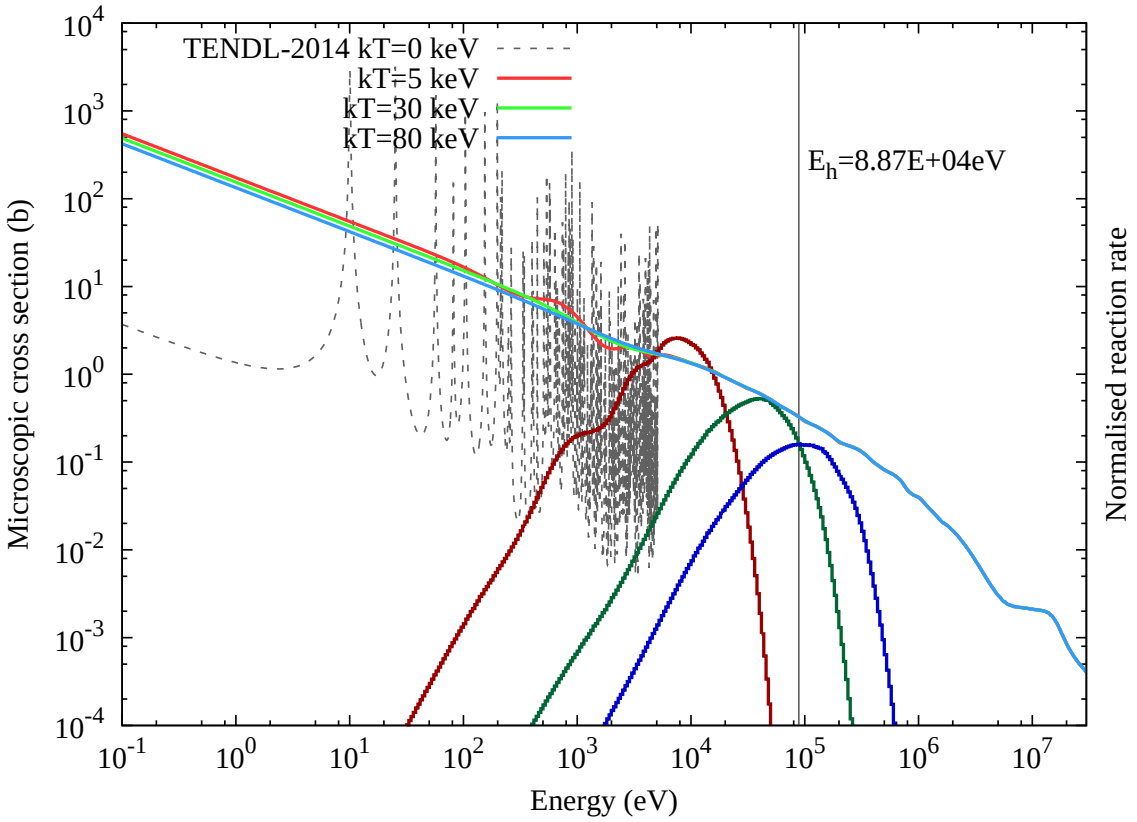


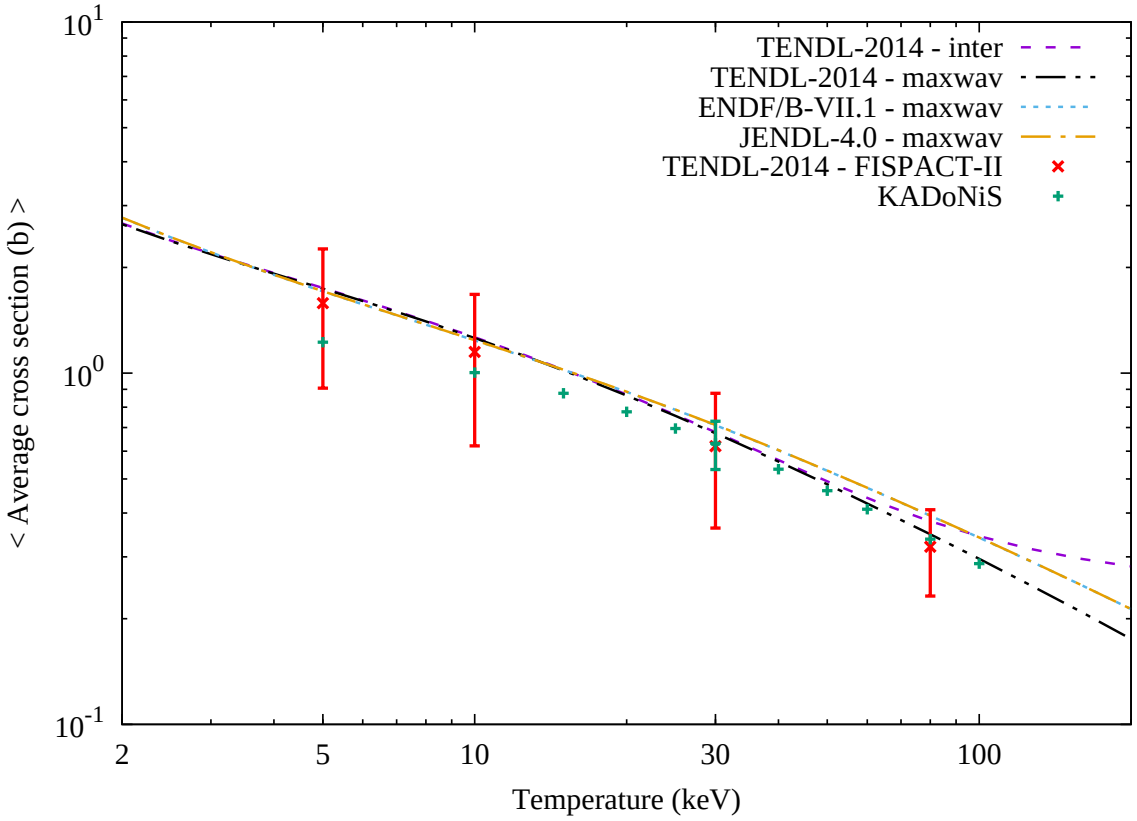
$^{98}Ru_{44}$ [Stable] (KADoNiS=SMC)



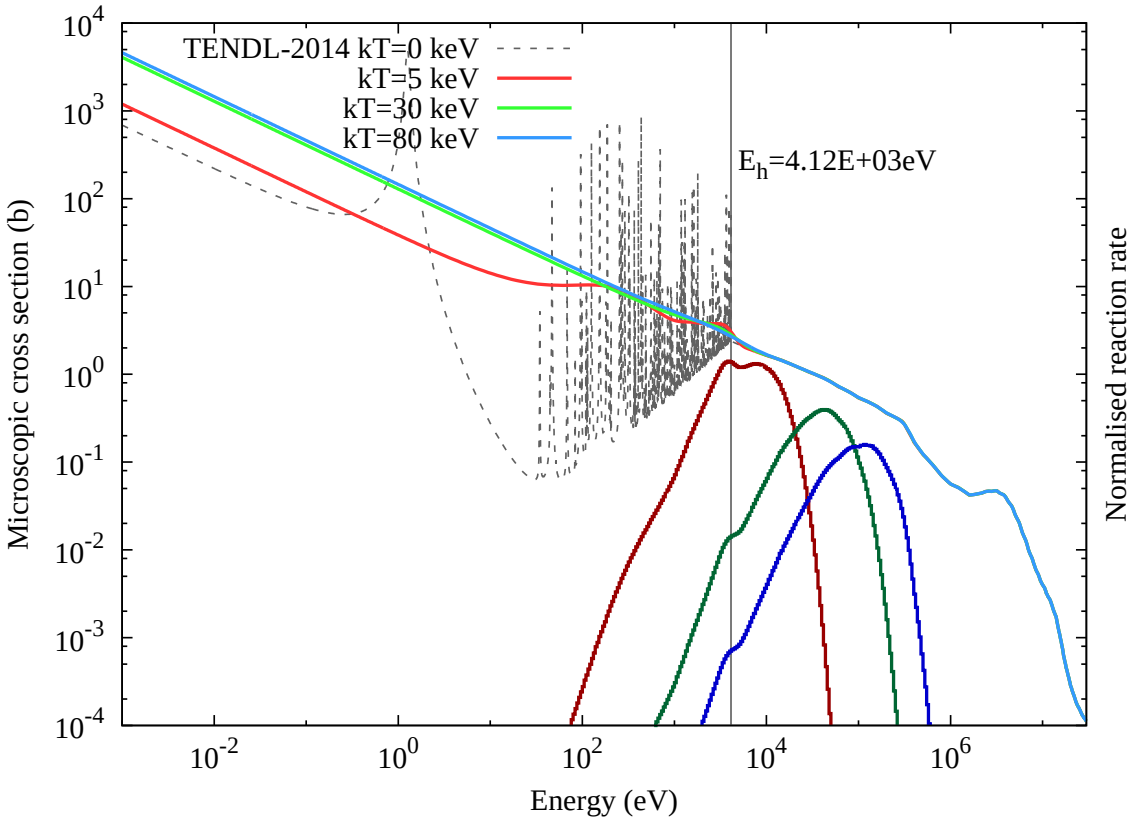


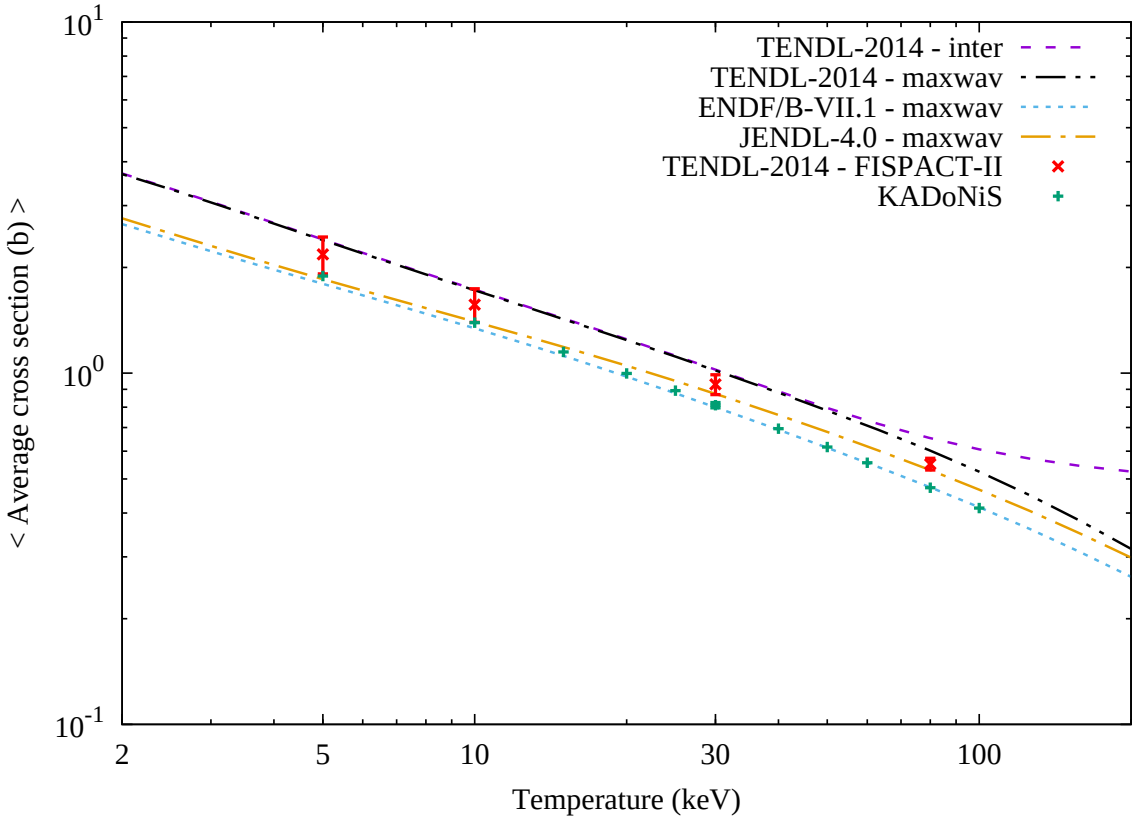
$^{99}Ru_{44}$ [Stable] (KADoNiS=SMC)



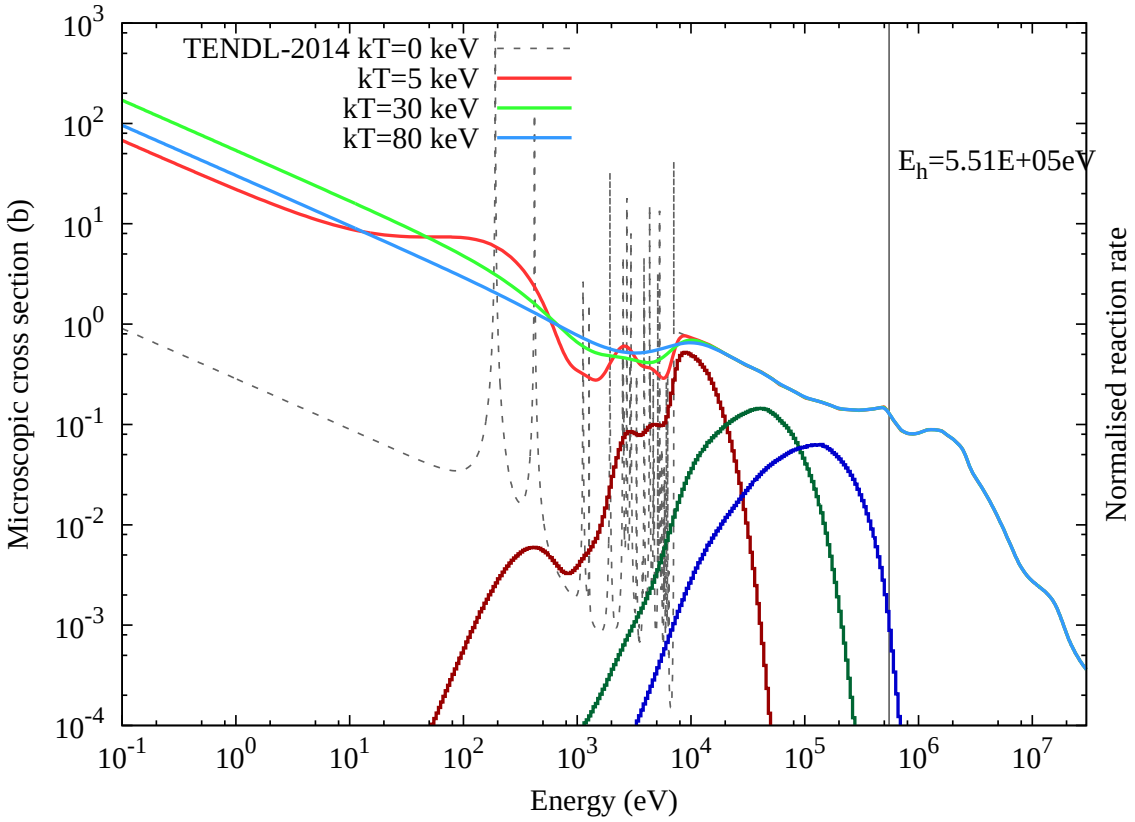


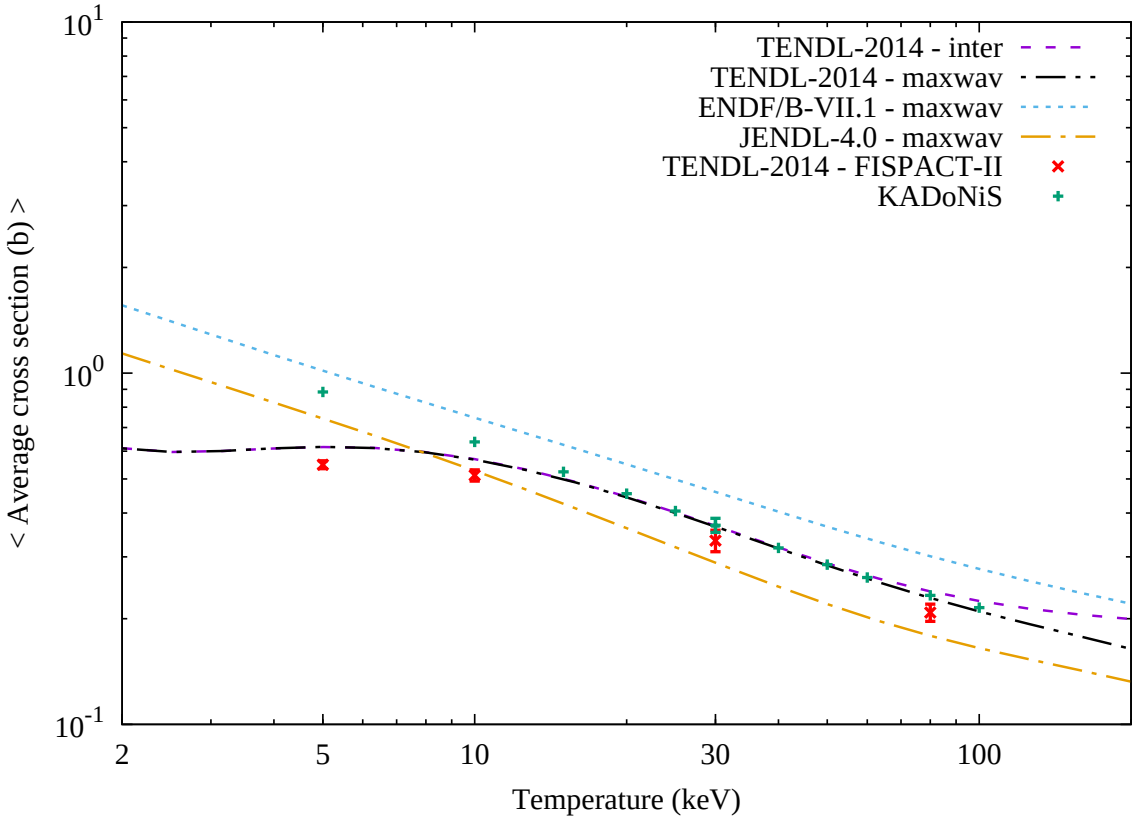
$^{103}Rh_{45}$ [Stable]



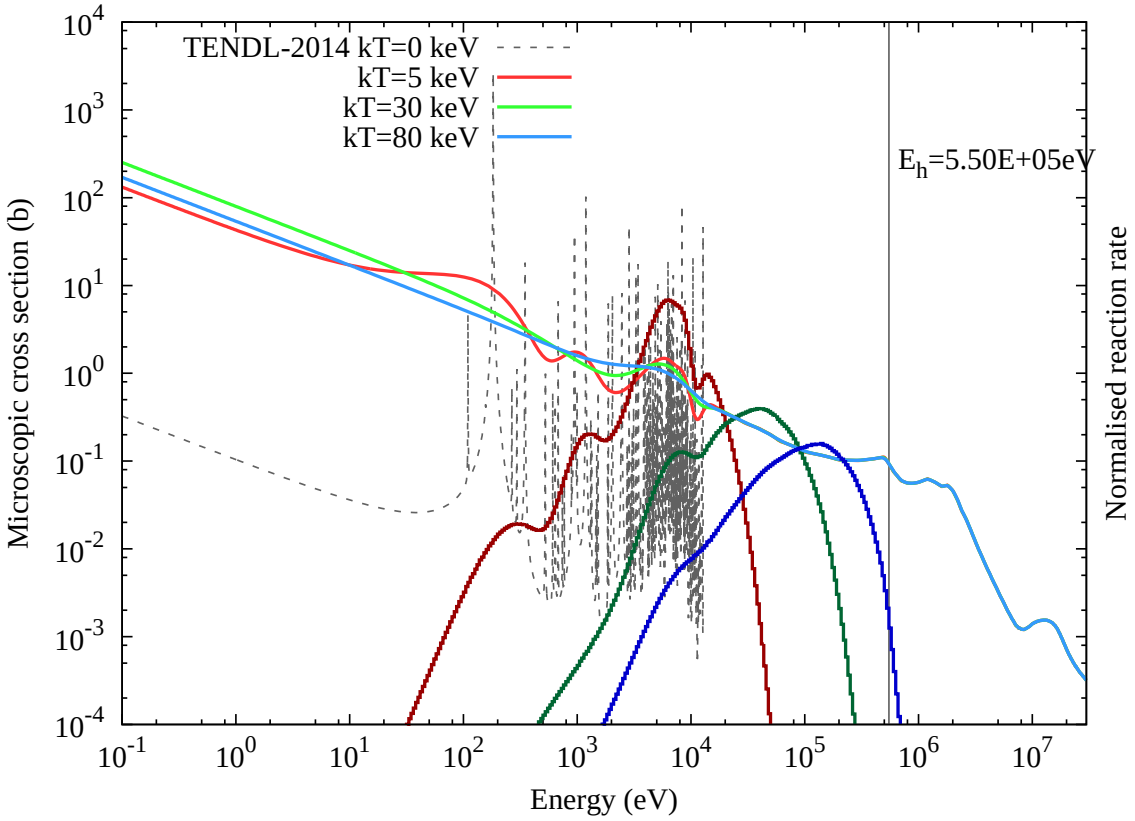


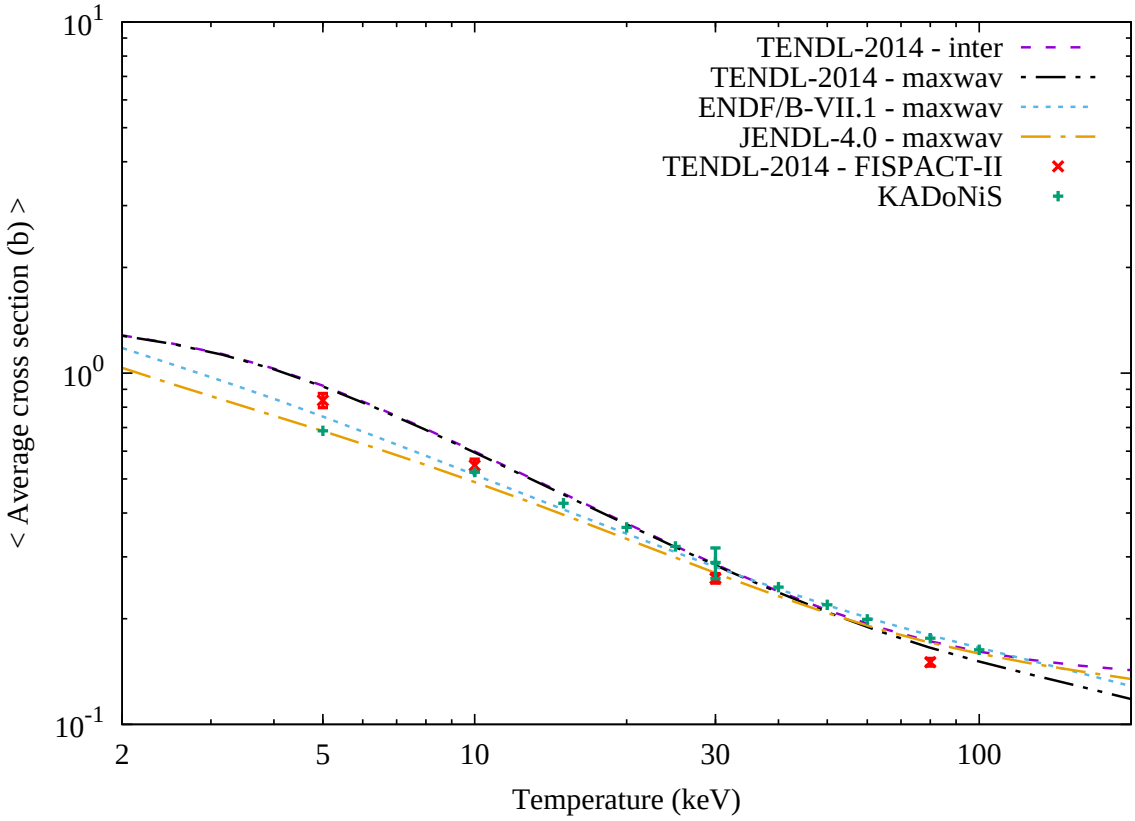
$^{102}Pd_{46}$ [Stable]



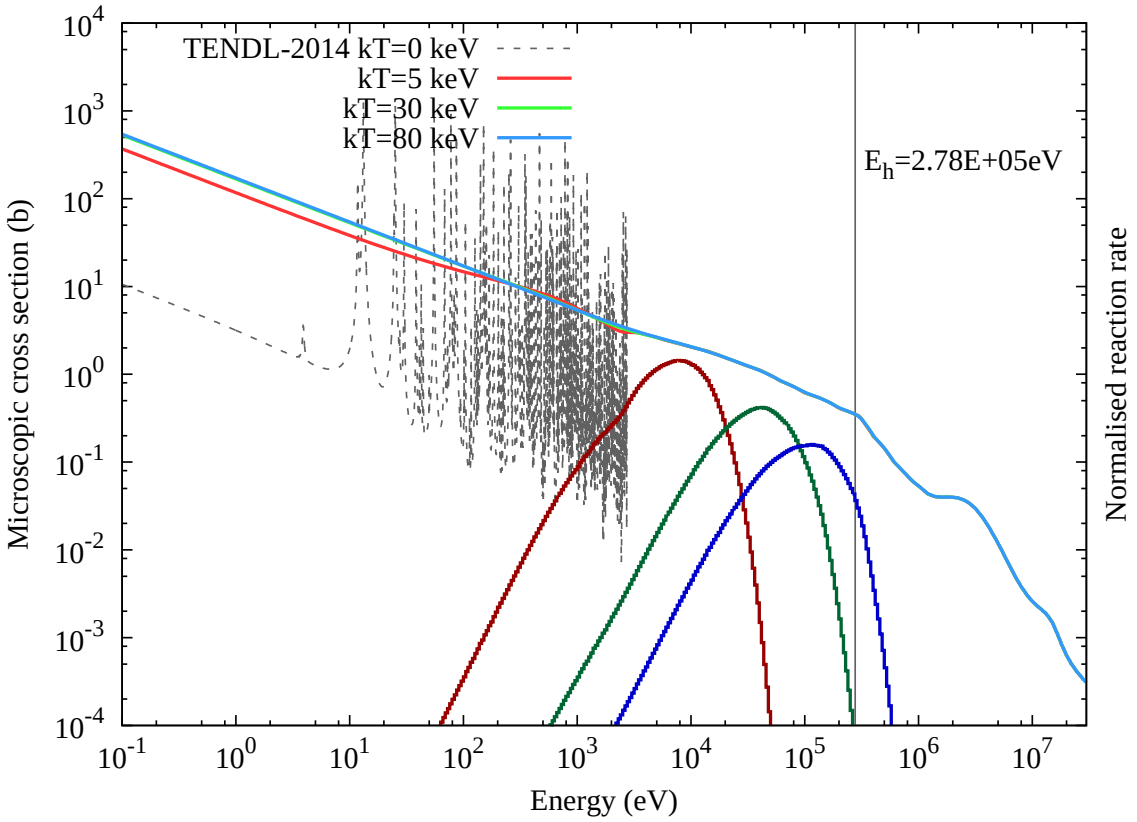


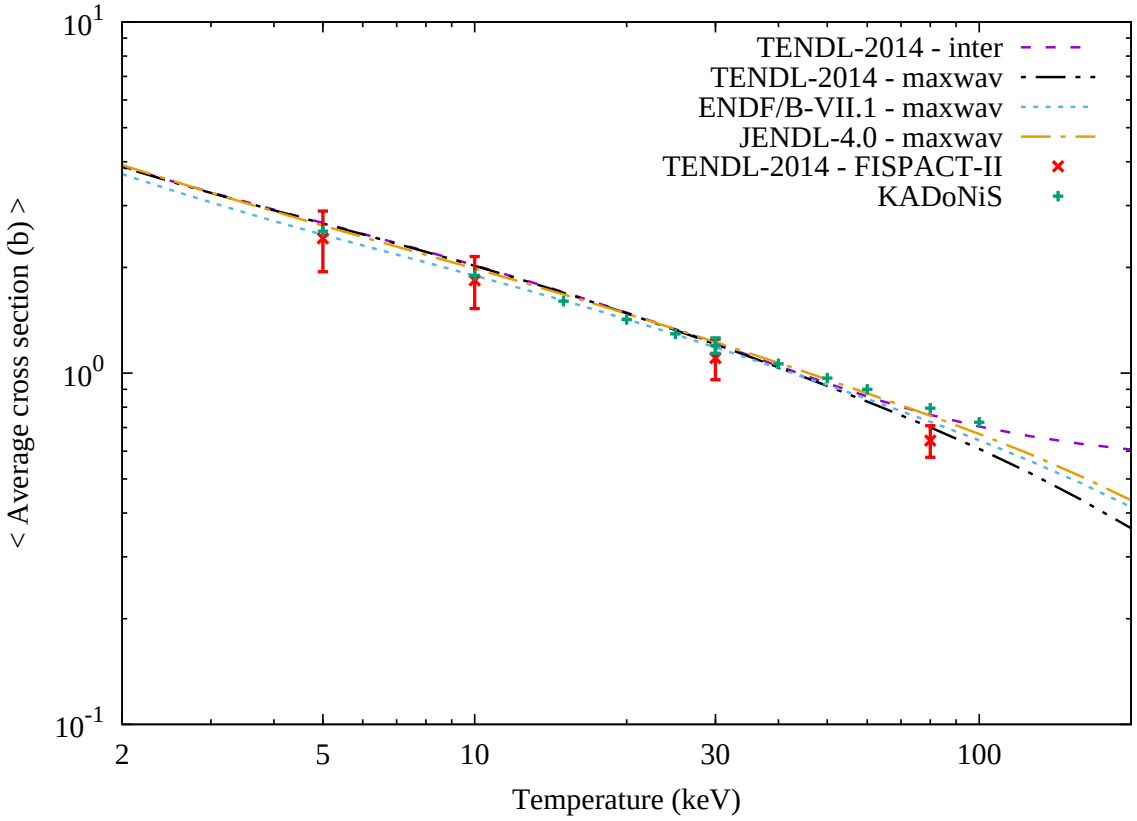
$^{104}Pd_{46}$ [Stable]



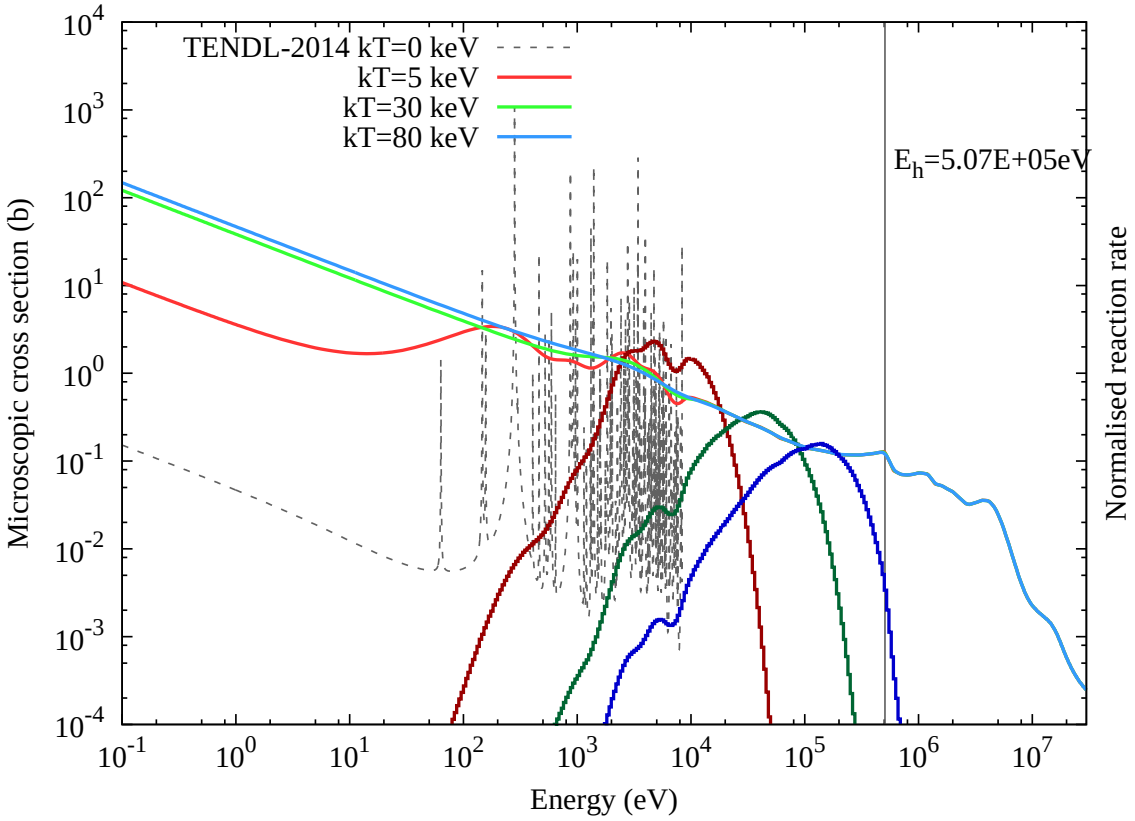


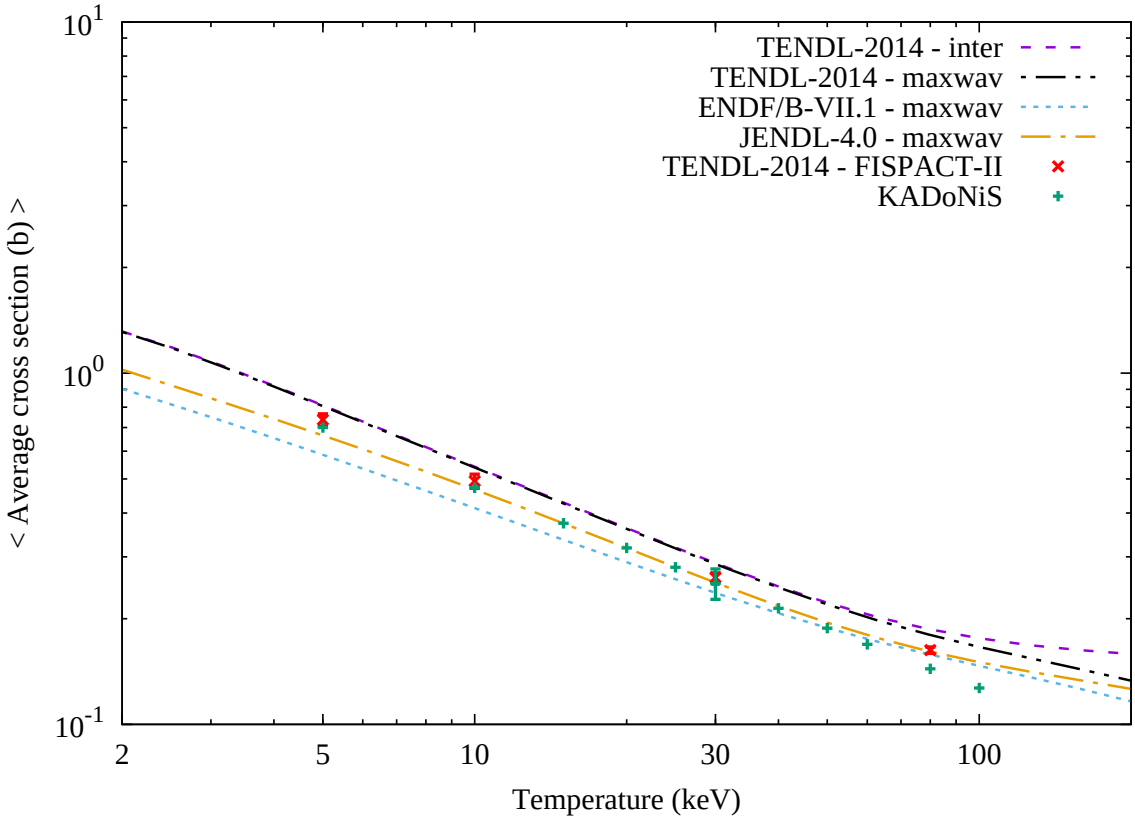
$^{105}Pd_{46}$ [Stable]



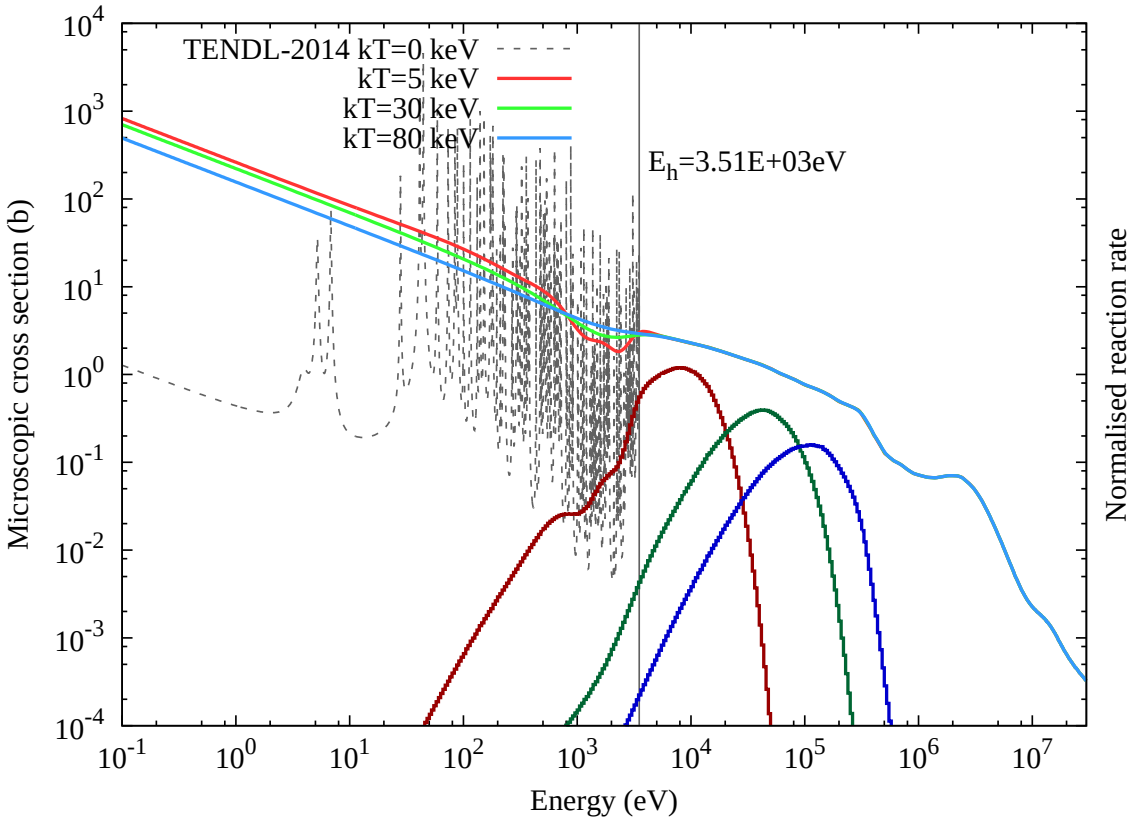


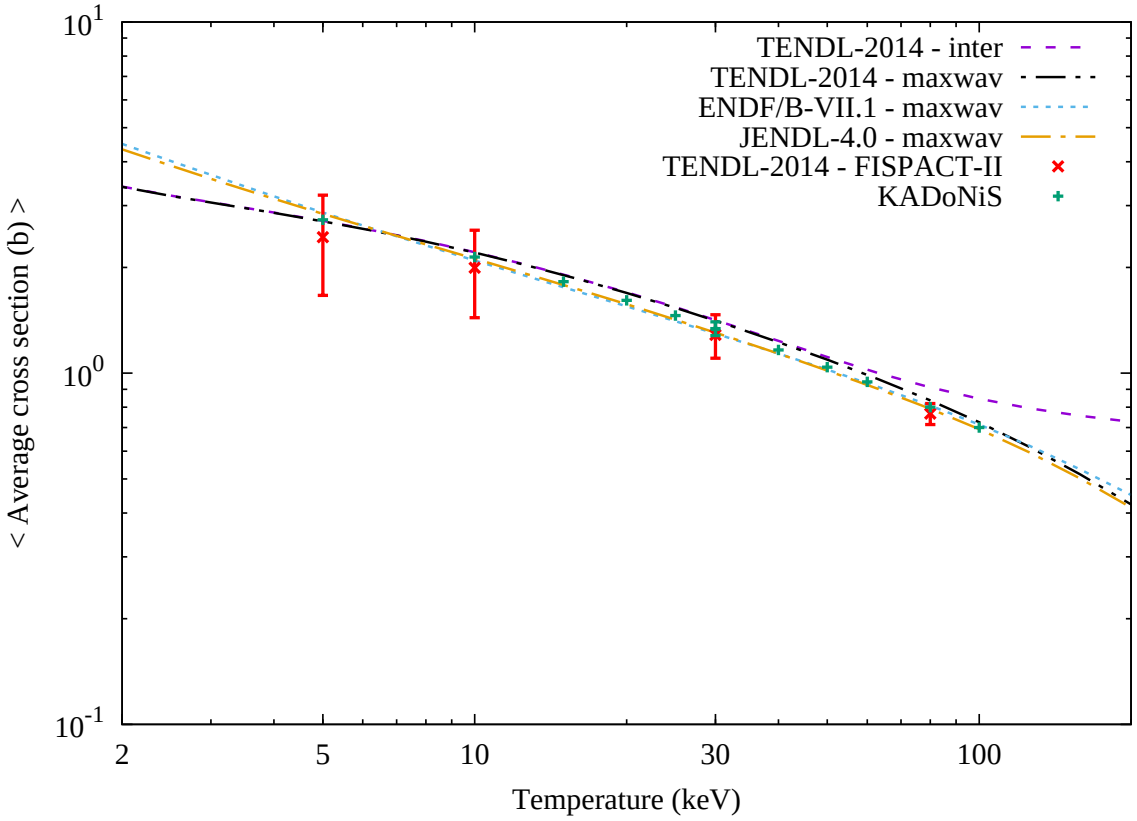
$^{106}Pd_{46}$ [Stable]



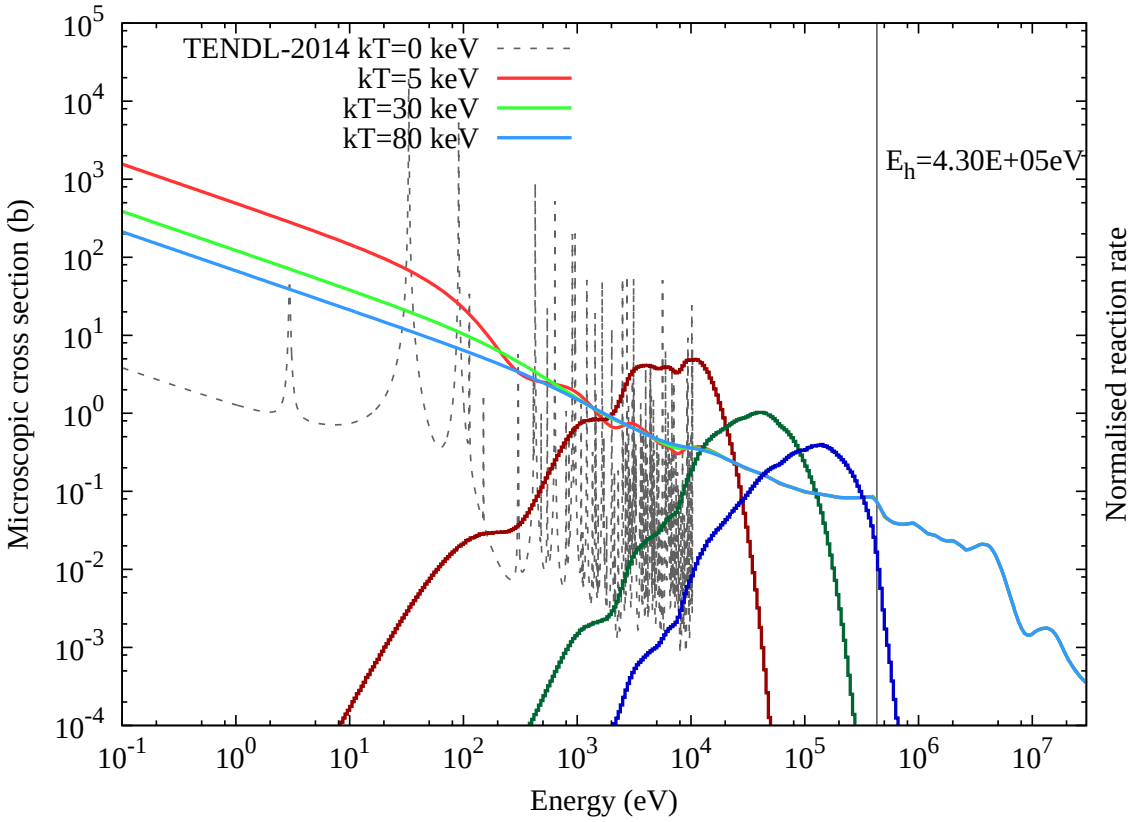


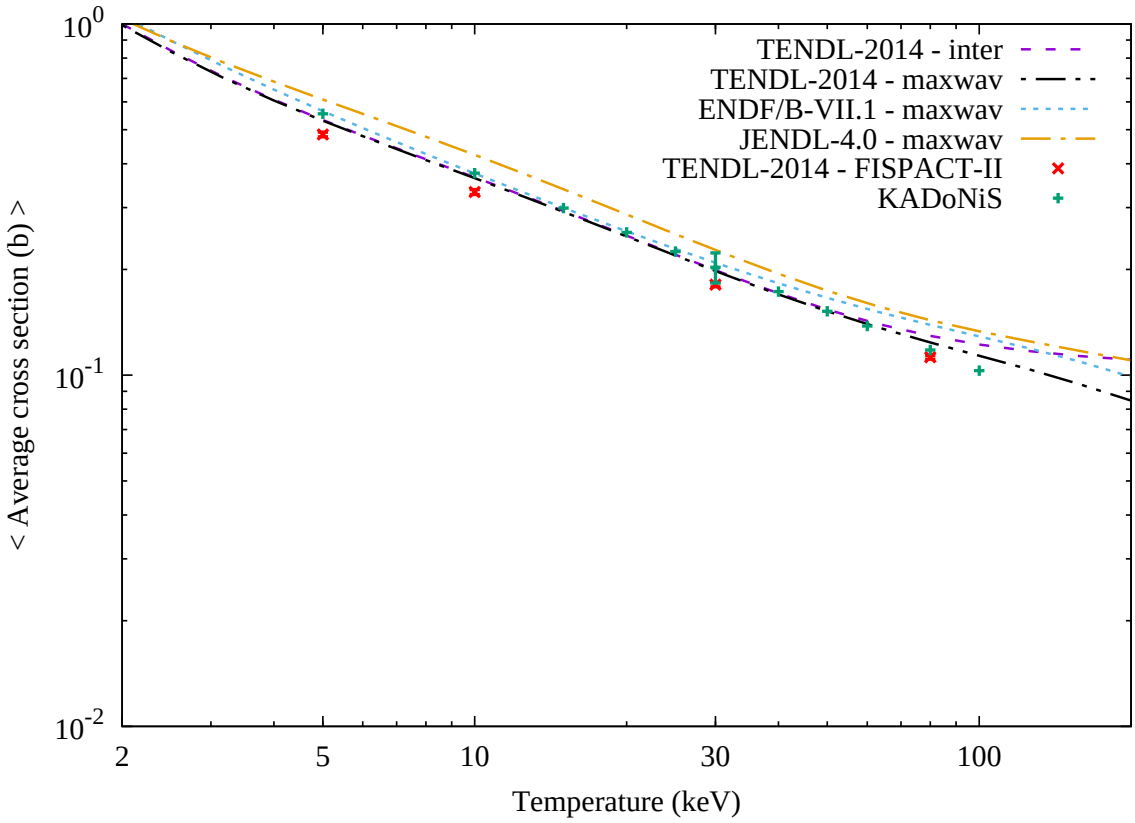
$^{107}Pd_{46}$ $[T_{1/2} = 6.50 \times 10^6$ years$]$



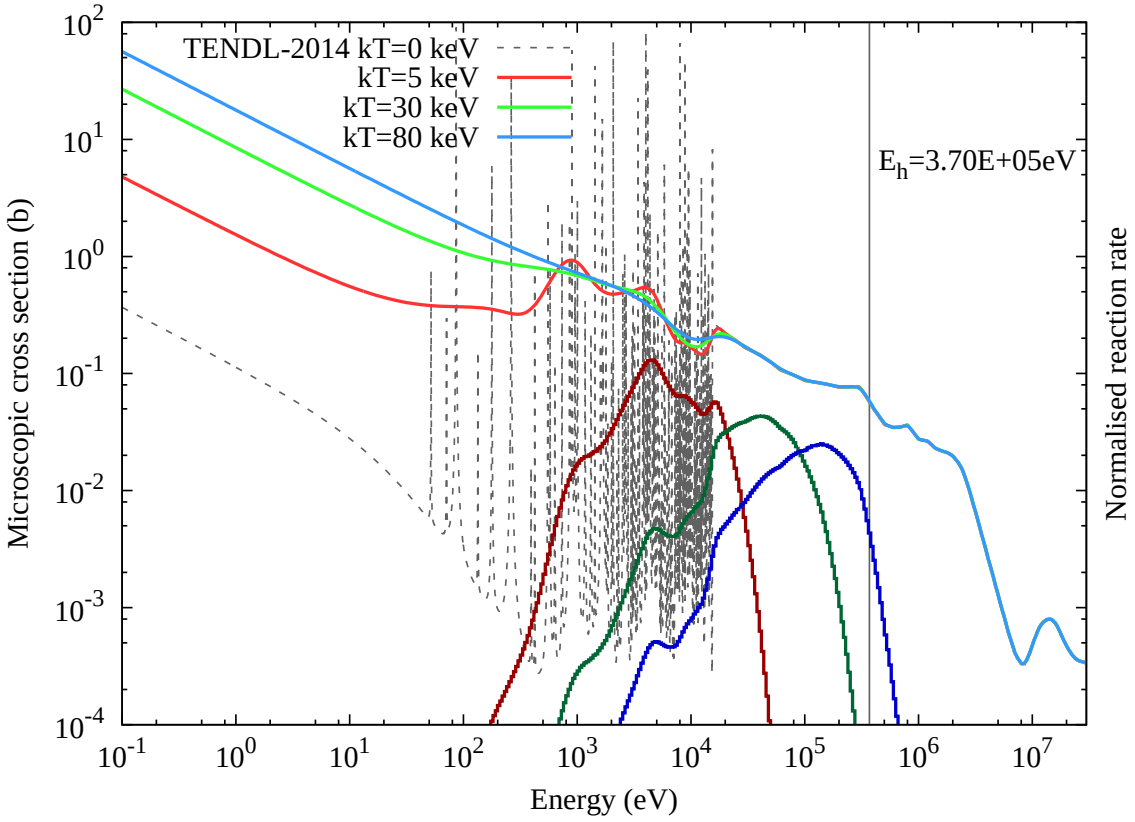


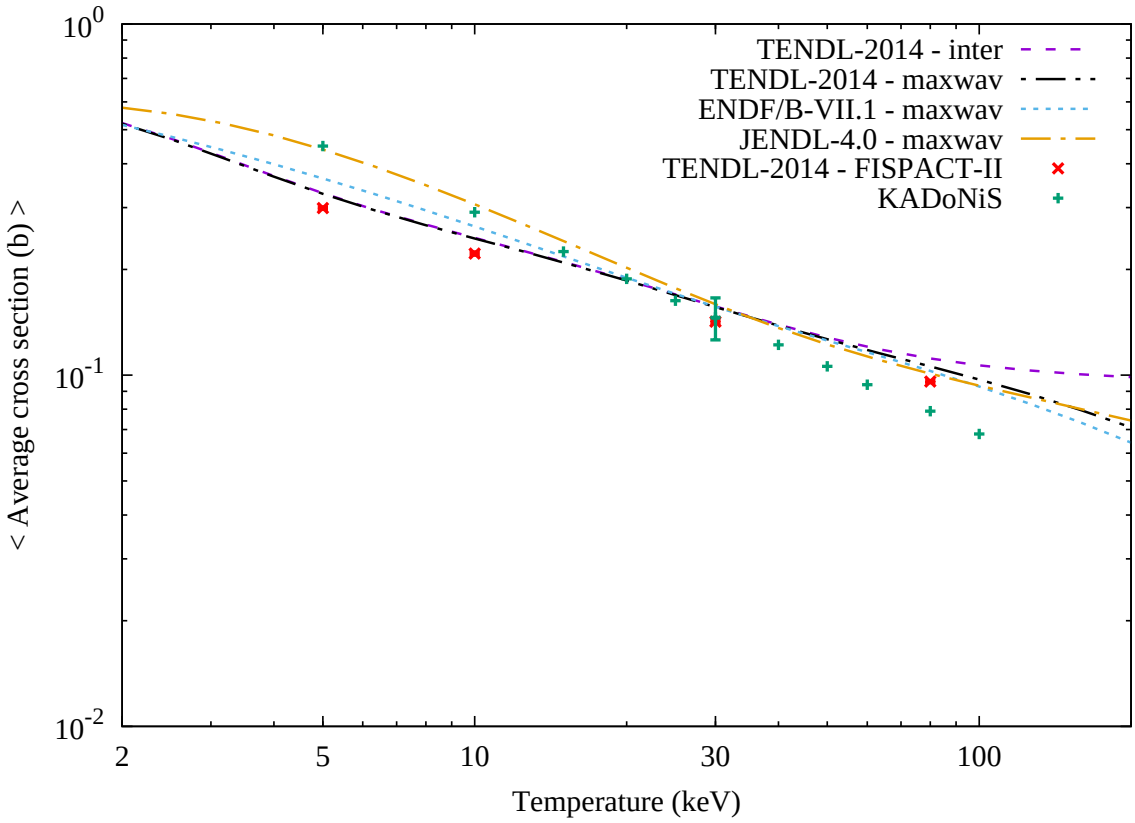
$^{108}Pd_{46}$ [Stable]



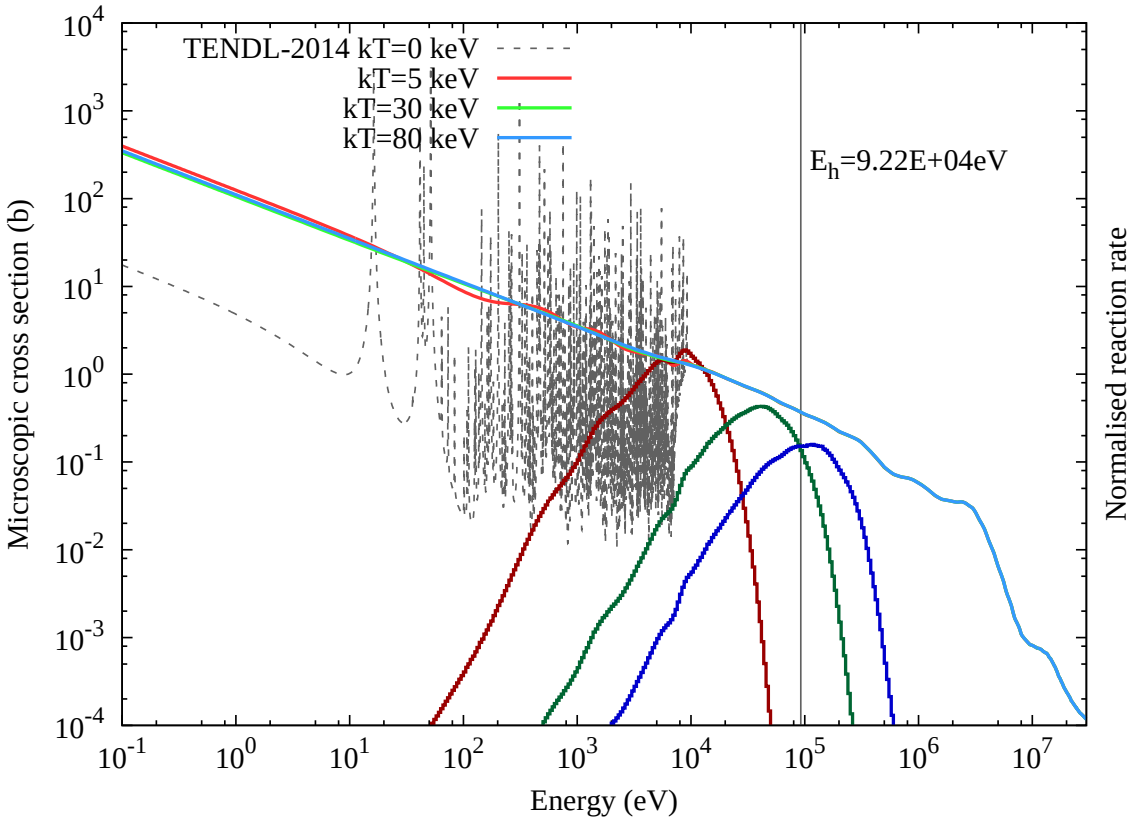


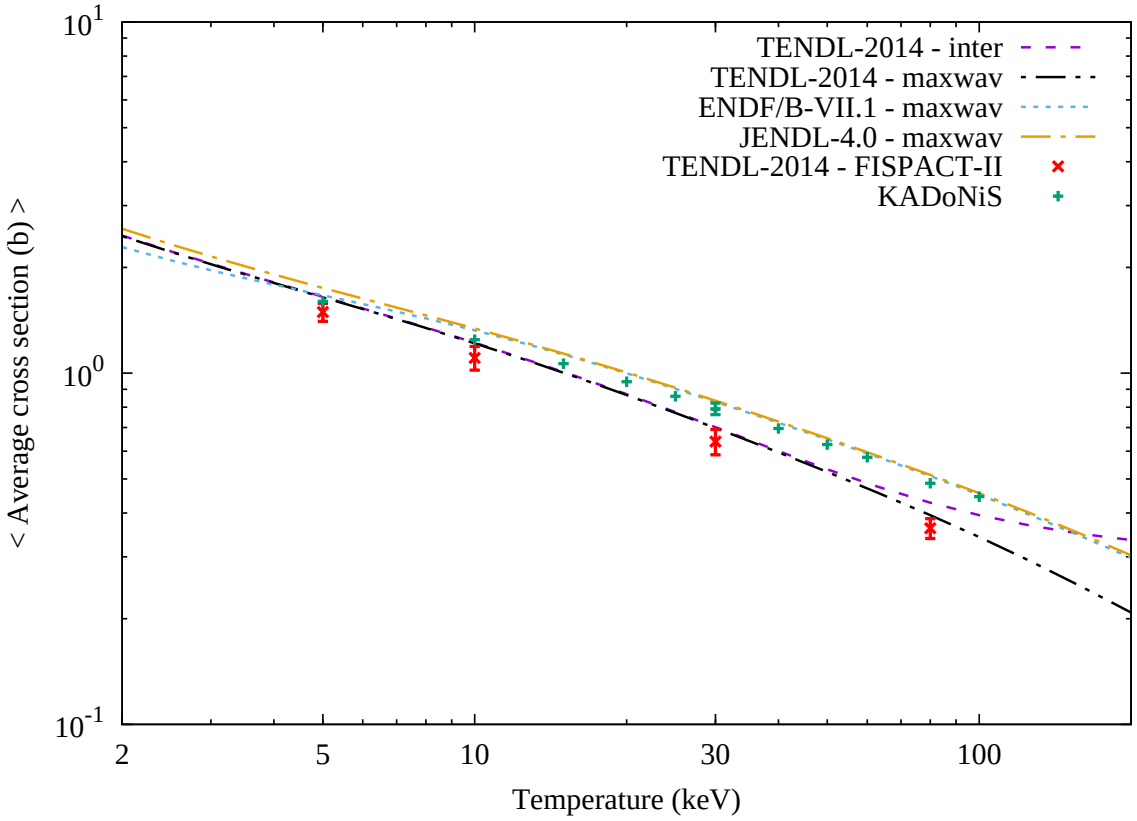
$^{110}Pd_{46}$ $[T_{1/2} = 6.00 \times 10^{17}$ years$]$



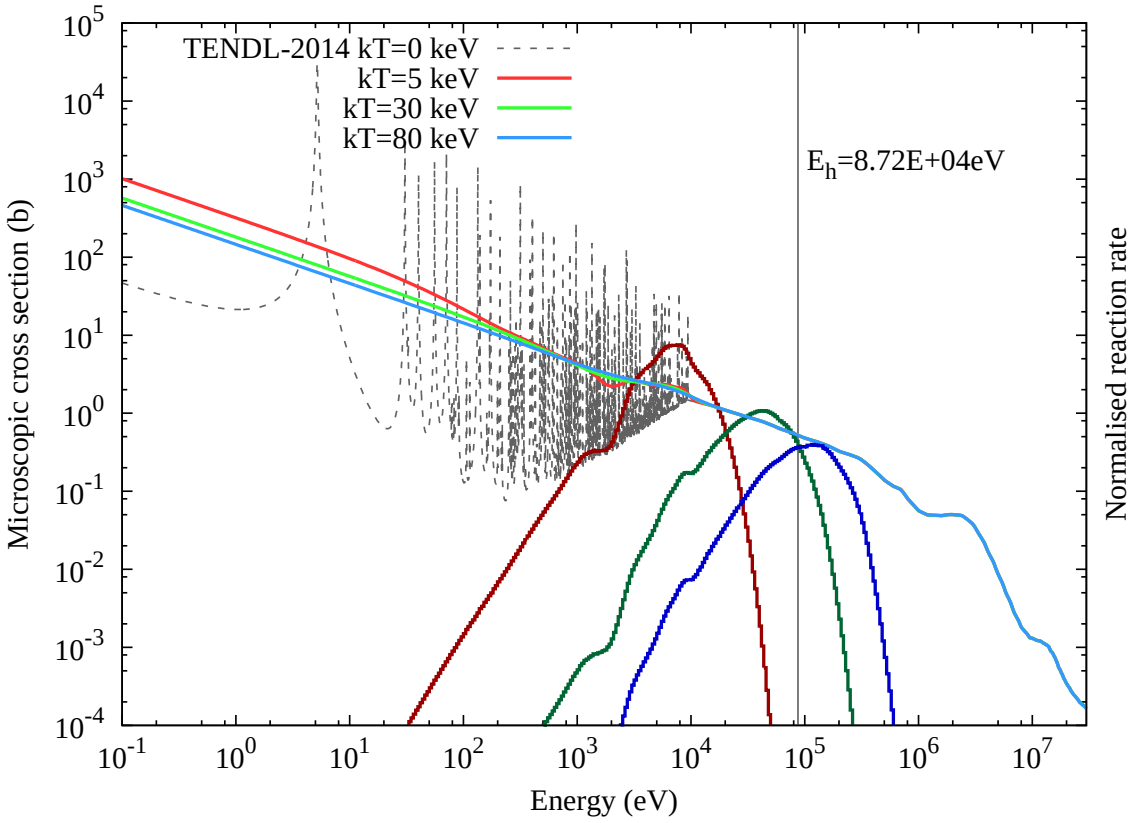


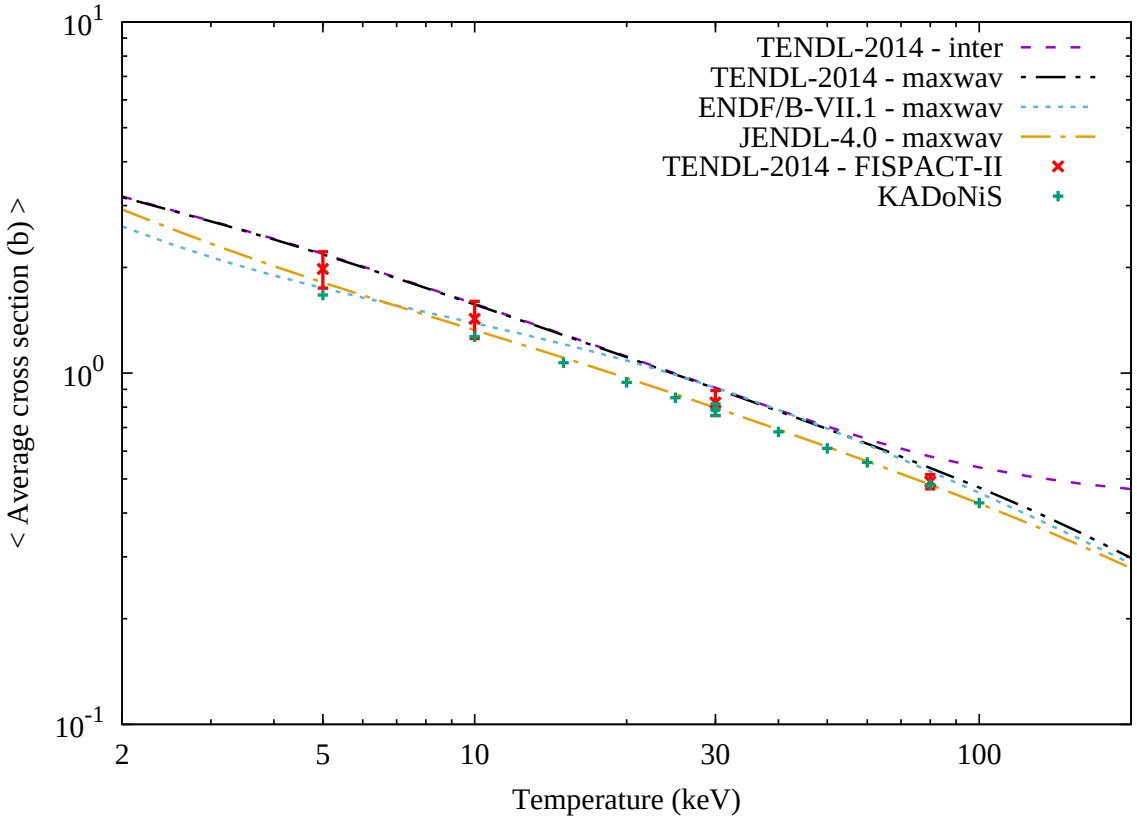
$^{107}Ag_{47}$ [Stable]



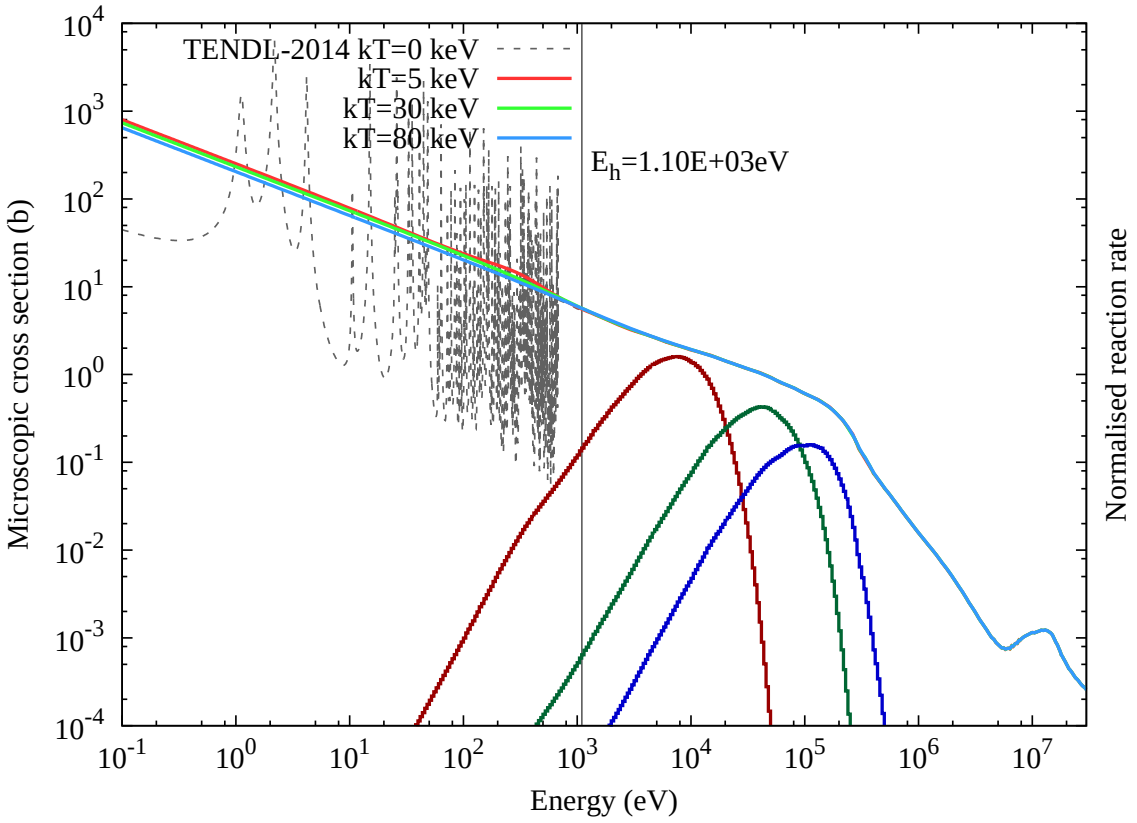


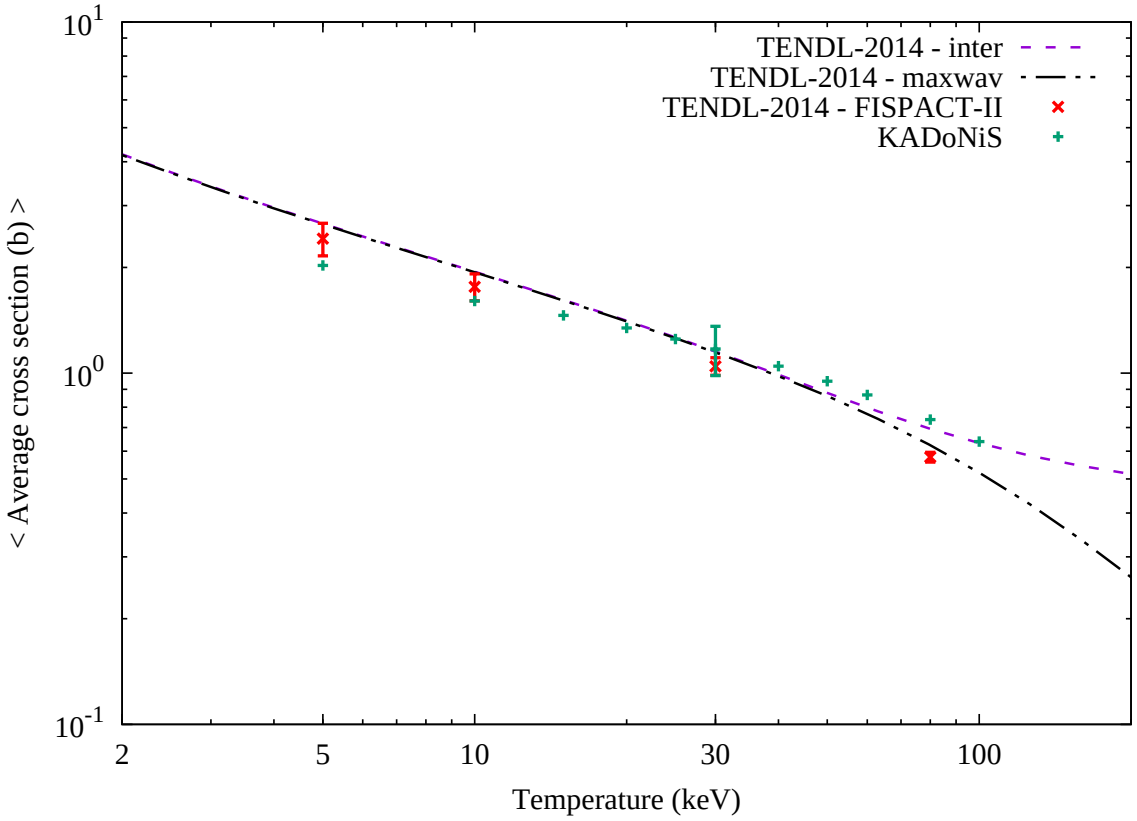
$^{109}Ag_{47}$ [Stable]



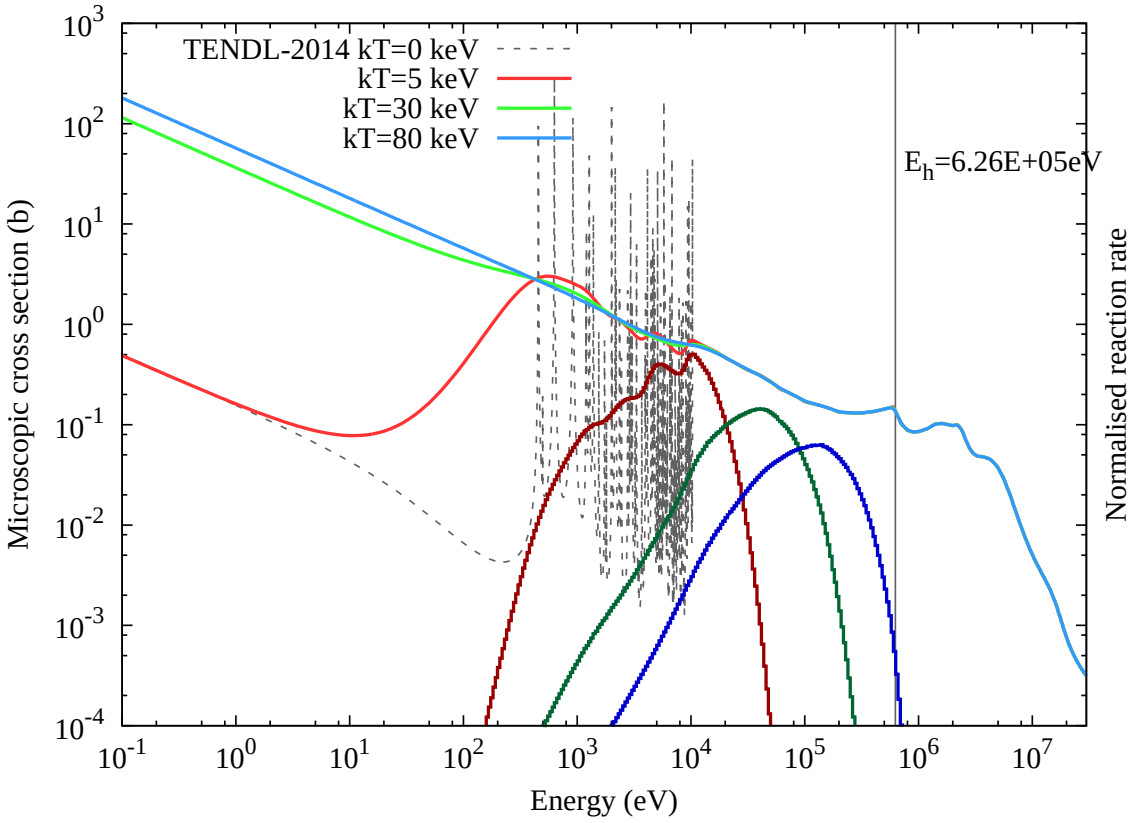


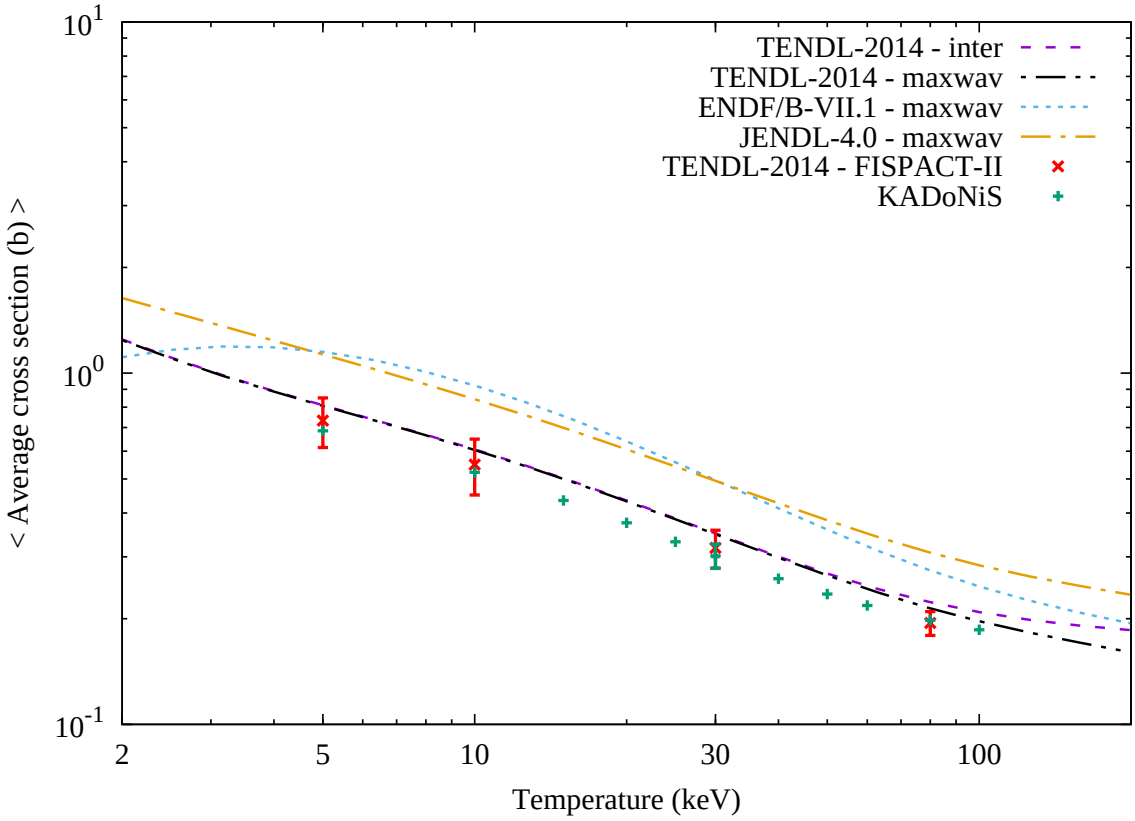
$^{110}Ag_{47}$ [$T_{1/2}$ = 24.56 seconds] (KADoNiS=SMC)



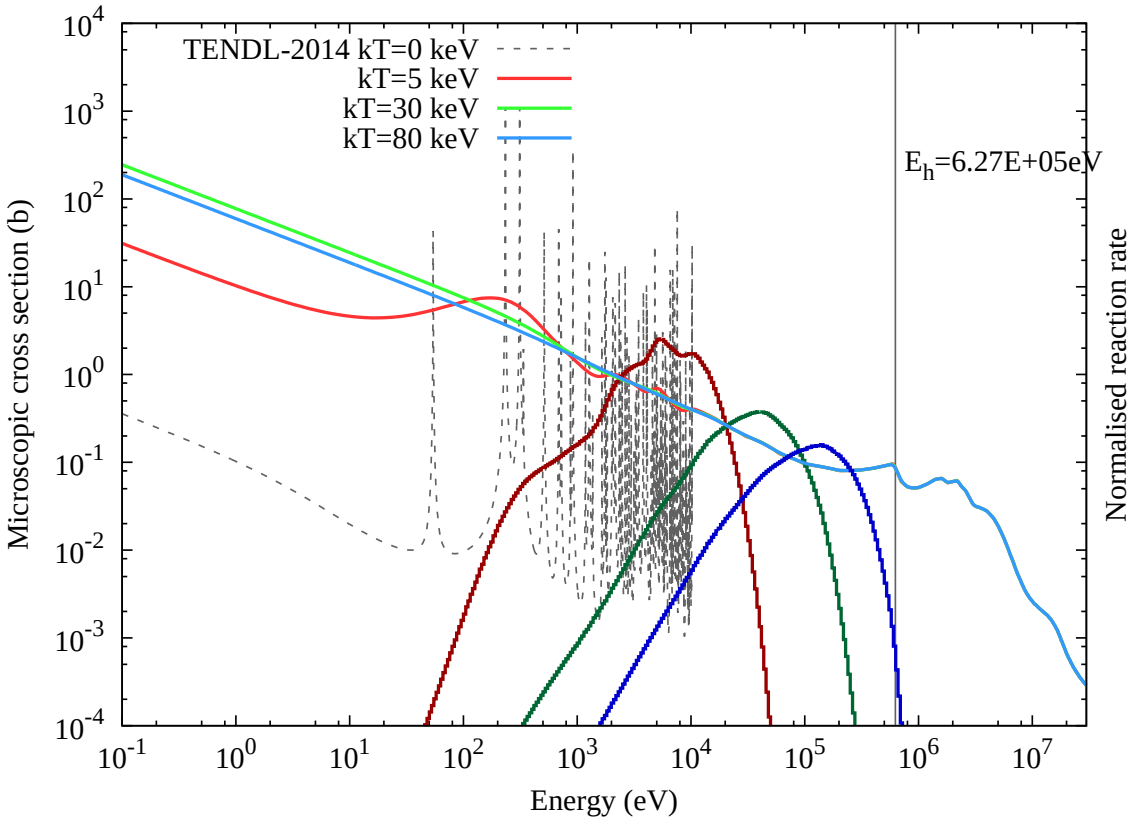


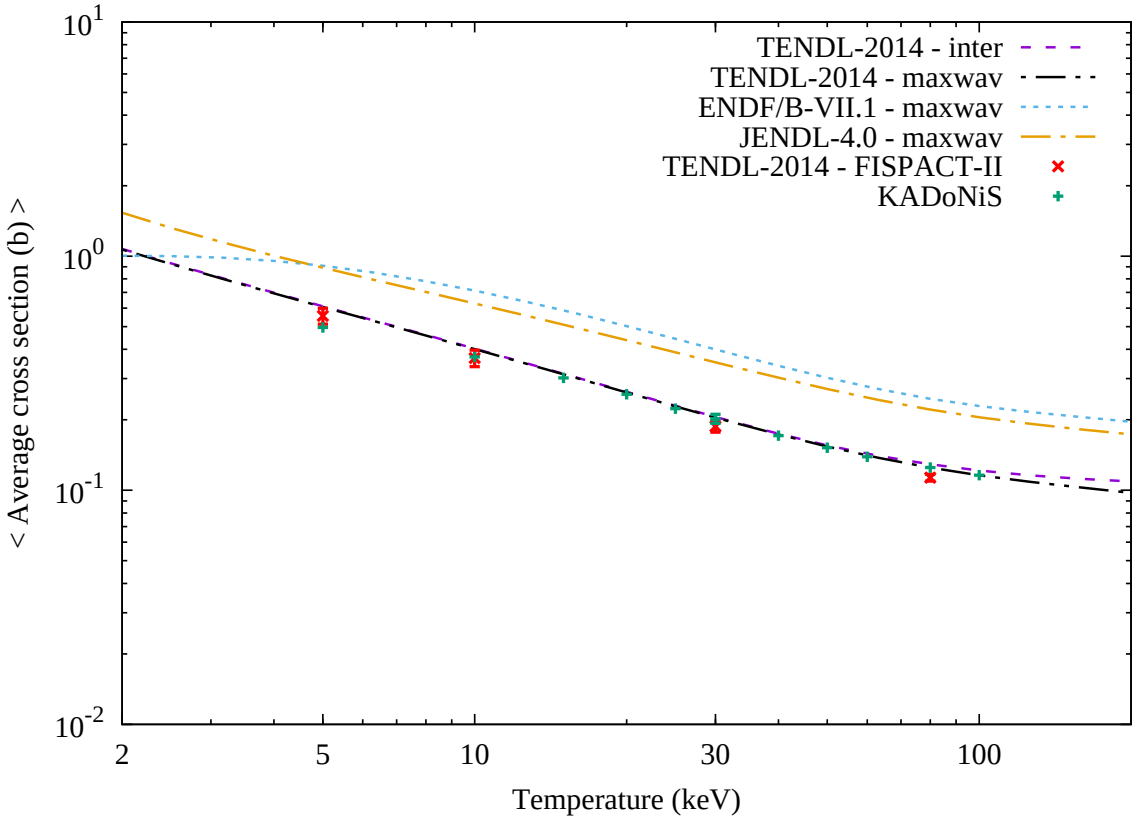
$^{106}Cd_{48}$ $[T_{1/2} = 6.60 \times 10^{18}$ years$]$



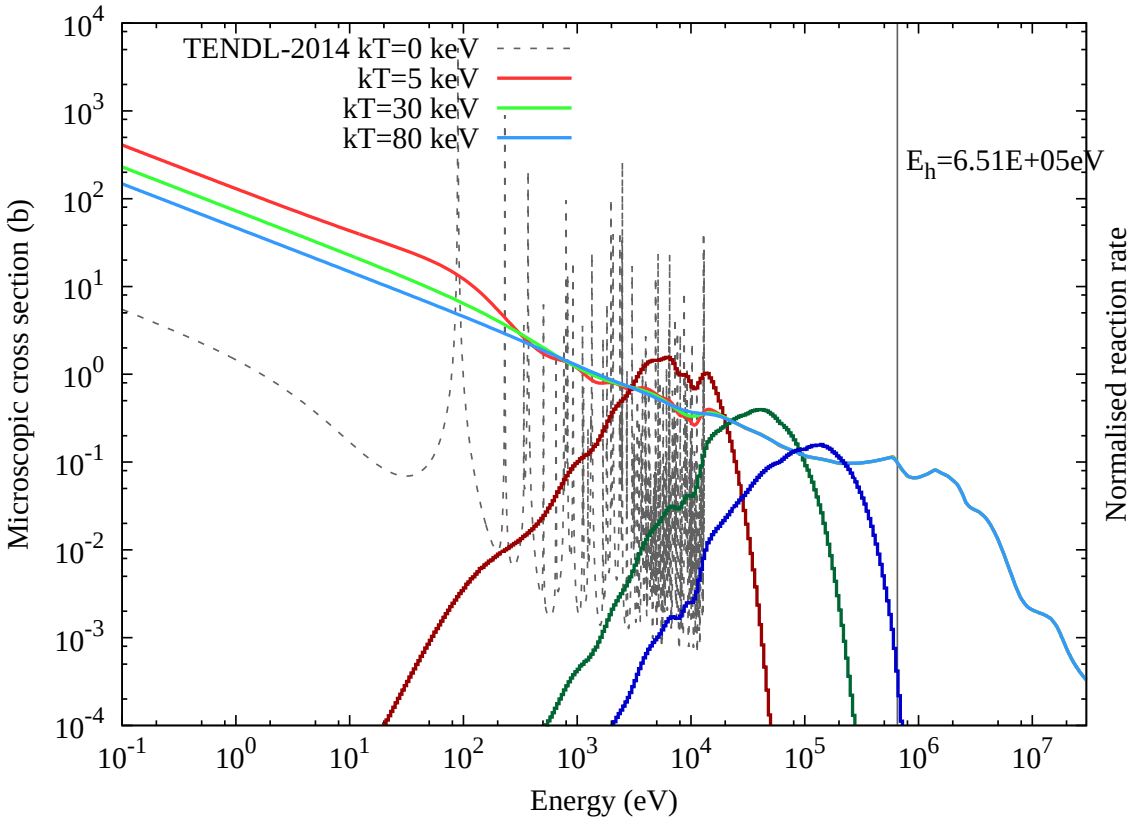


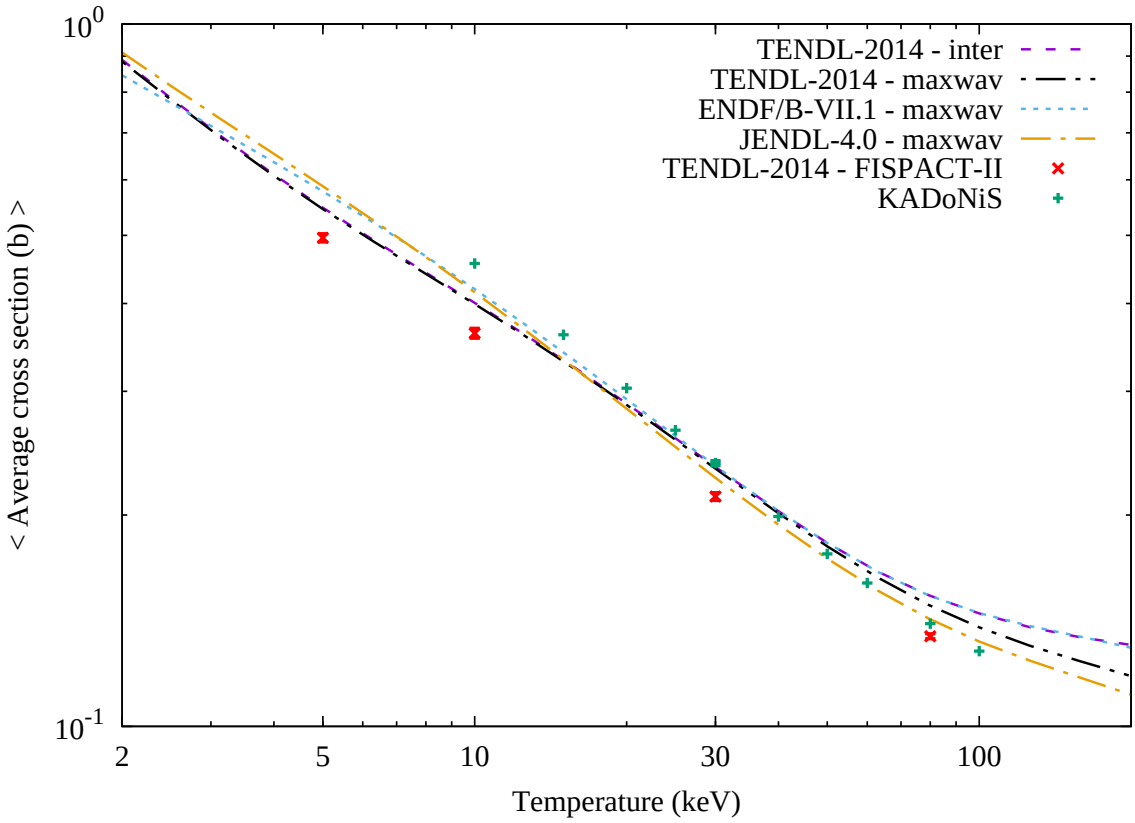
$^{108}Cd_{48}$ $[T_{1/2} = 4.10 \times 10^{17}$ years$]$



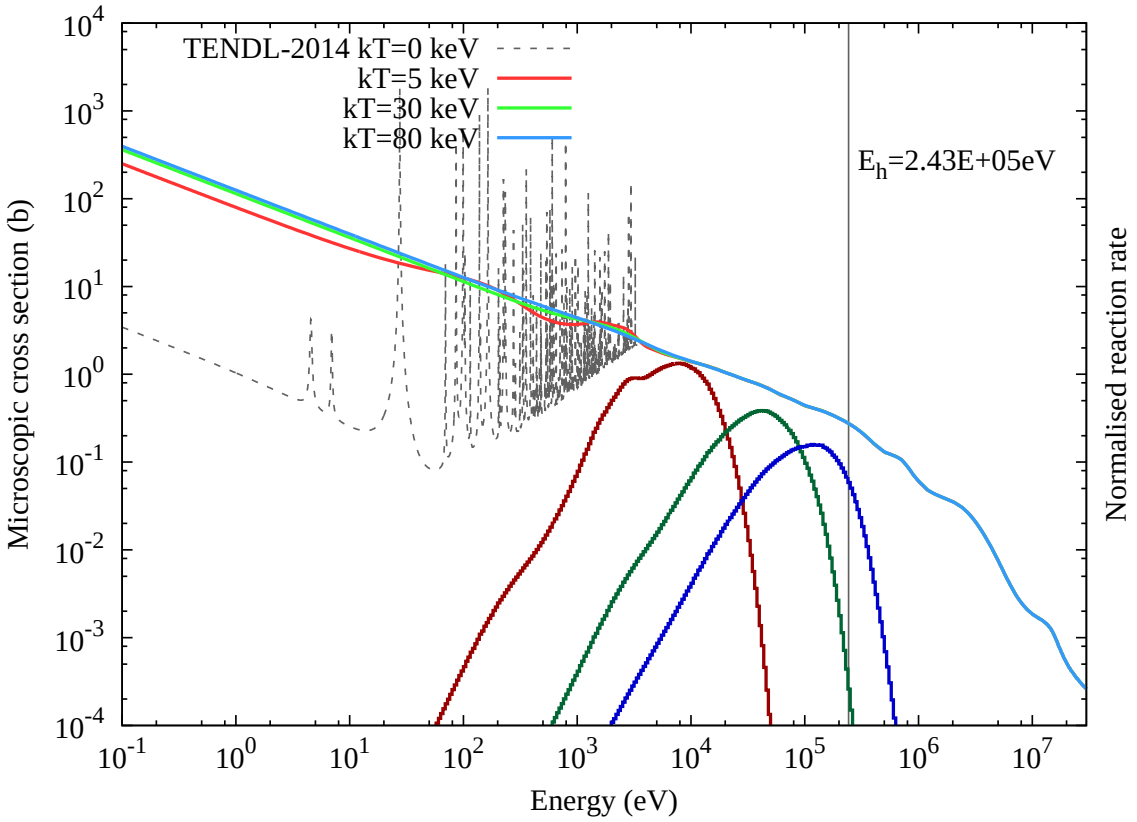


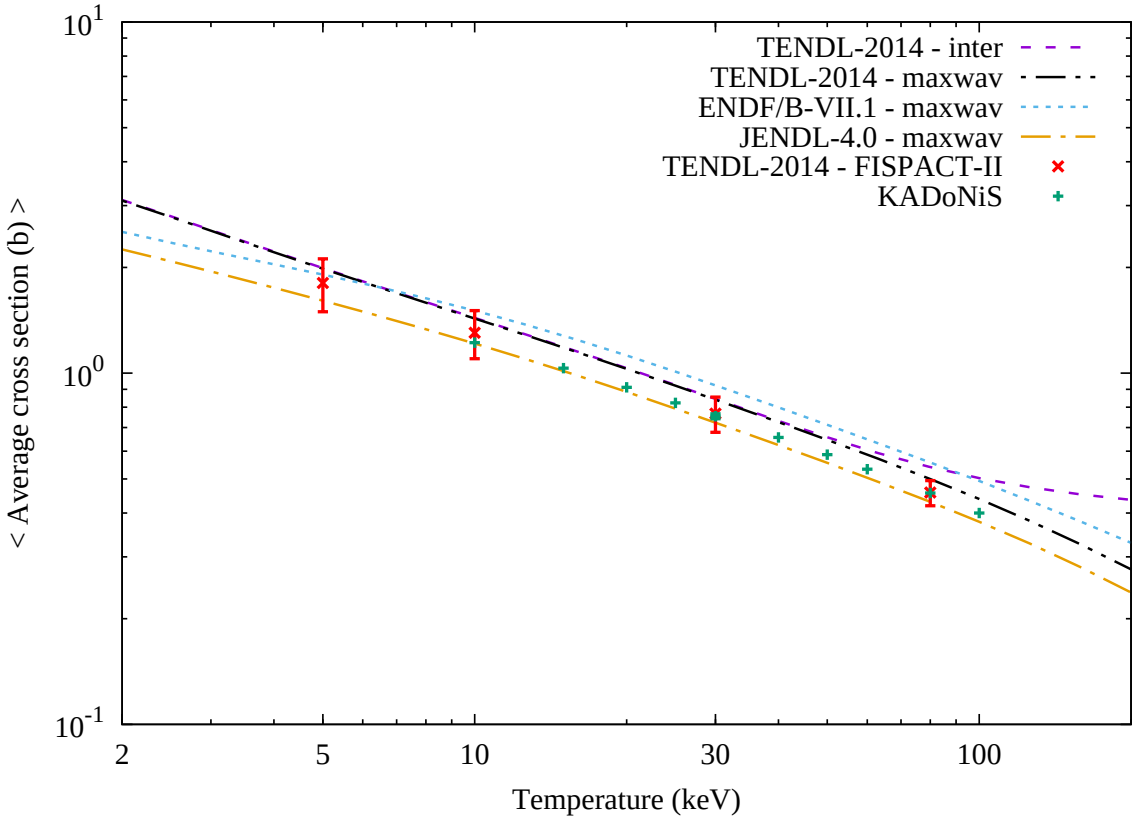
$^{110}Cd_{48}$ [Stable]



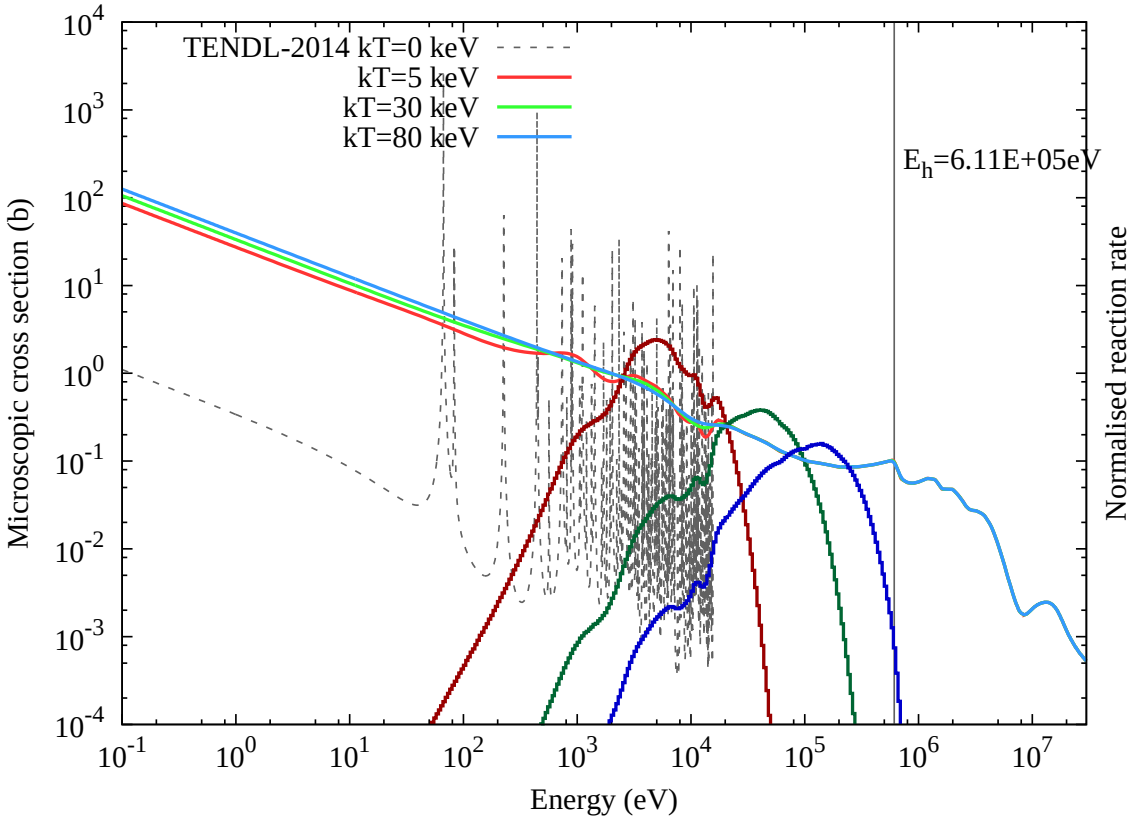


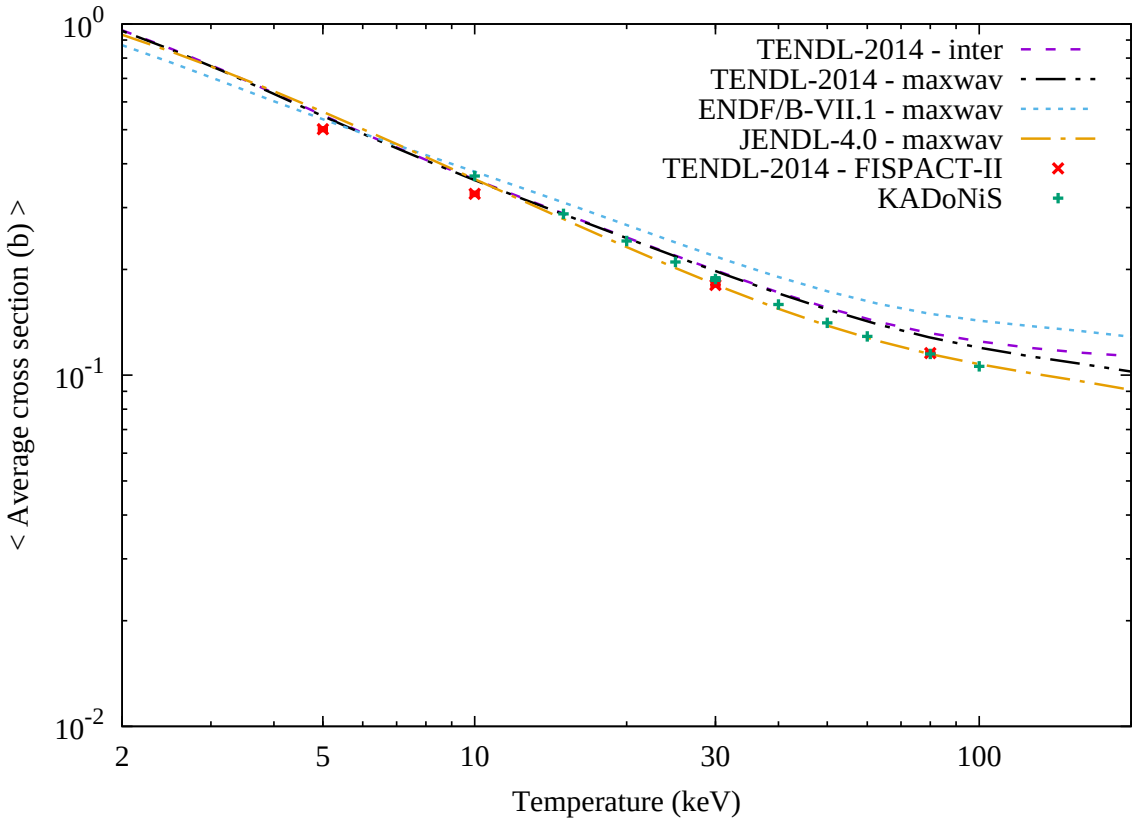
$^{111}Cd_{48}$ [Stable]



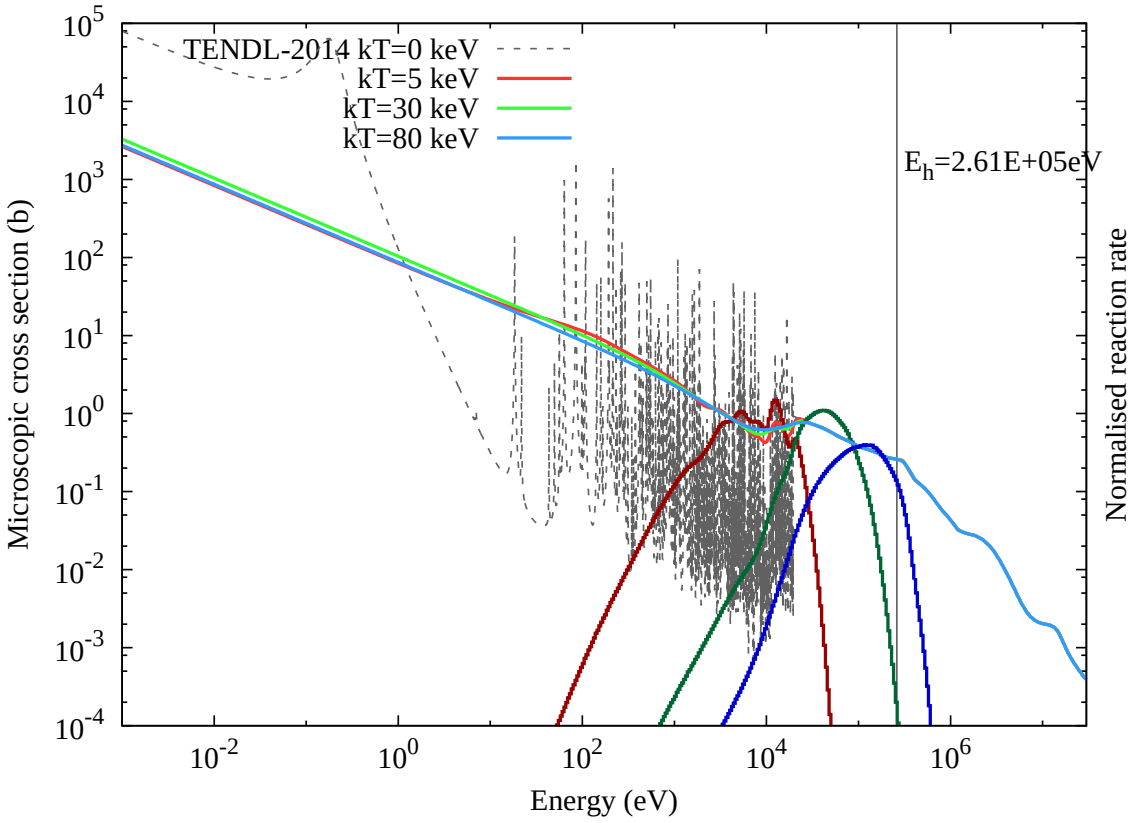


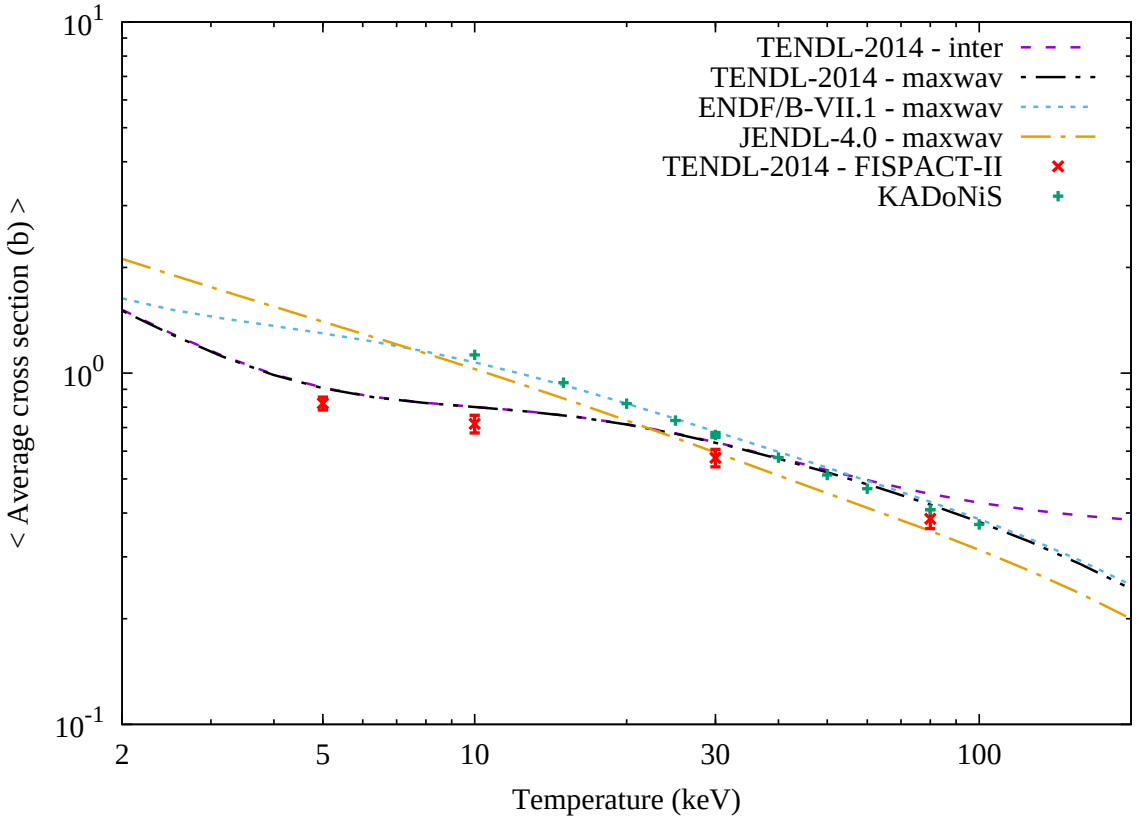
$^{112}Cd_{48}$ [Stable]



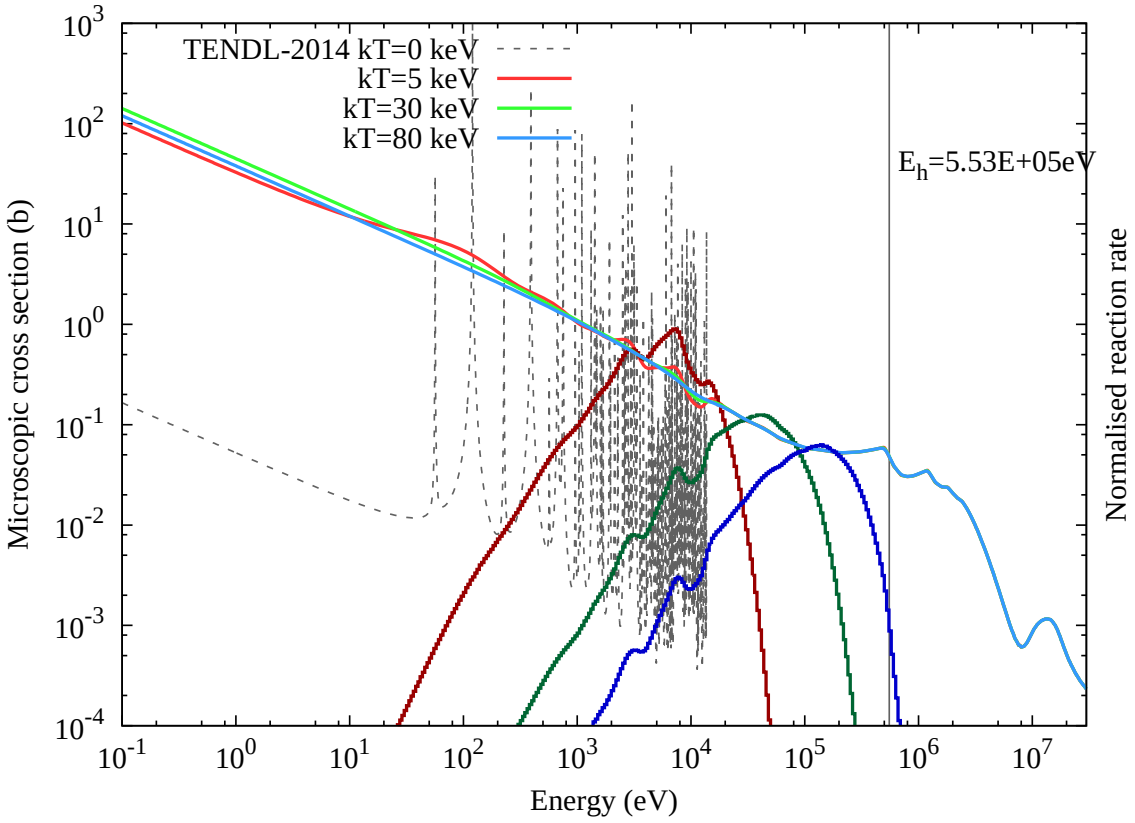


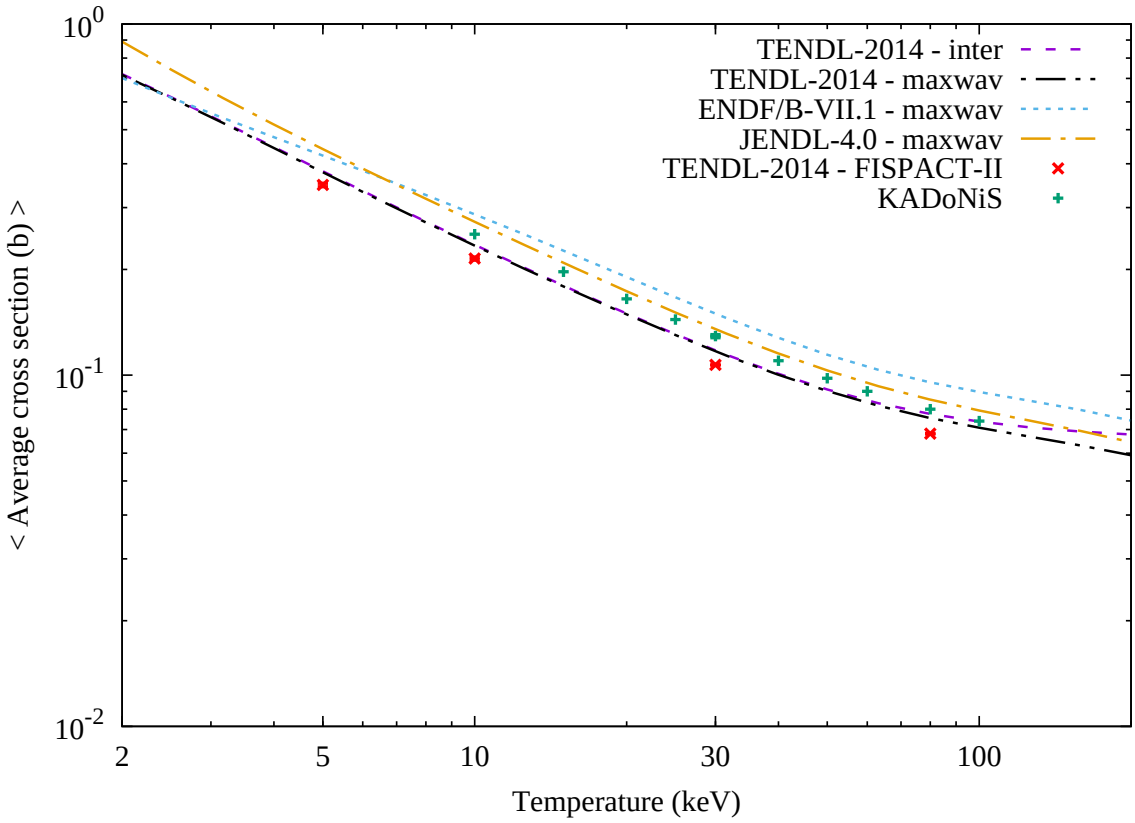
$^{113}Cd_{48}$ $[T_{1/2} = 7.80 \times 10^{15}$ years$]$



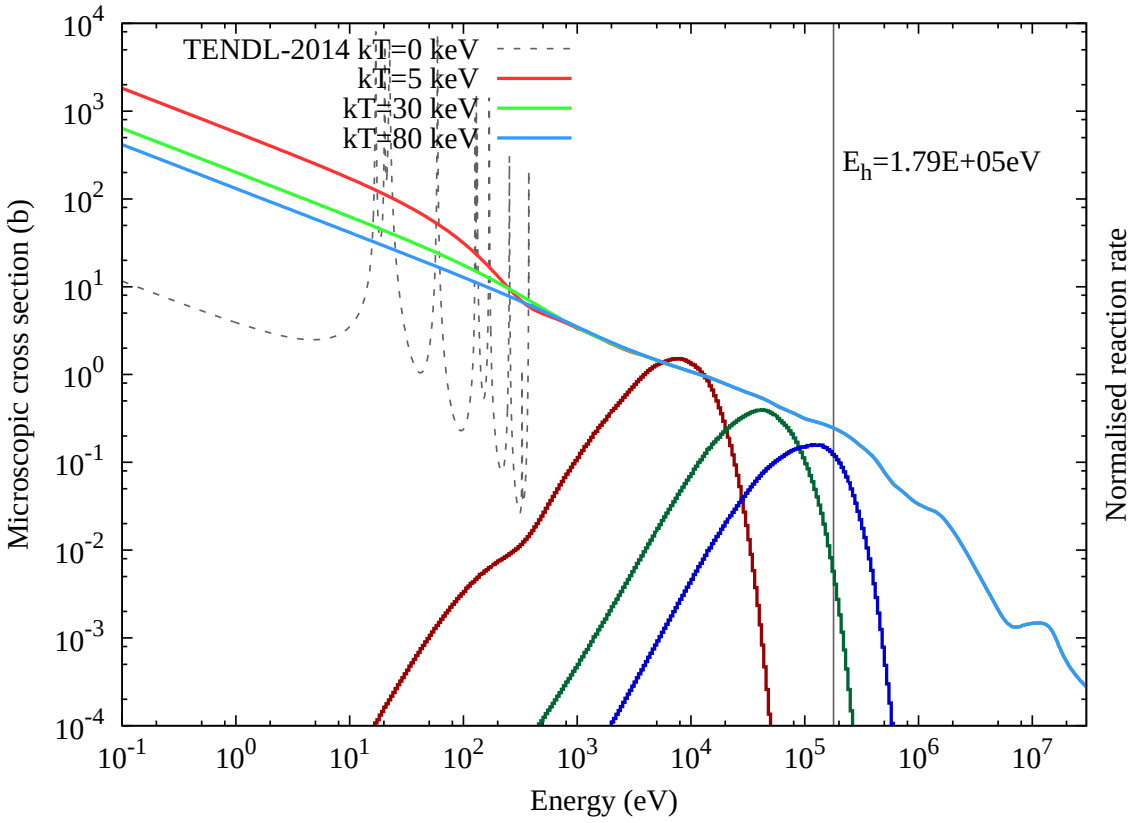


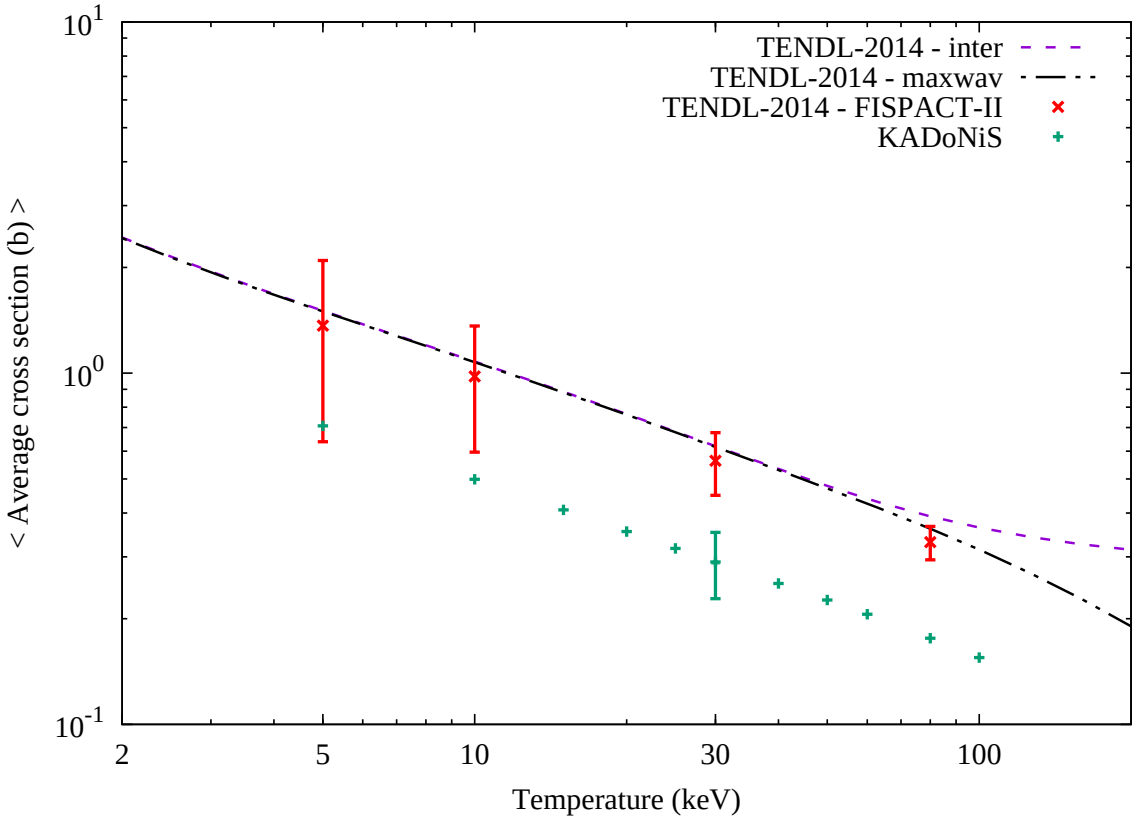
$^{114}Cd_{48}$ $[T_{1/2} = 6.00 \times 10^{17}$ years$]$



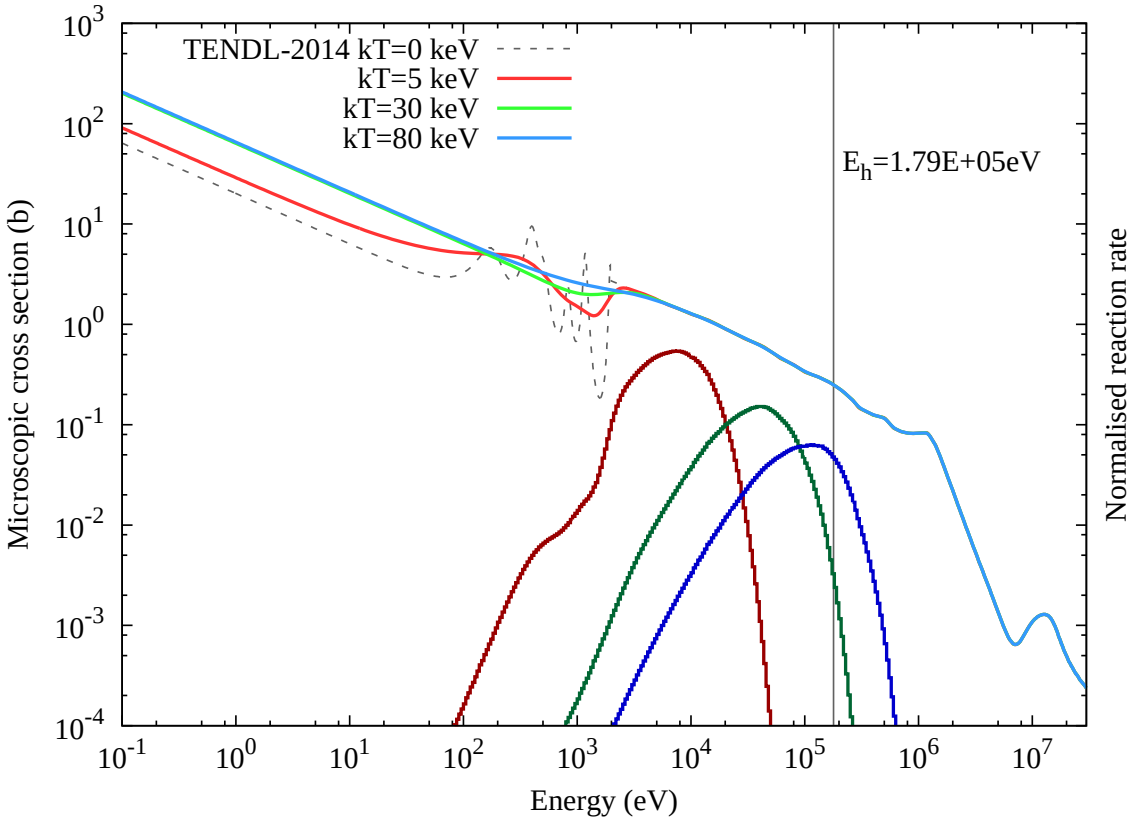


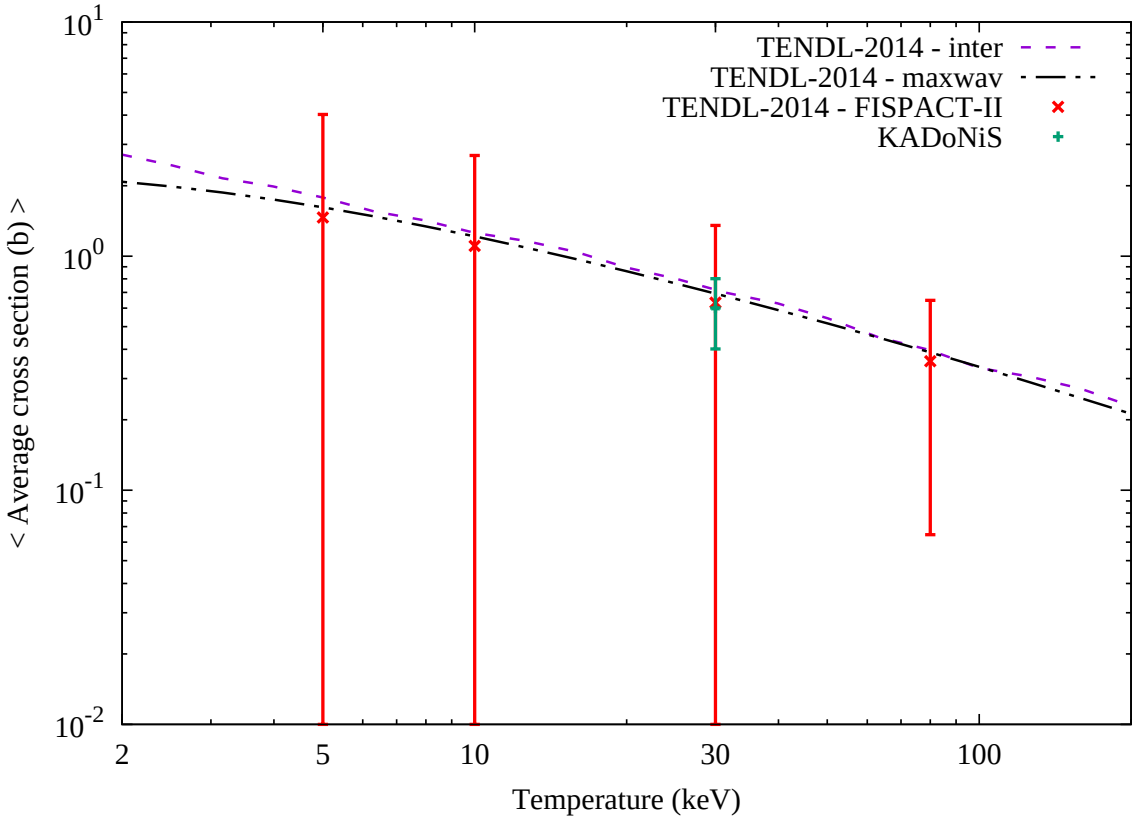
$^{115}Cd_{48}$ $[T_{1/2} = 2.23$ days$]$ (KADoNiS=SMC)



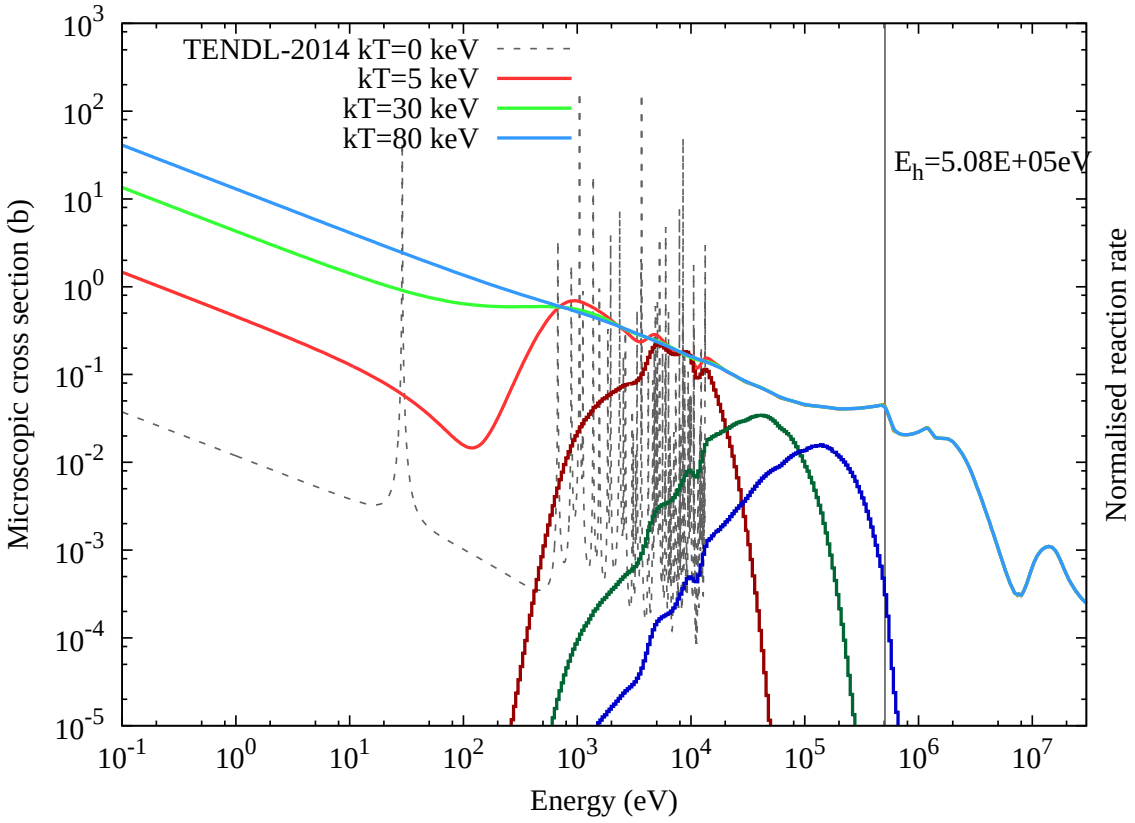


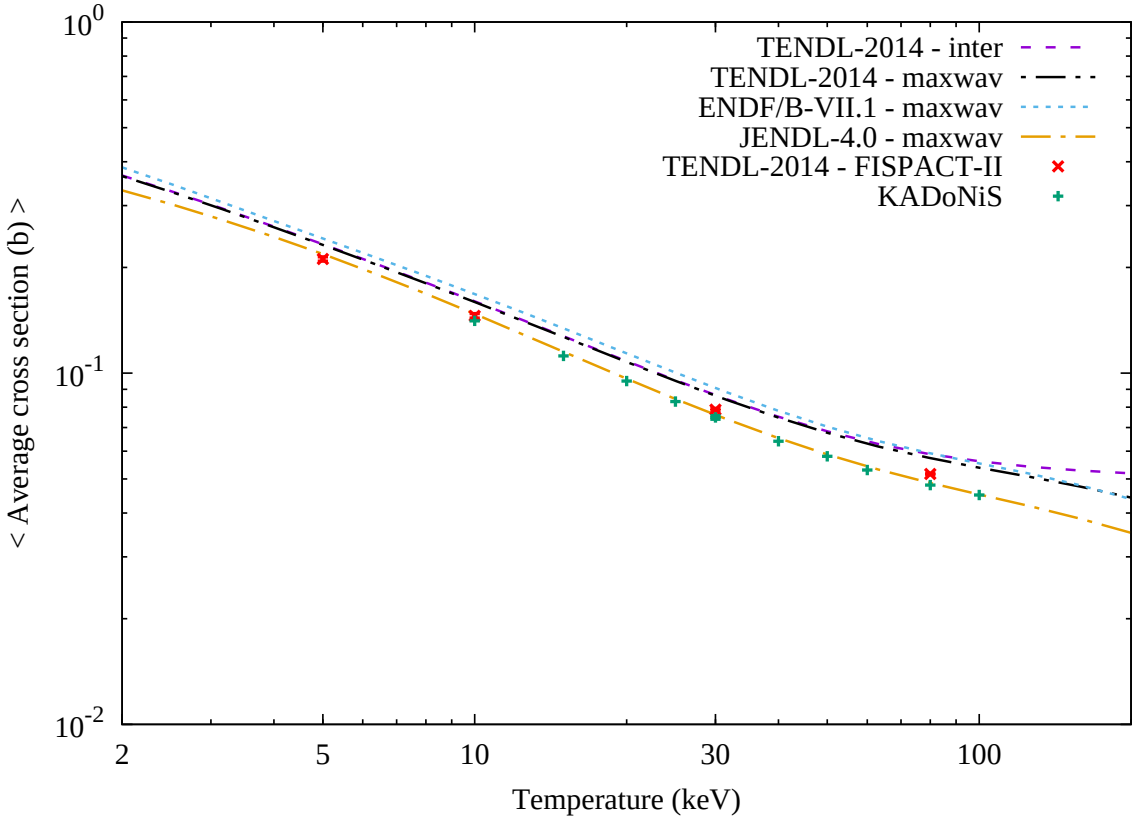
$^{115m}Cd_{48}$ $[T_{1/2} = 44.45 \text{ days}]$ (KADoNiS=SMC)



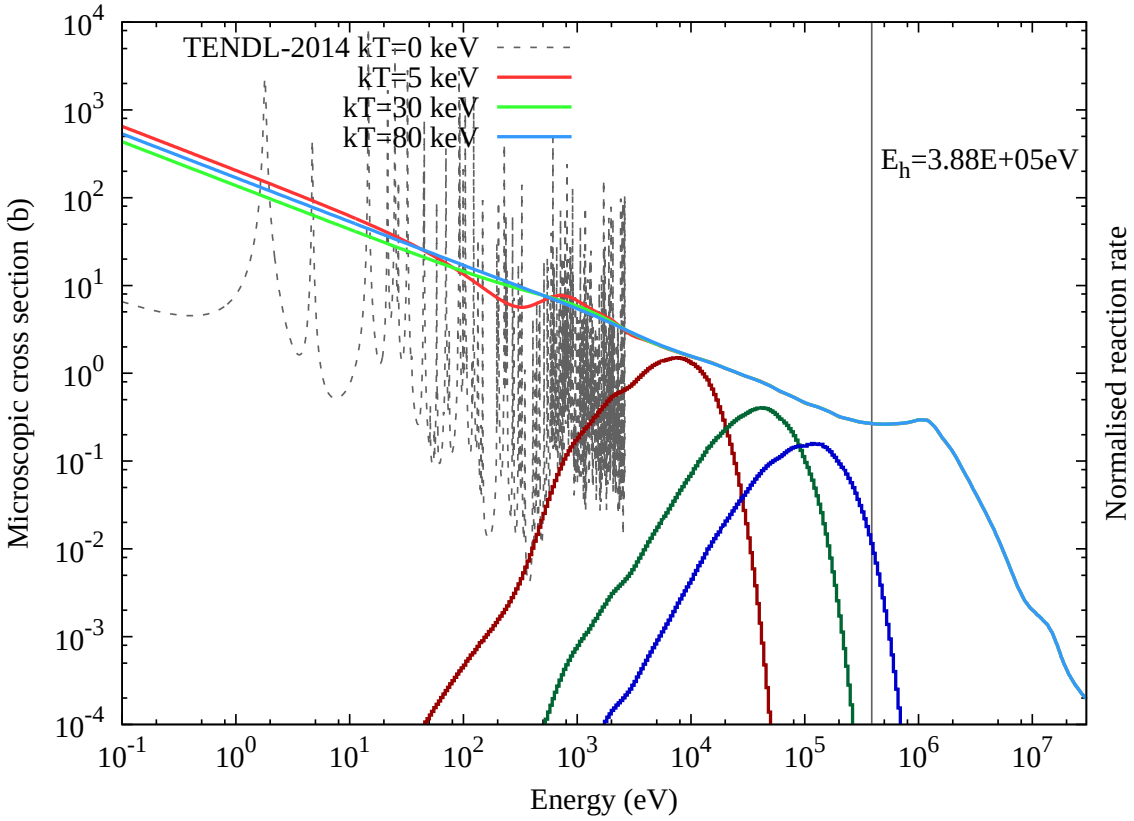


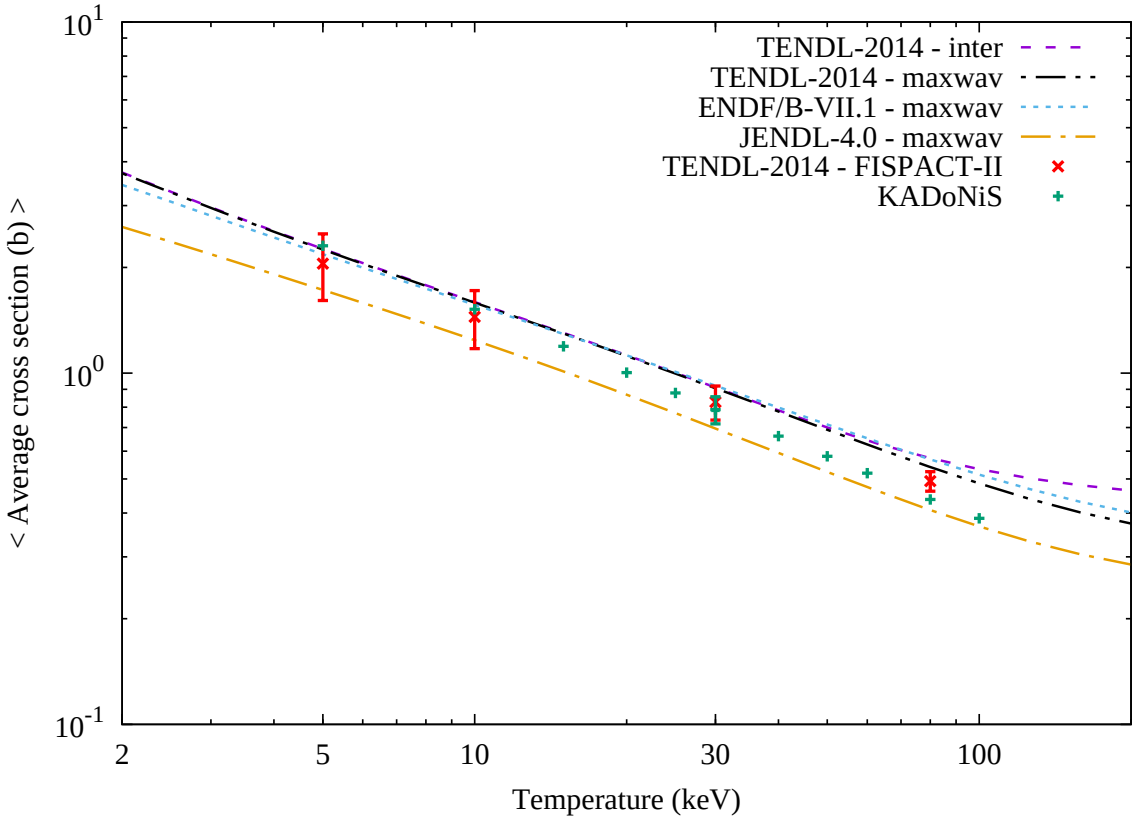
$^{116}Cd_{48}$ $[T_{1/2} = 3.40 \times 10^{19}$ years$]$



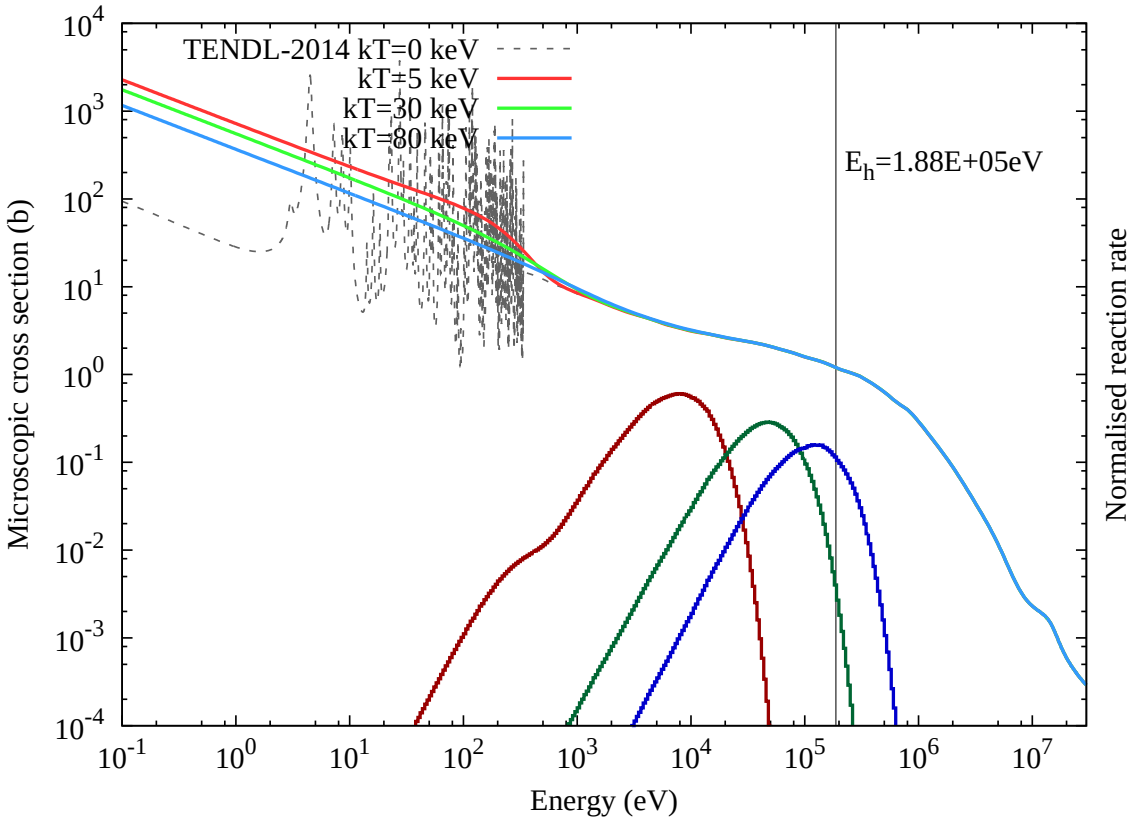


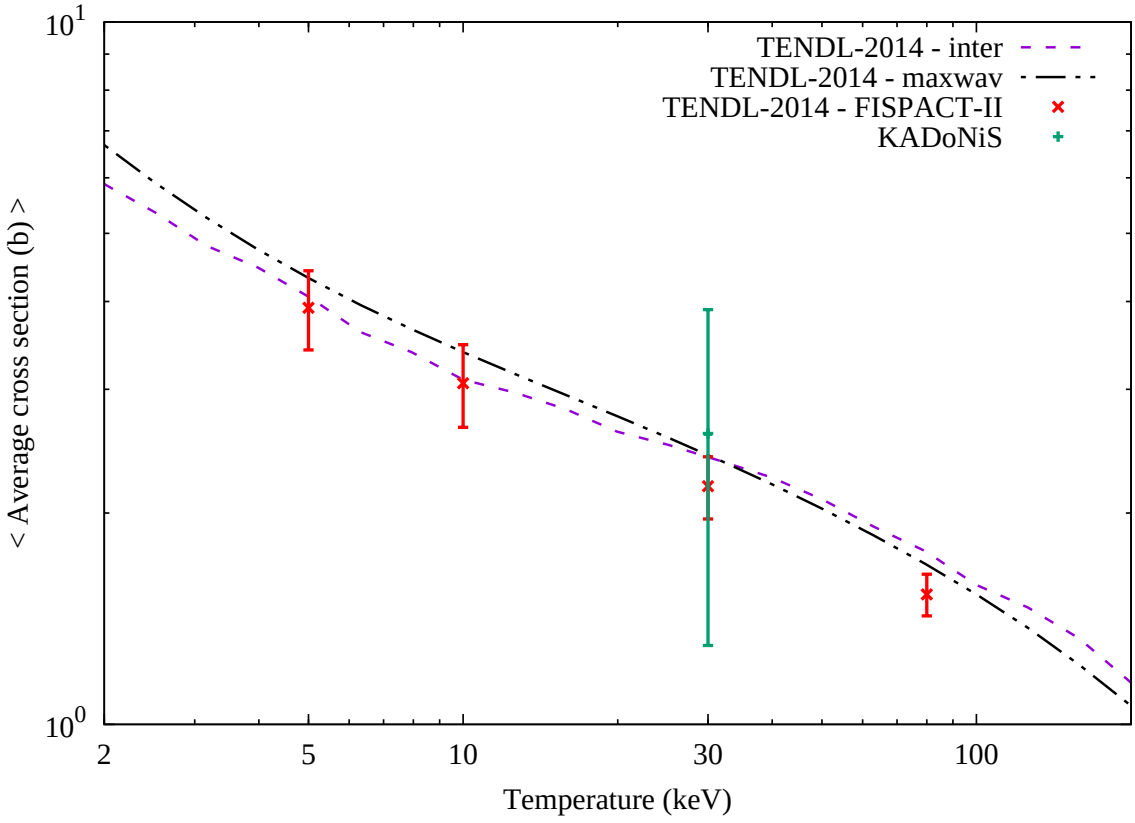
$^{113}In_{49}$ [Stable]



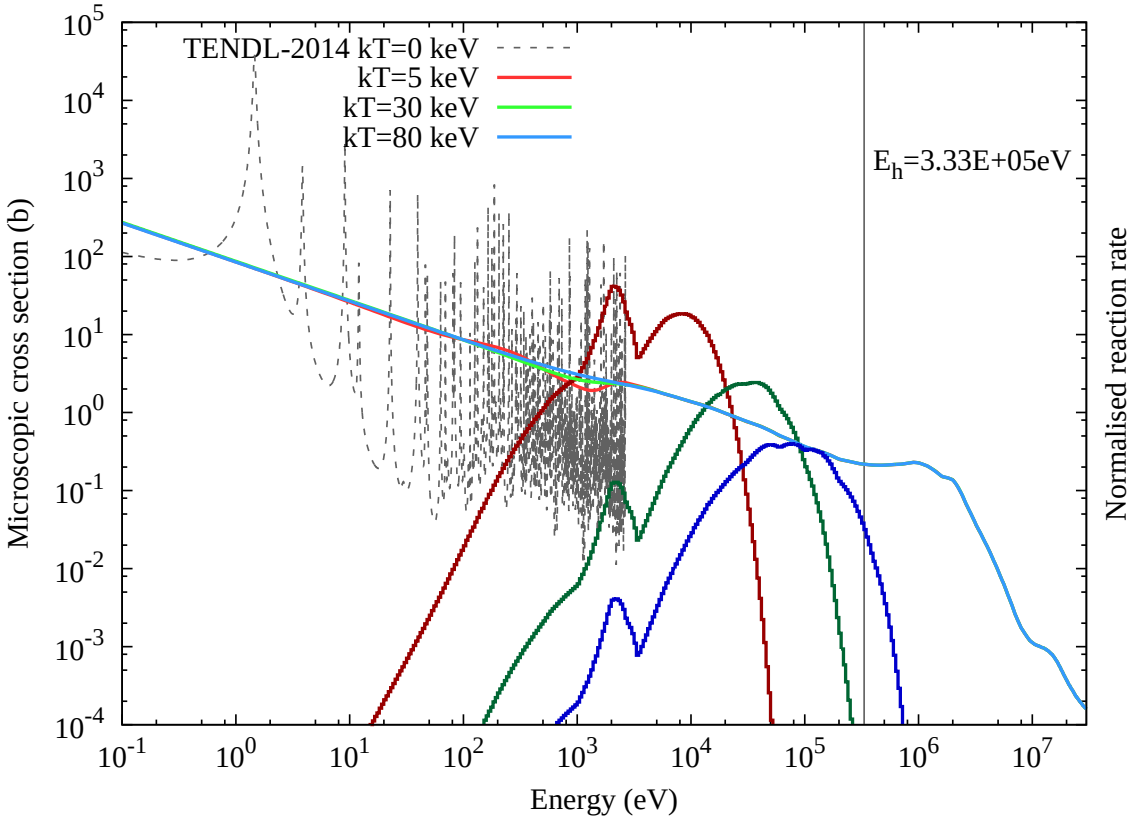


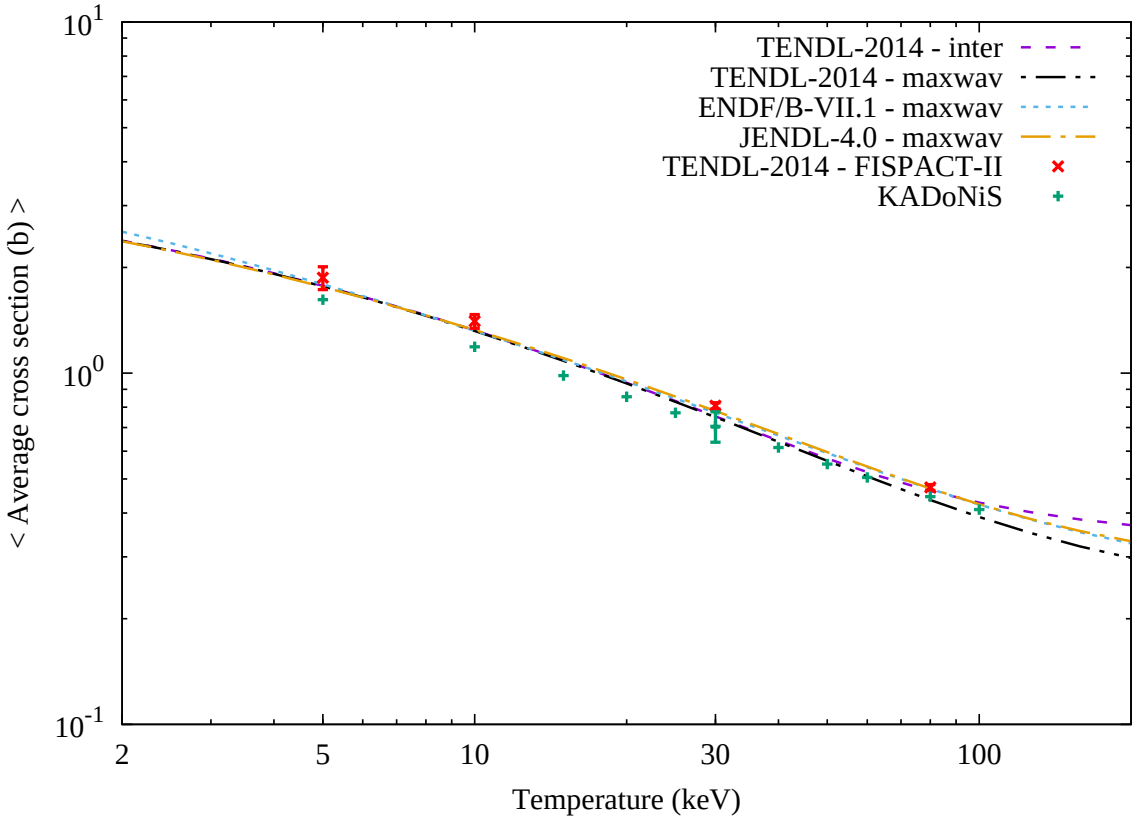
$^{114m}In_{49}$ $[T_{1/2} = 50.00 \text{ days}]$



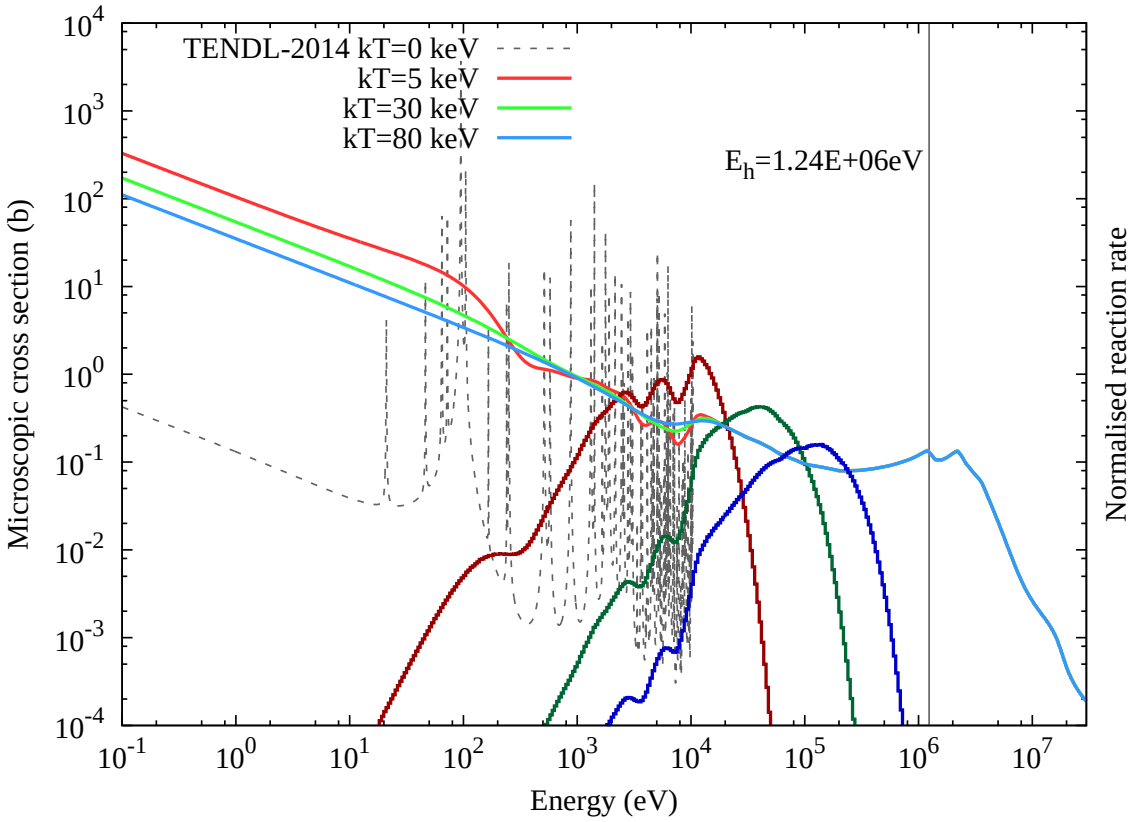


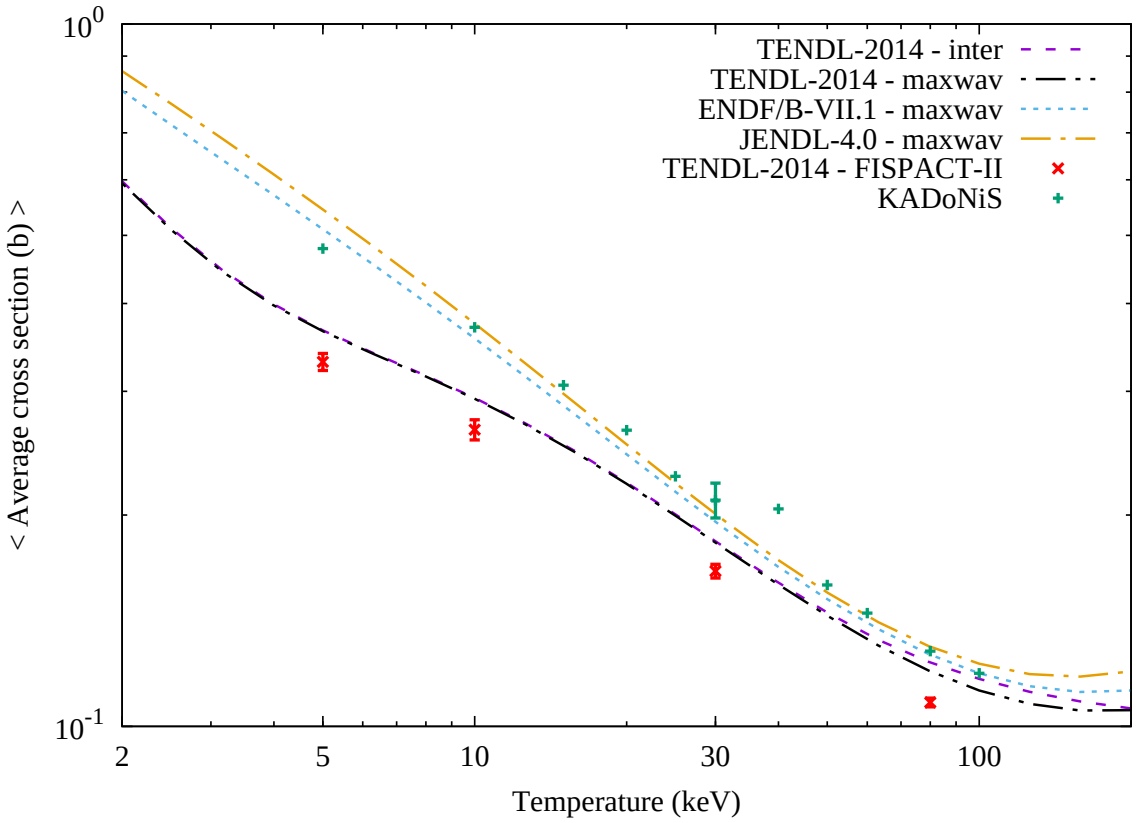
$^{115}In_{49}$ $[T_{1/2} = 4.41 \times 10^{14}$ years$]$



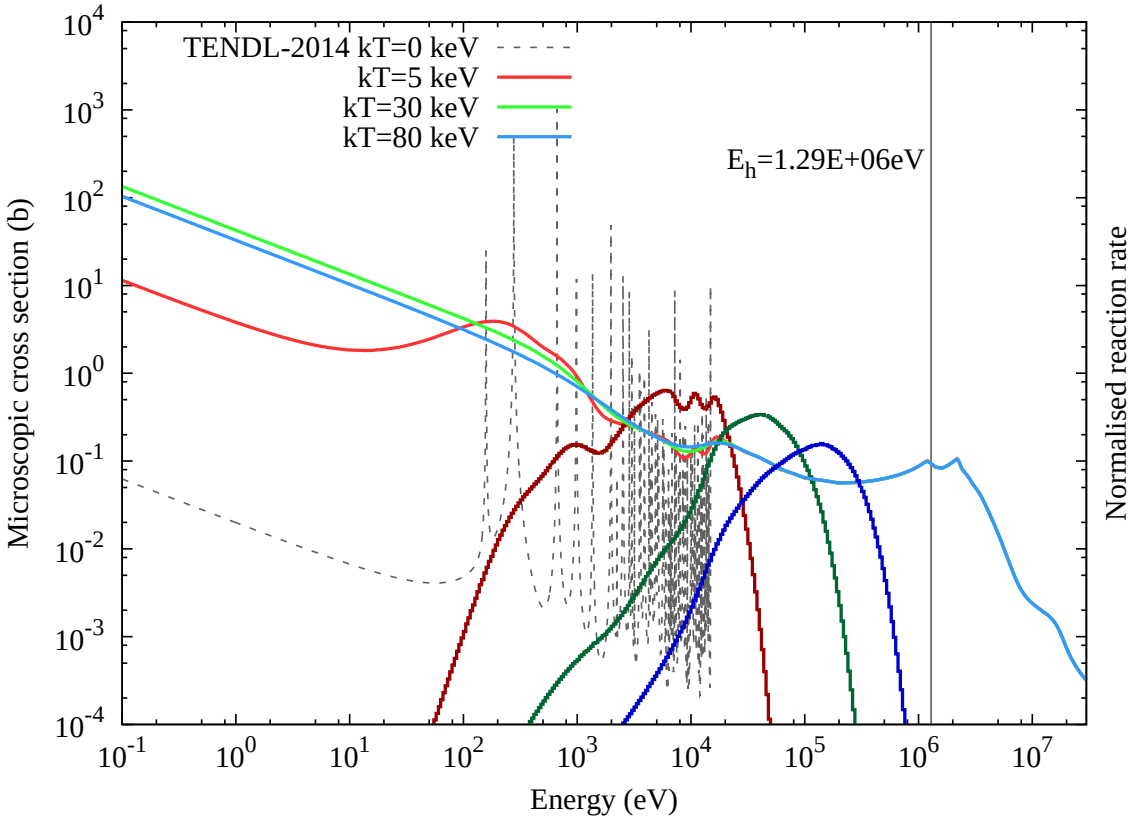


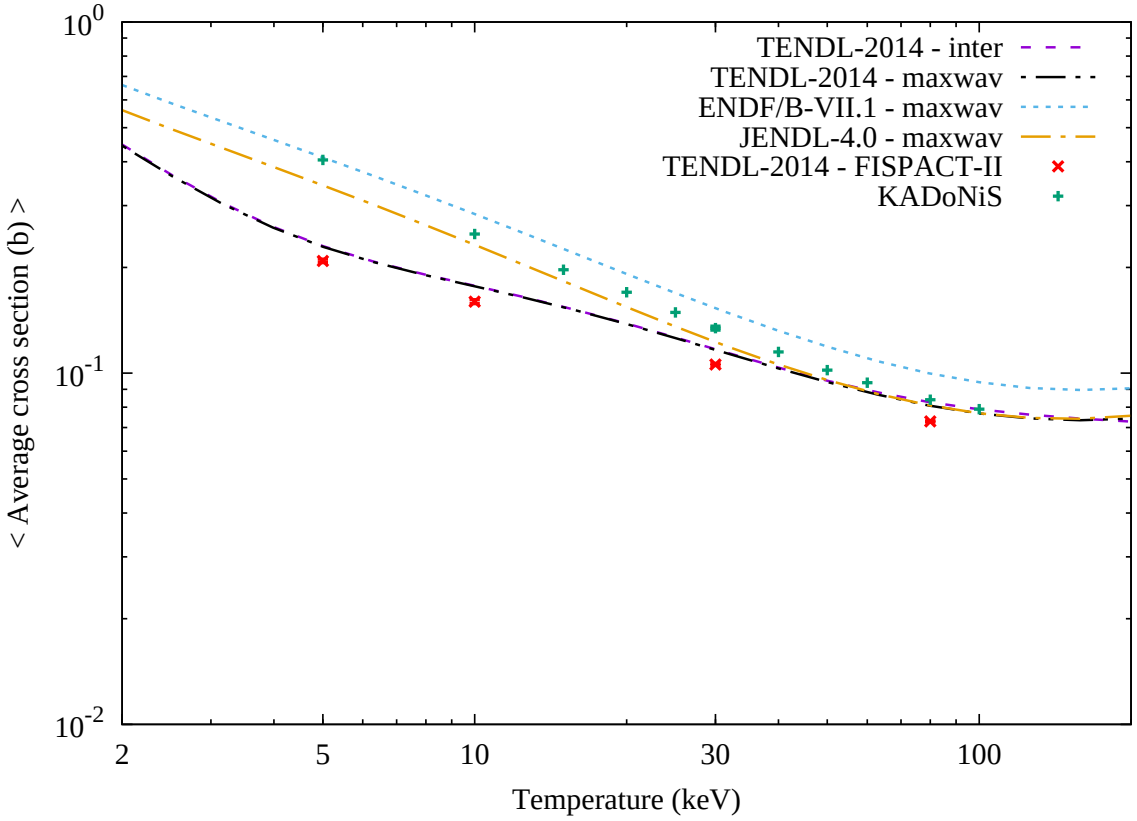
$^{112}Sn_{50}$ [Stable]



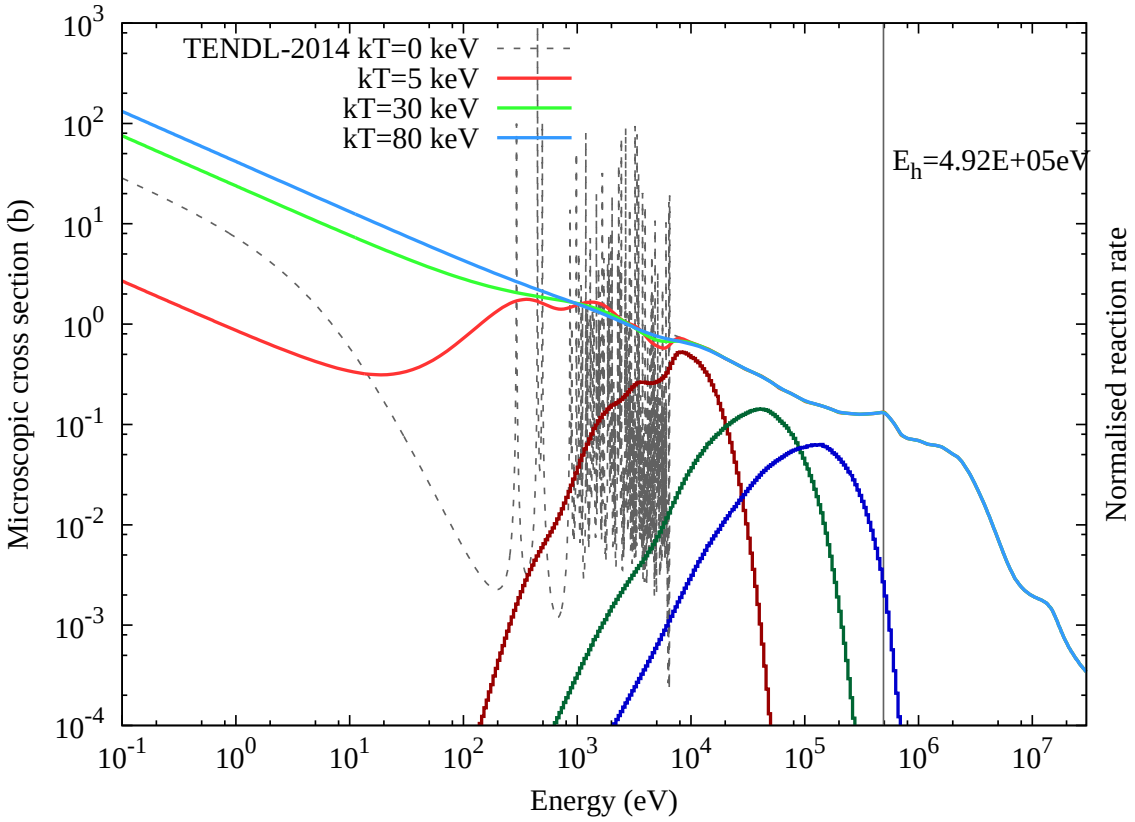


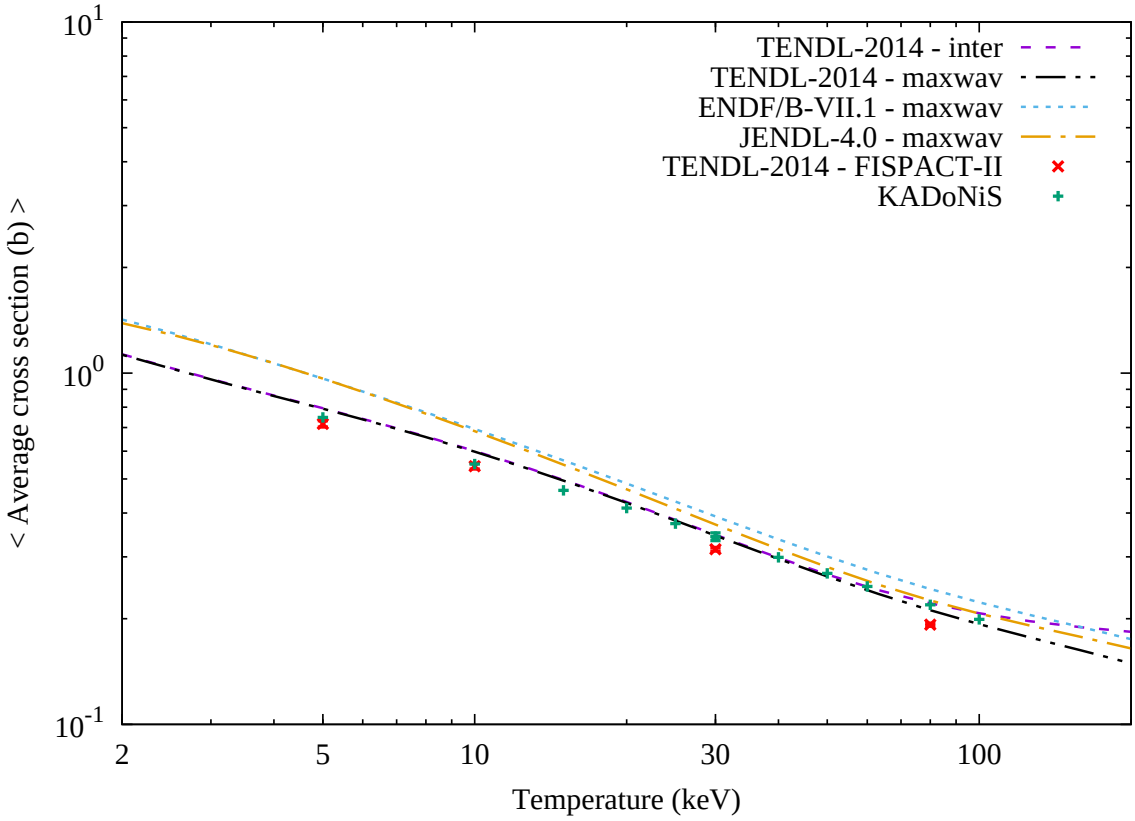
$^{114}Sn_{50}$ [Stable]



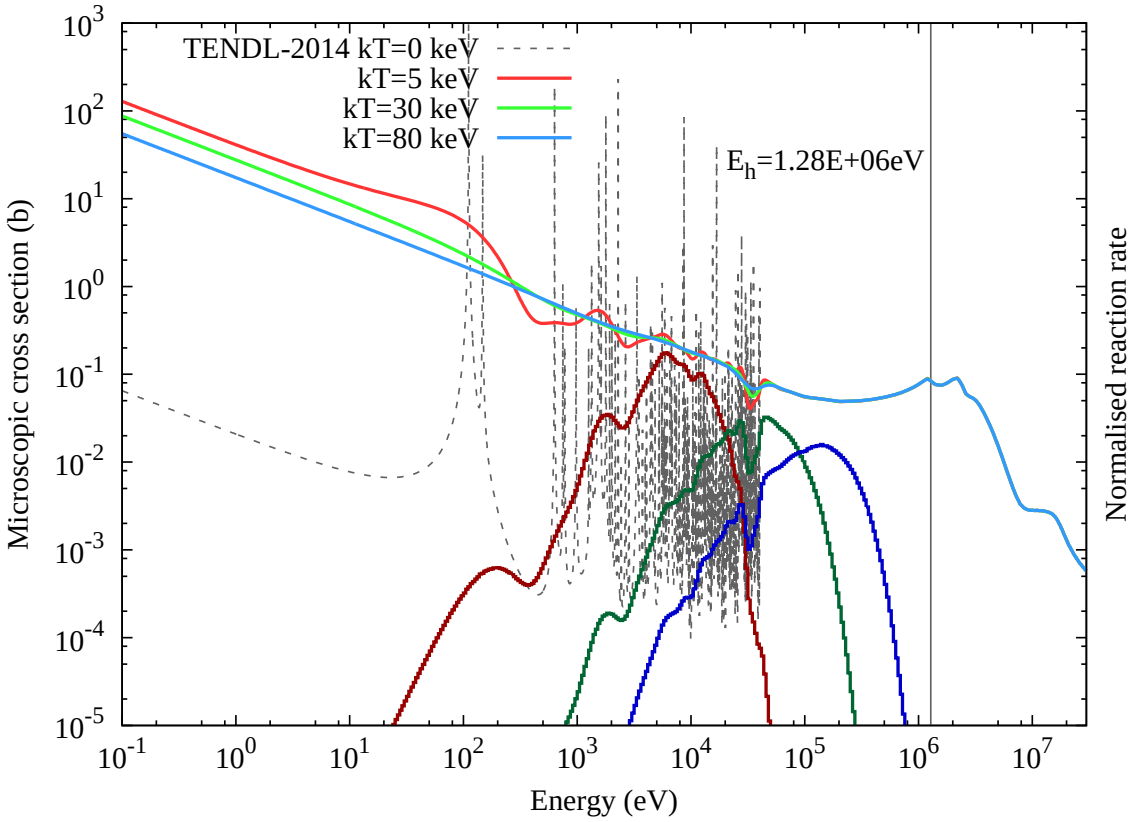


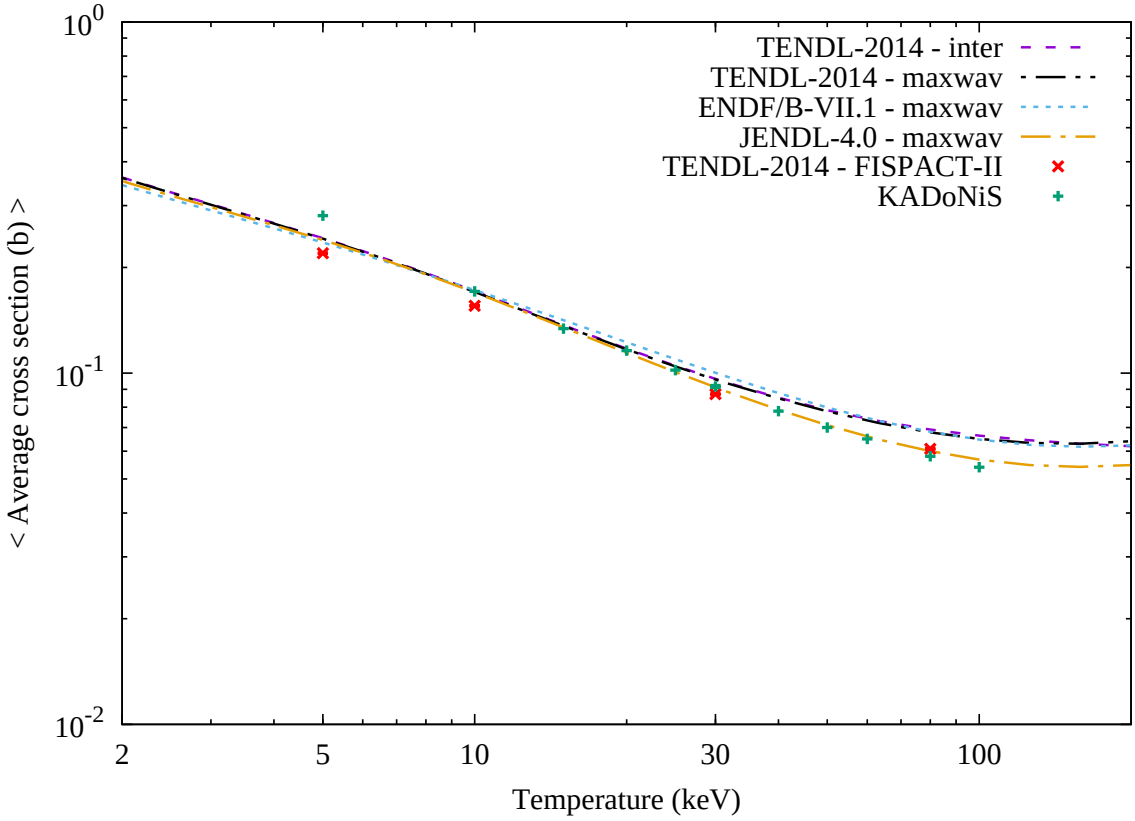
$^{115}Sn_{50}$ [Stable]



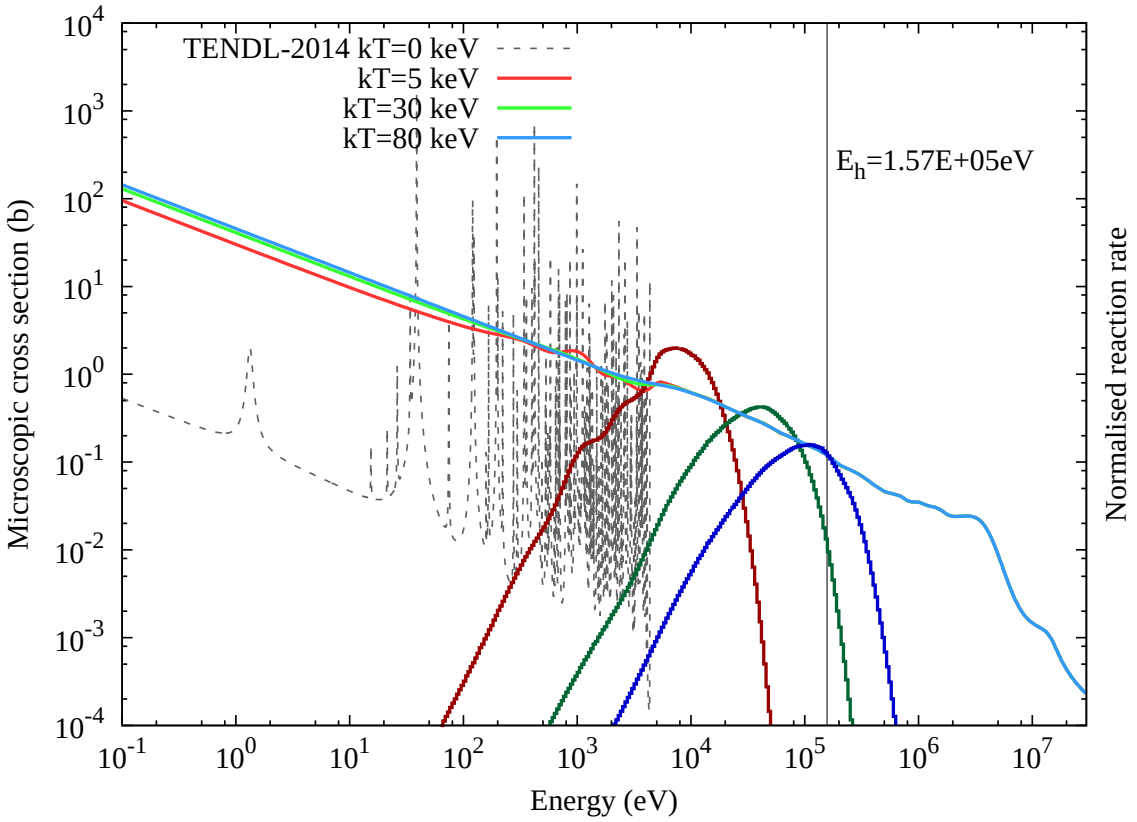


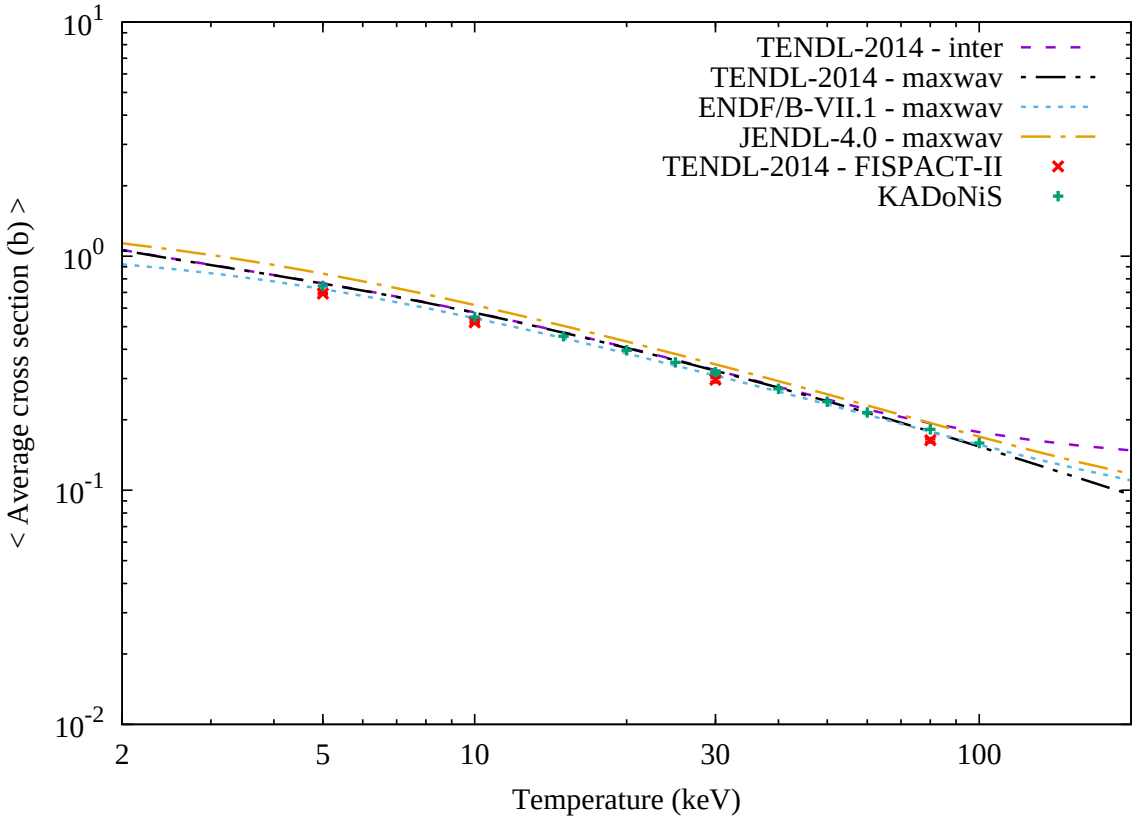
$^{116}Sn_{50}$ [Stable]



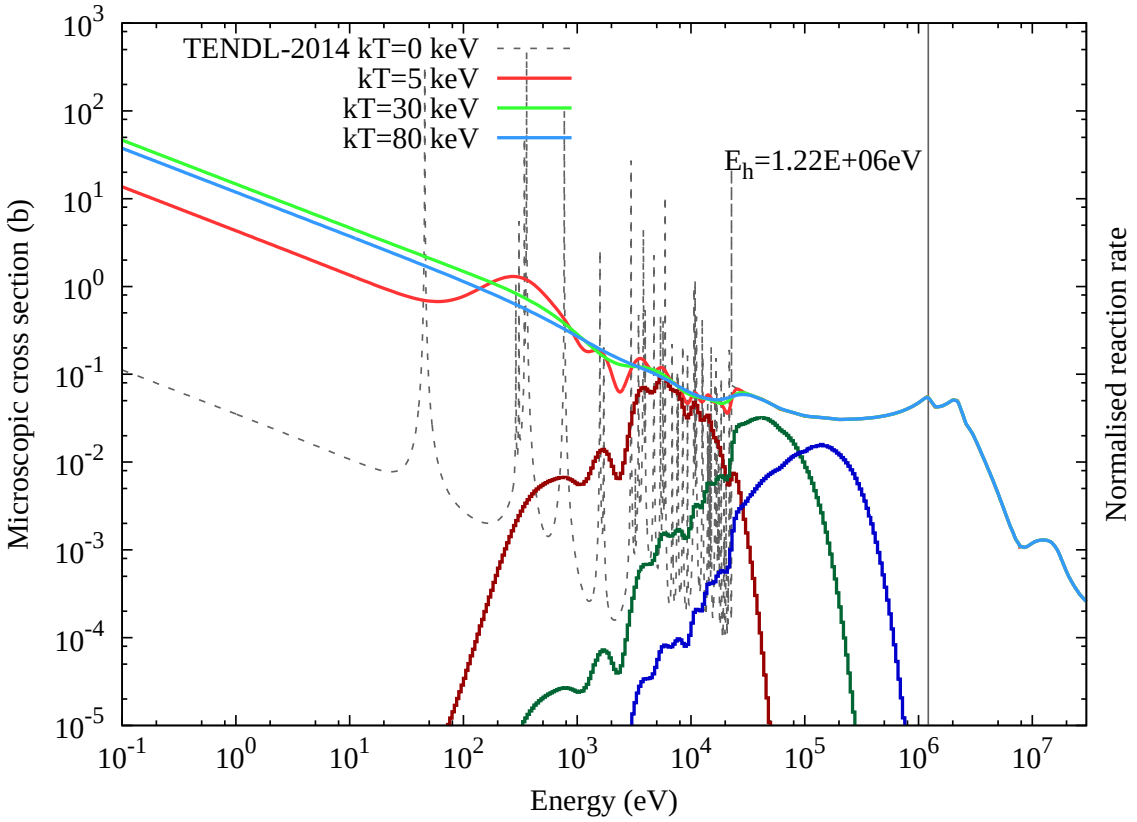


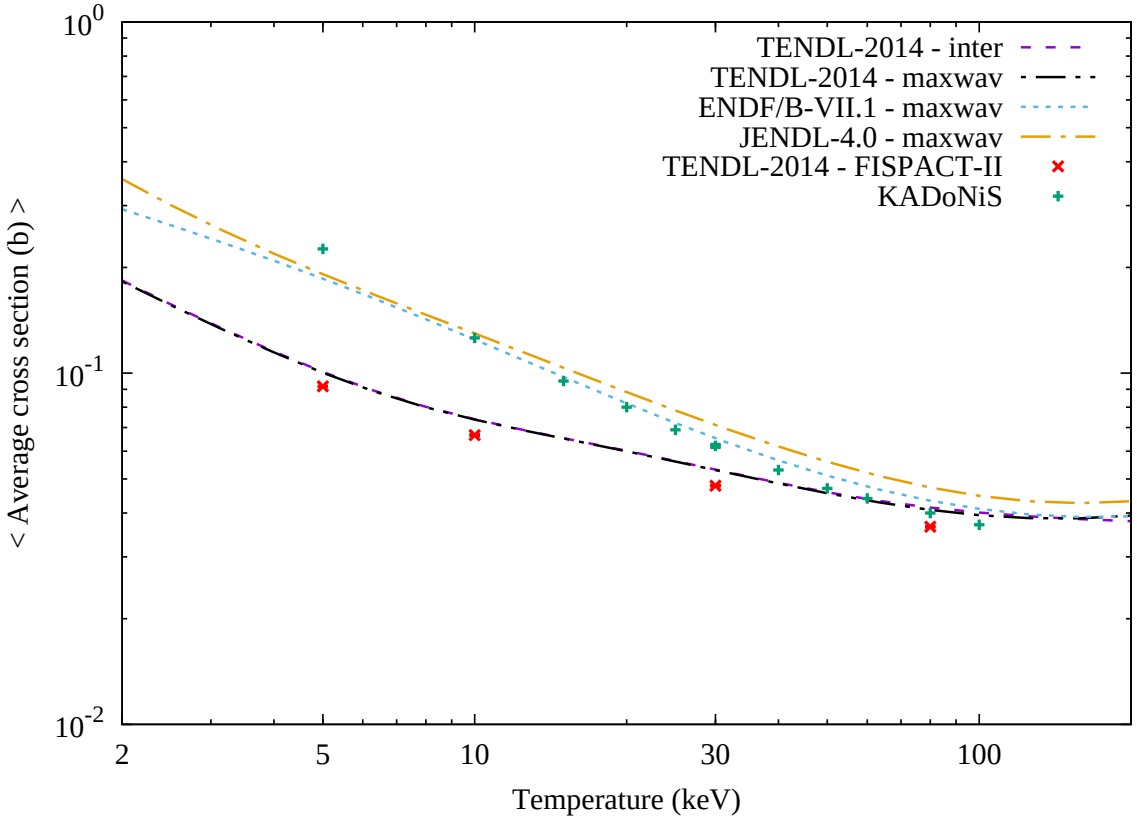
$^{117}Sn_{50}$ [Stable]



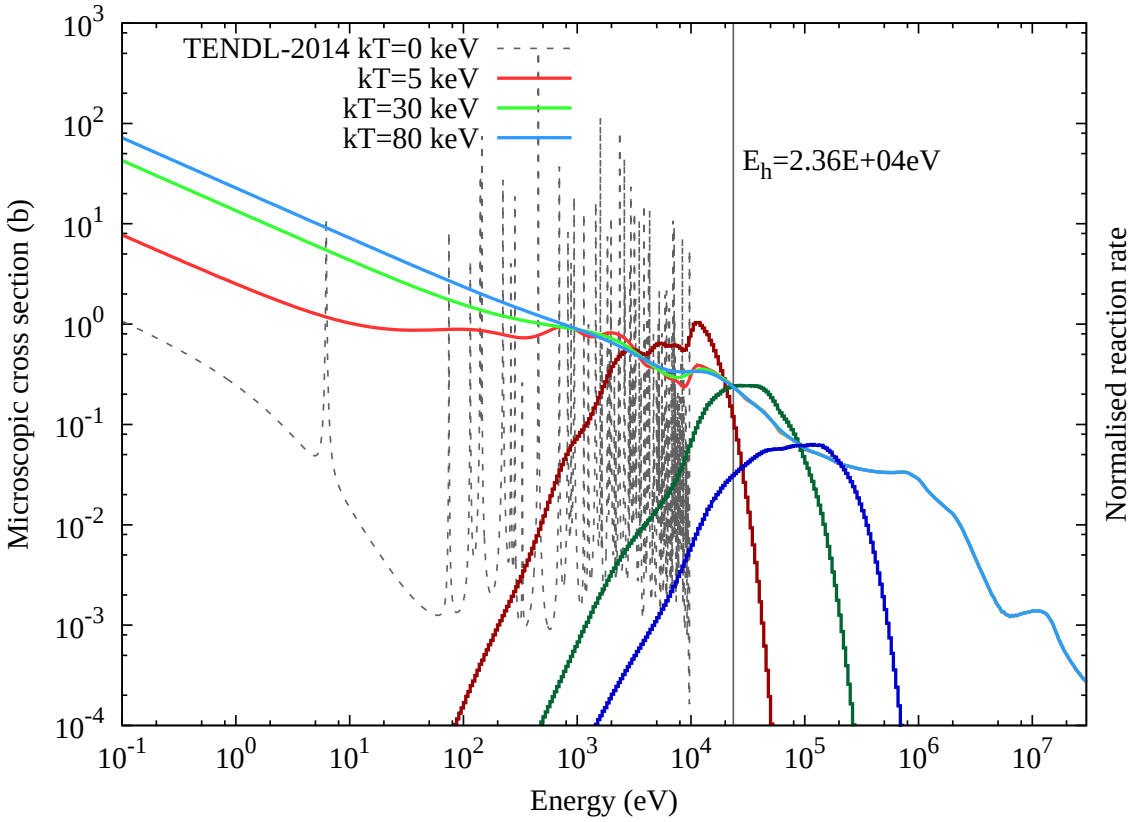


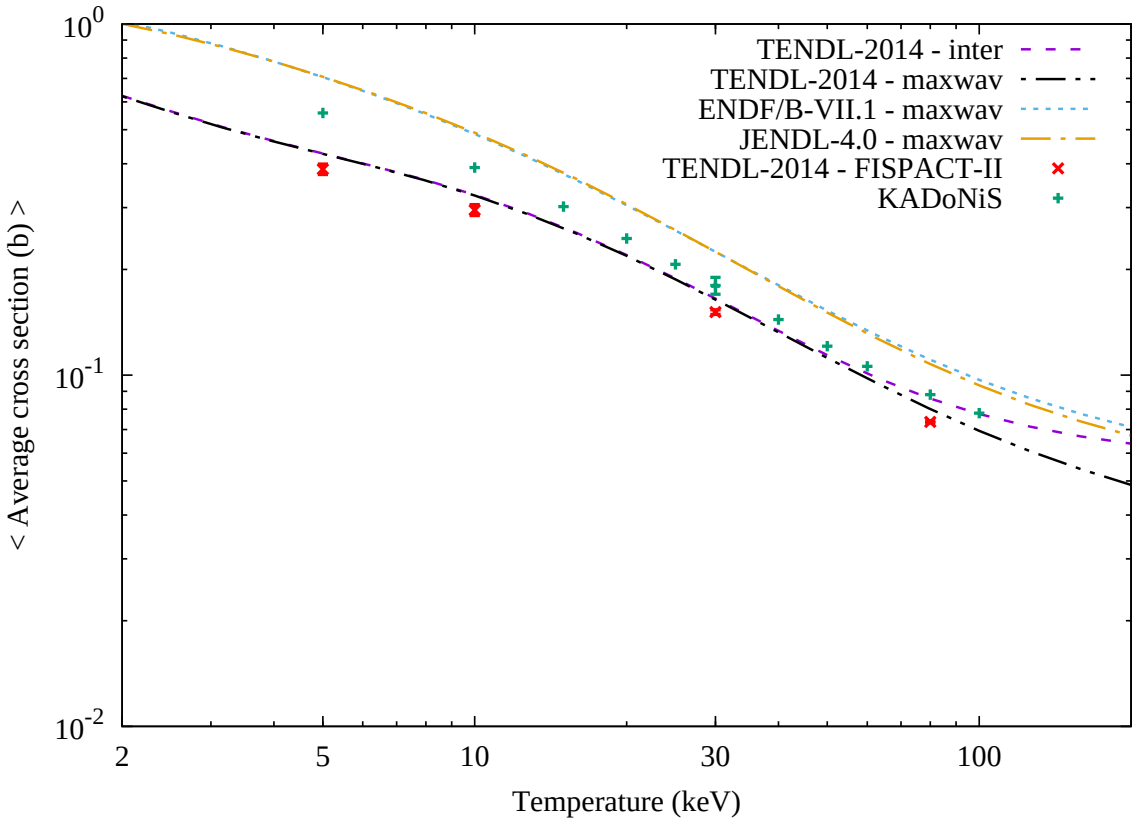
$^{118}Sn_{50}$ [Stable]



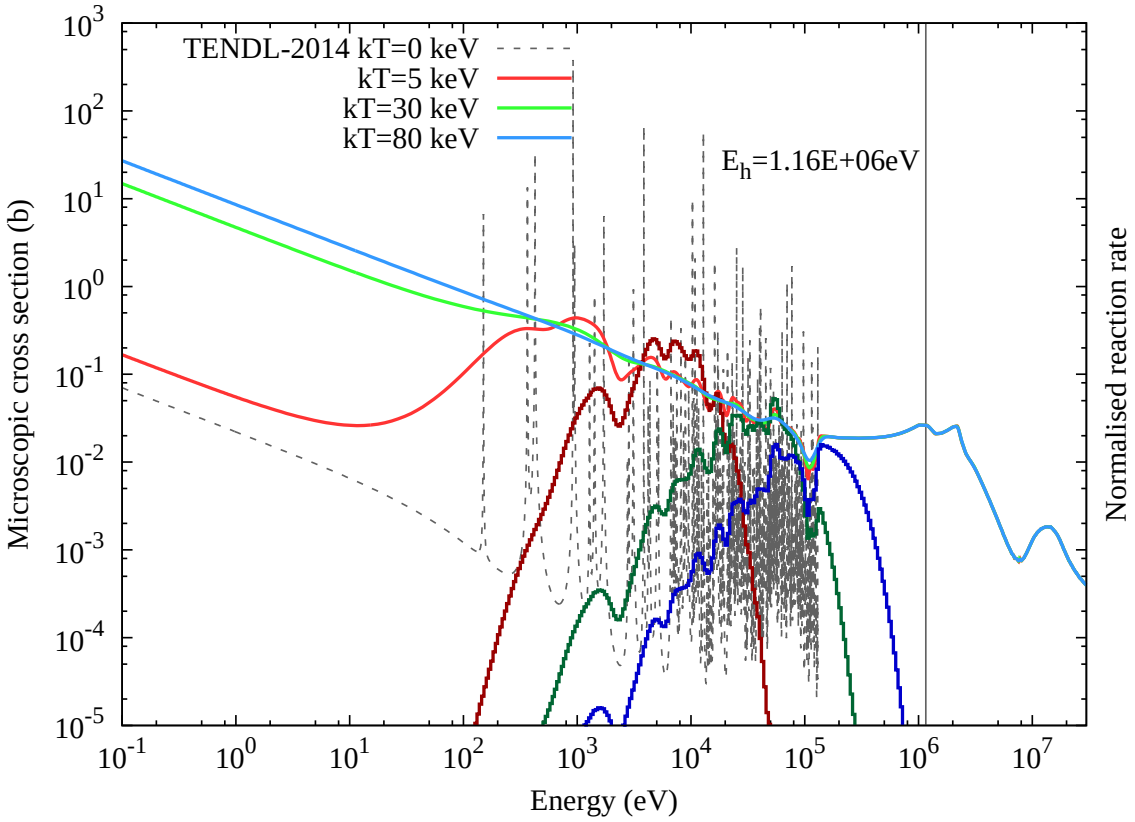


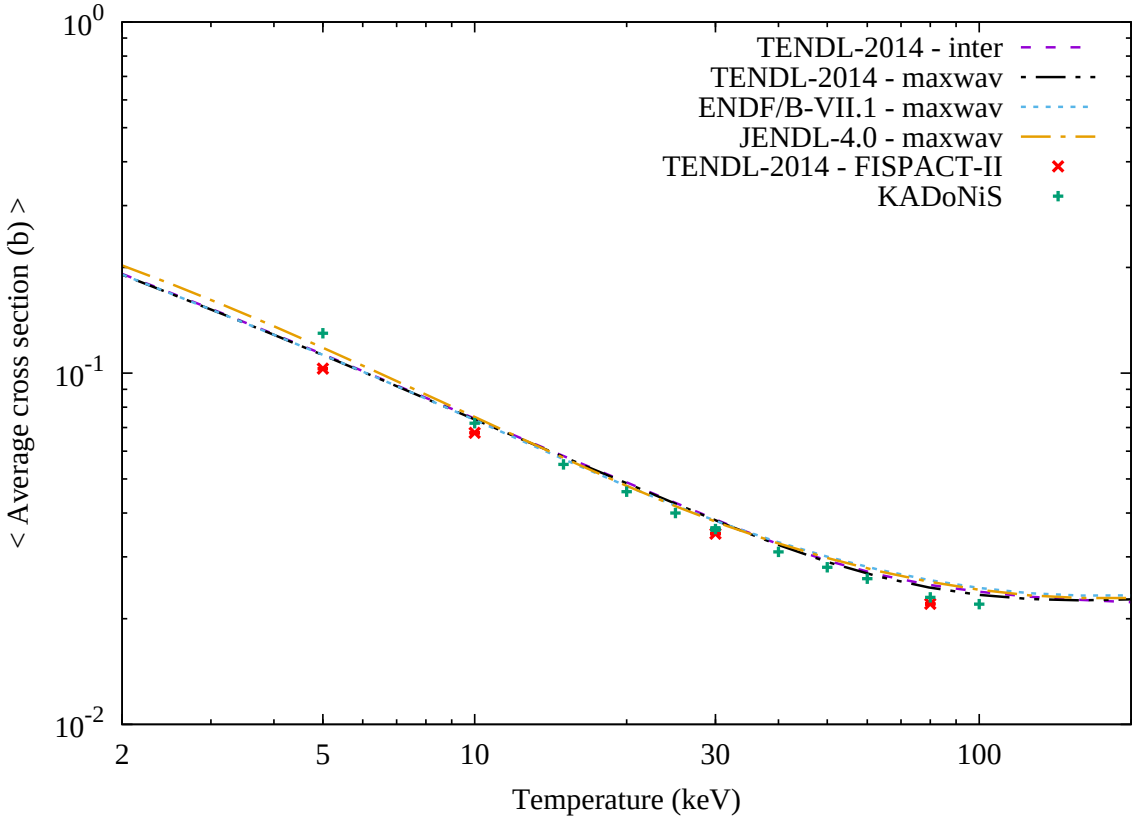
$^{119}Sn_{50}$ [Stable]



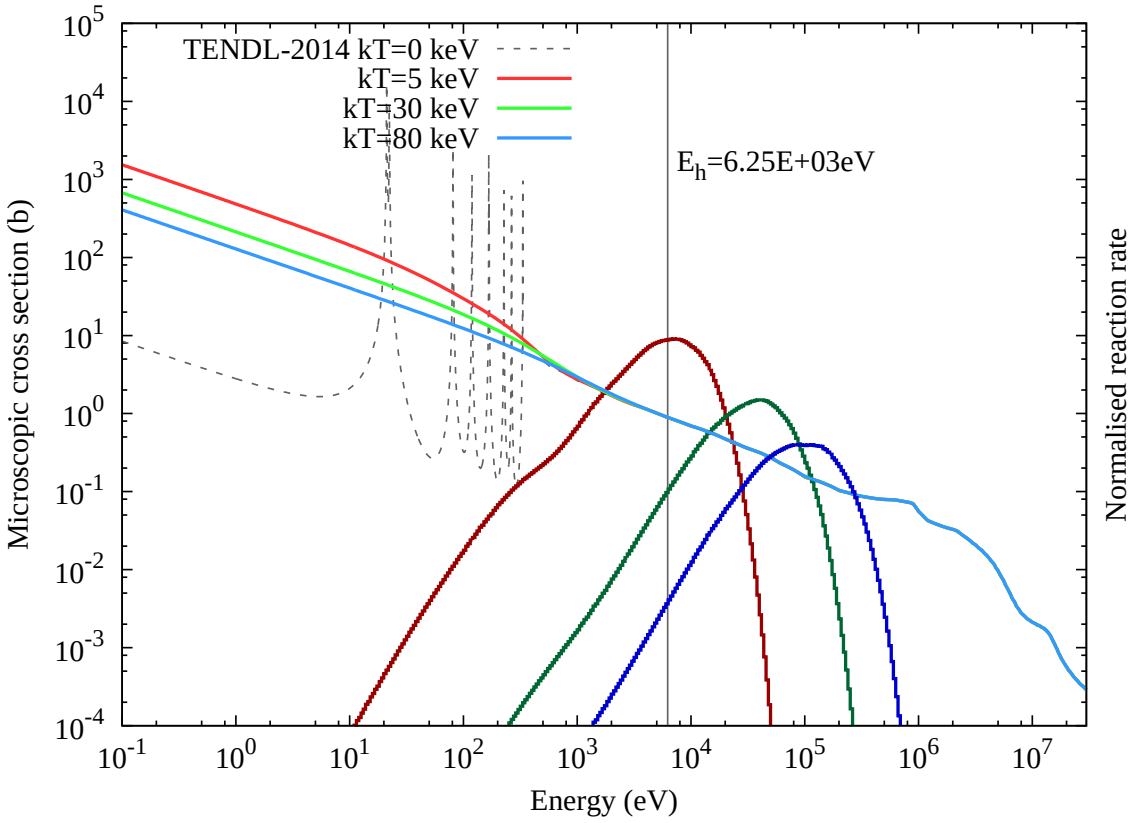


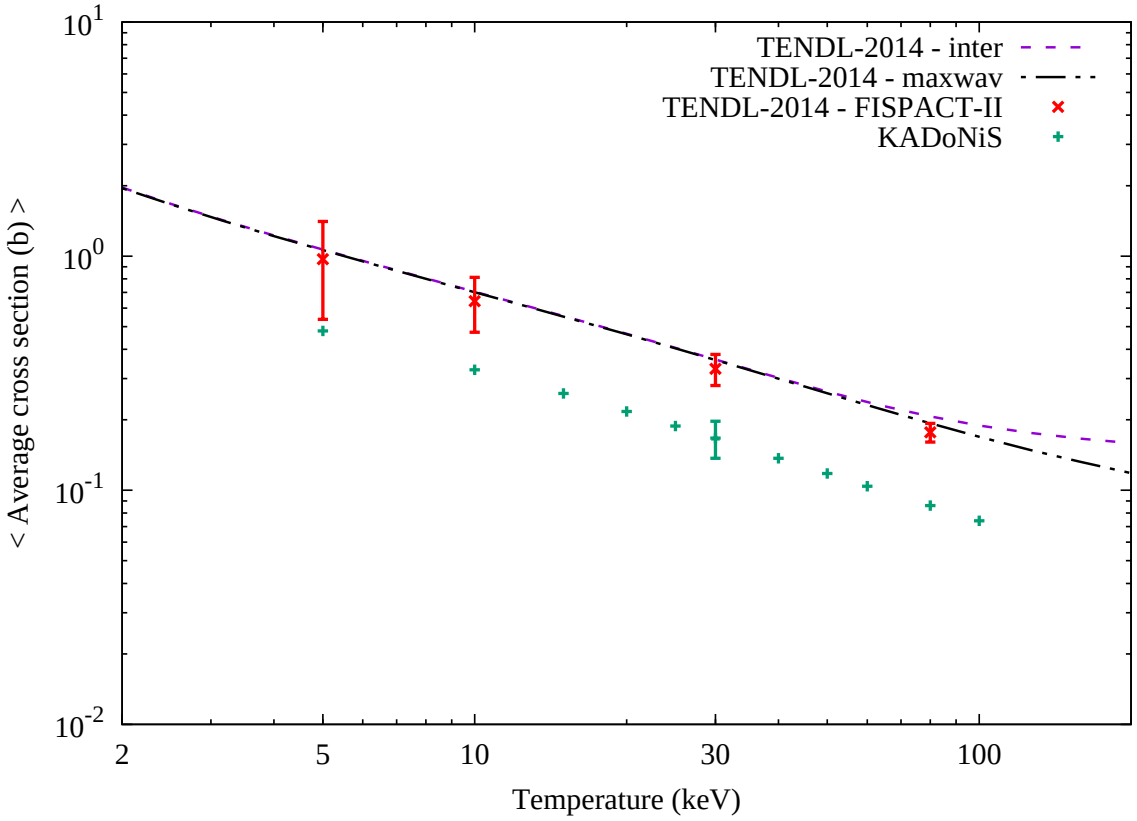
$^{120}Sn_{50}$ [Stable]



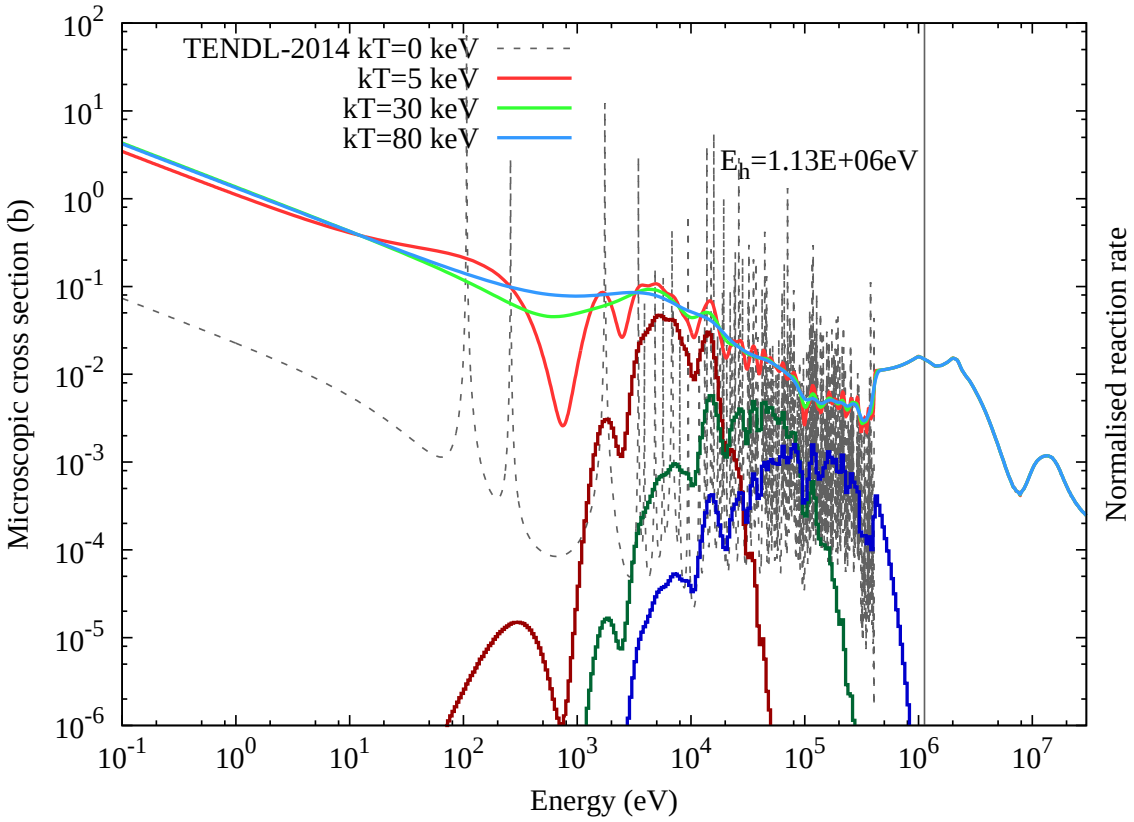


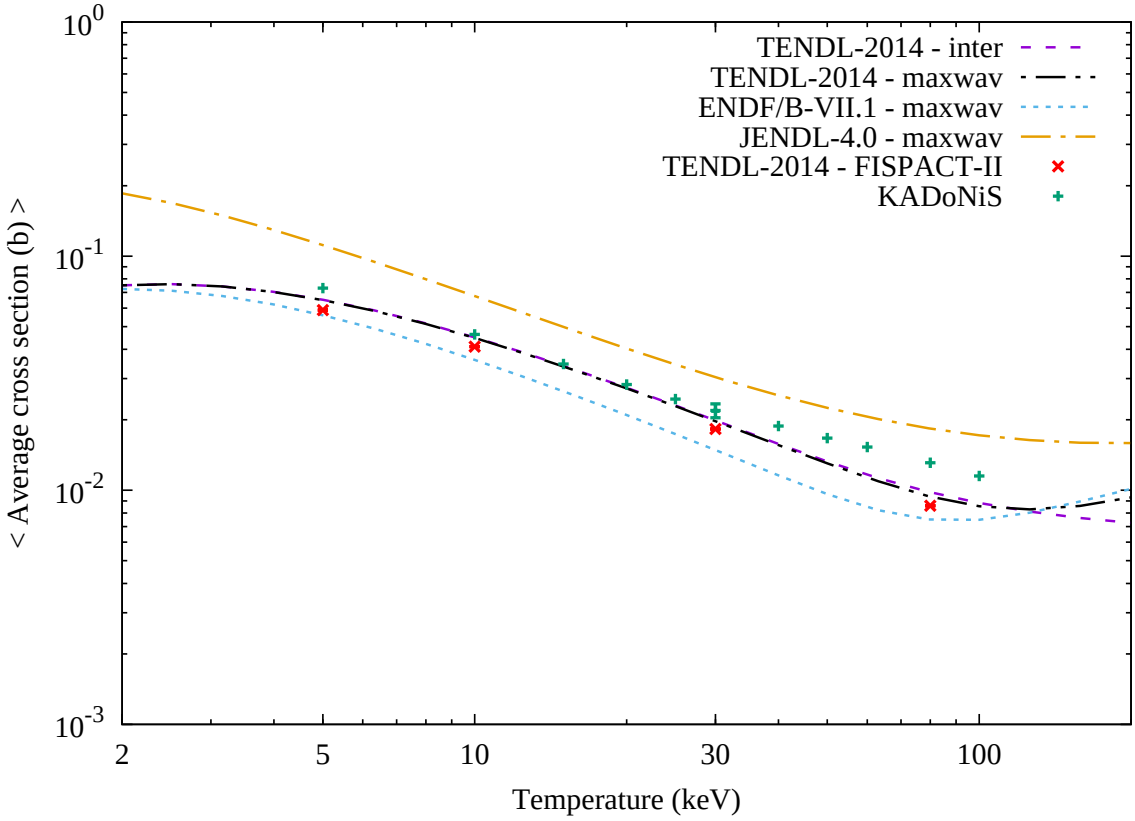
$^{121}Sn_{50}$ $[T_{1/2} = 1.12 \text{ days}]$ (KADoNiS=SMC)



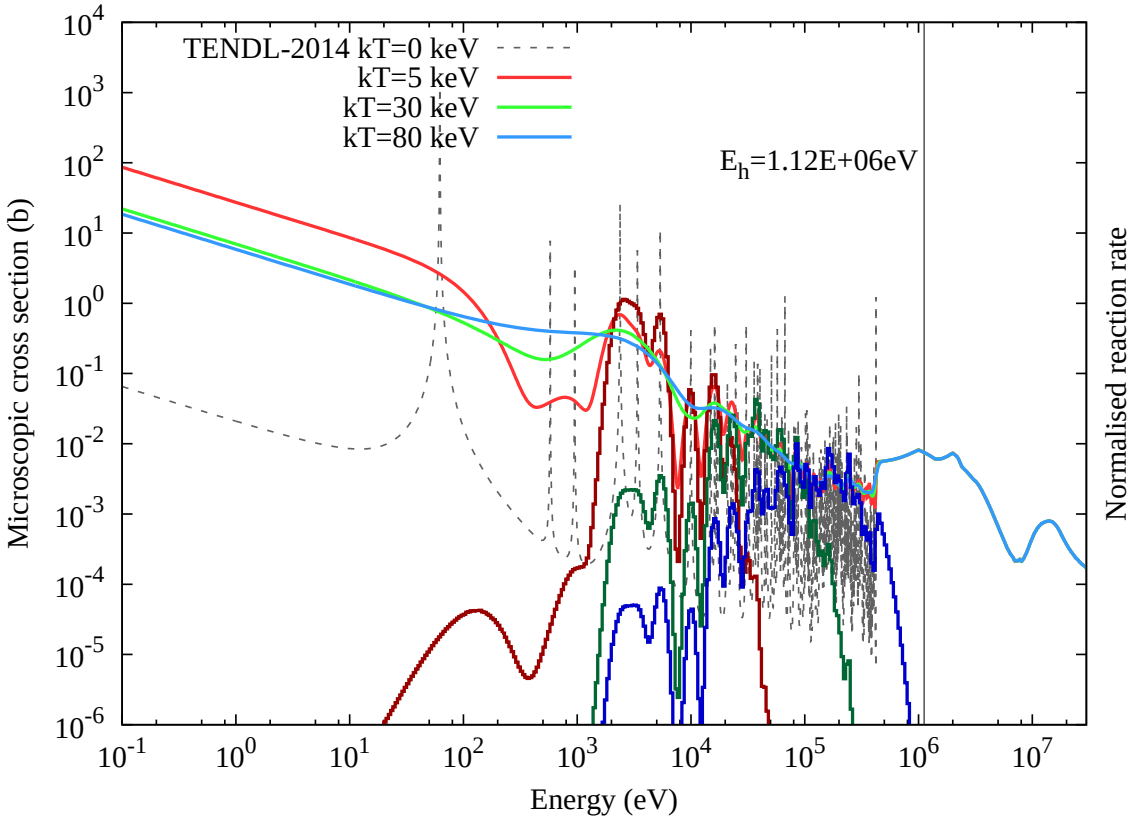


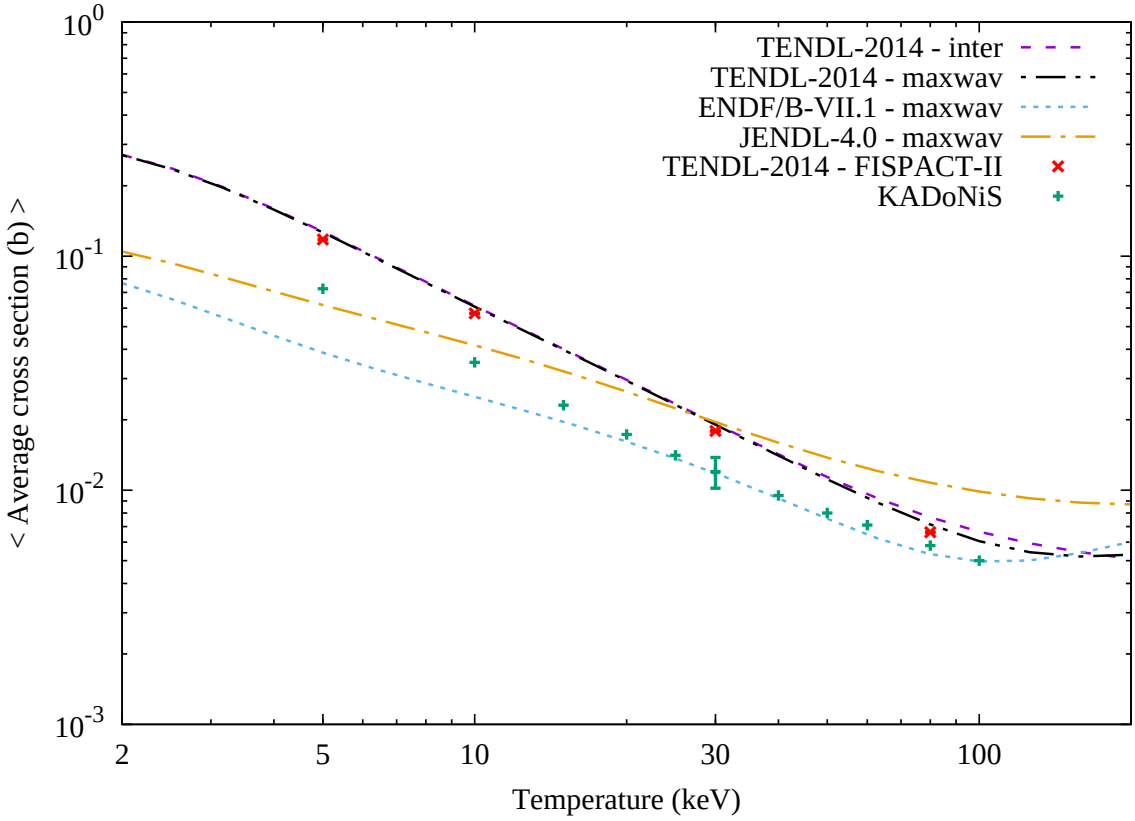
$^{122}Sn_{50}$ [Stable]



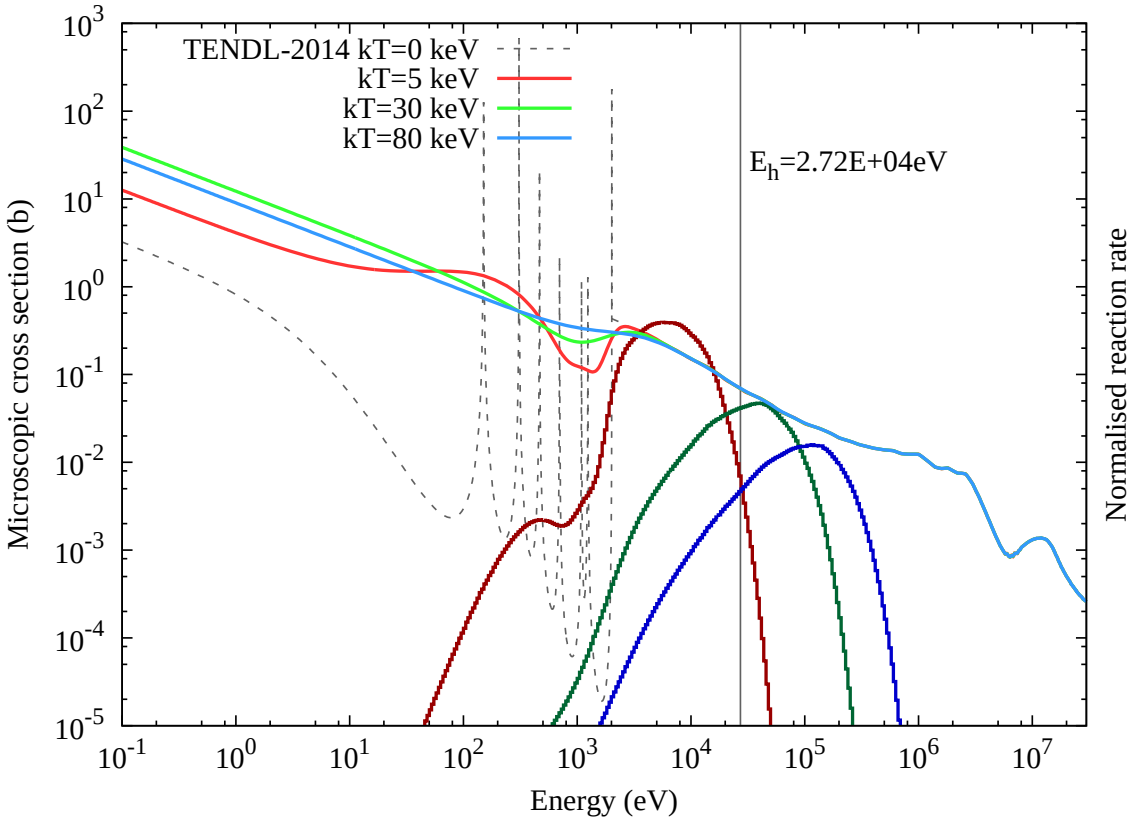


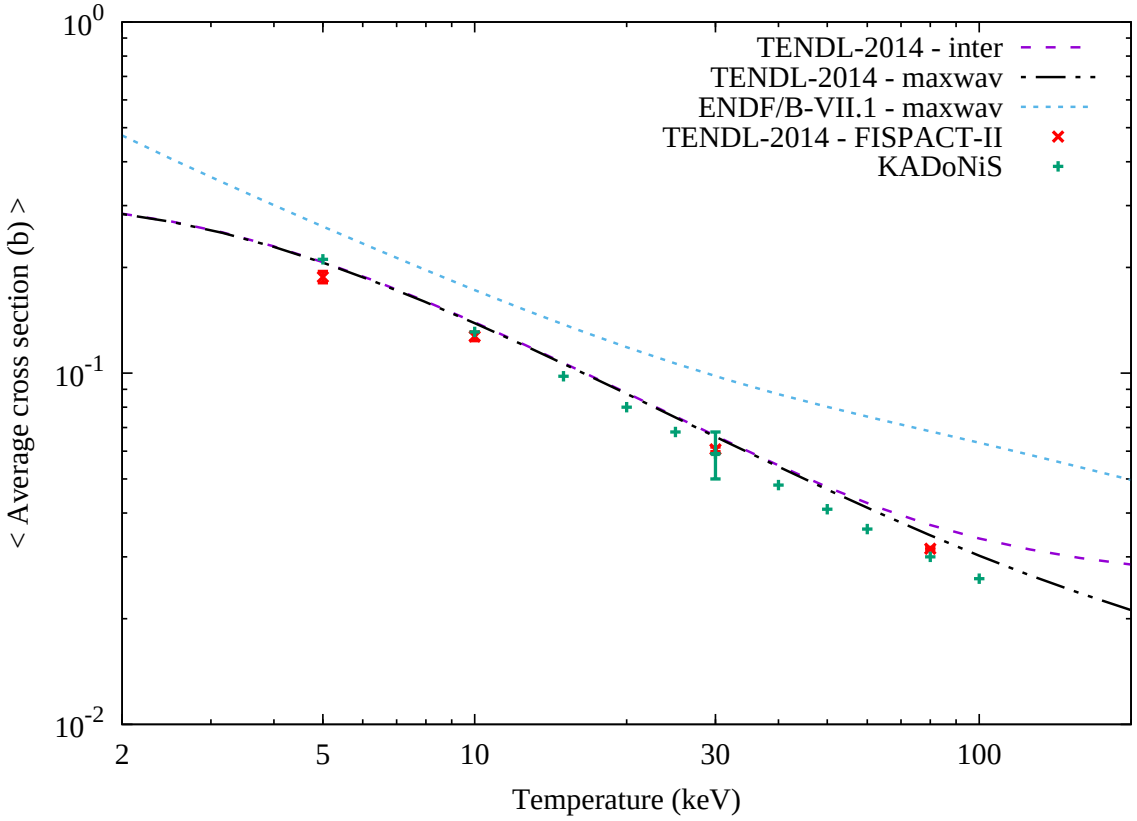
$^{124}Sn_{50}$ $[T_{1/2} = 1.00 \times 10^{17}$ years$]$



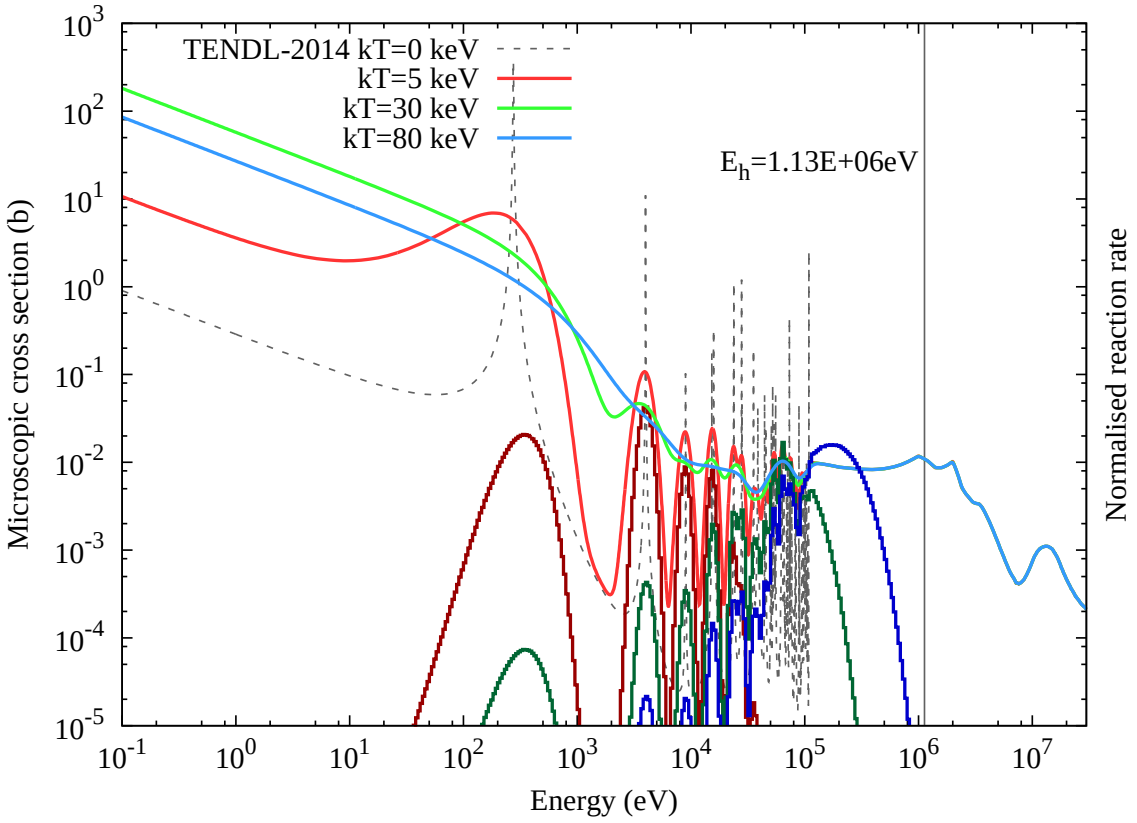


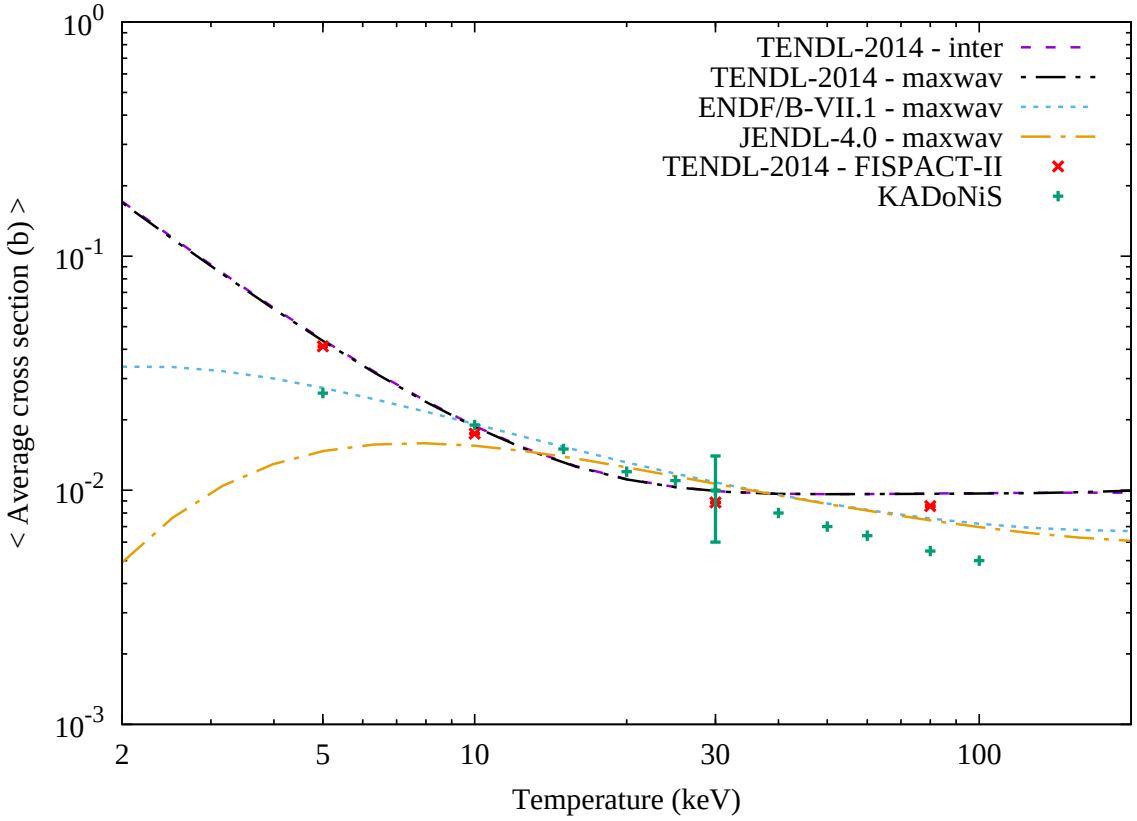
$^{125}Sn_{50}$ $[T_{1/2} = 9.64$ days$]$ (KADoNiS=SMC)



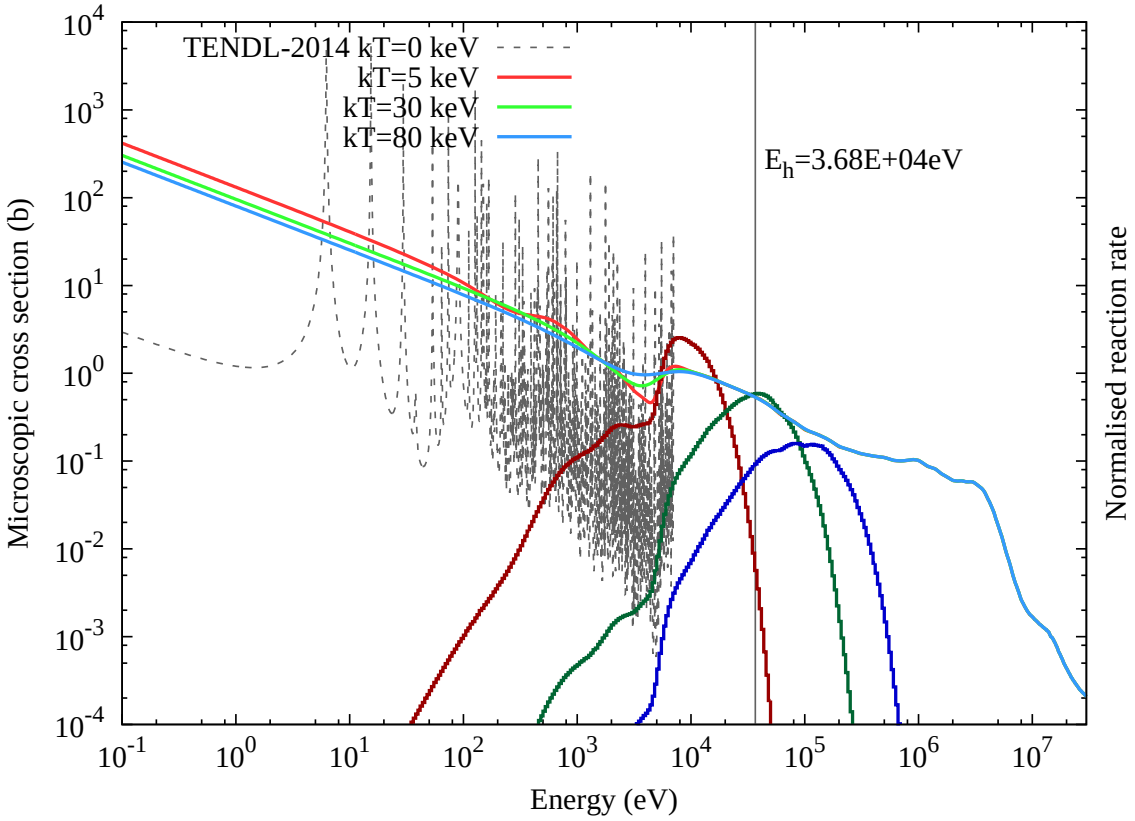


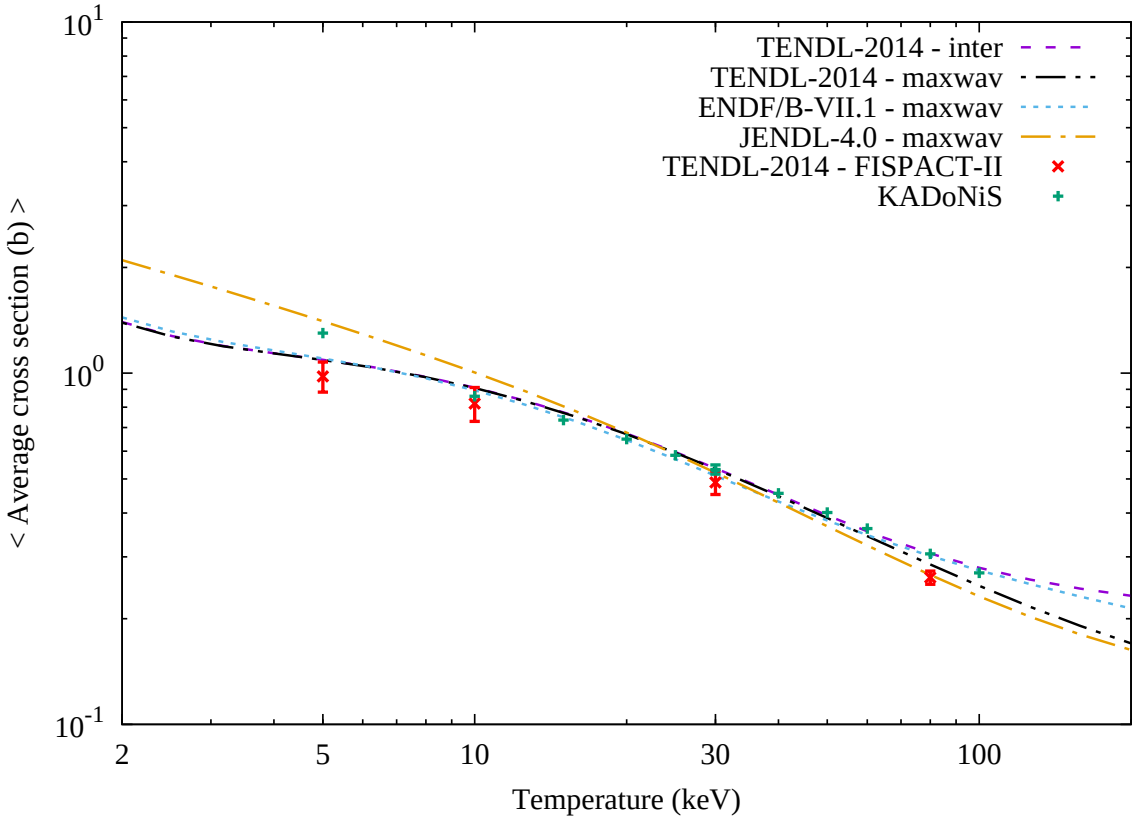
$^{126}Sn_{50}$ $[T_{1/2} = 2.30 \times 10^5$ years] (KADoNiS=SMC)



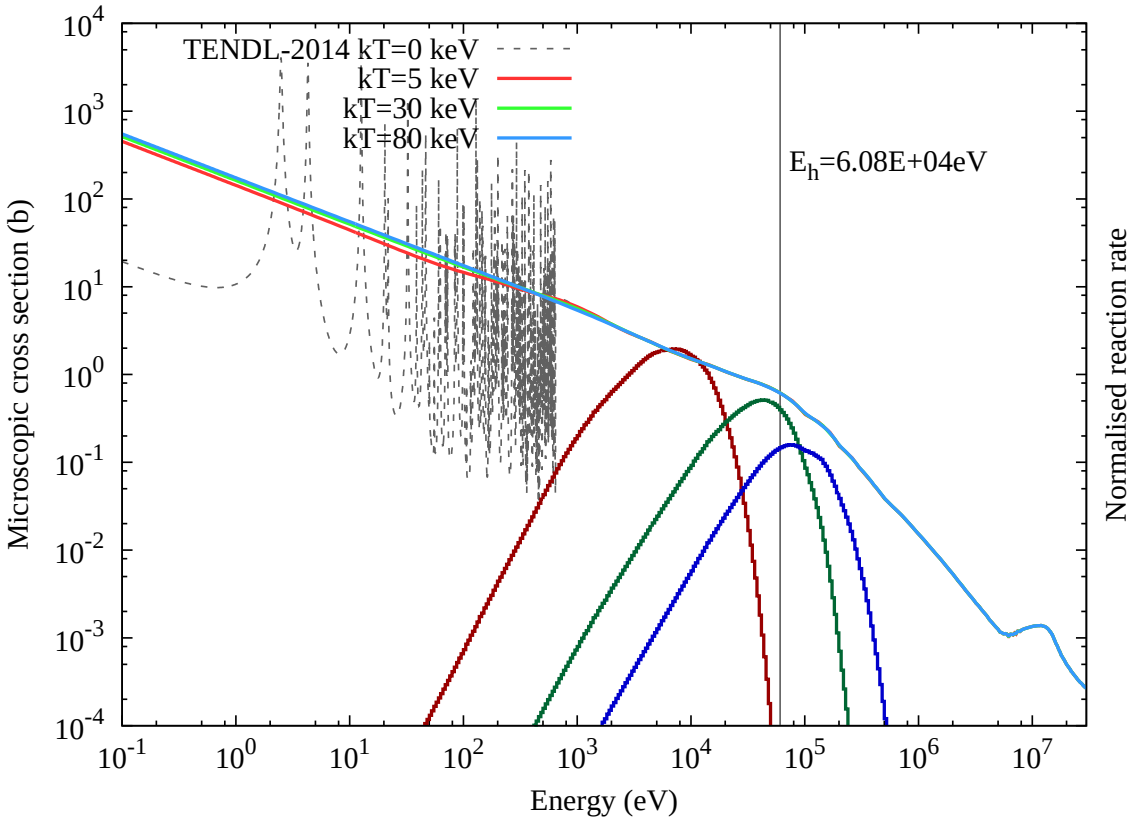


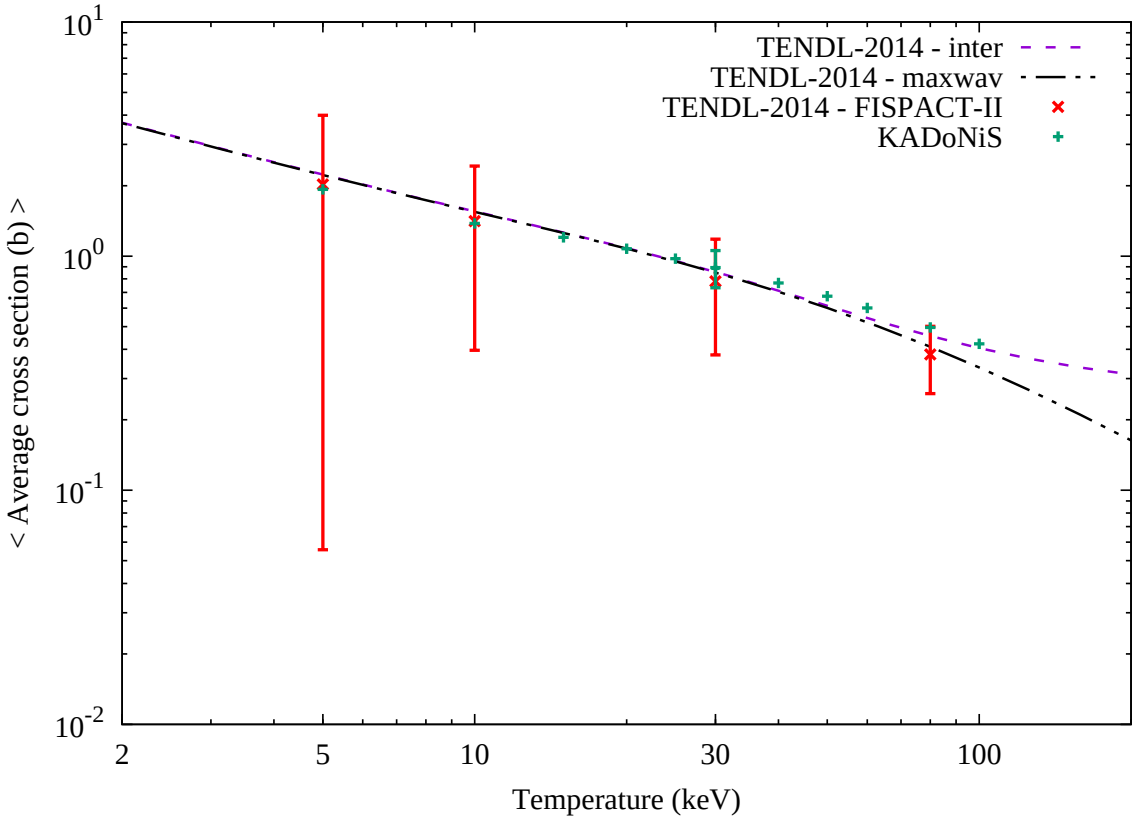
$^{121}Sb_{51}$ [Stable]



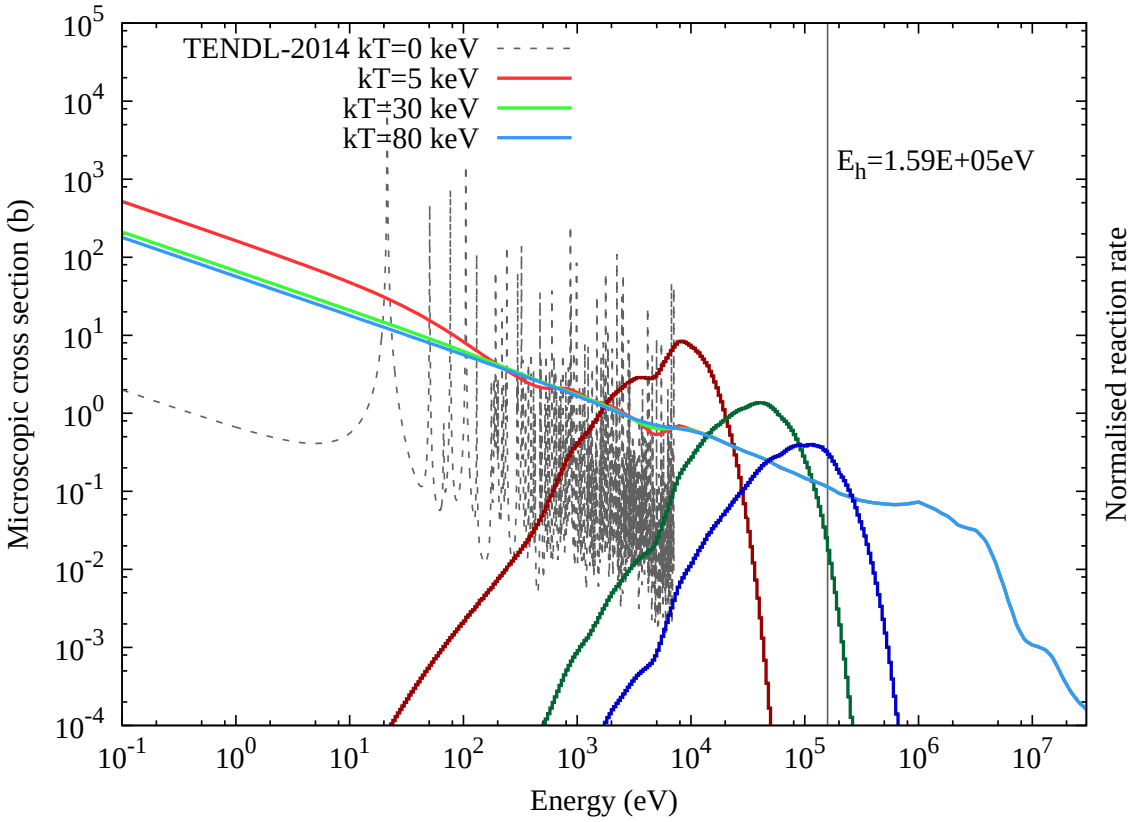


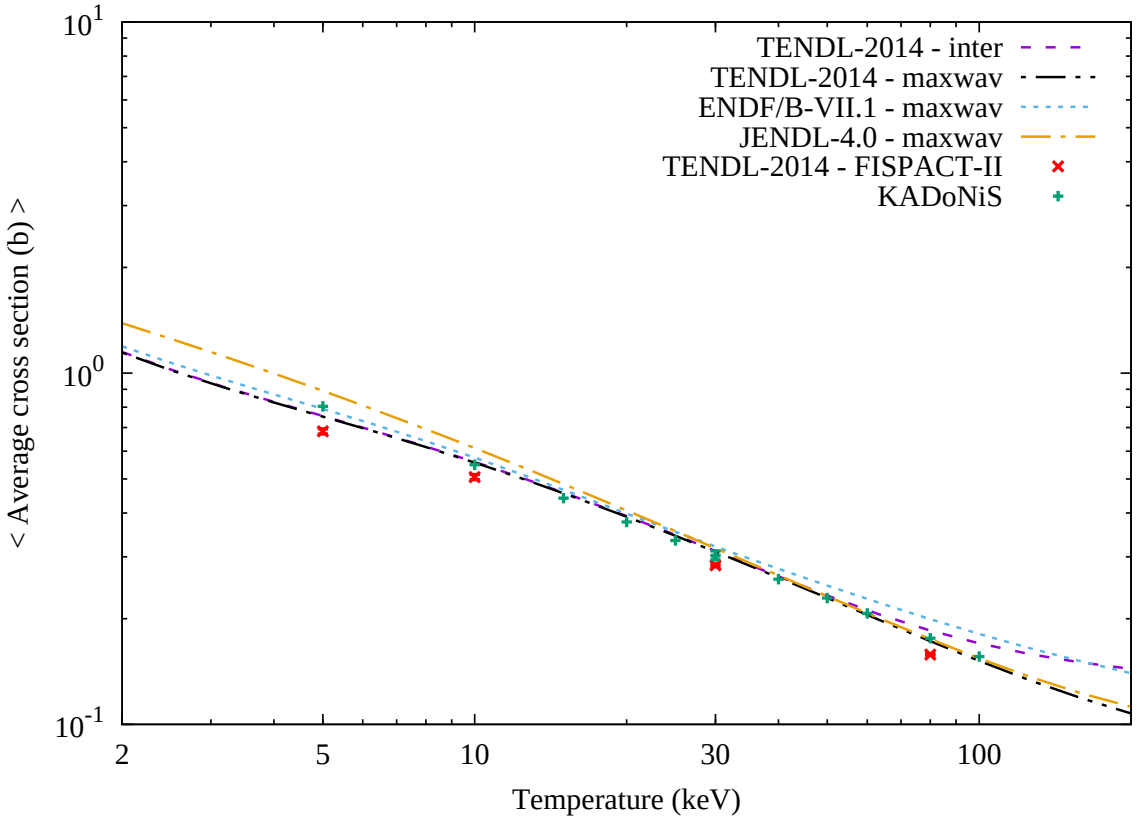
$^{122}Sb_{51}$ $[T_{1/2} = 2.70 \text{ days}]$ (KADoNiS=SMC)



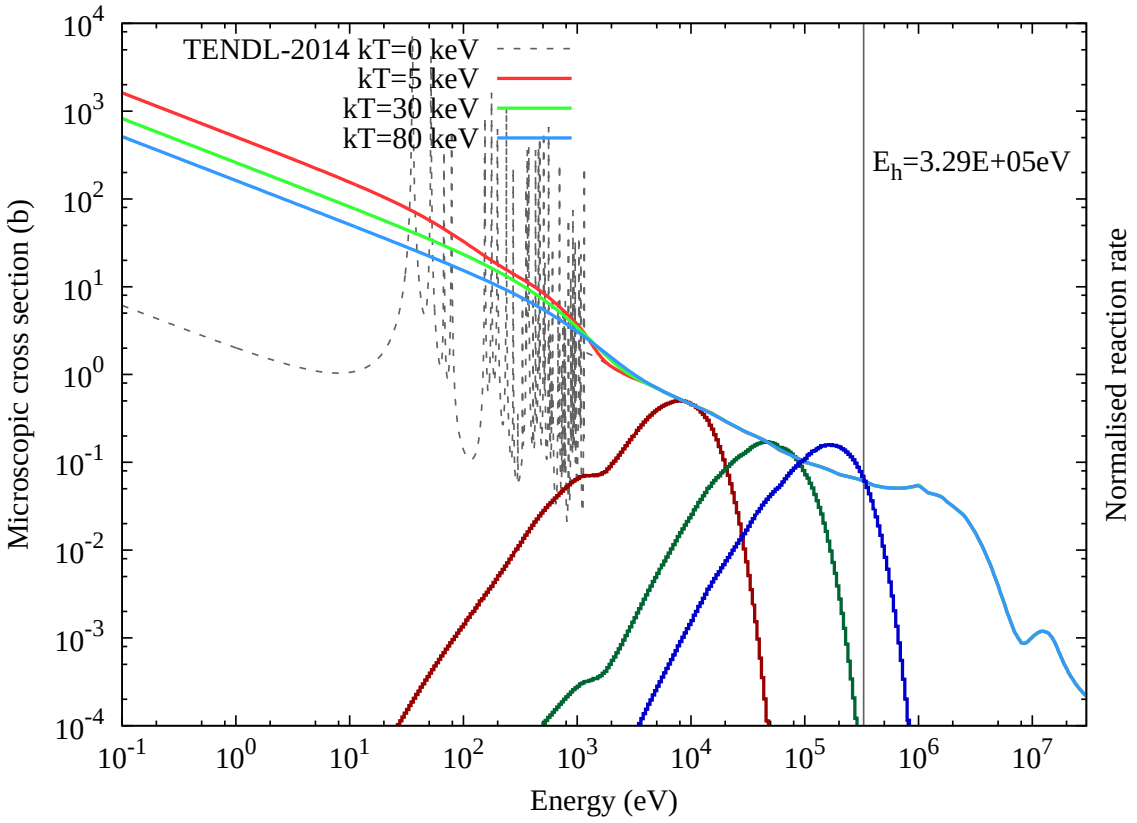


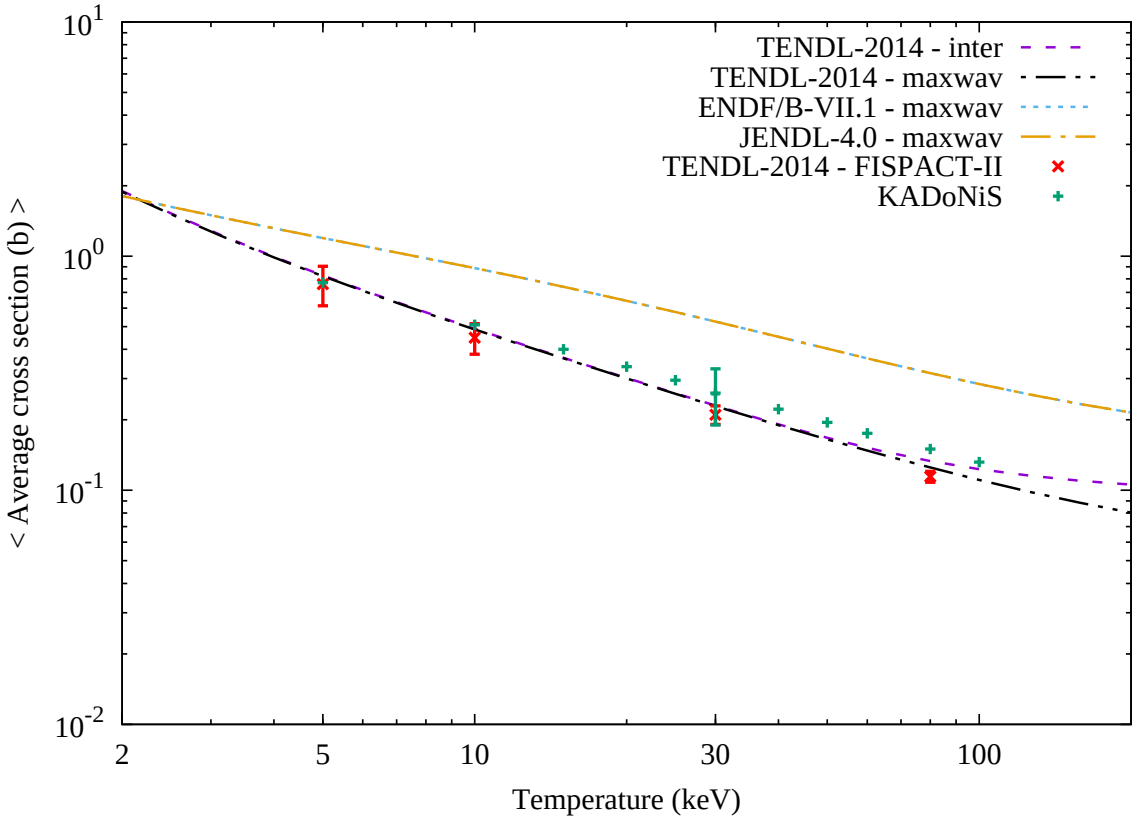
$^{123}Sb_{51}$ [Stable]



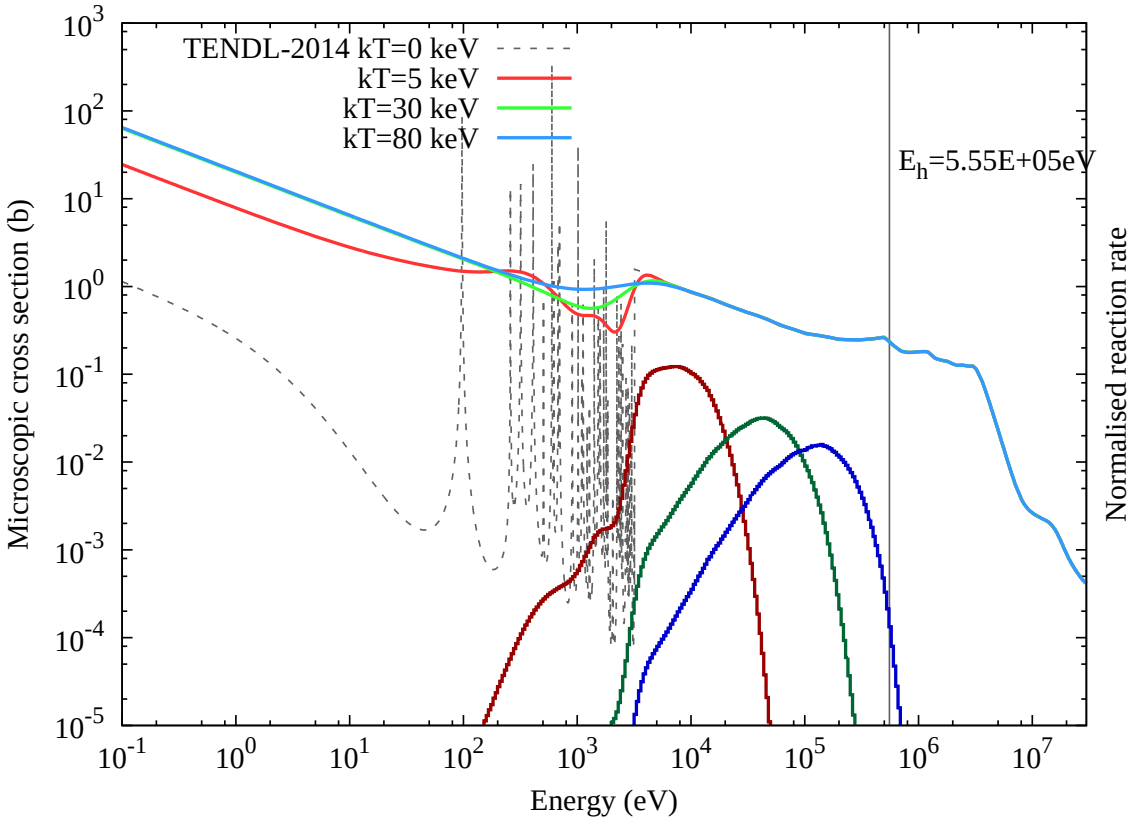


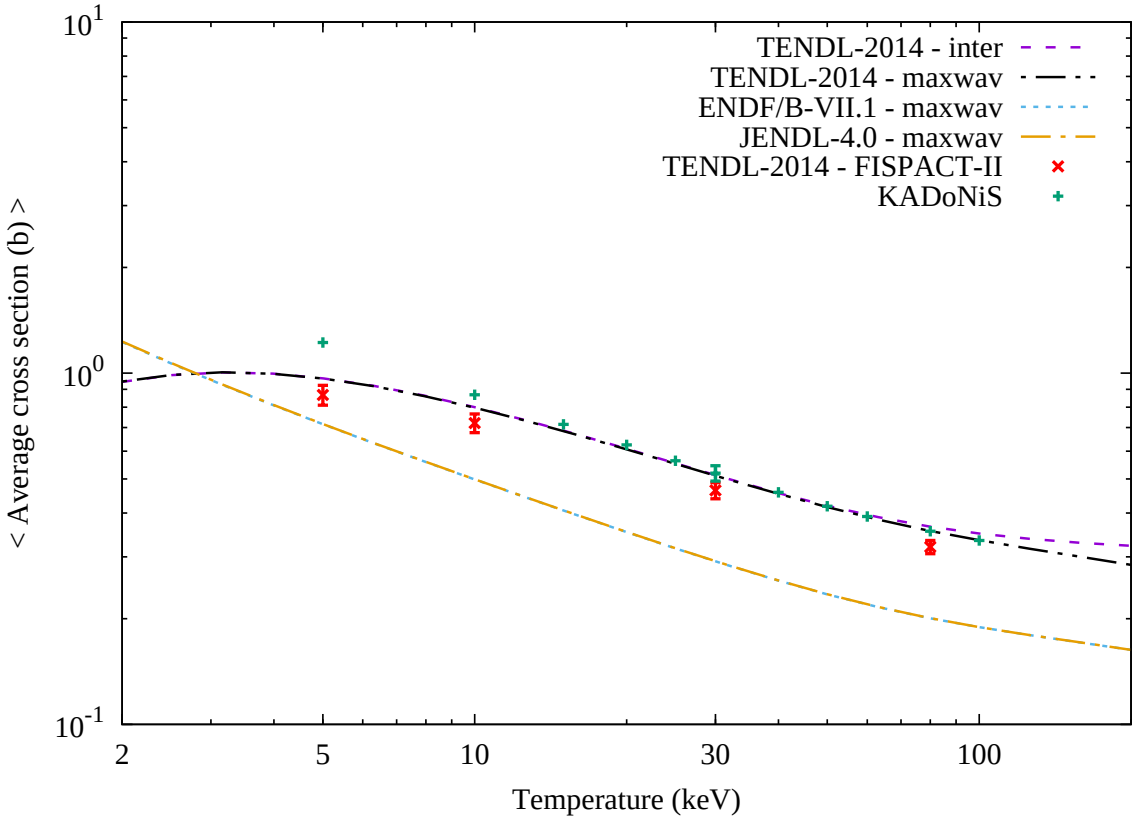
$^{125}Sb_{51}$ [$T_{1/2}$ = 2.76 years] (KADoNiS=SMC)



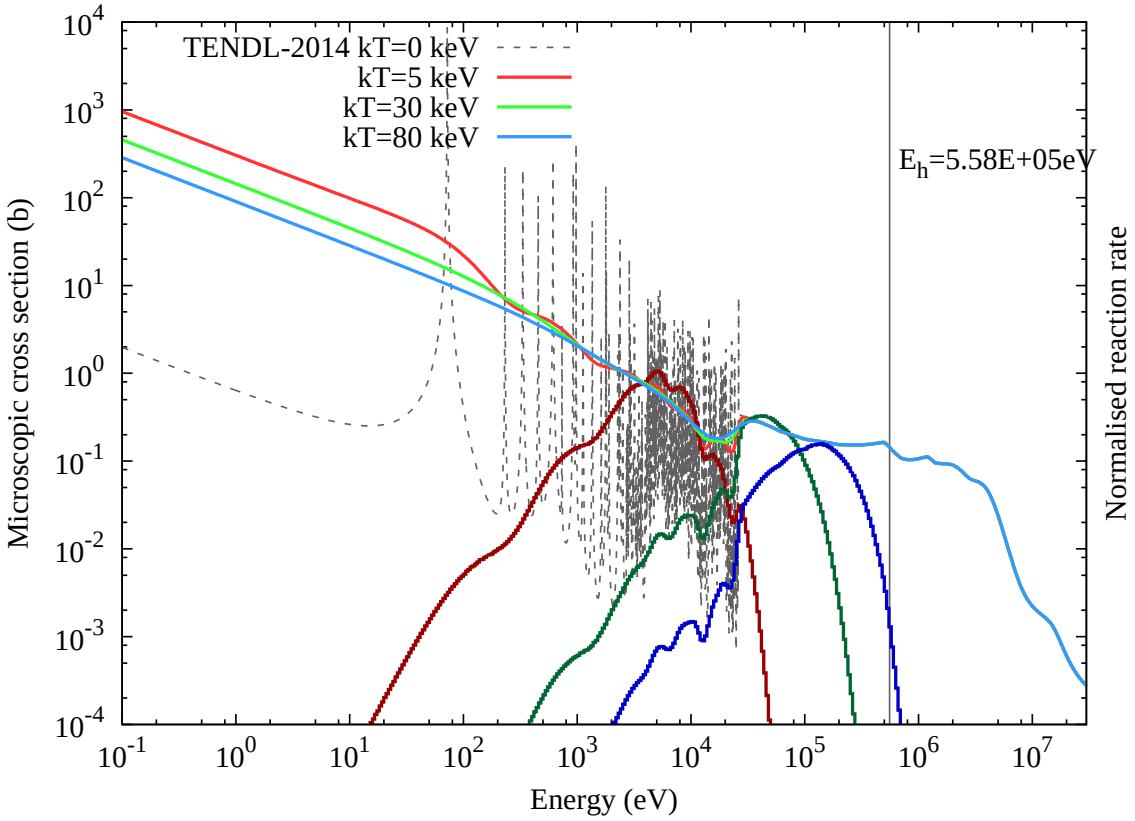


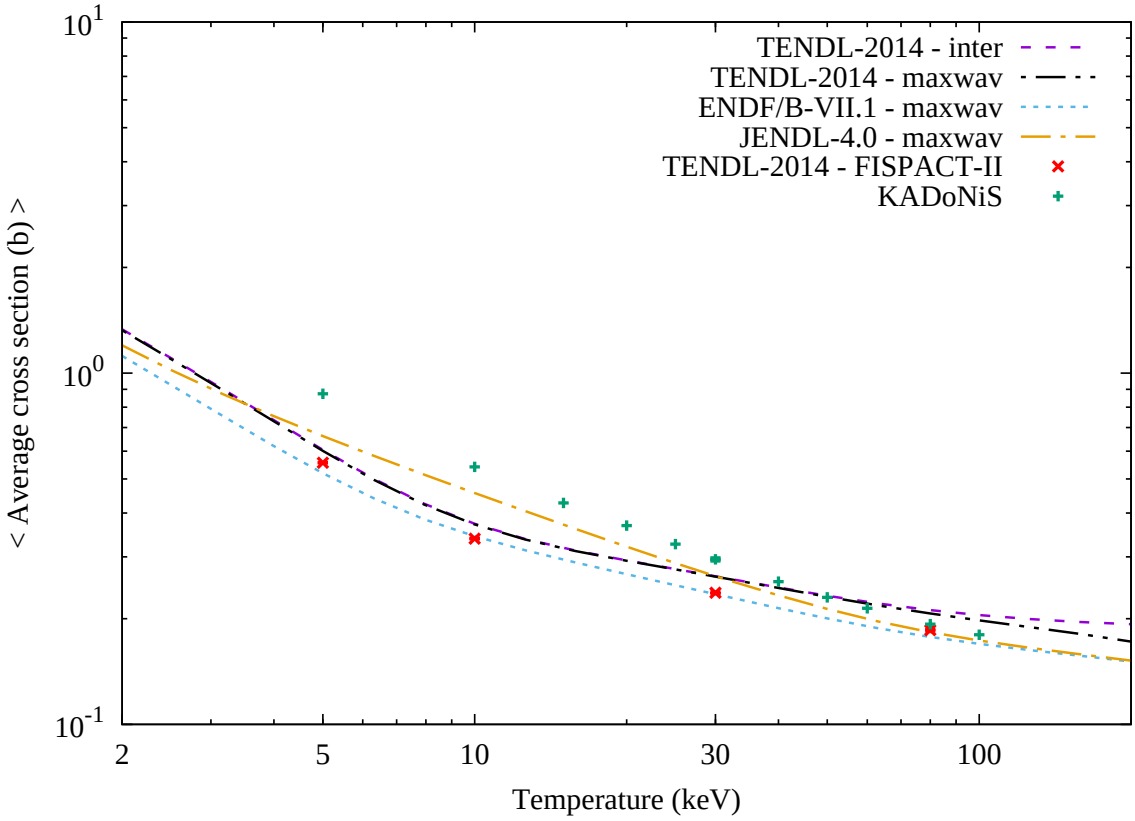
$^{120}Te_{52}$ [Stable]



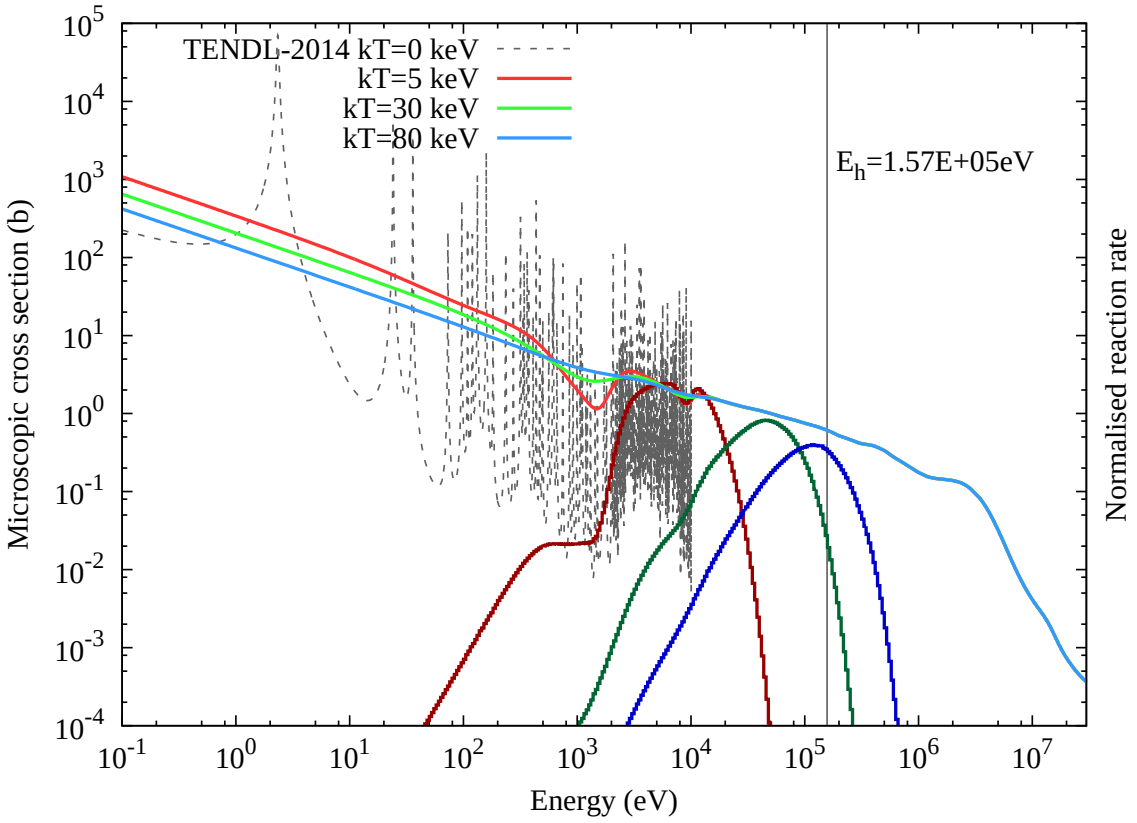


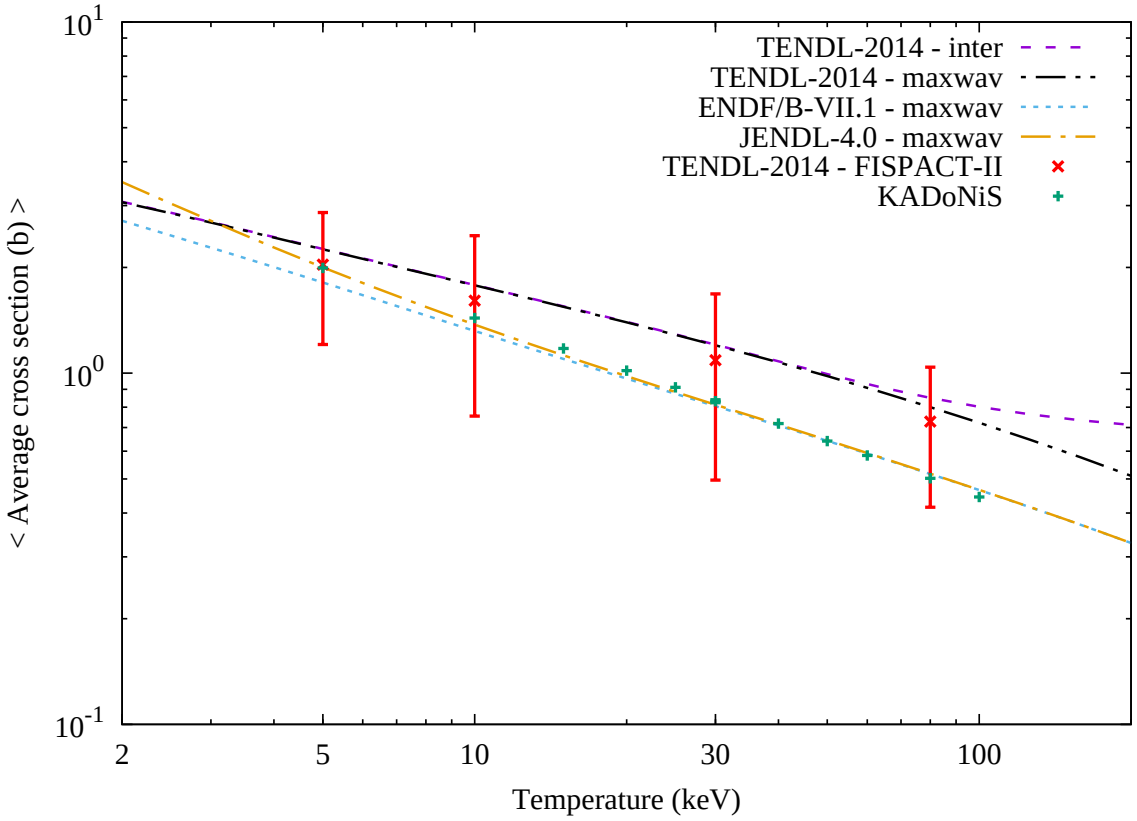
$^{122}Te_{52}$ [Stable]



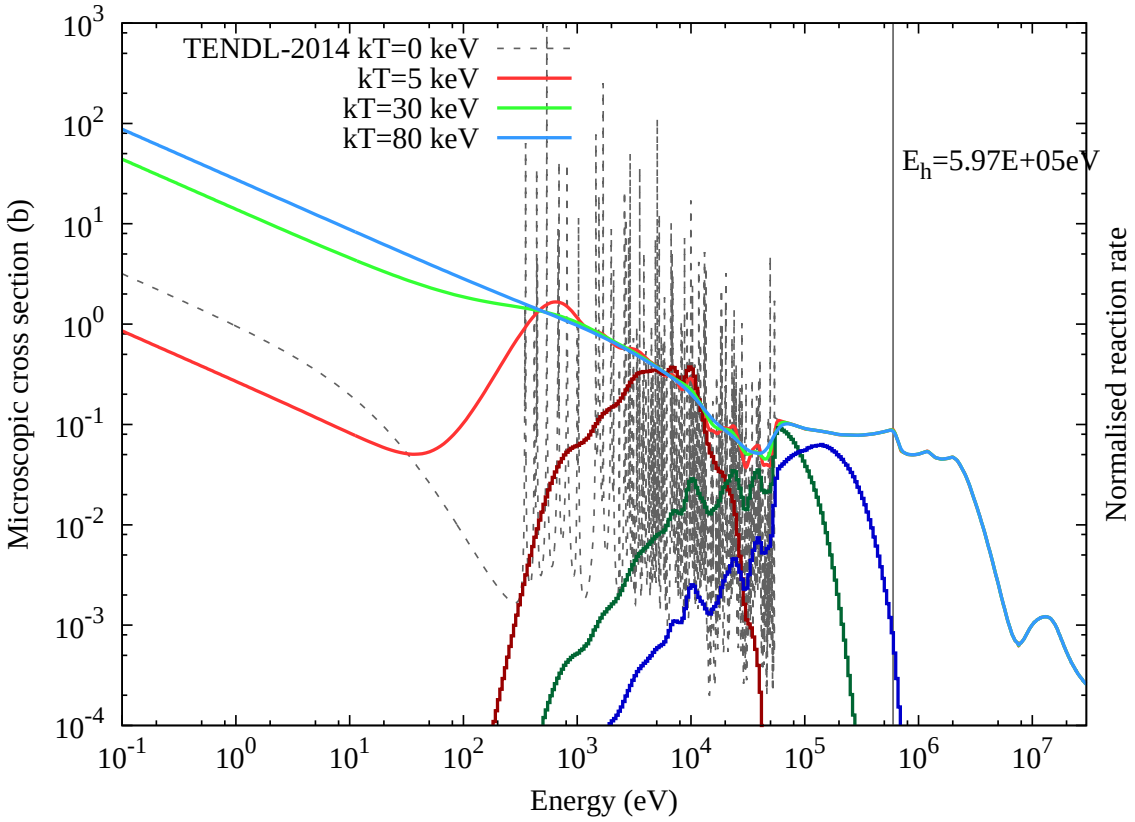


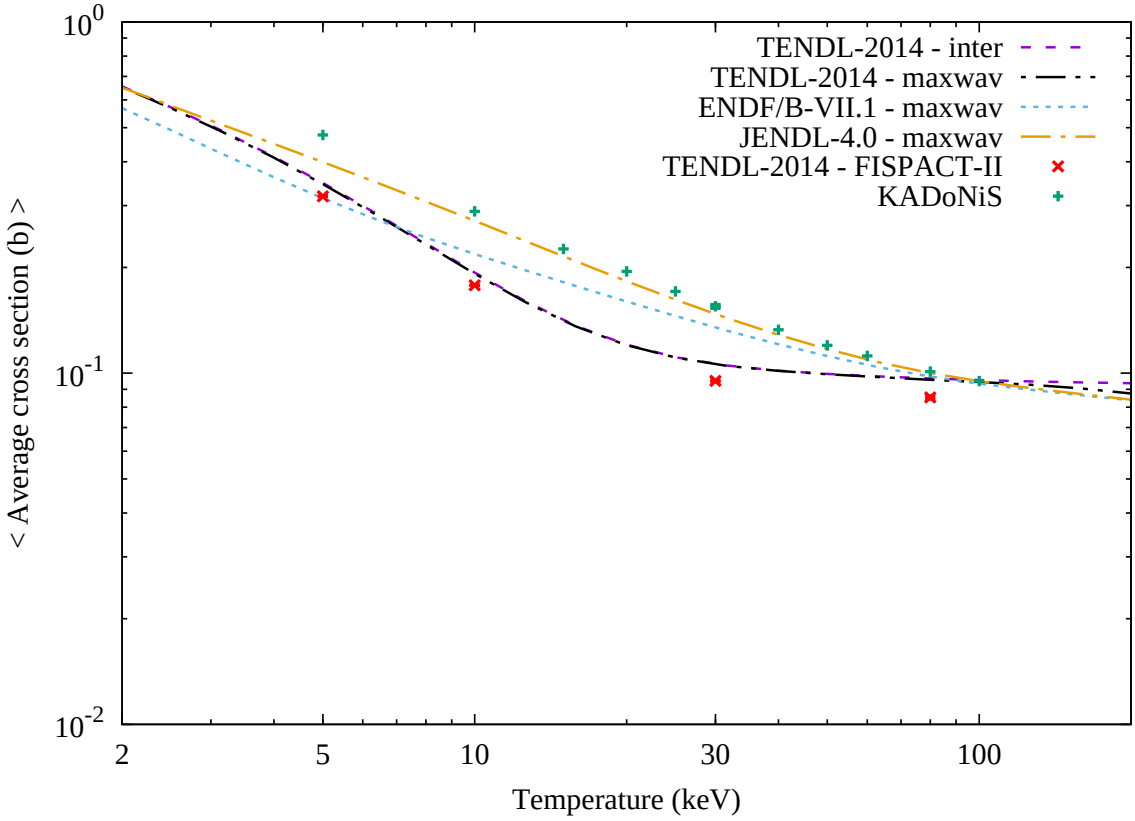
$^{123}Te_{52}$ $[T_{1/2} = 9.20 \times 10^{16}$ years$]$



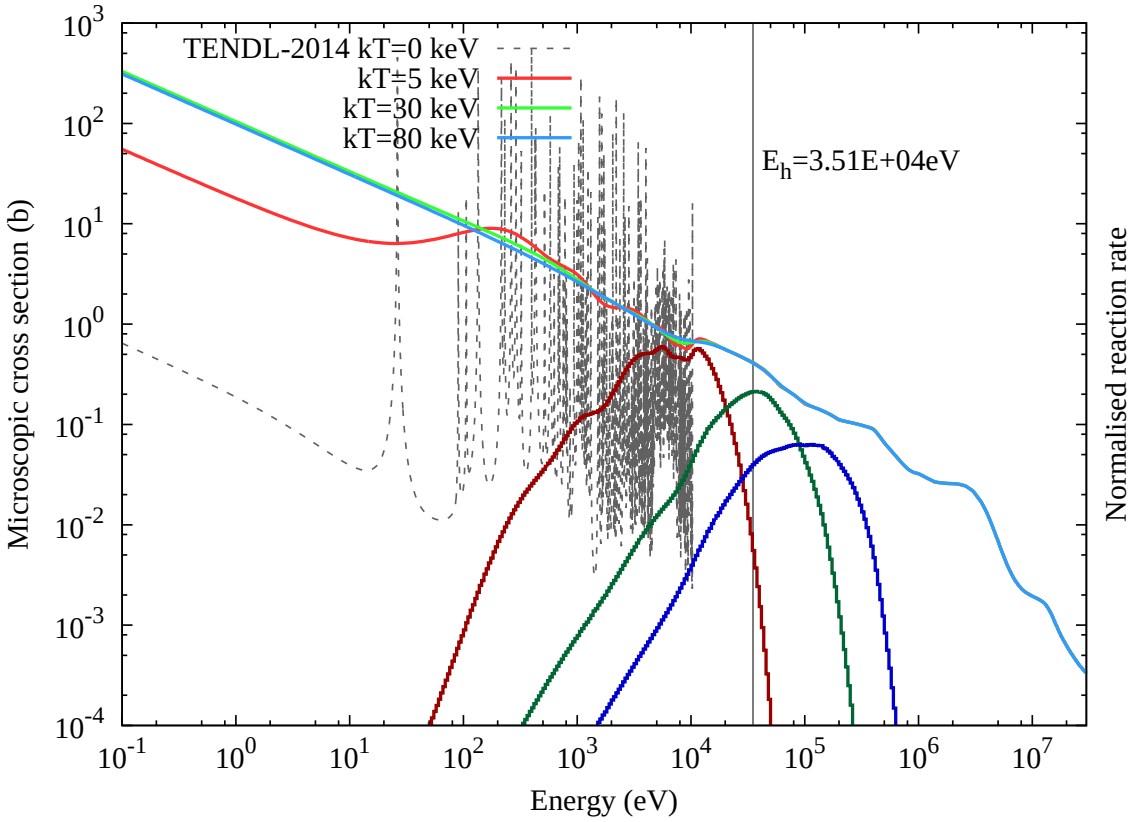


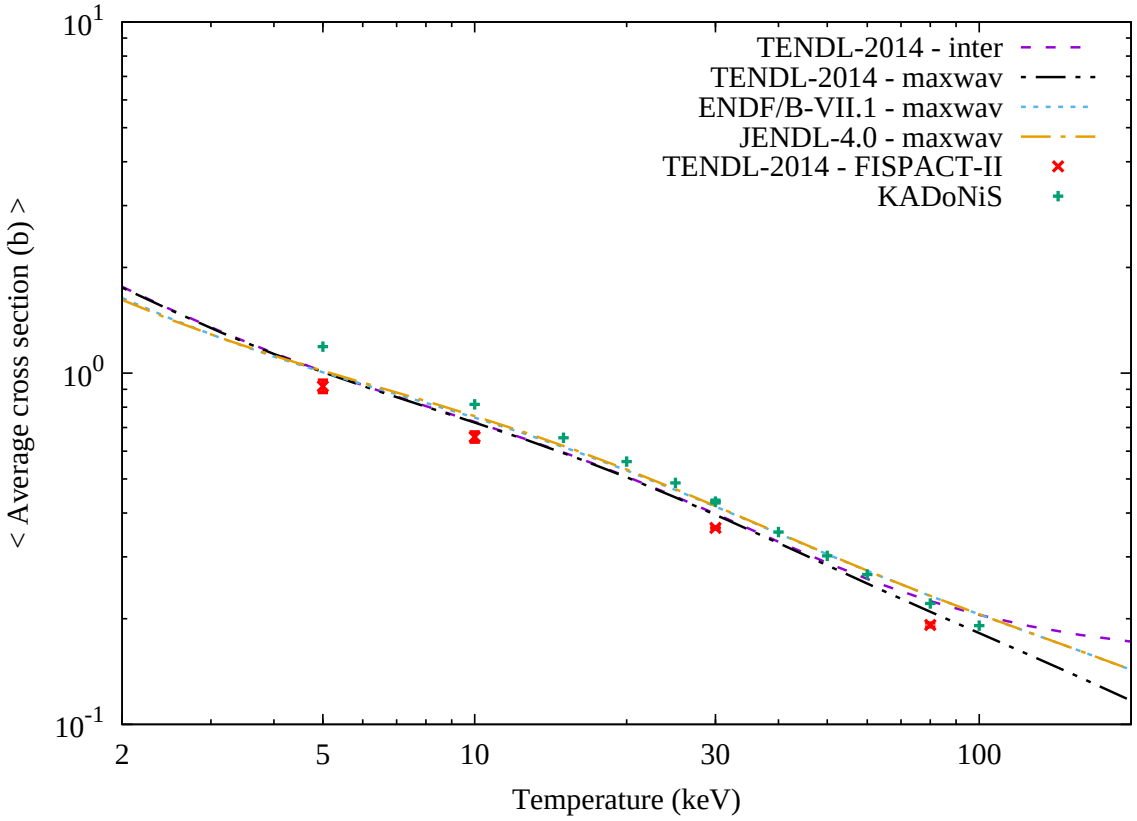
$^{124}Te_{52}$ [Stable]



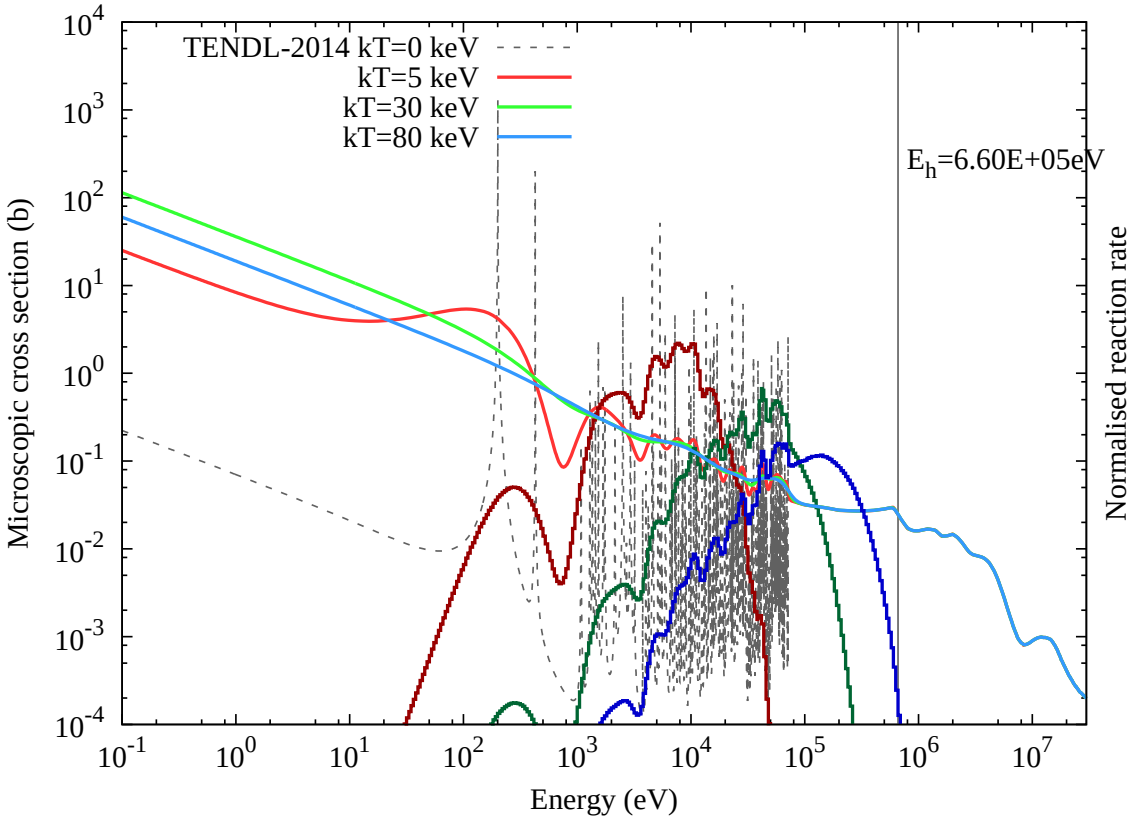


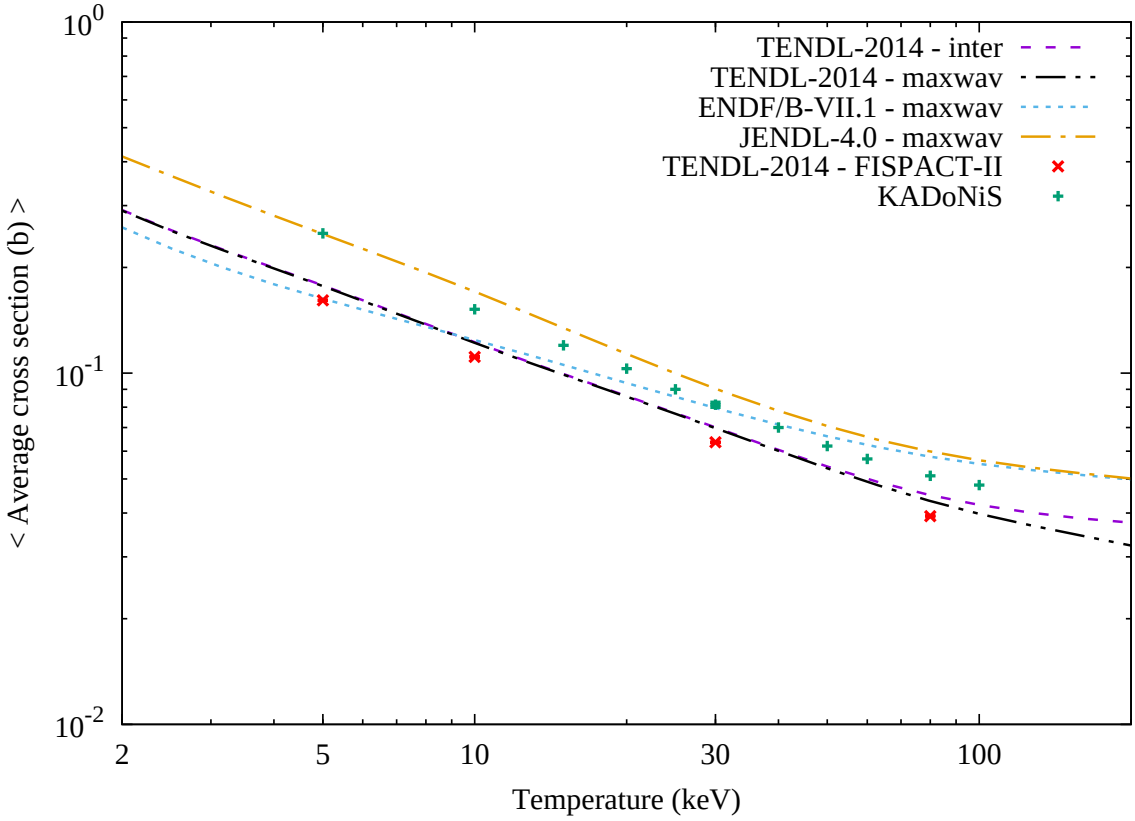
$^{125}Te_{52}$ [Stable]



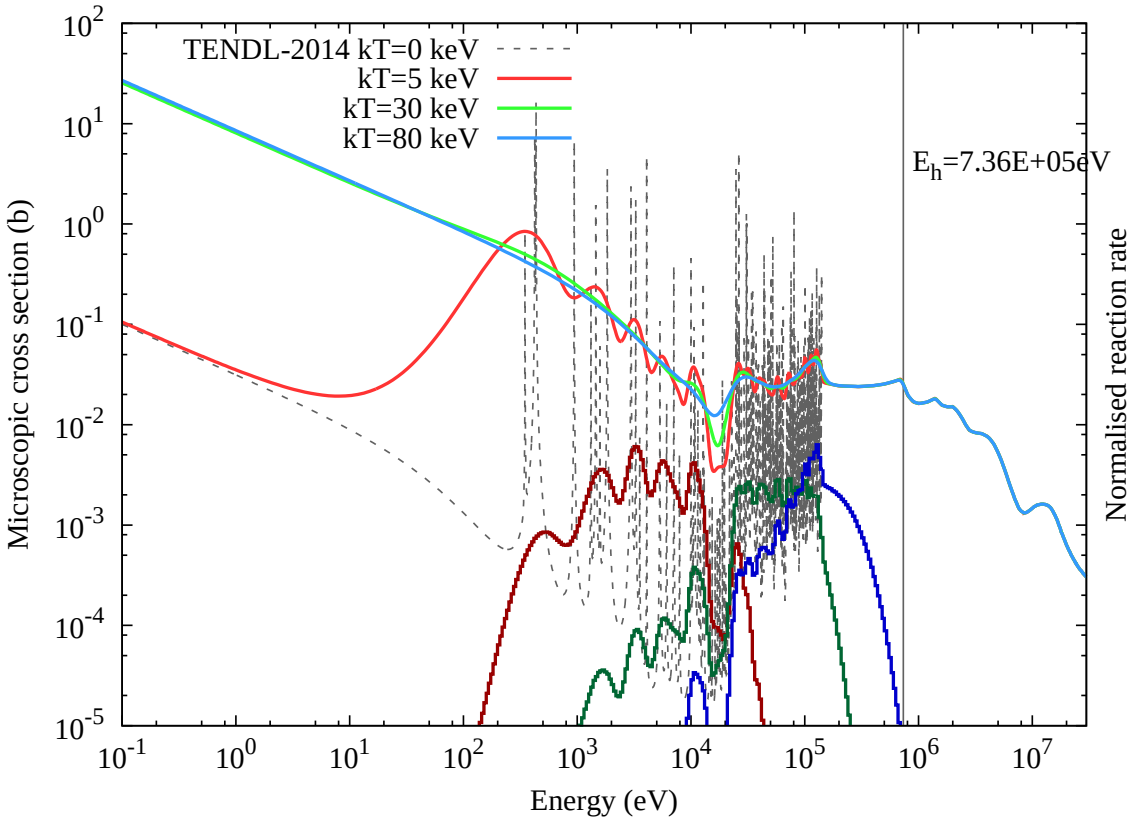


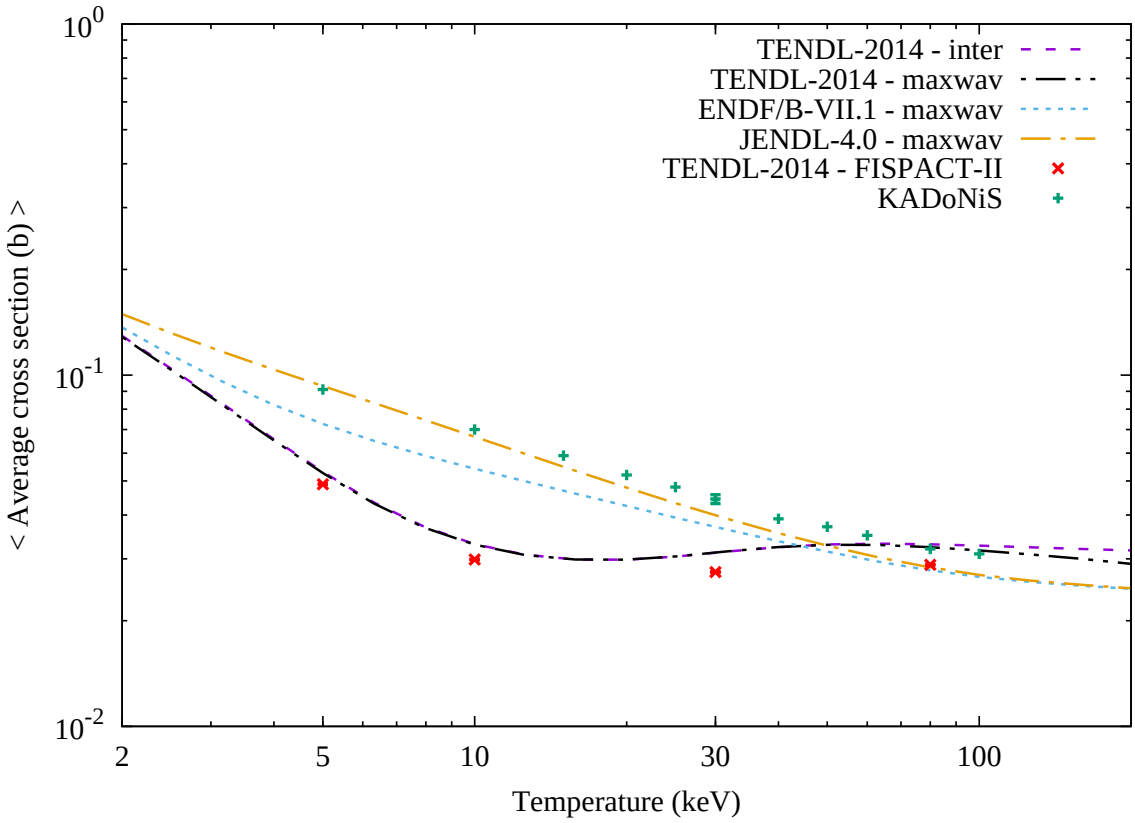
$^{126}Te_{52}$ [Stable]



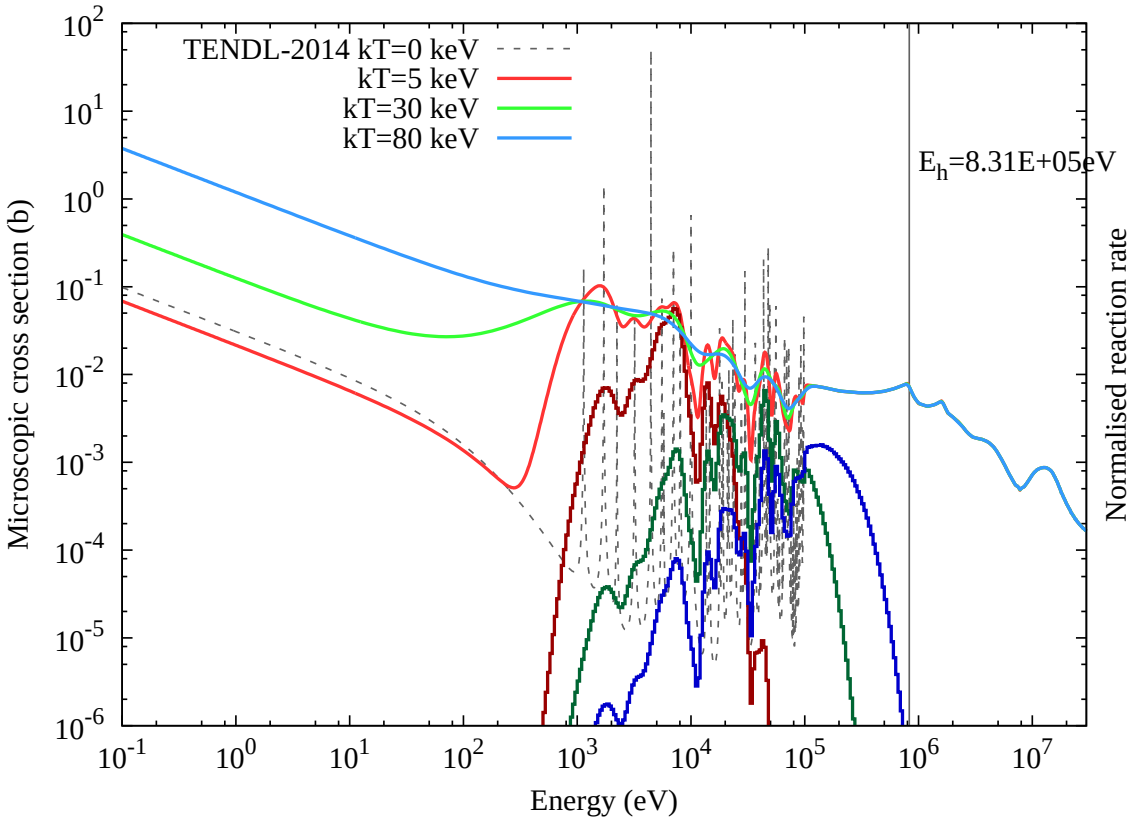


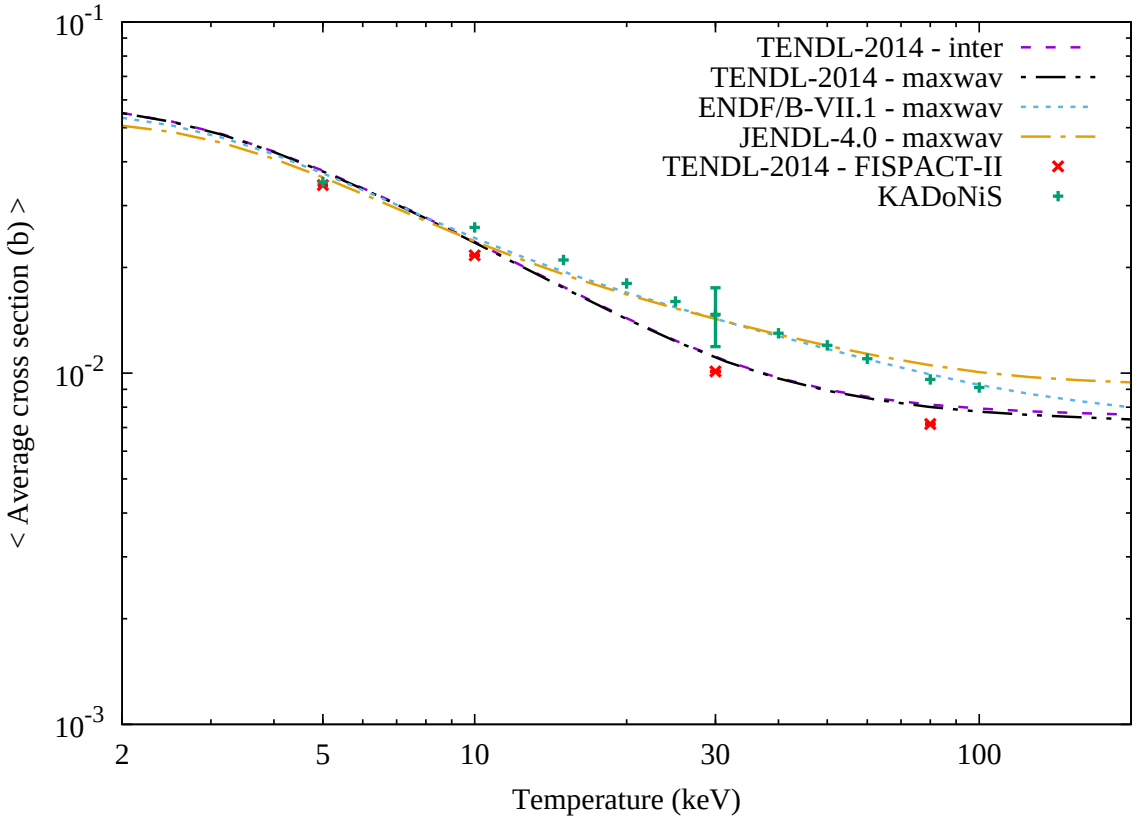
$^{128}Te_{52}$ $[T_{1/2} = 2.20 \times 10^{24}$ years$]$



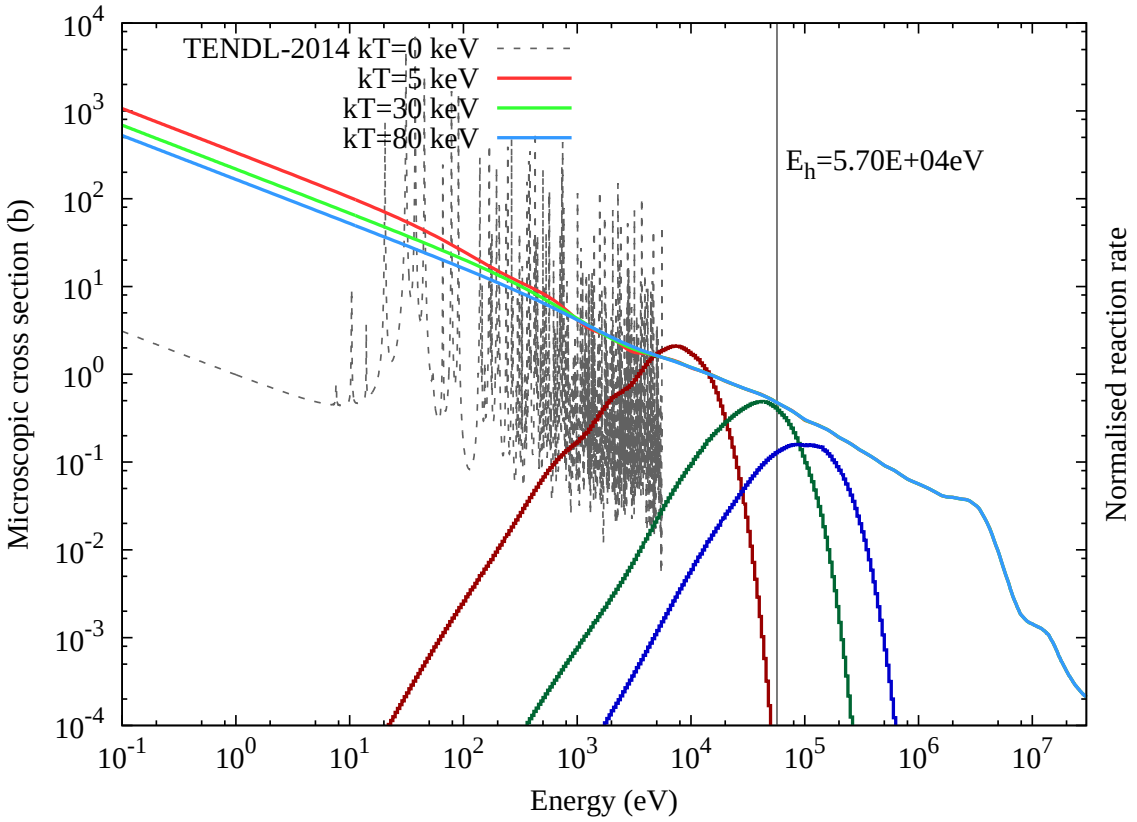


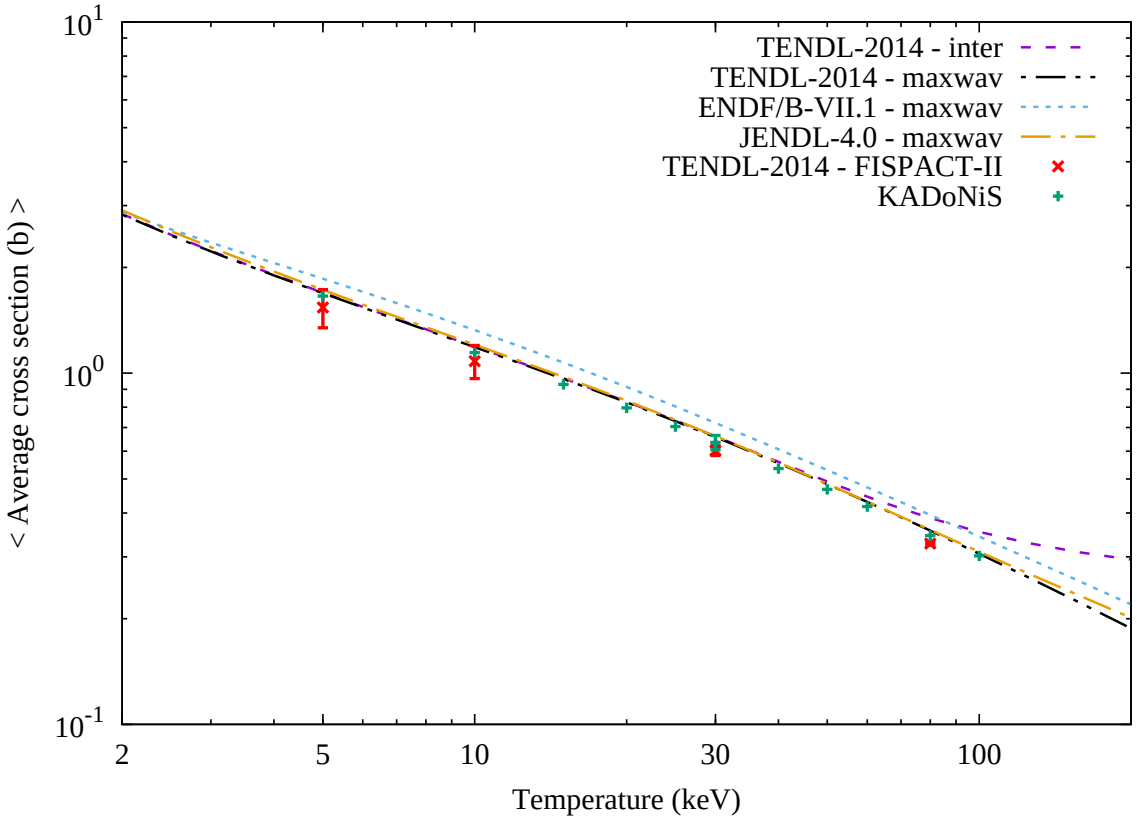
$^{130}Te_{52}$ $[T_{1/2} = 7.90 \times 10^{23}$ years$]$



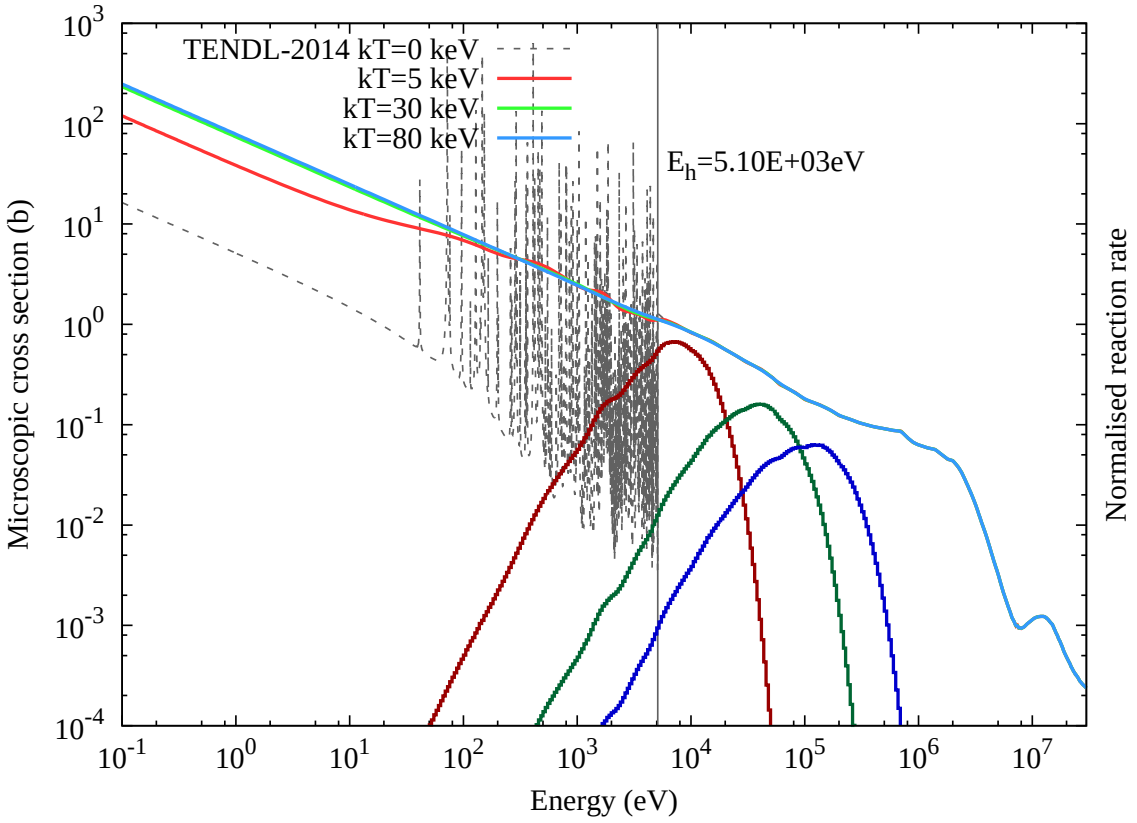


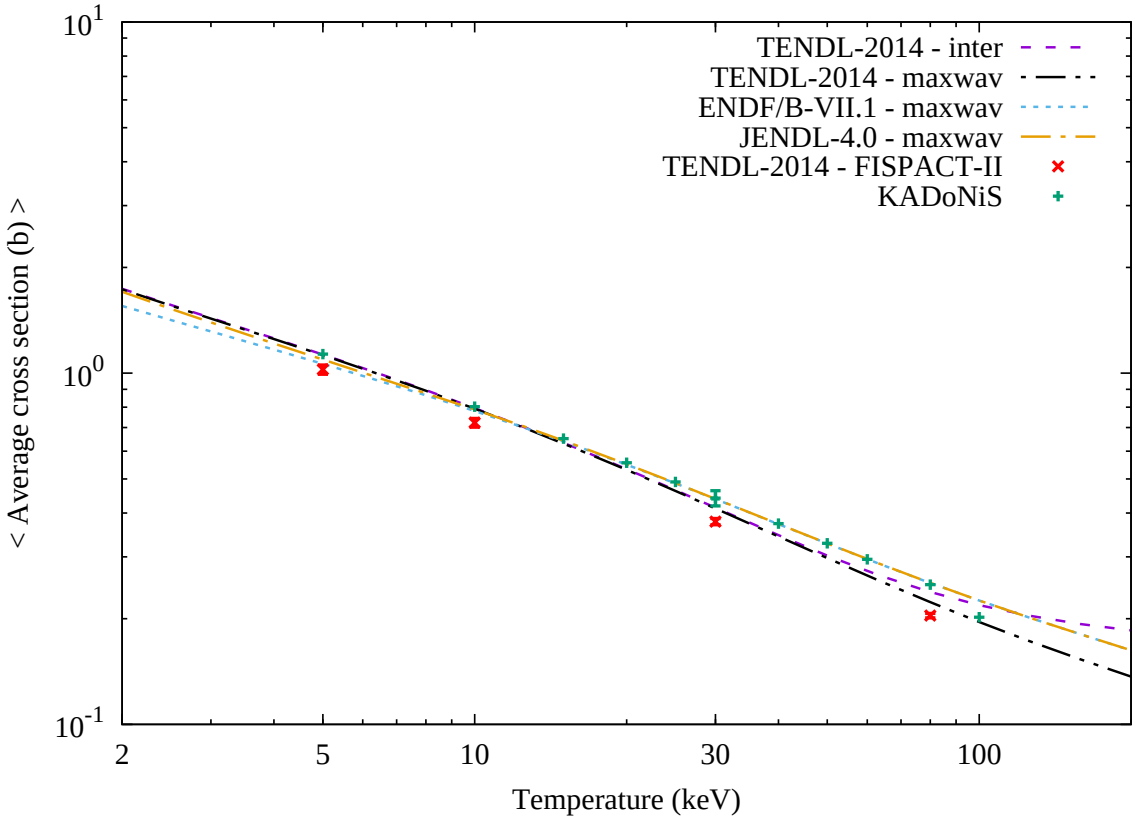
$^{127}I_{53}$ [Stable]



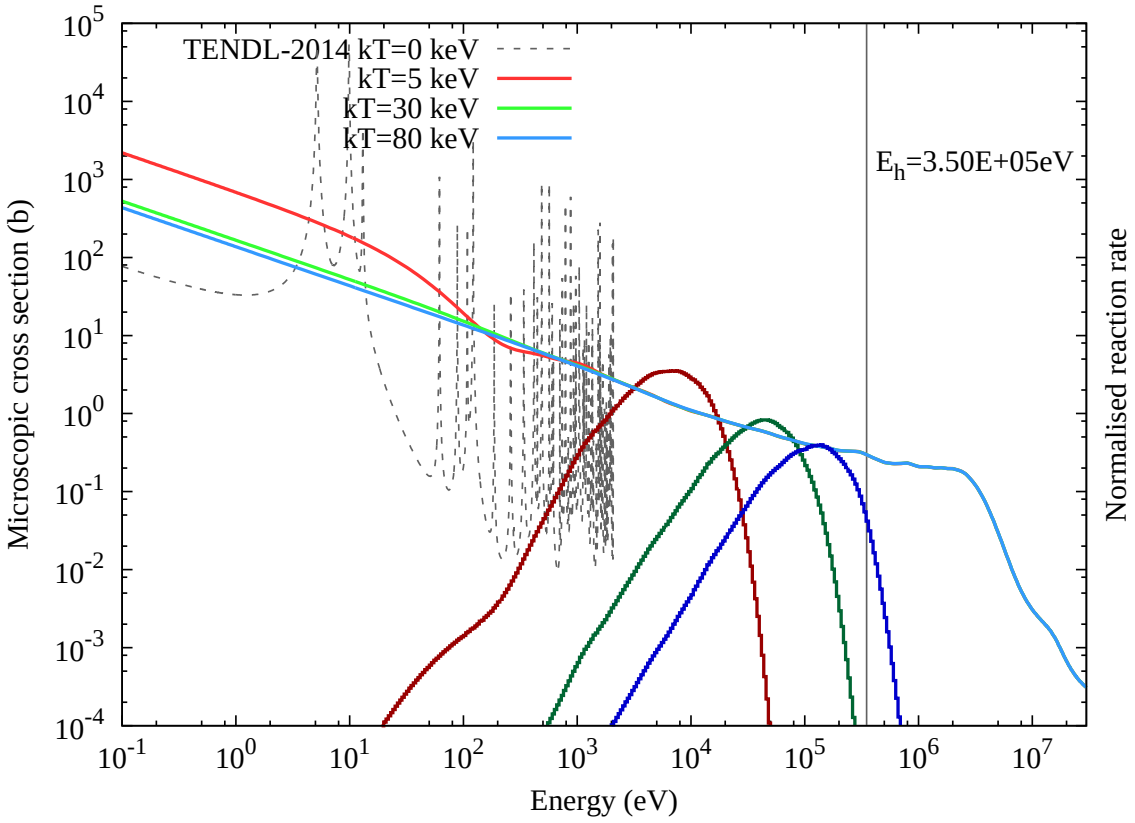


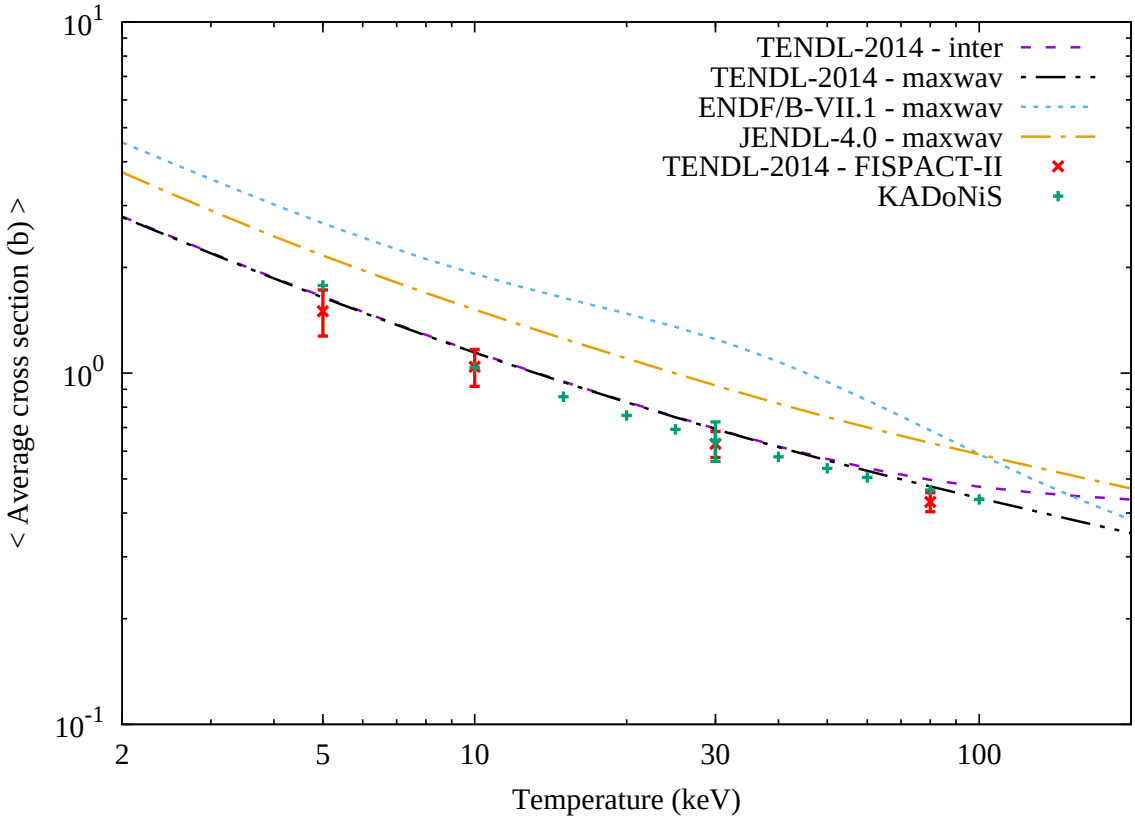
$^{129}I_{53}$ $[T_{1/2} = 1.61 \times 10^7$ years$]$



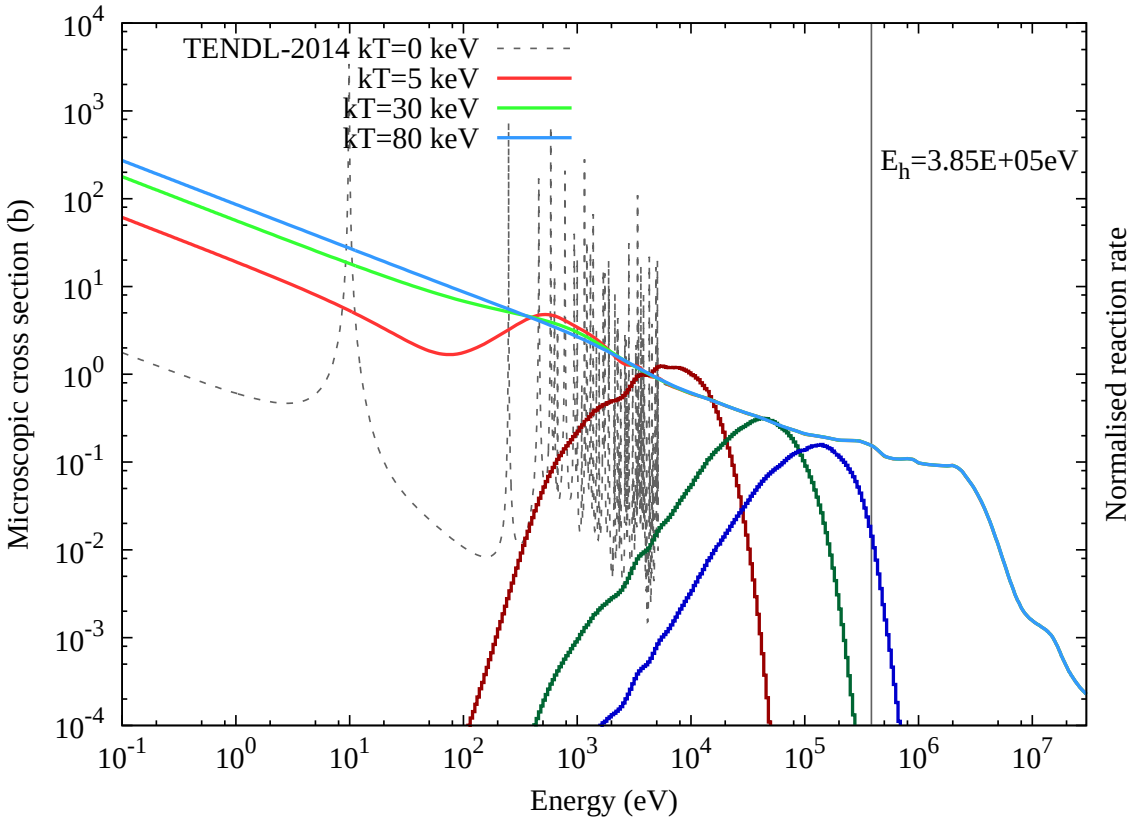


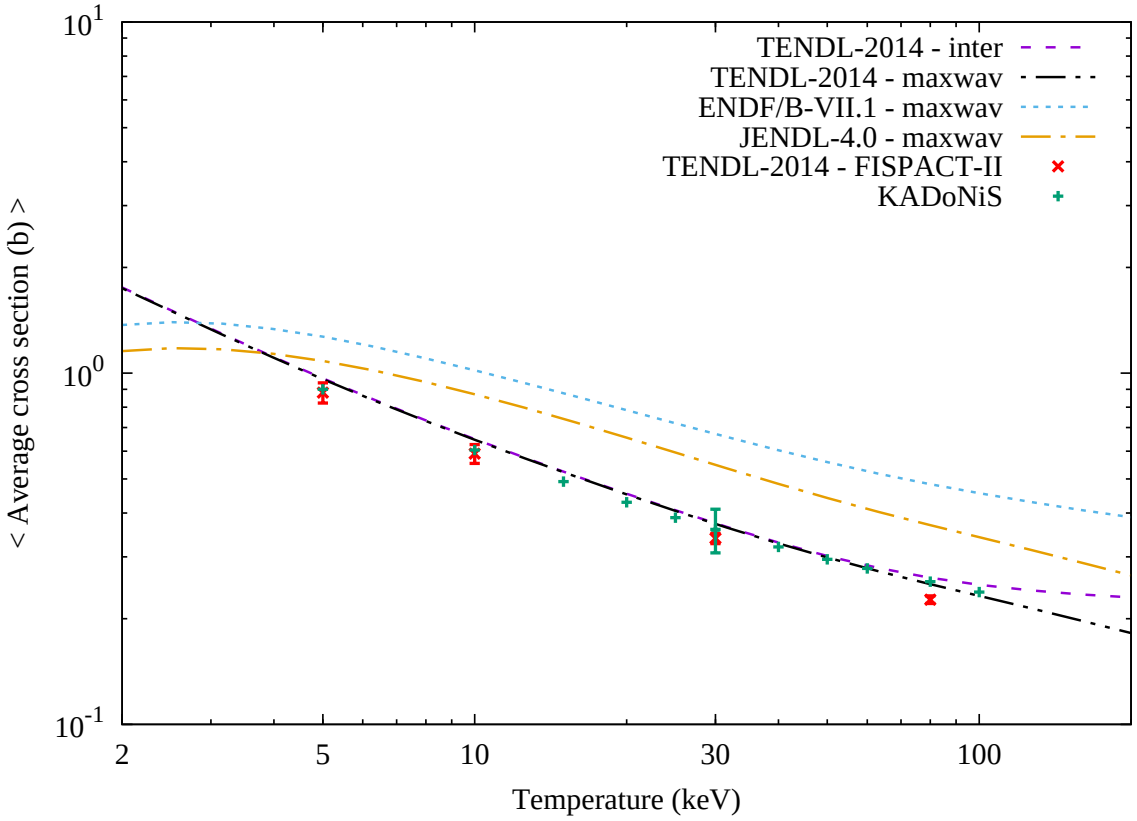
$^{124}Xe_{54}$ $[T_{1/2} = 2.00 \times 10^{14}$ years$]$



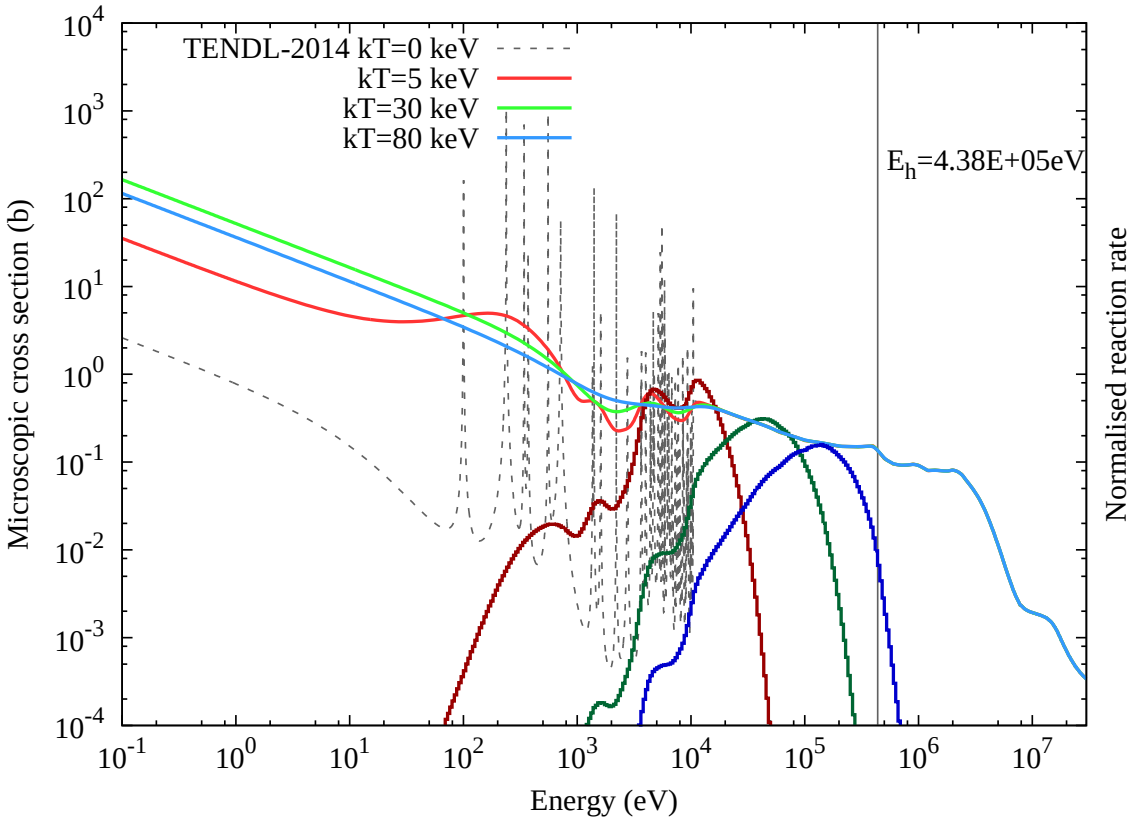


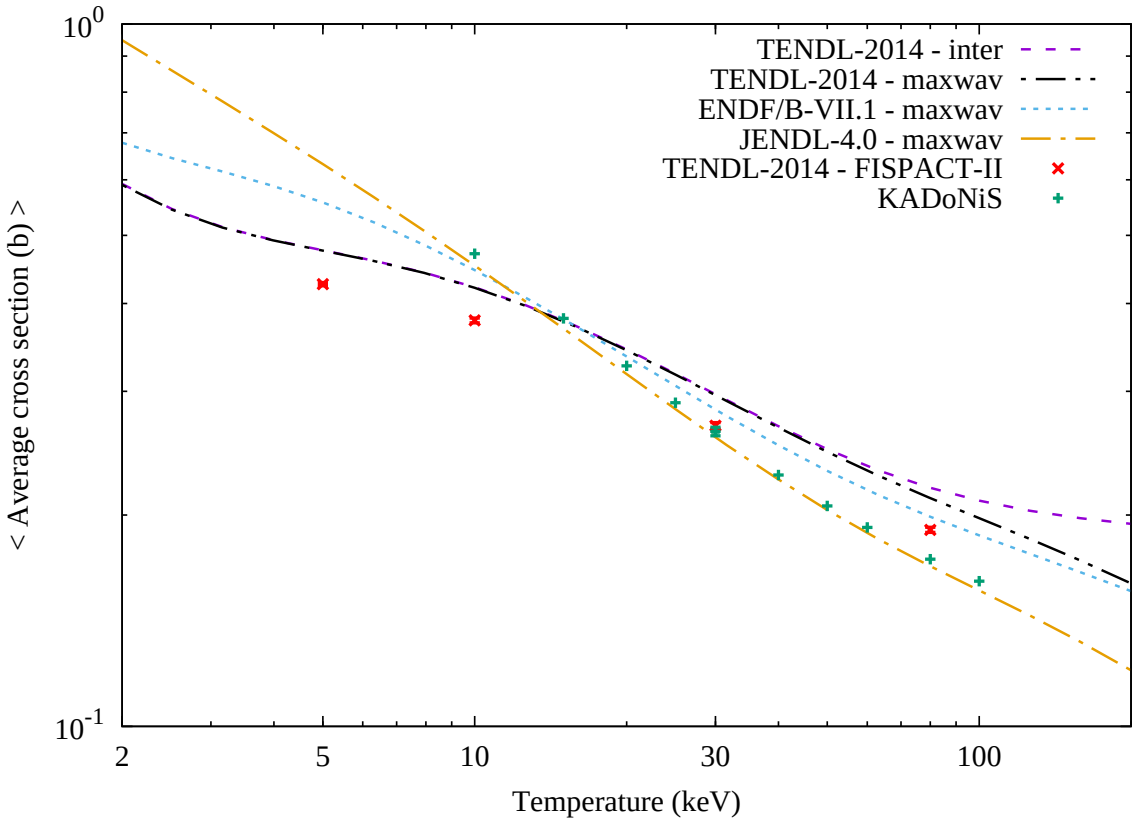
$^{126}Xe_{54}$ [Stable]



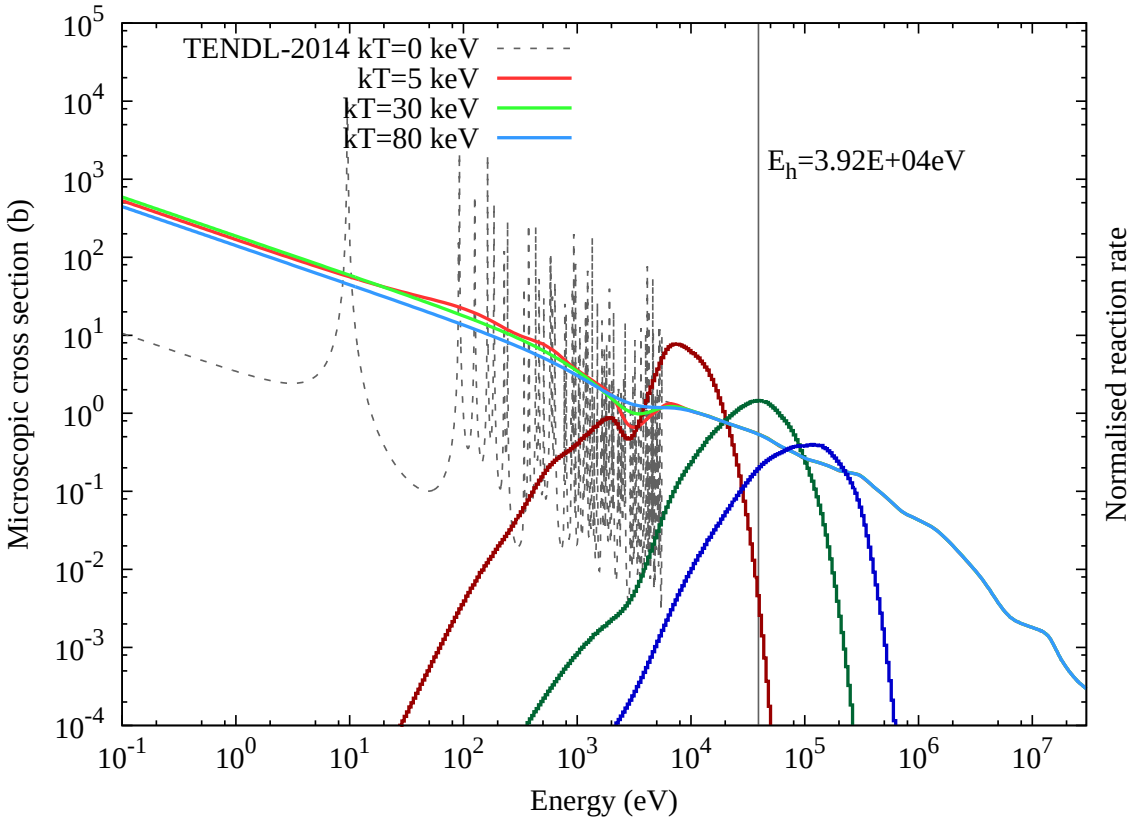


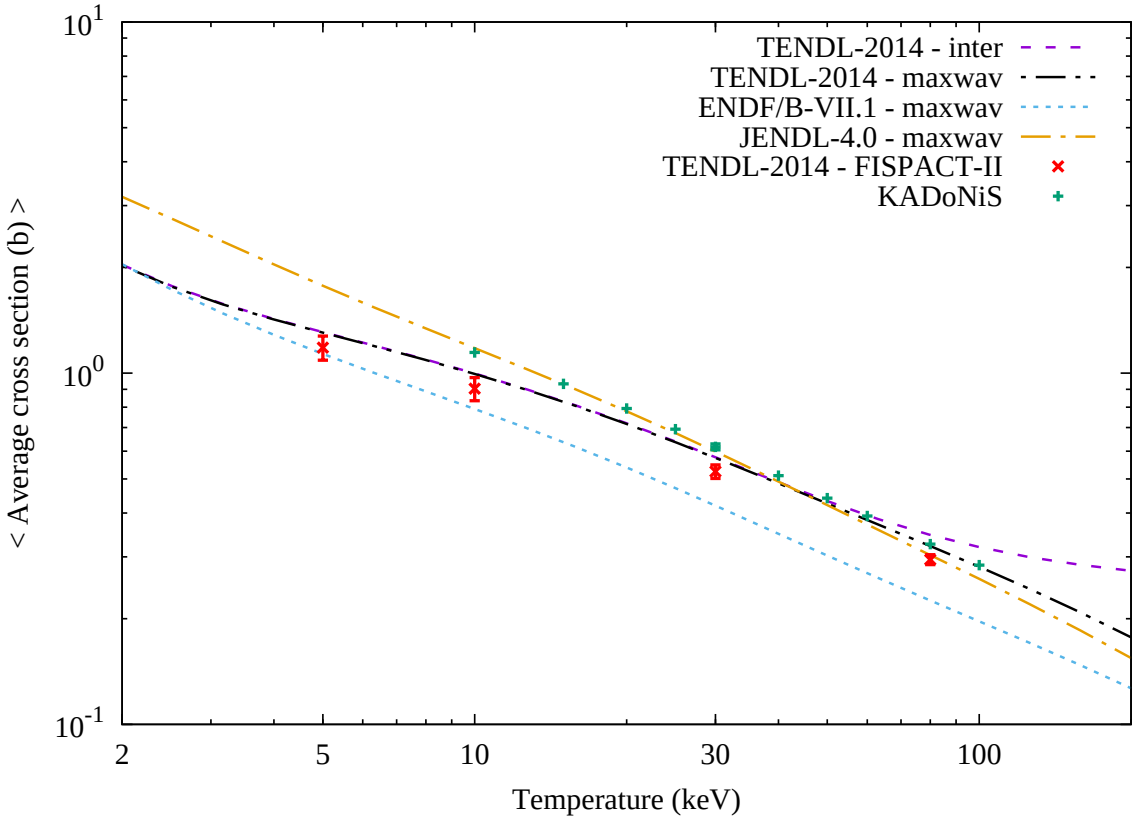
$^{128}Xe_{54}$ [Stable]



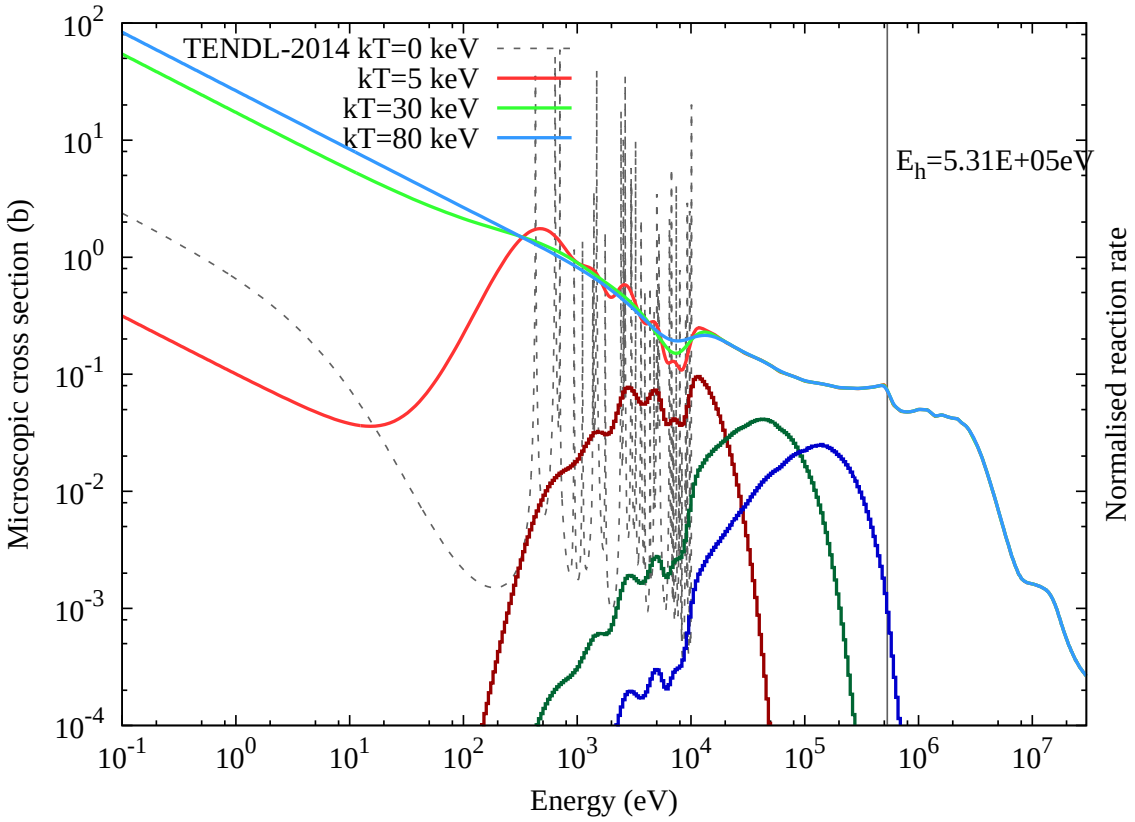


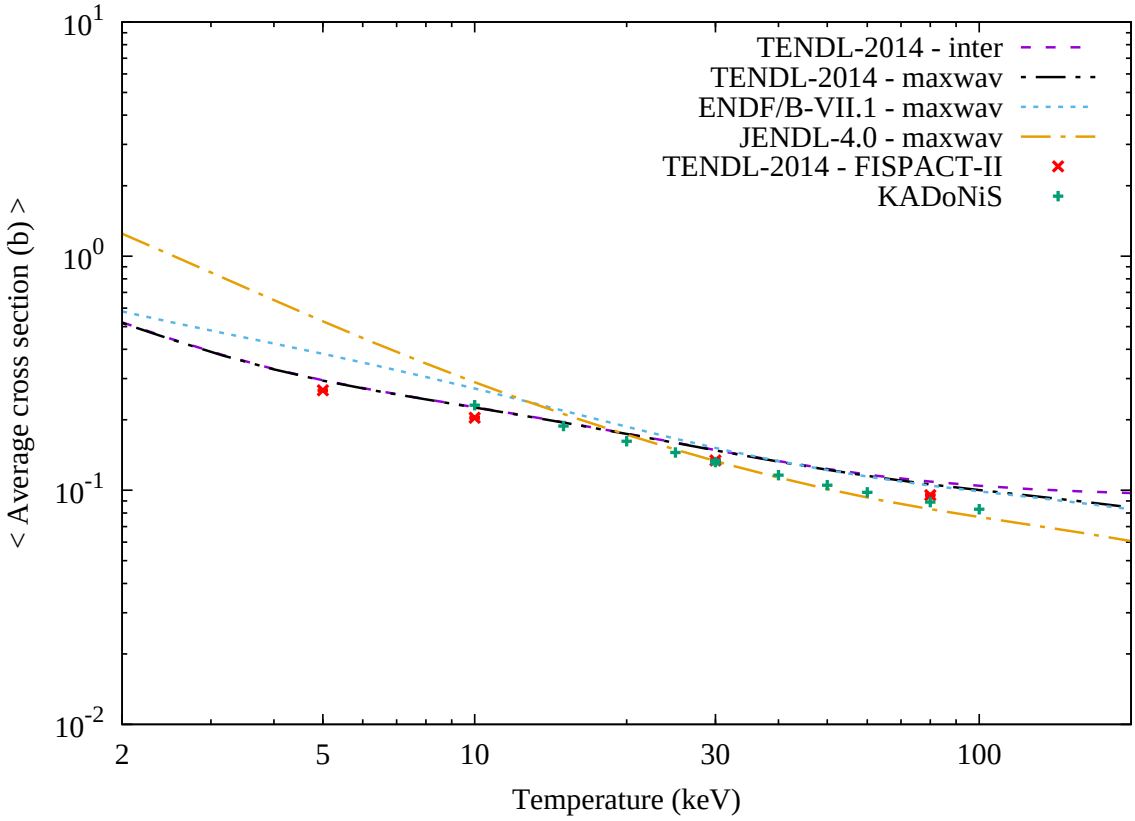
$^{129}Xe_{54}$ [Stable]



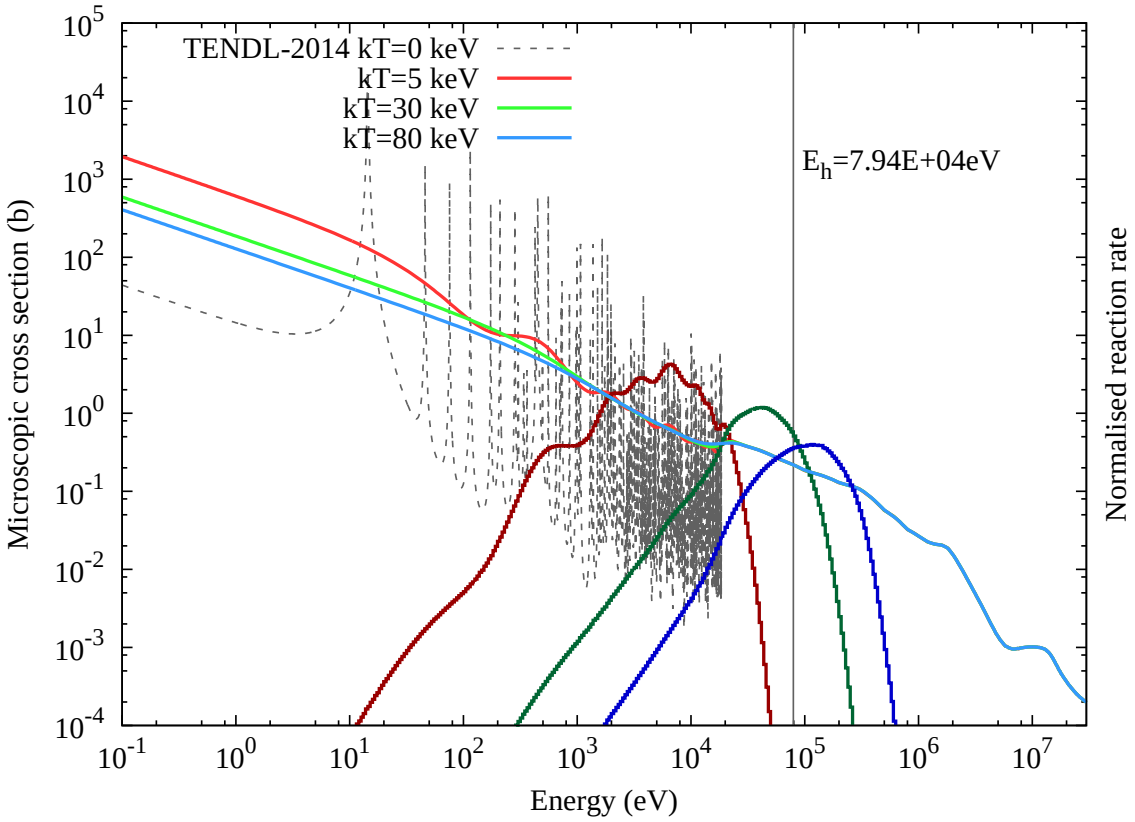


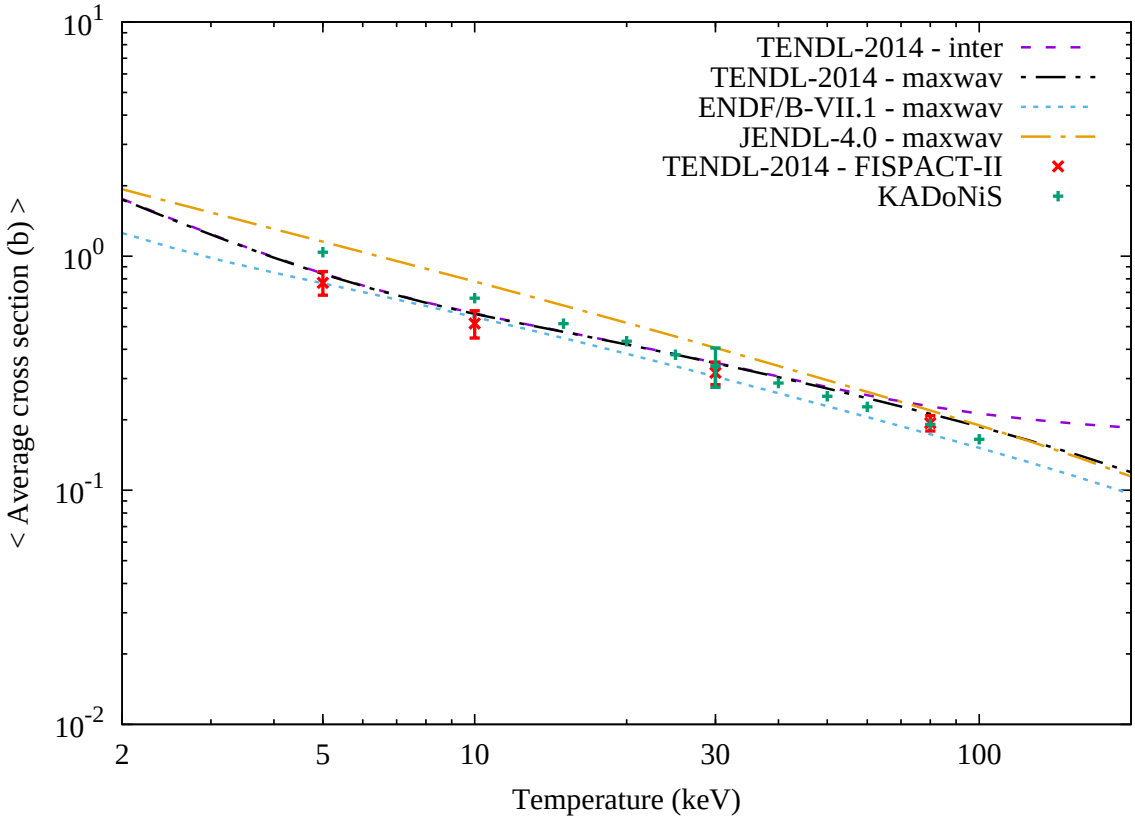
$^{130}Xe_{54}$ [Stable]



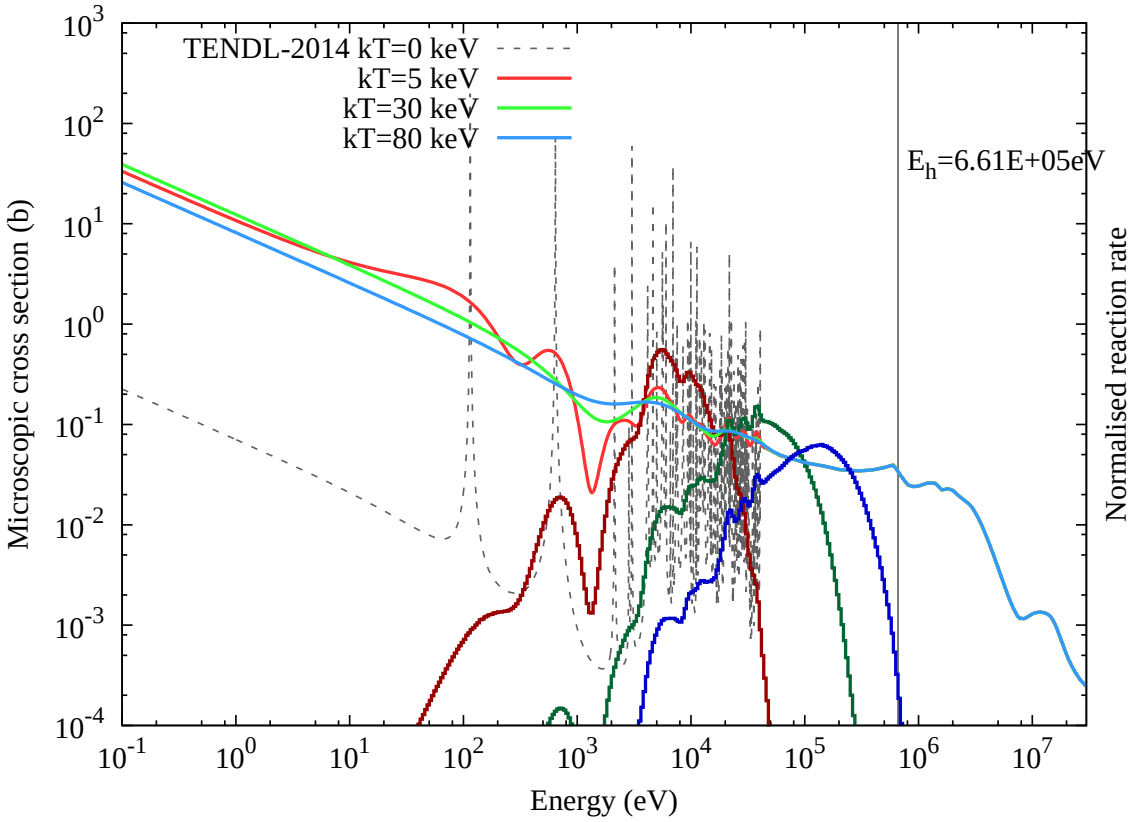


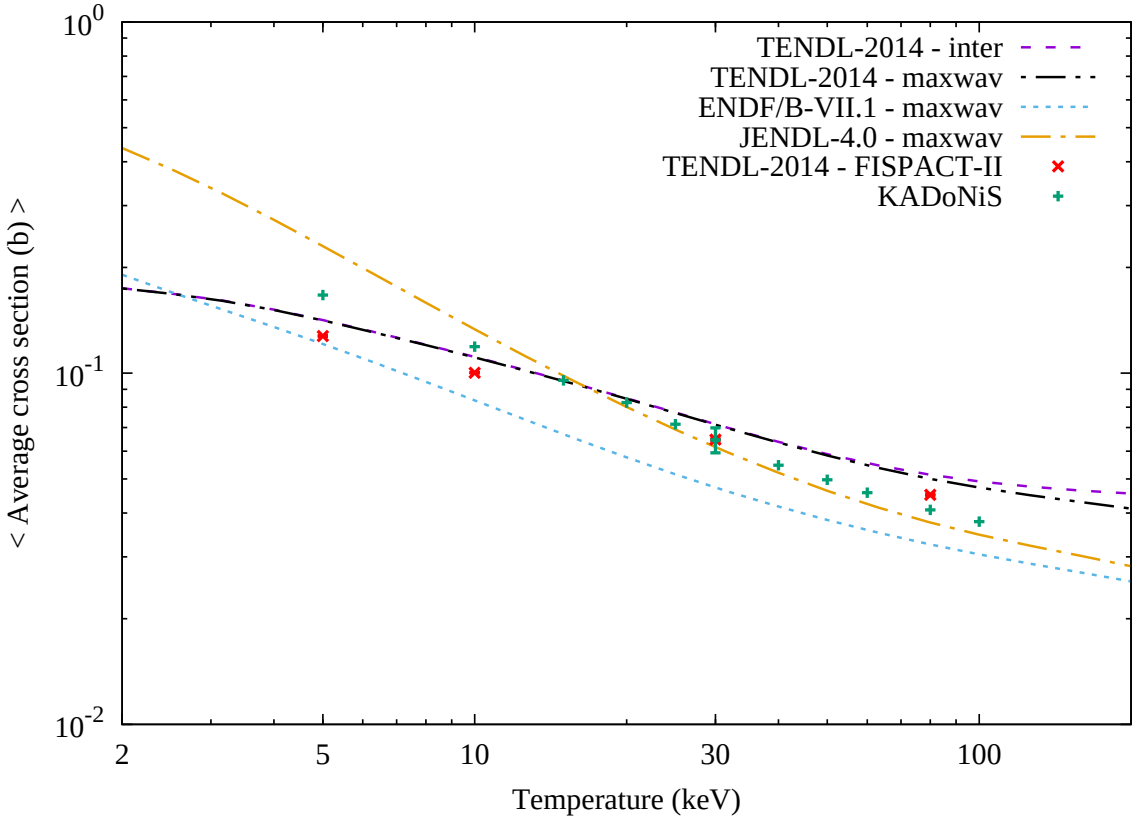
$^{131}Xe_{54}$ [Stable] (KADoNiS=SMC)



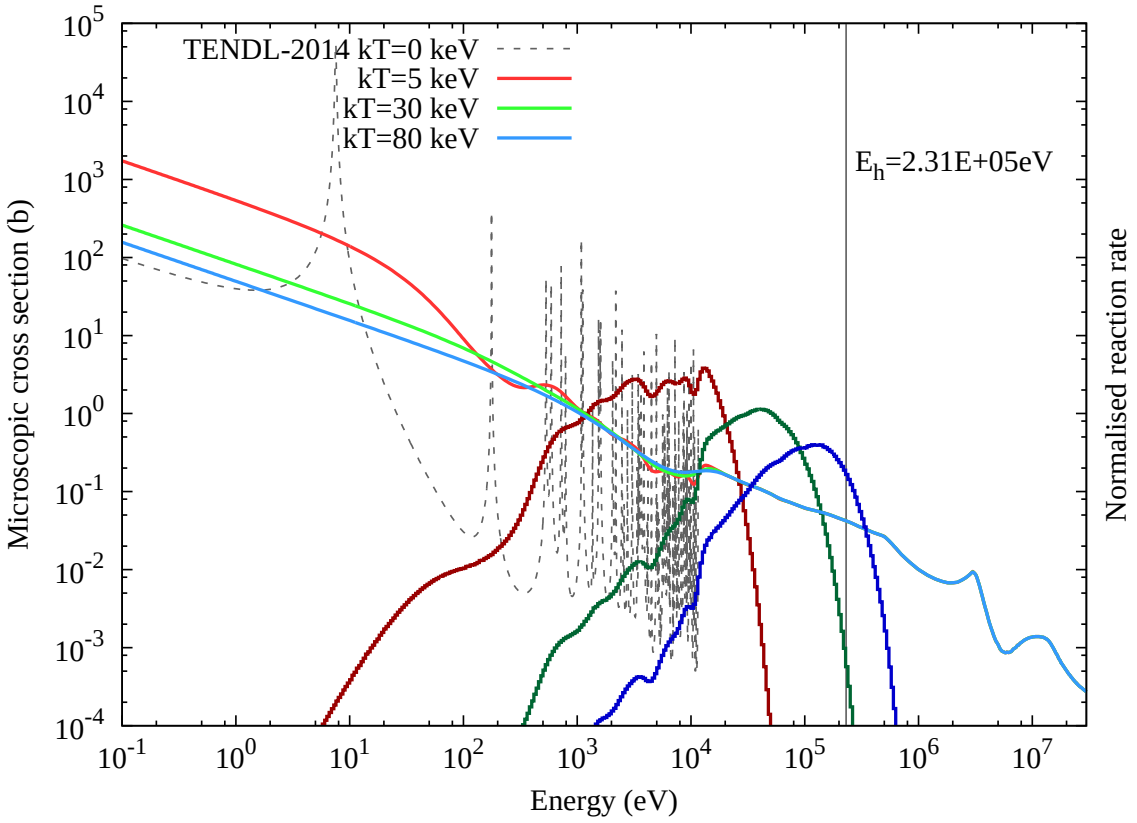


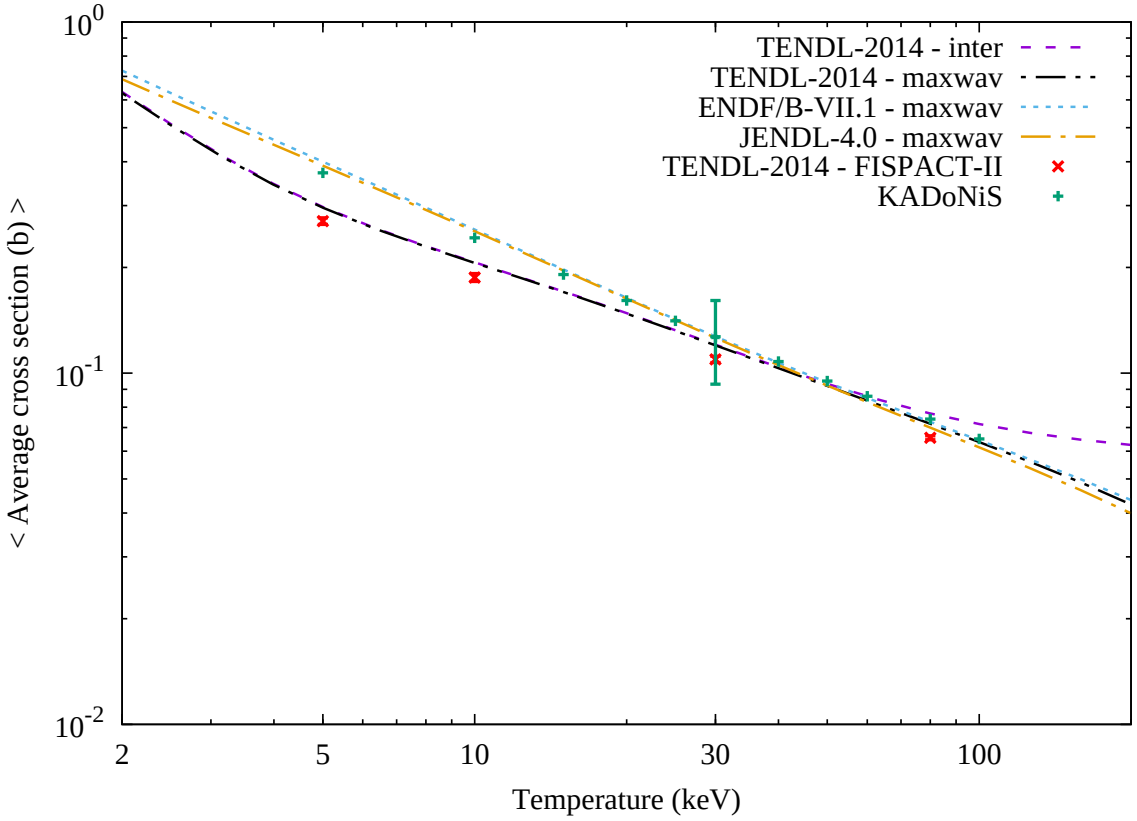
$^{132}Xe_{54}$ [Stable]



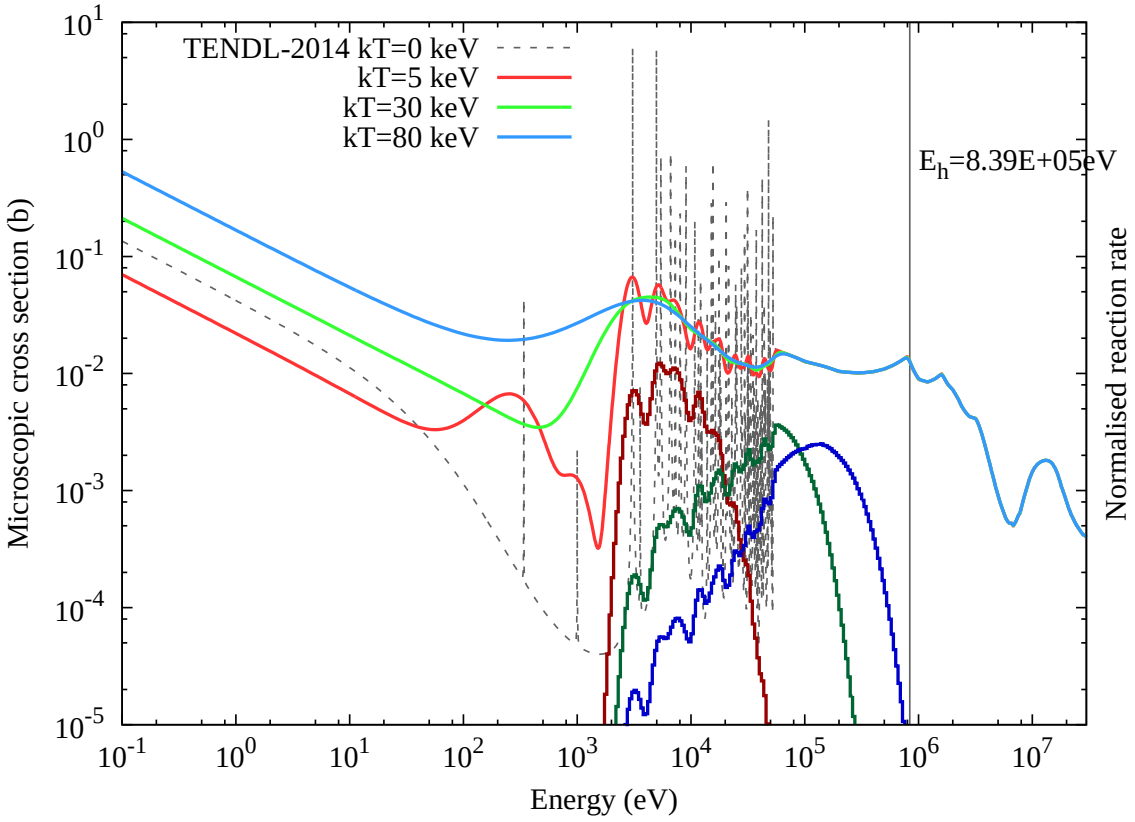


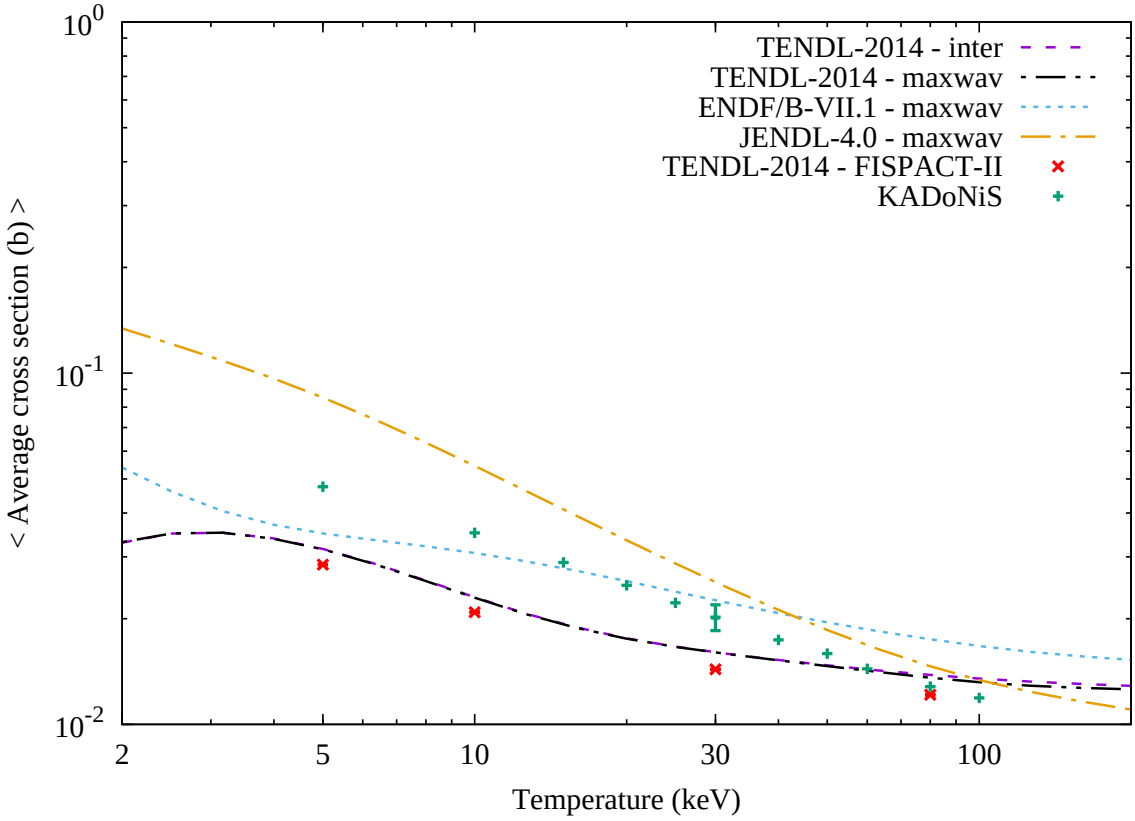
$^{133}Xe_{54}$ $[T_{1/2} = 5.24$ days$]$ (KADoNiS=SMC)



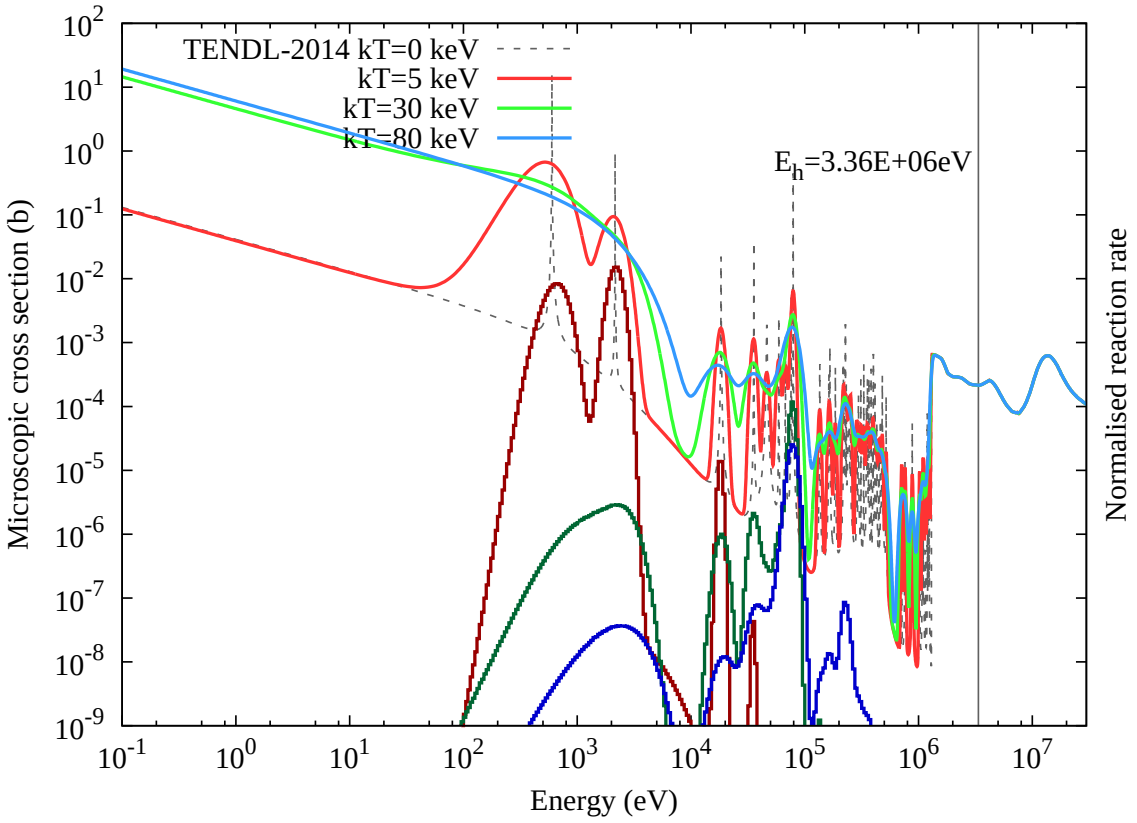


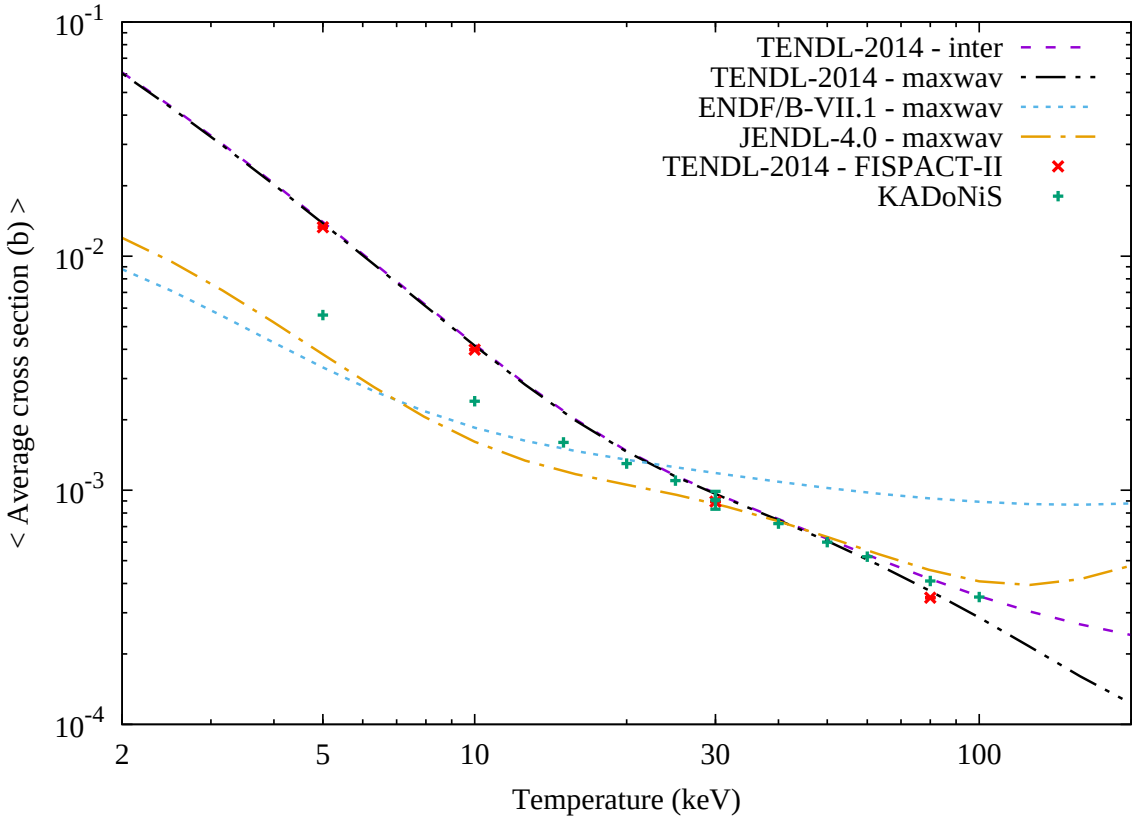
$^{134}Xe_{54}$ $[T_{1/2} = 1.10 \times 10^{16}$ years$]$



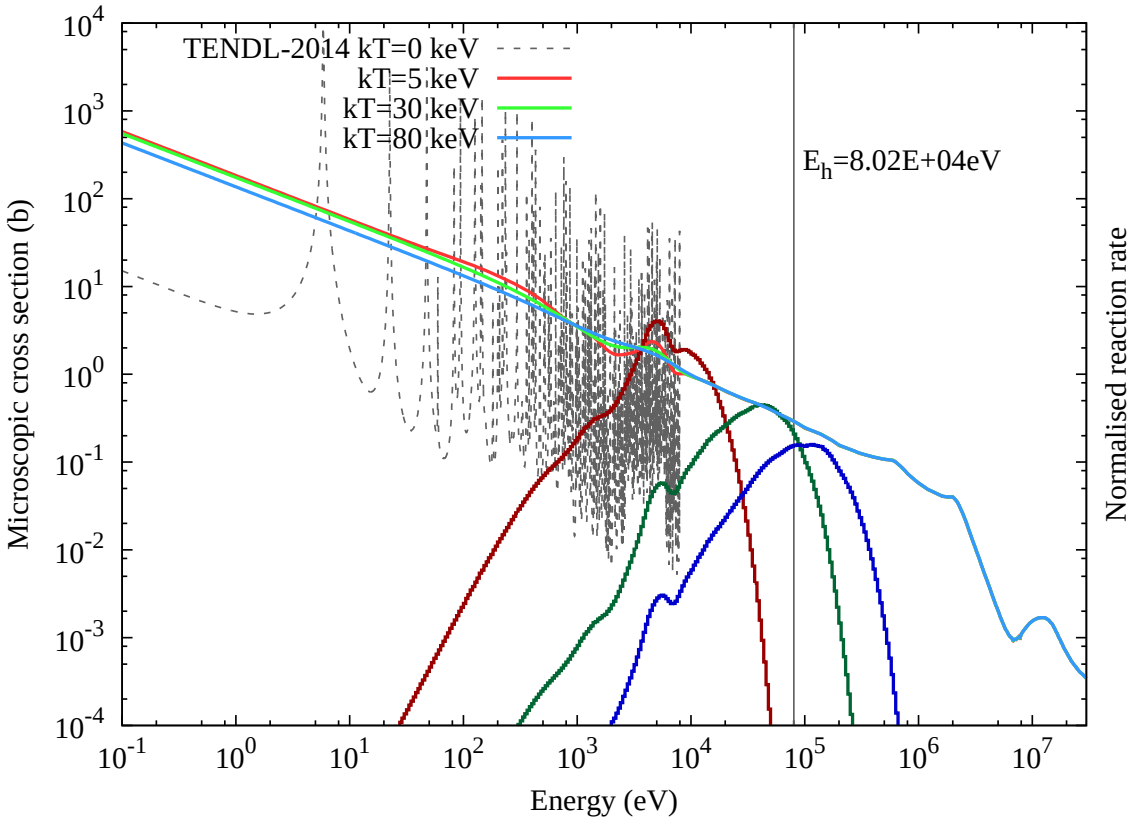


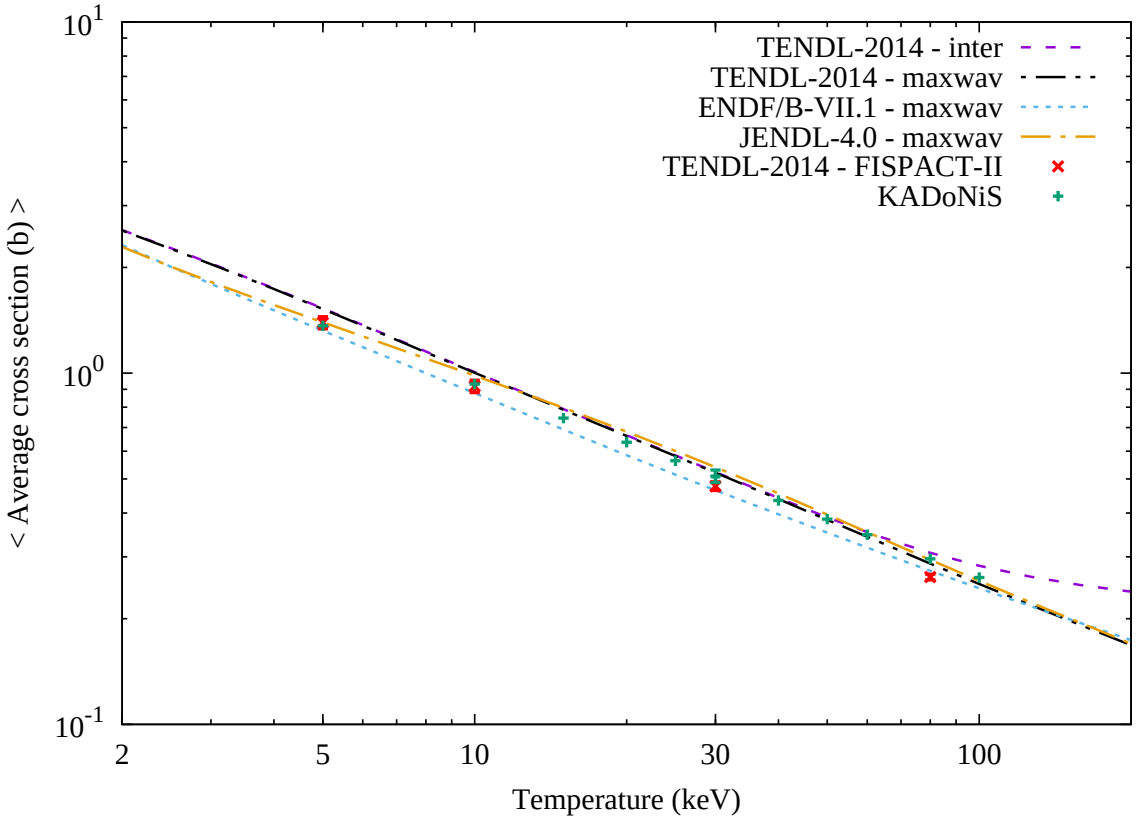
$^{136}Xe_{54}$ $[T_{1/2} = 2.10 \times 10^{20}$ years$]$



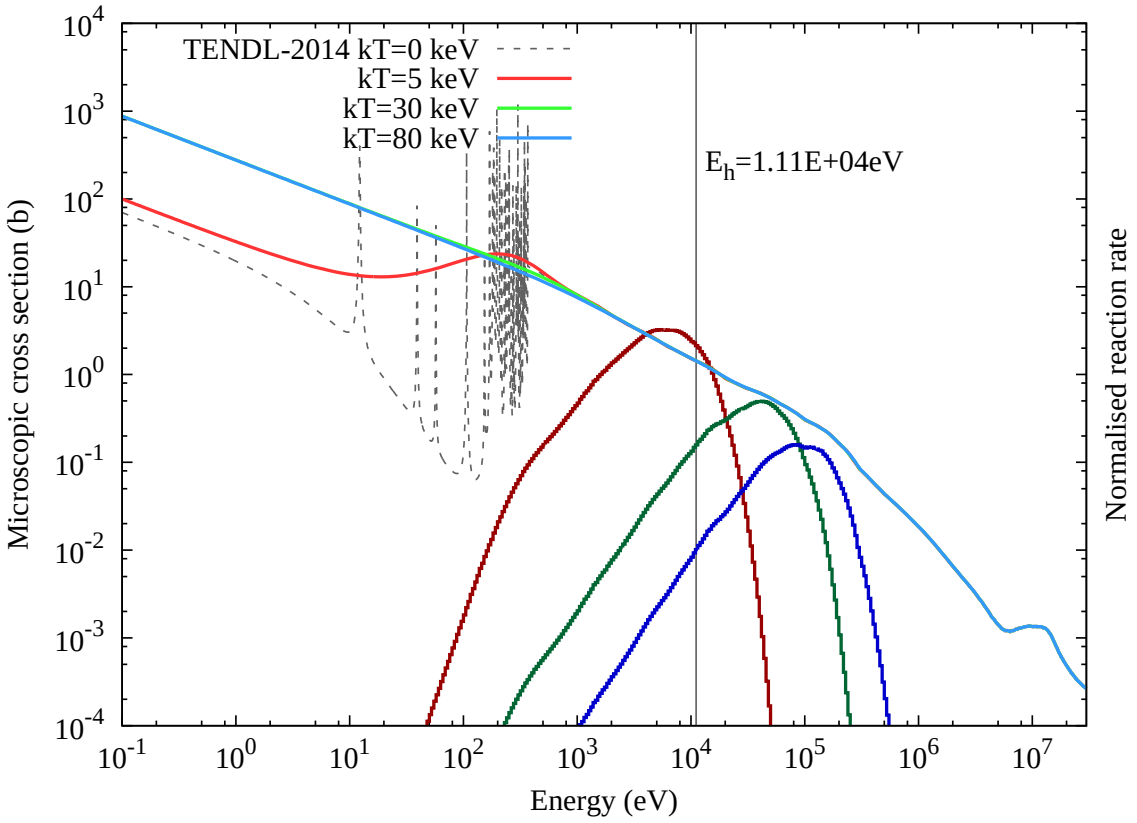


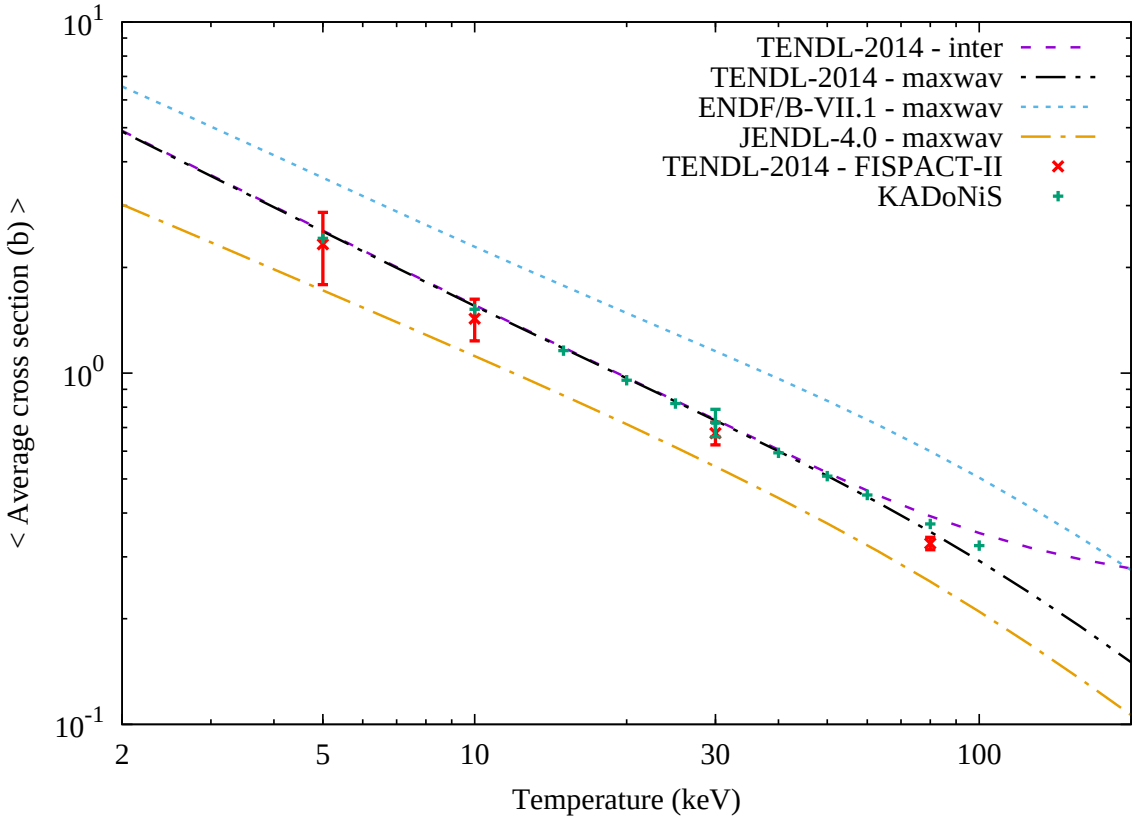
$^{133}Cs_{55}$ [Stable]



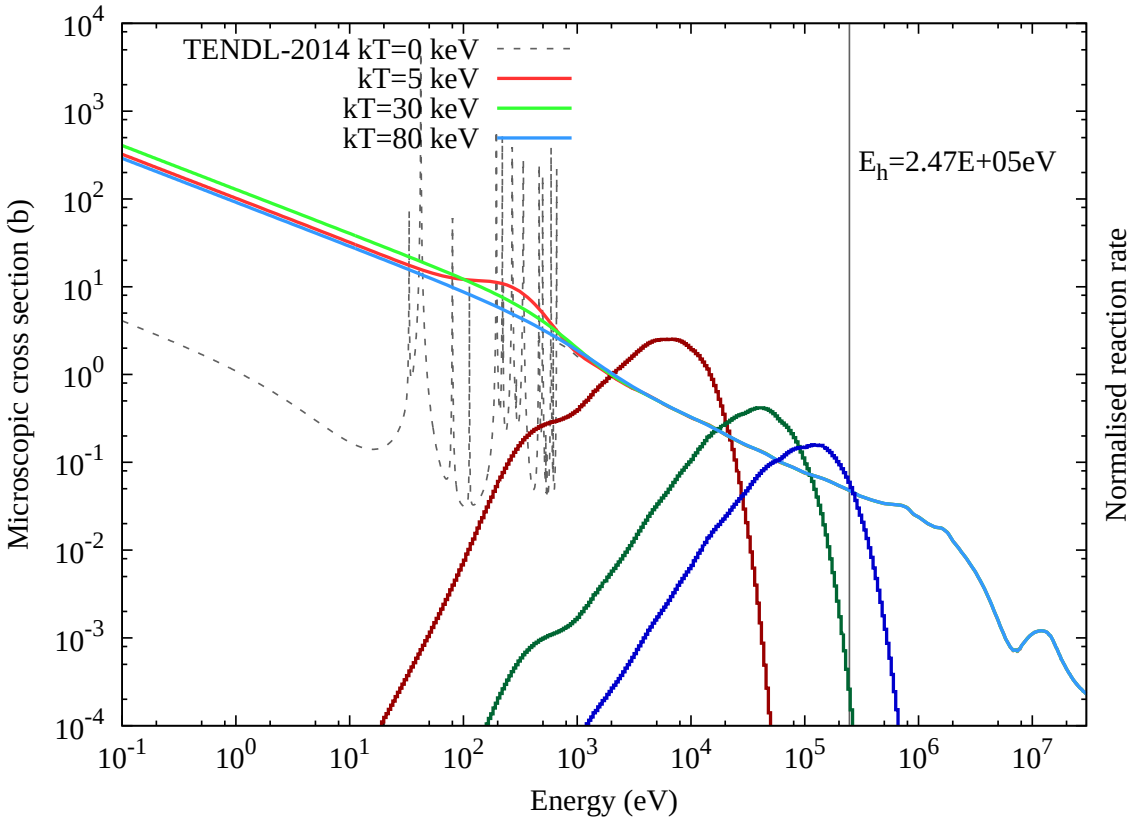


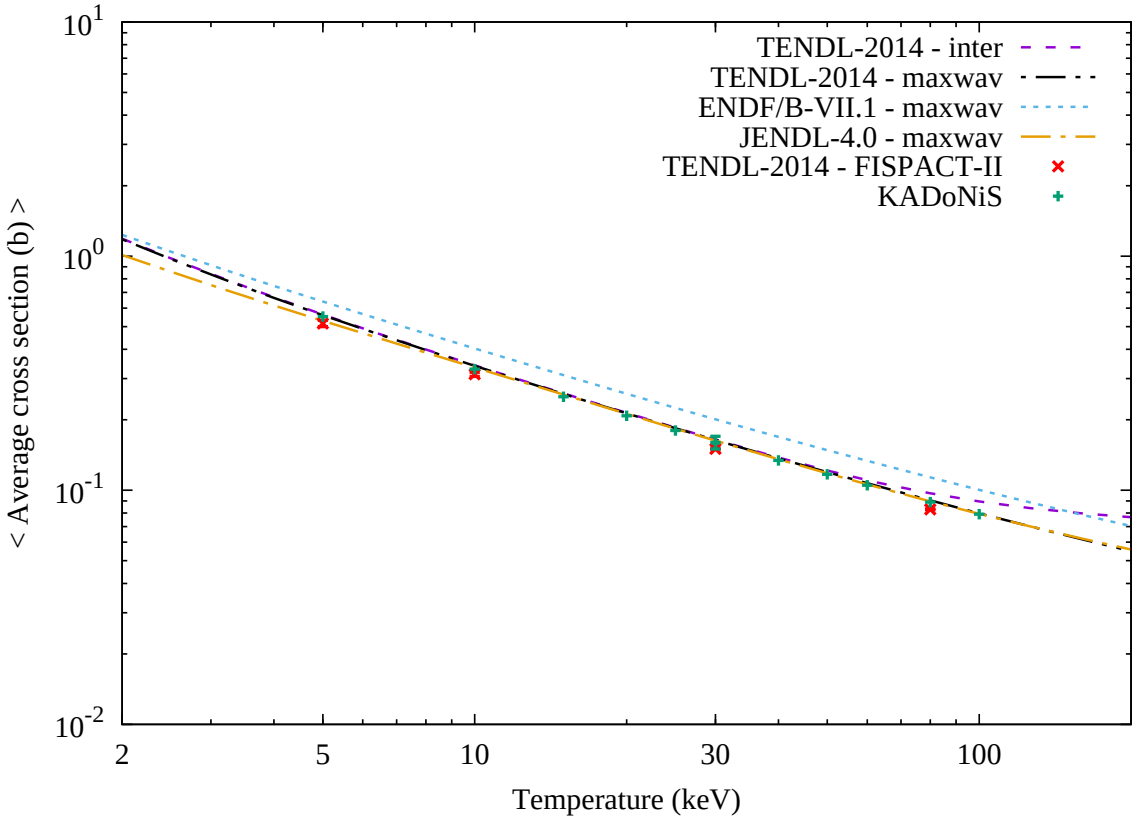
$^{134}Cs_{55}$ [$T_{1/2}$ = 2.07 years] (KADoNiS=SMC)



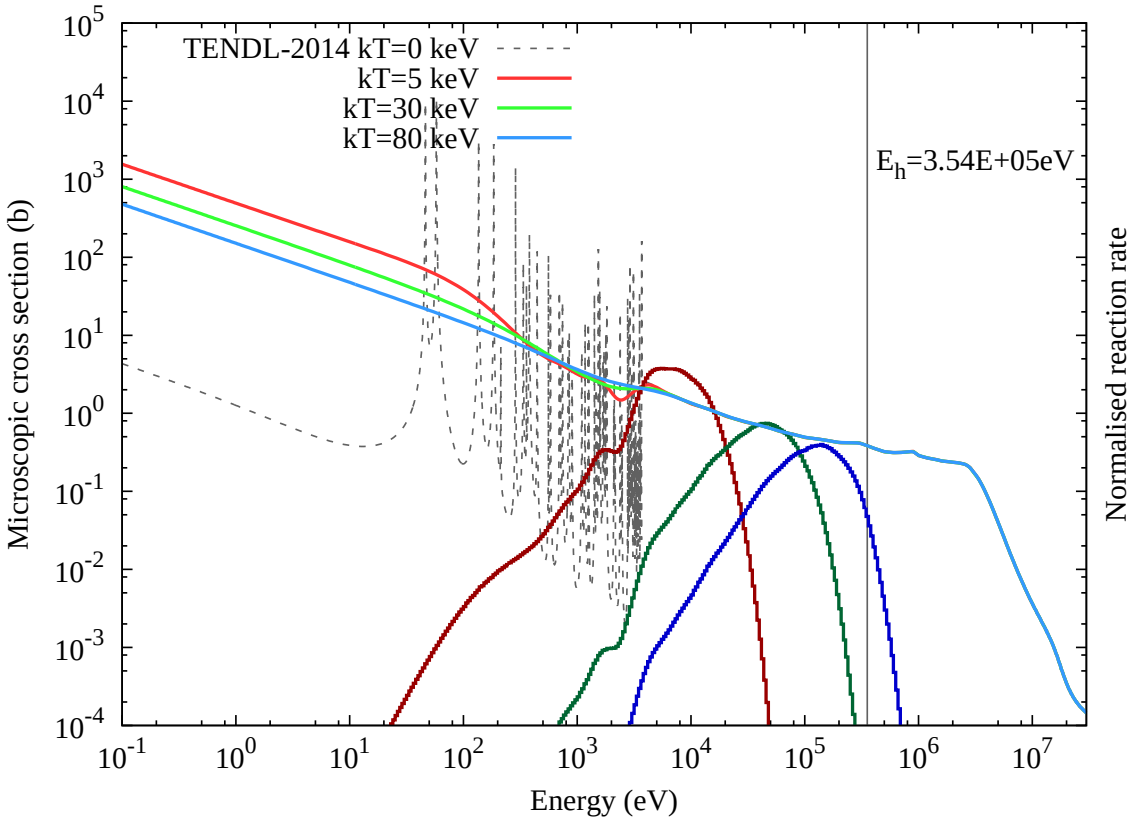


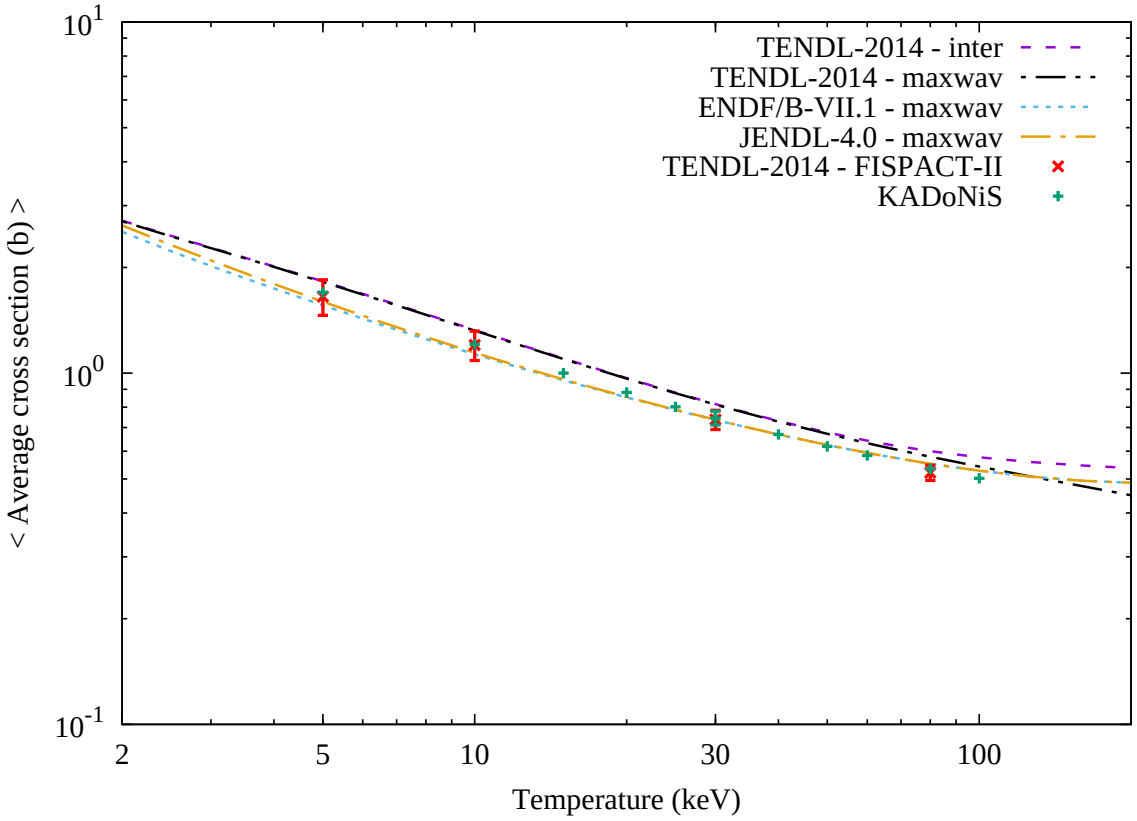
$^{135}Cs_{55}$ $[T_{1/2} = 2.30 \times 10^6$ years$]$



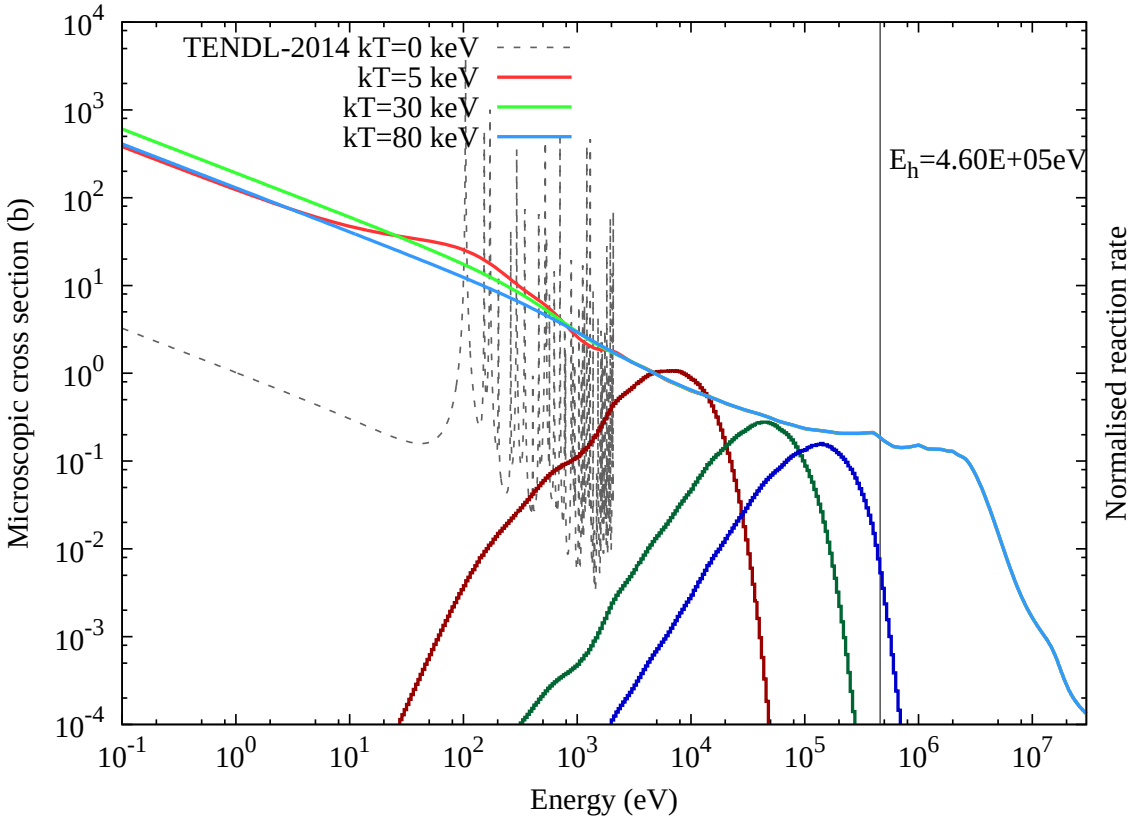


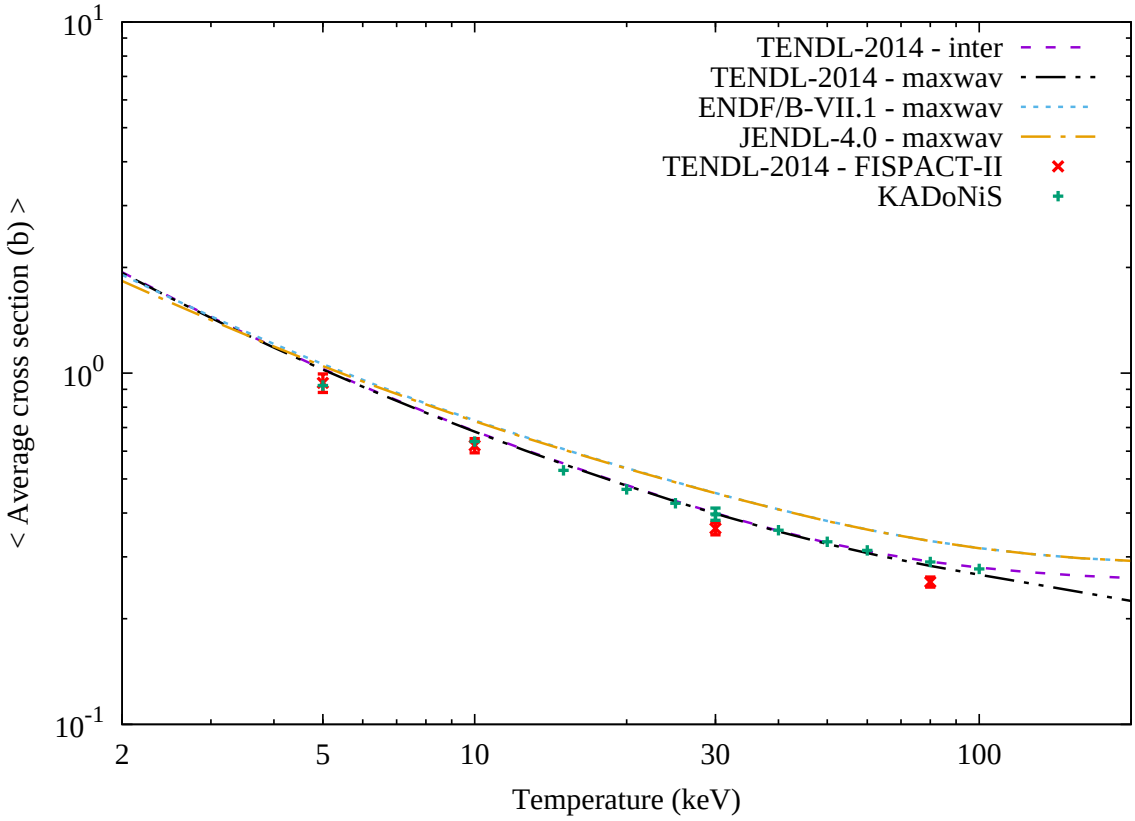
$^{130}Ba_{56}$ [Stable]



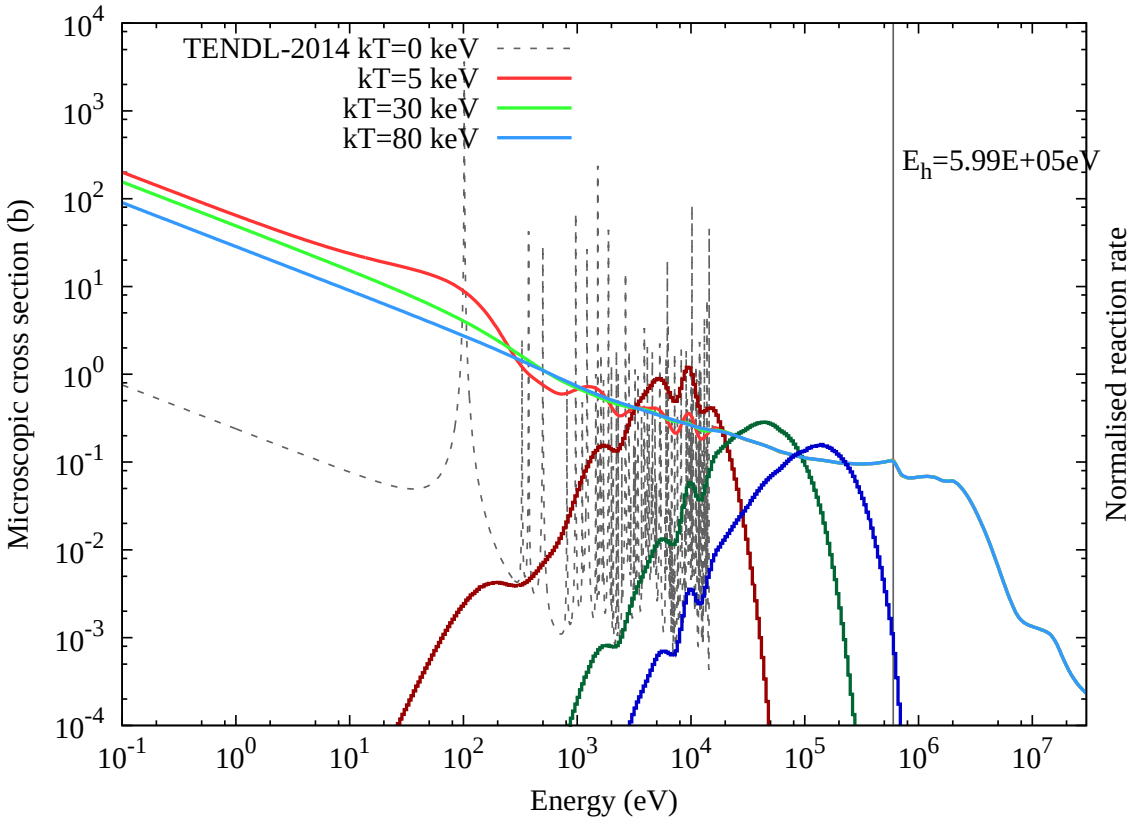


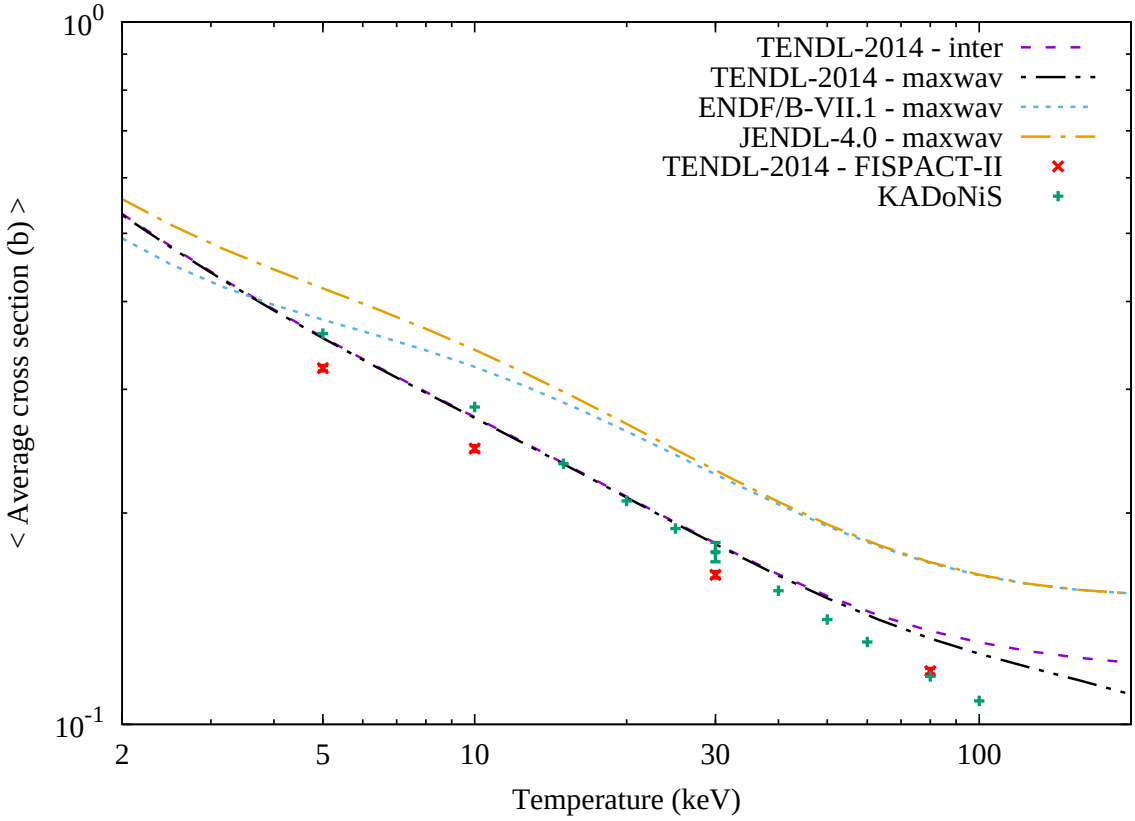
$^{132}Ba_{56}$ [Stable]



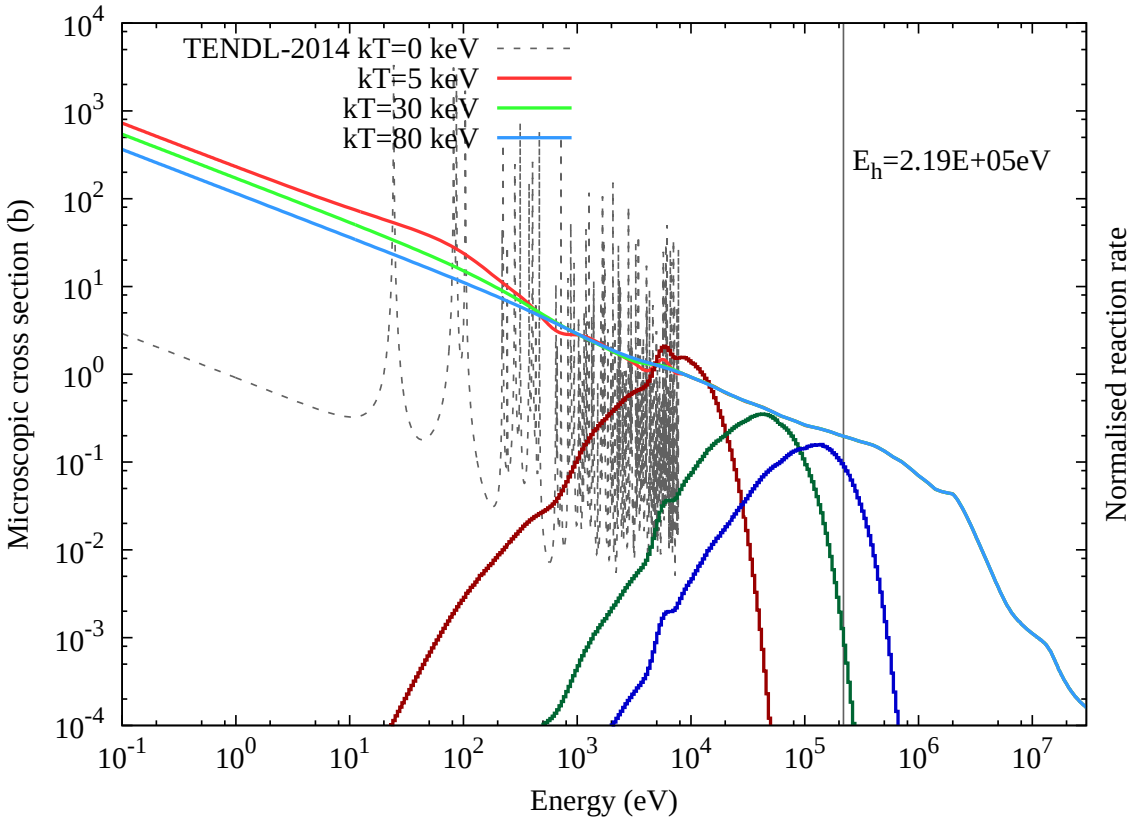


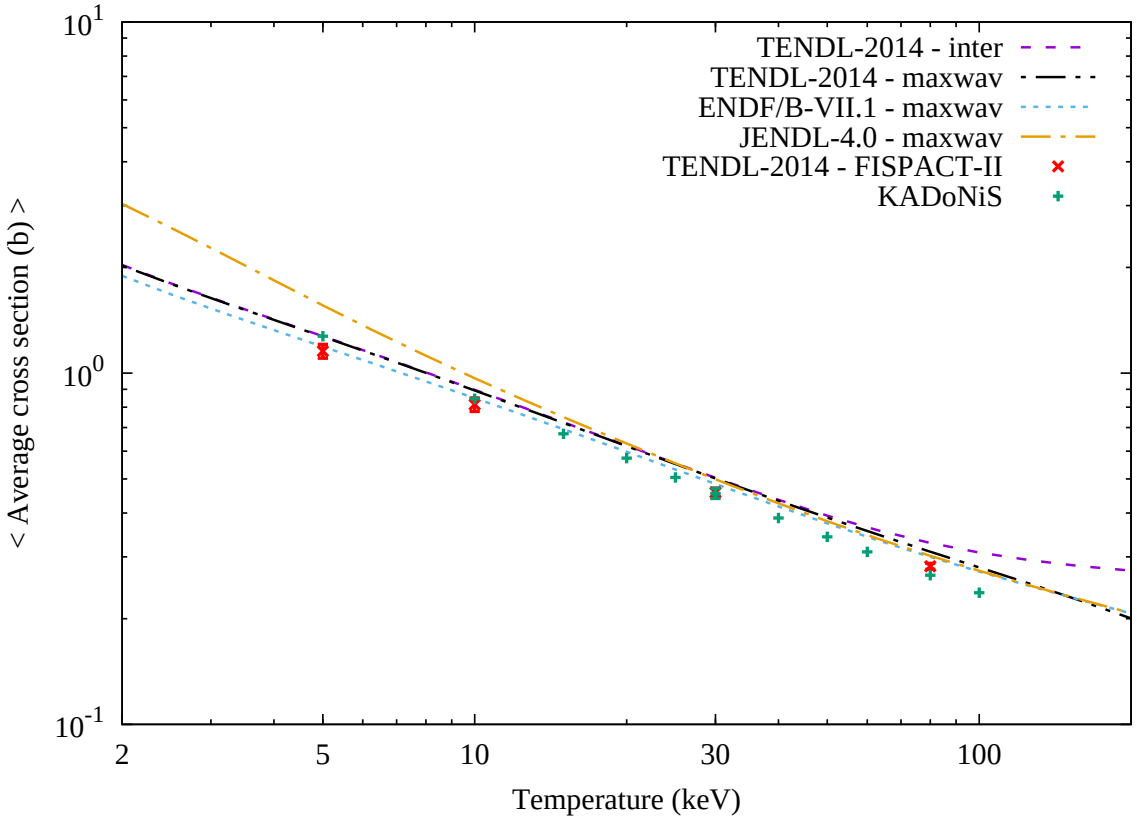
$^{134}Ba_{56}$ [Stable]



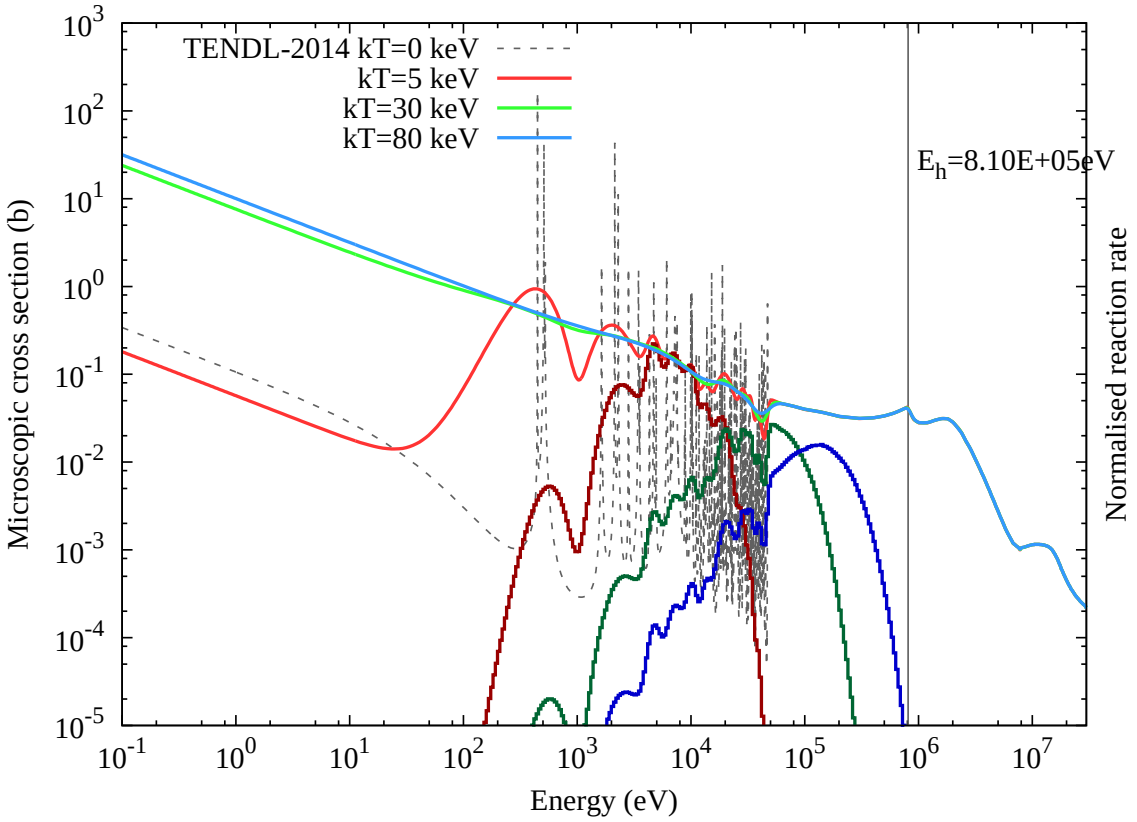


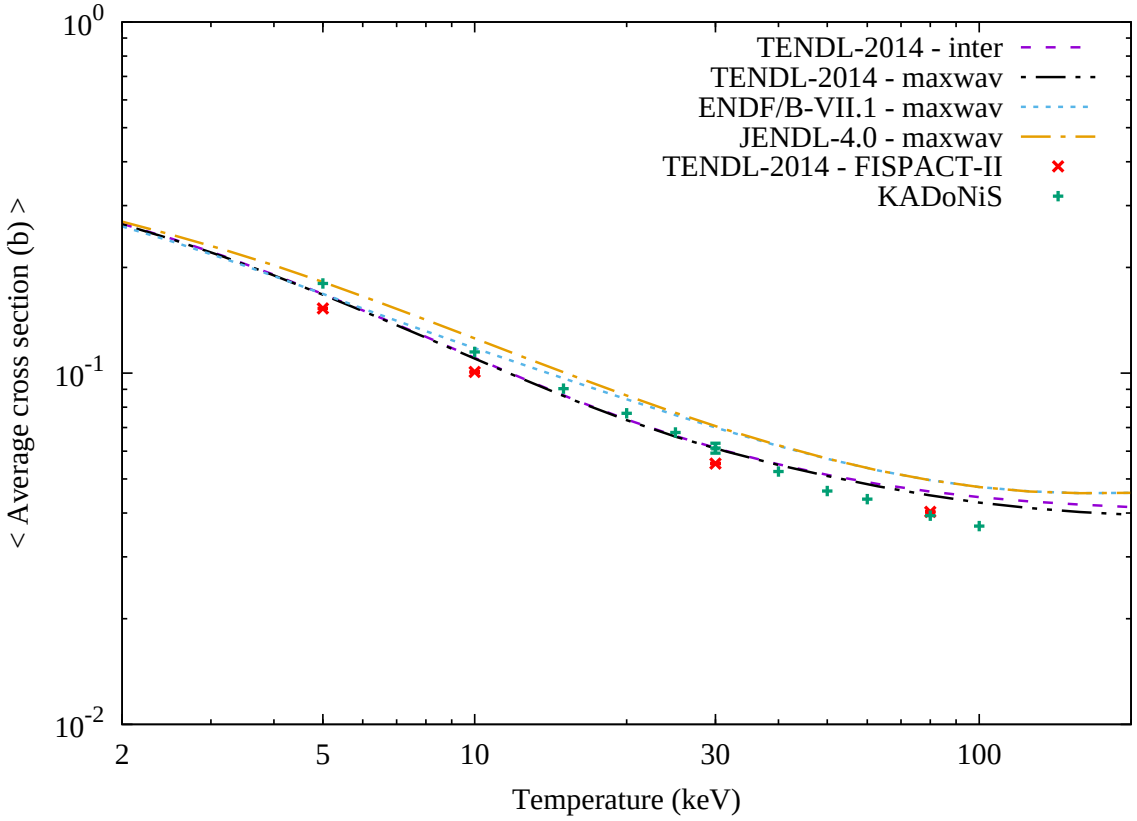
$^{135}Ba_{56}$ [Stable]



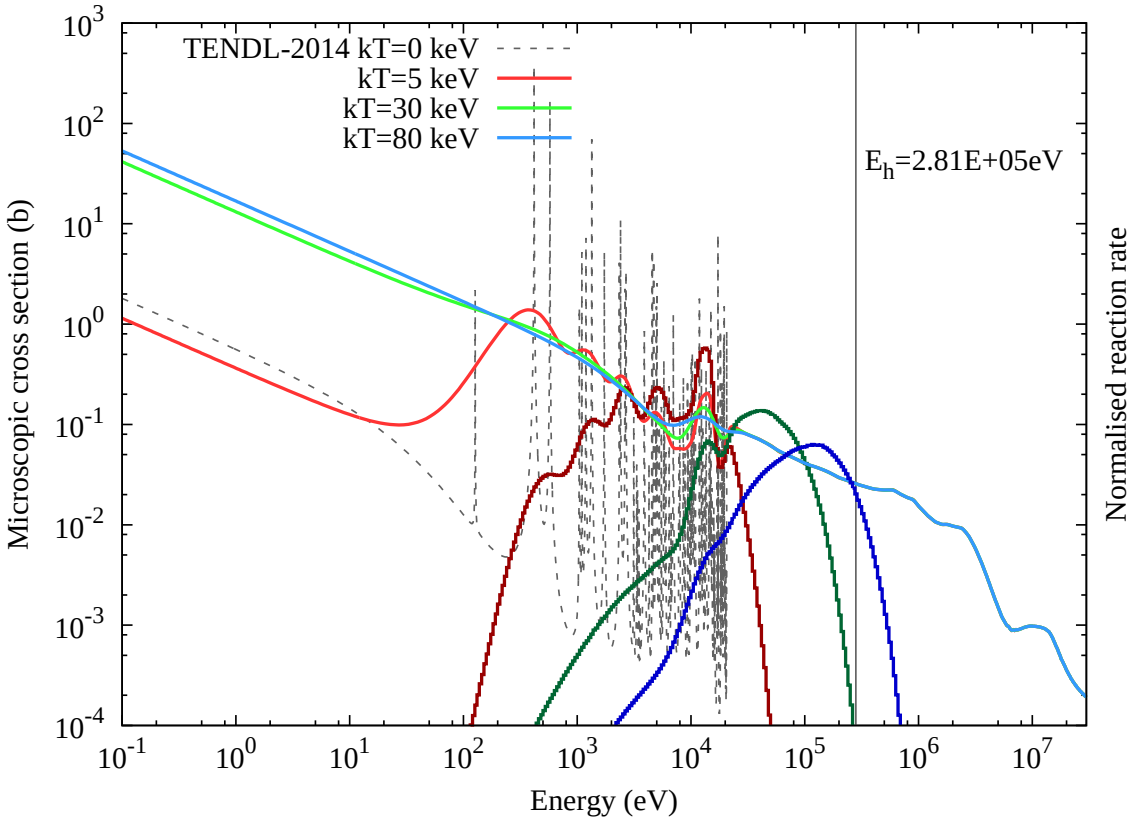


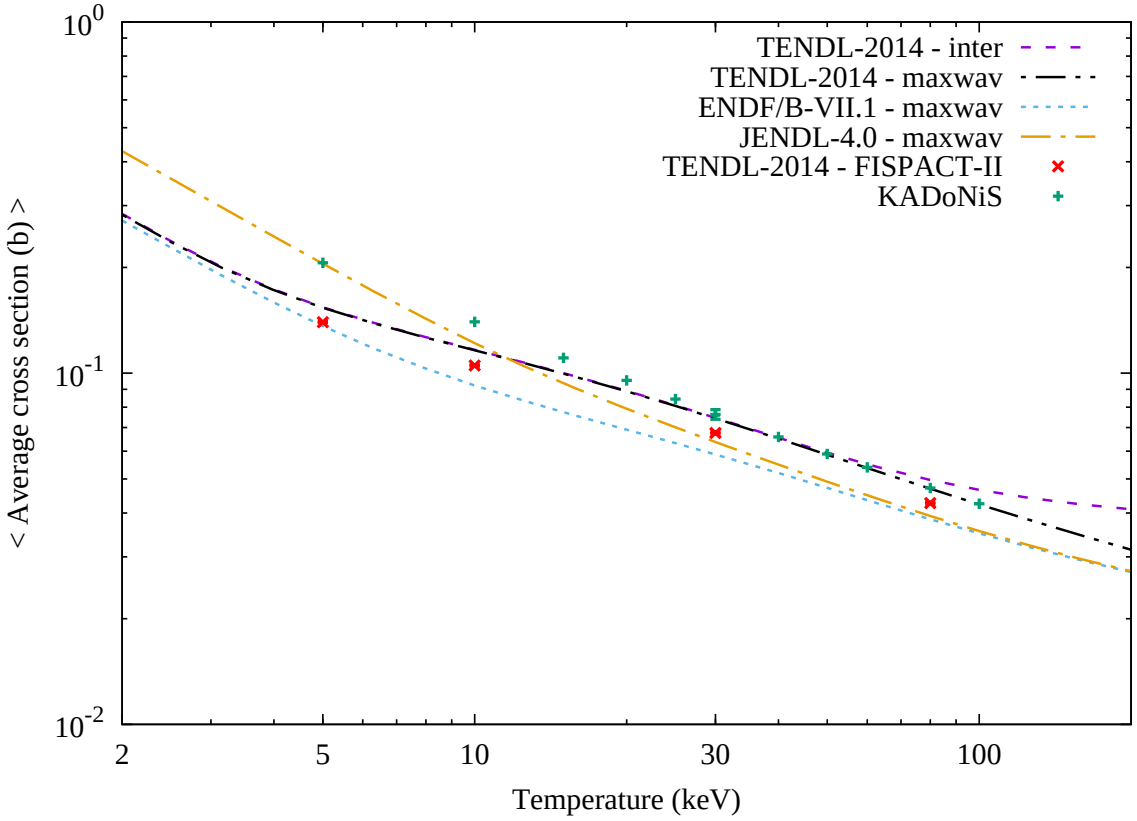
$^{136}Ba_{56}$ [Stable]



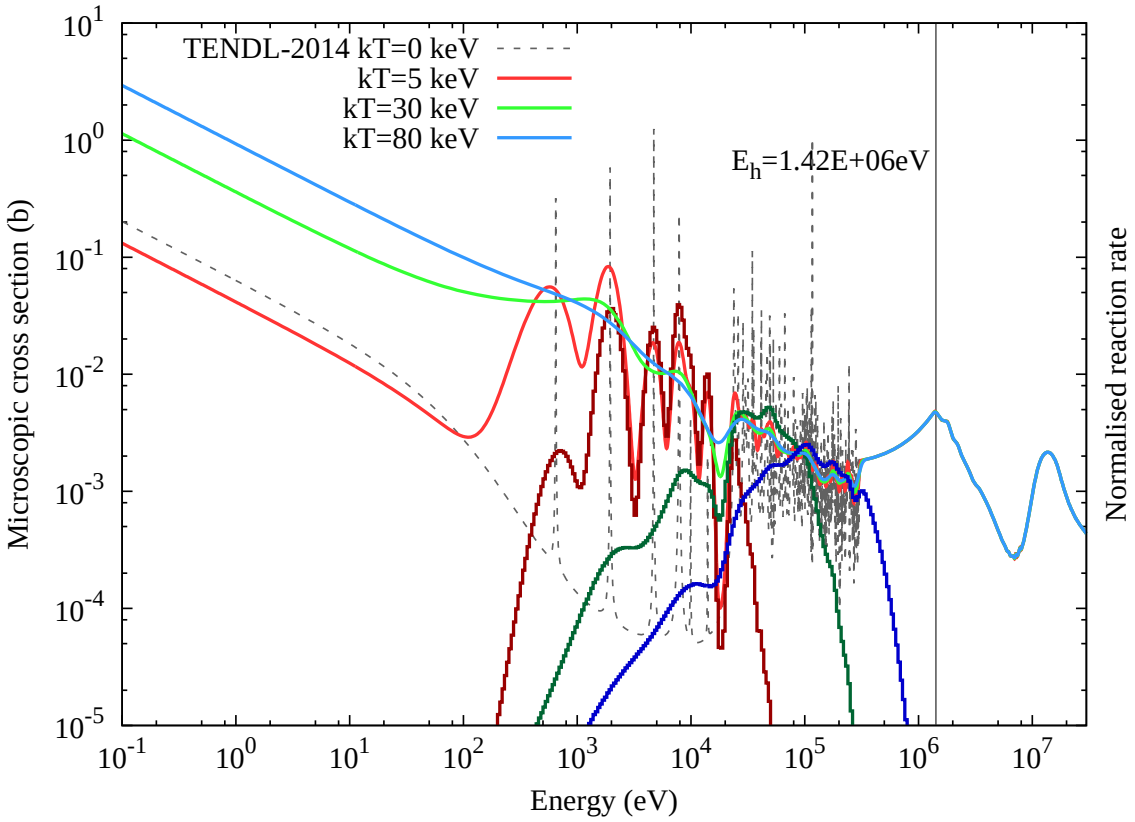


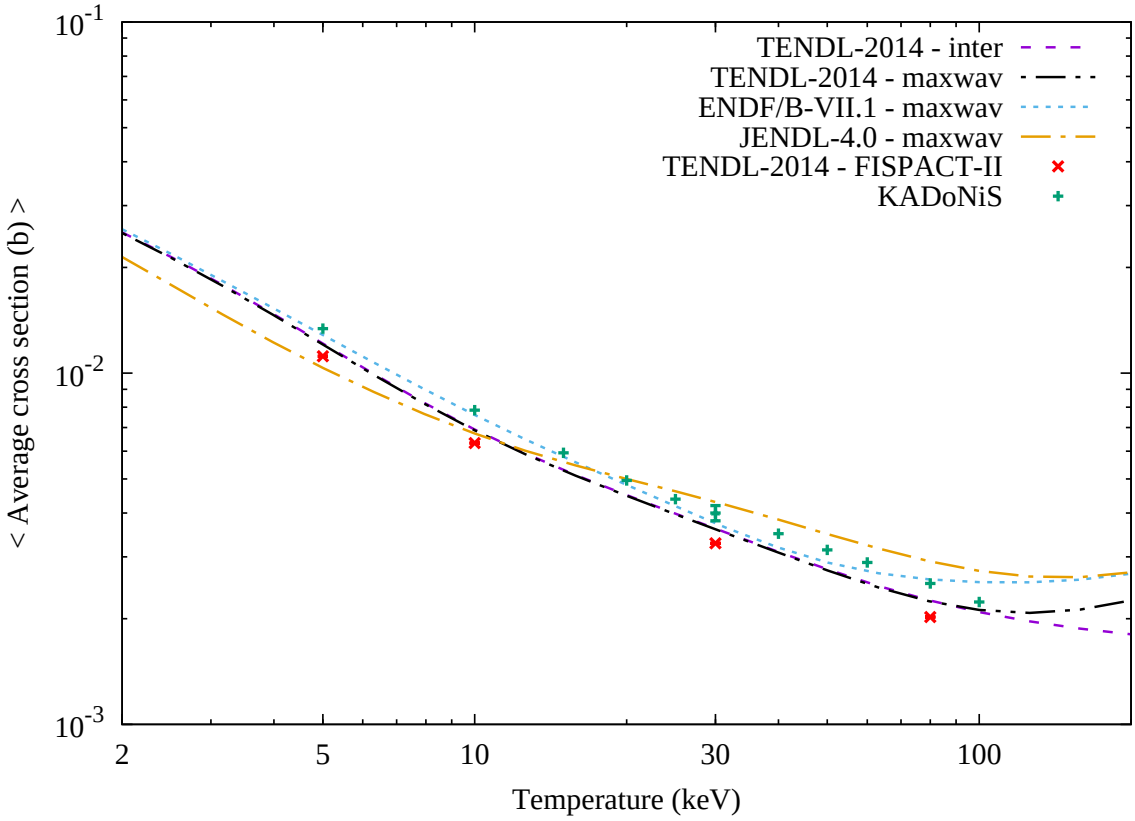
$^{137}Ba_{56}$ [Stable]



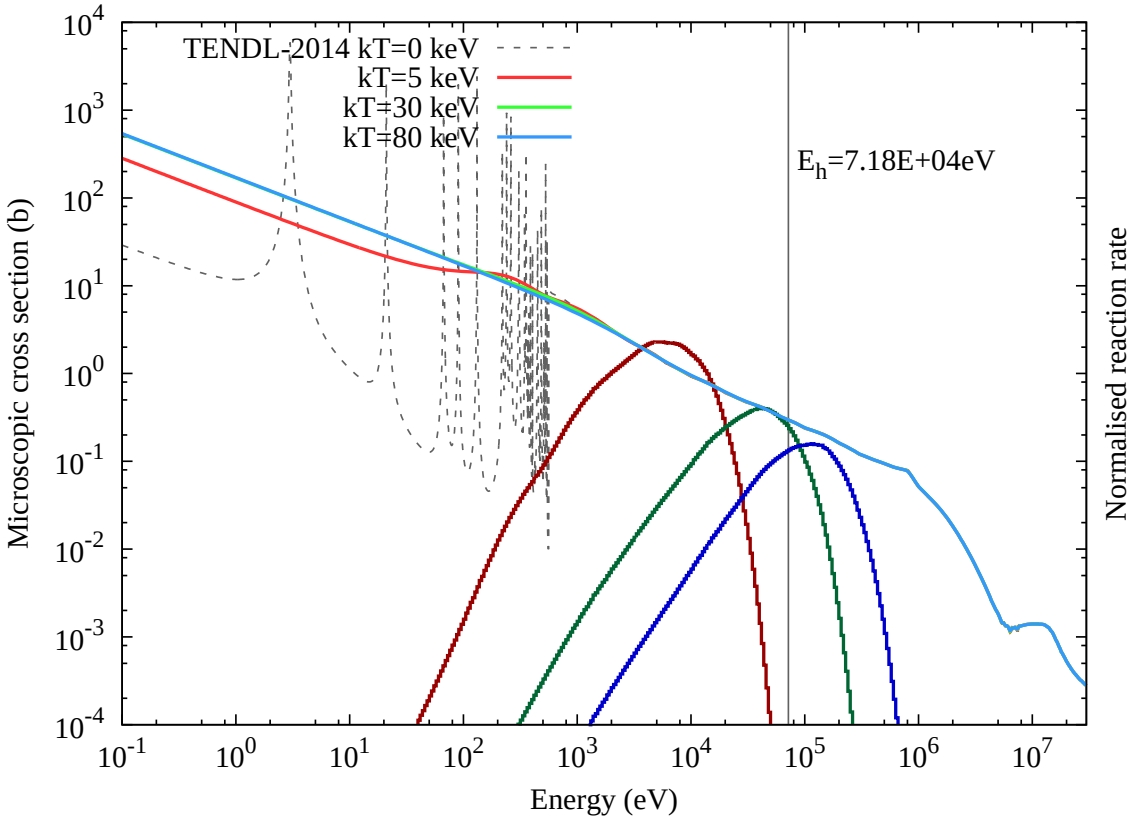


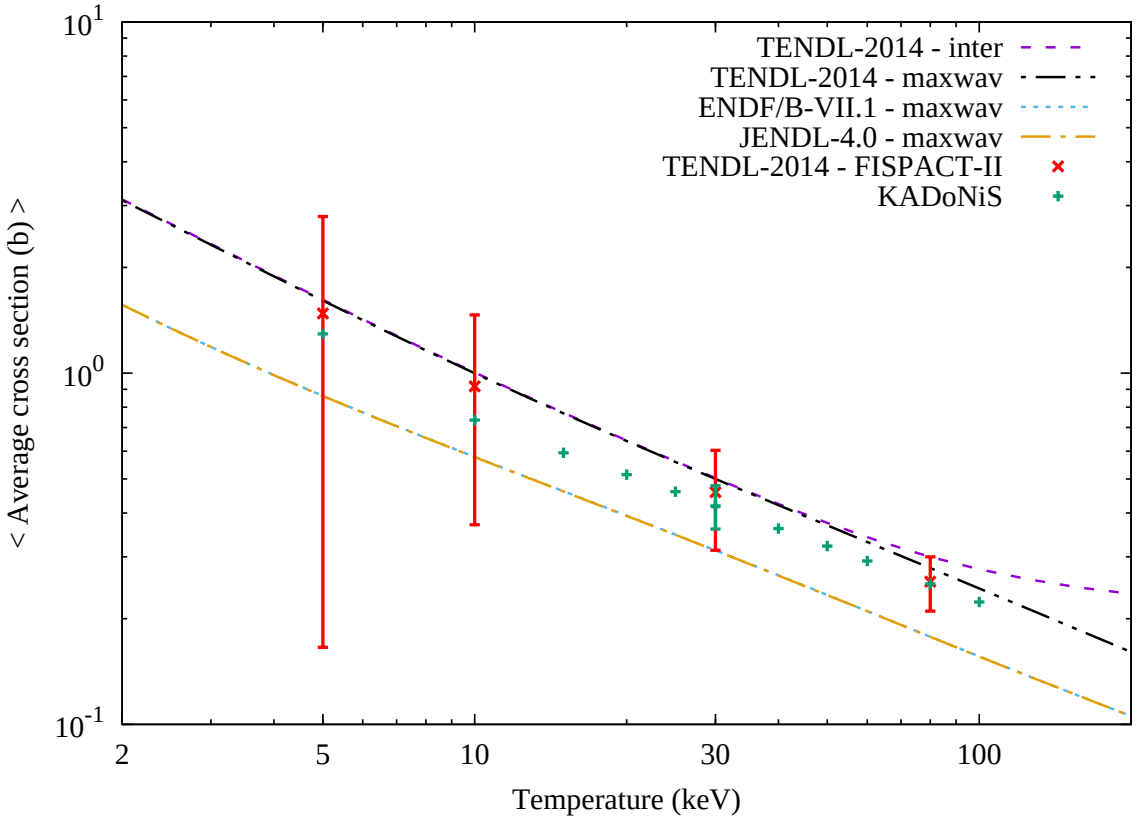
$^{138}Ba_{56}$ [Stable]



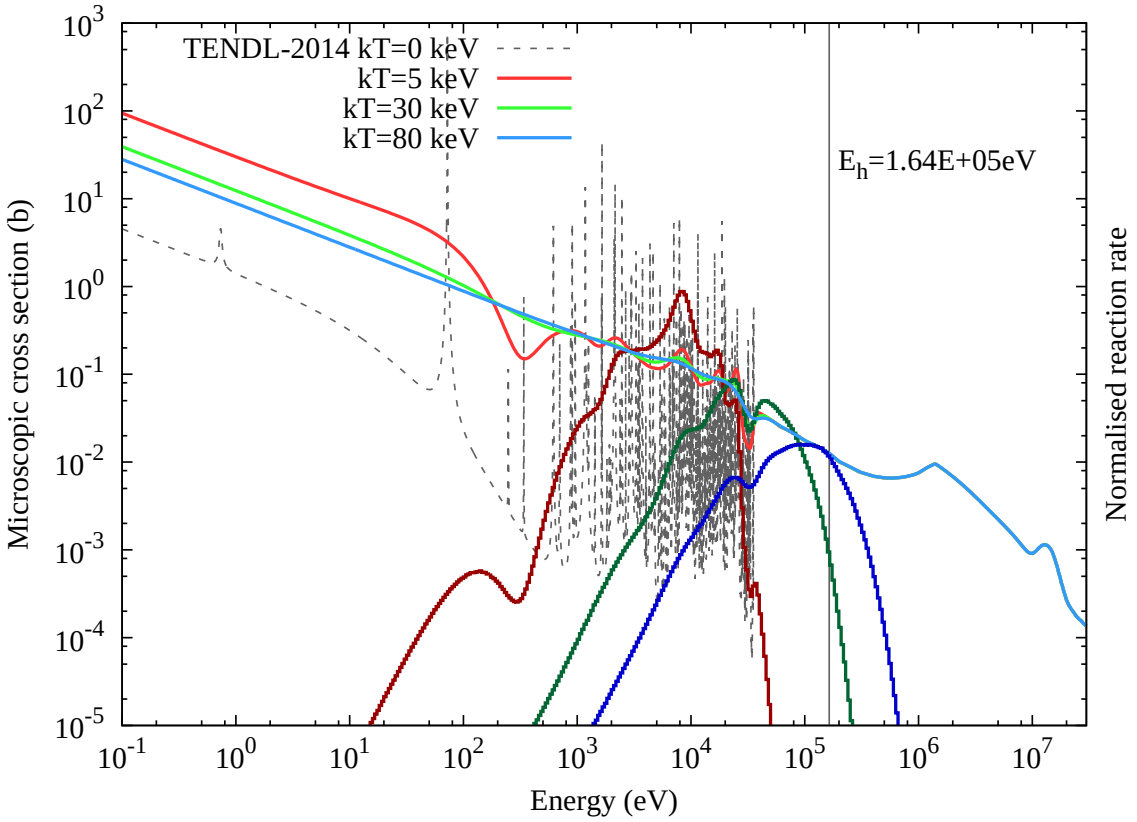


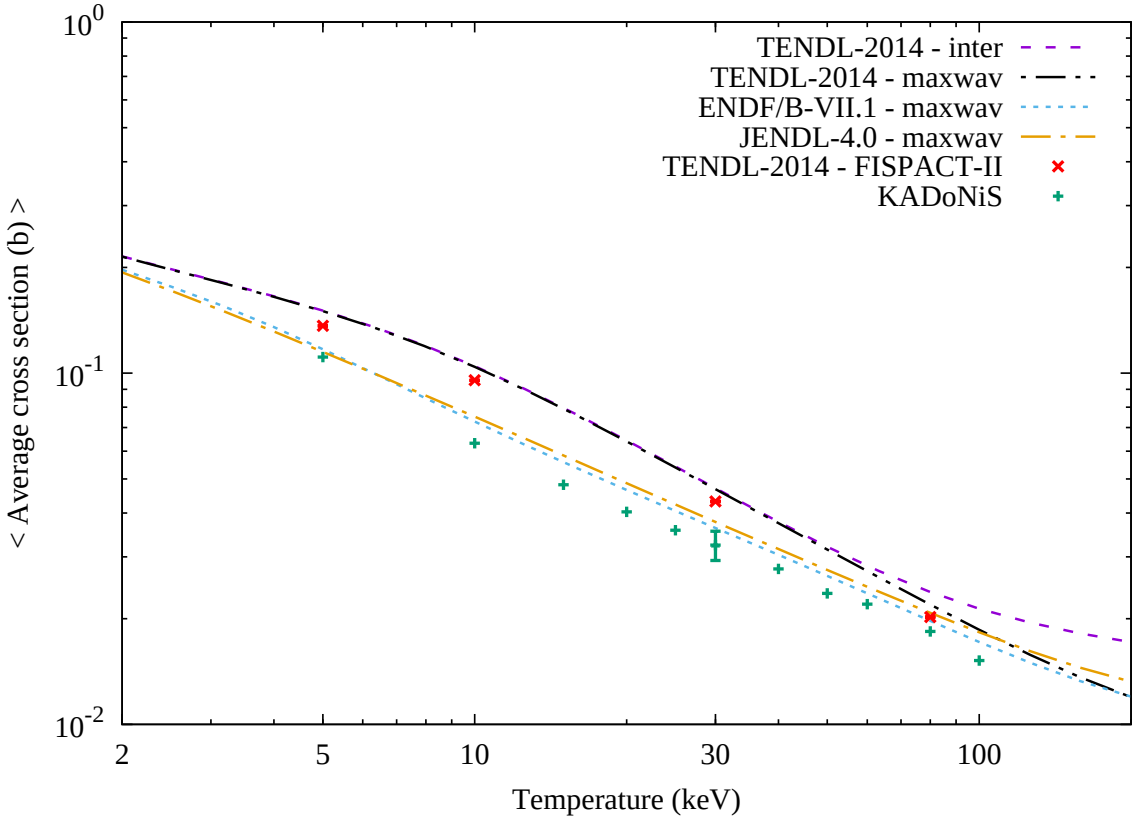
$^{138}La_{57}$ $[T_{1/2} = 1.02 \times 10^{11}$ years] (KADoNiS=SMC)



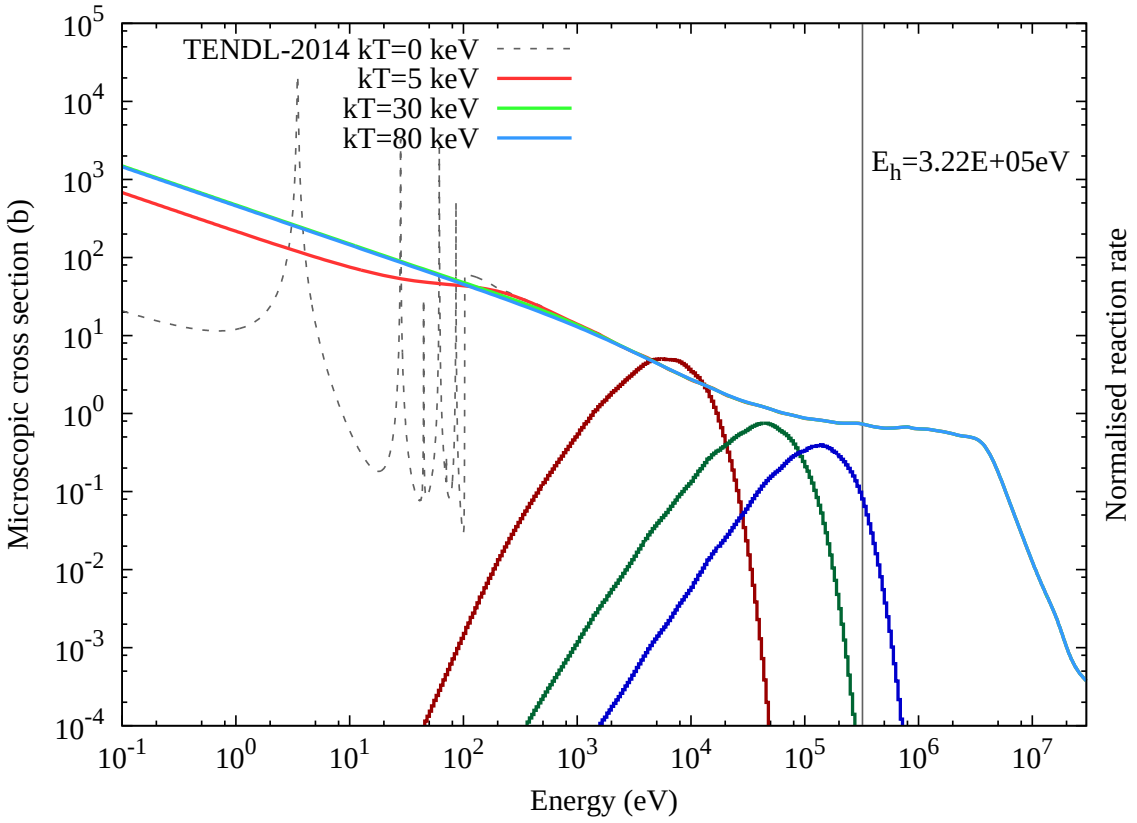


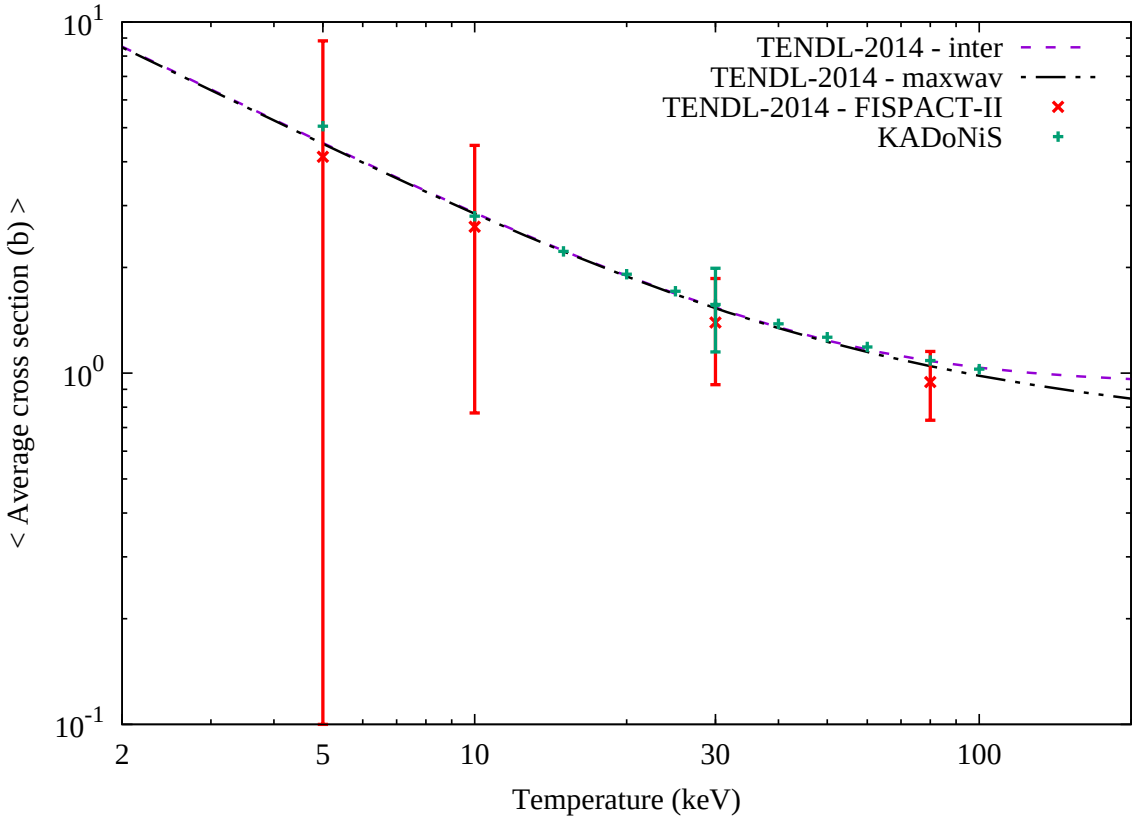
$^{139}La_{57}$ [Stable]



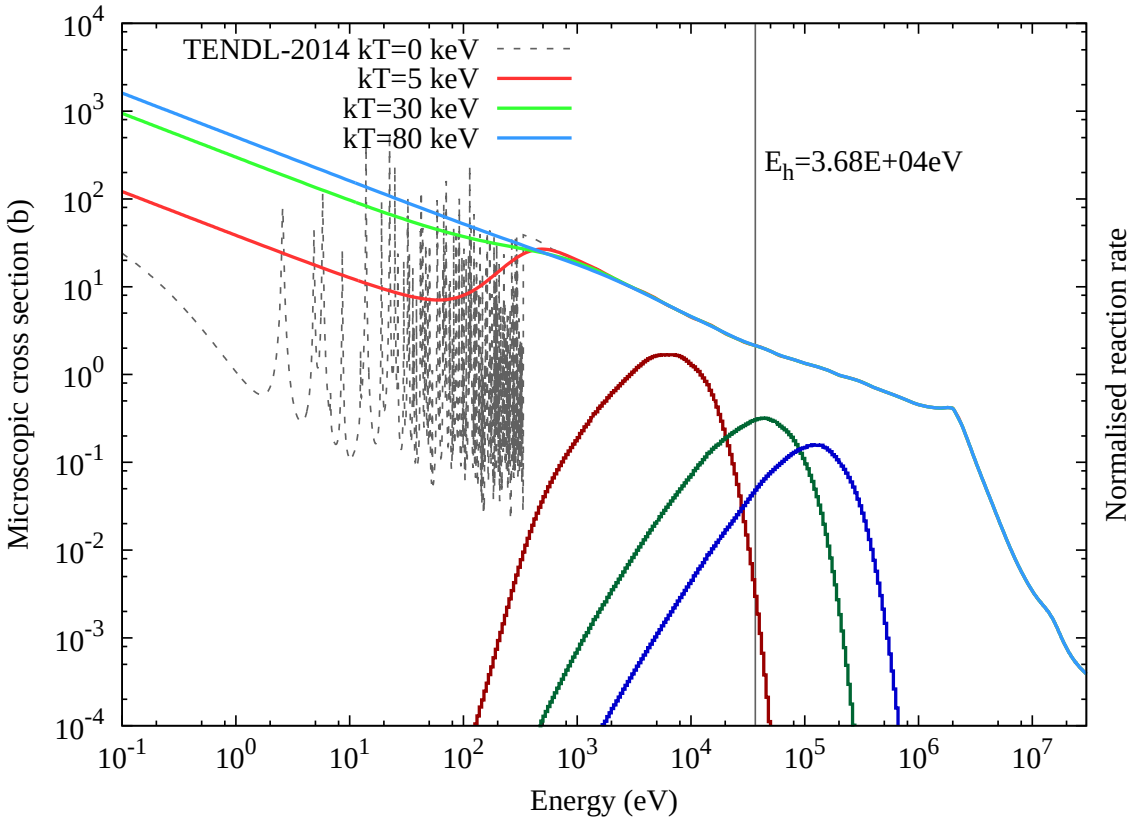


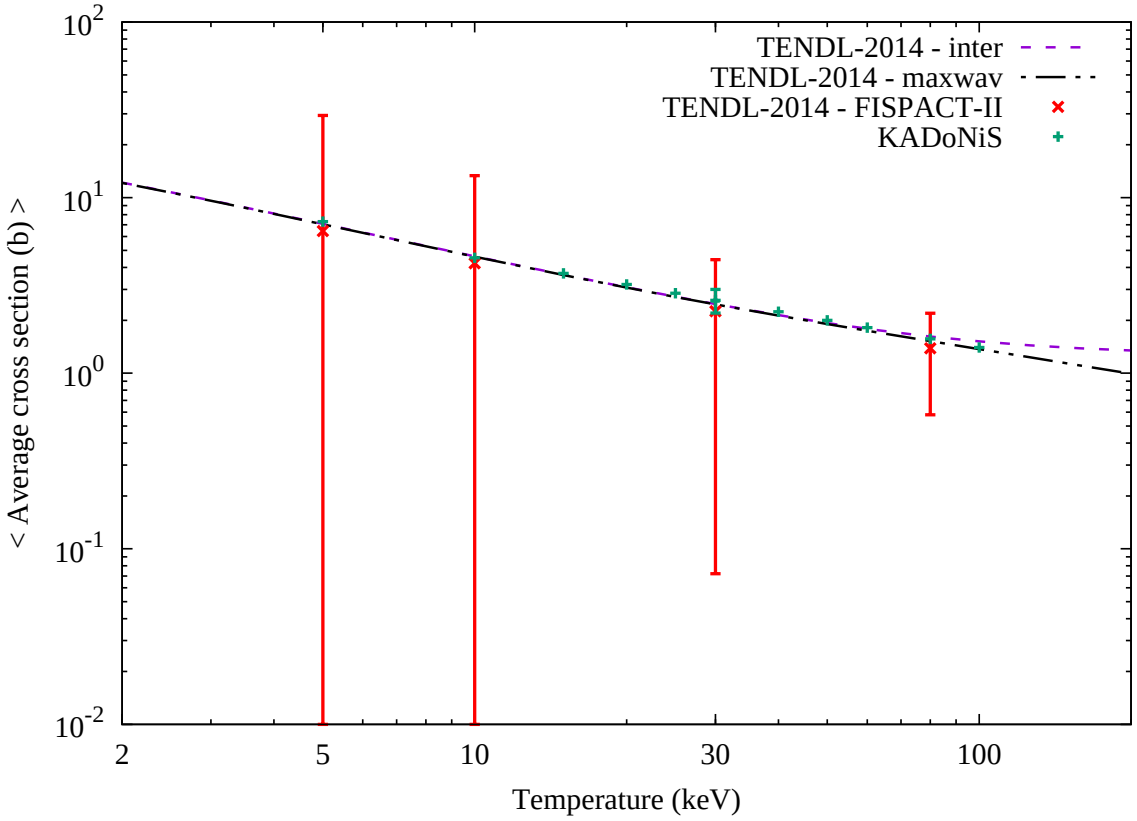
$^{132}Ce_{58}$ $[T_{1/2} = 3.51$ hours$]$ (KADoNiS=SMC)



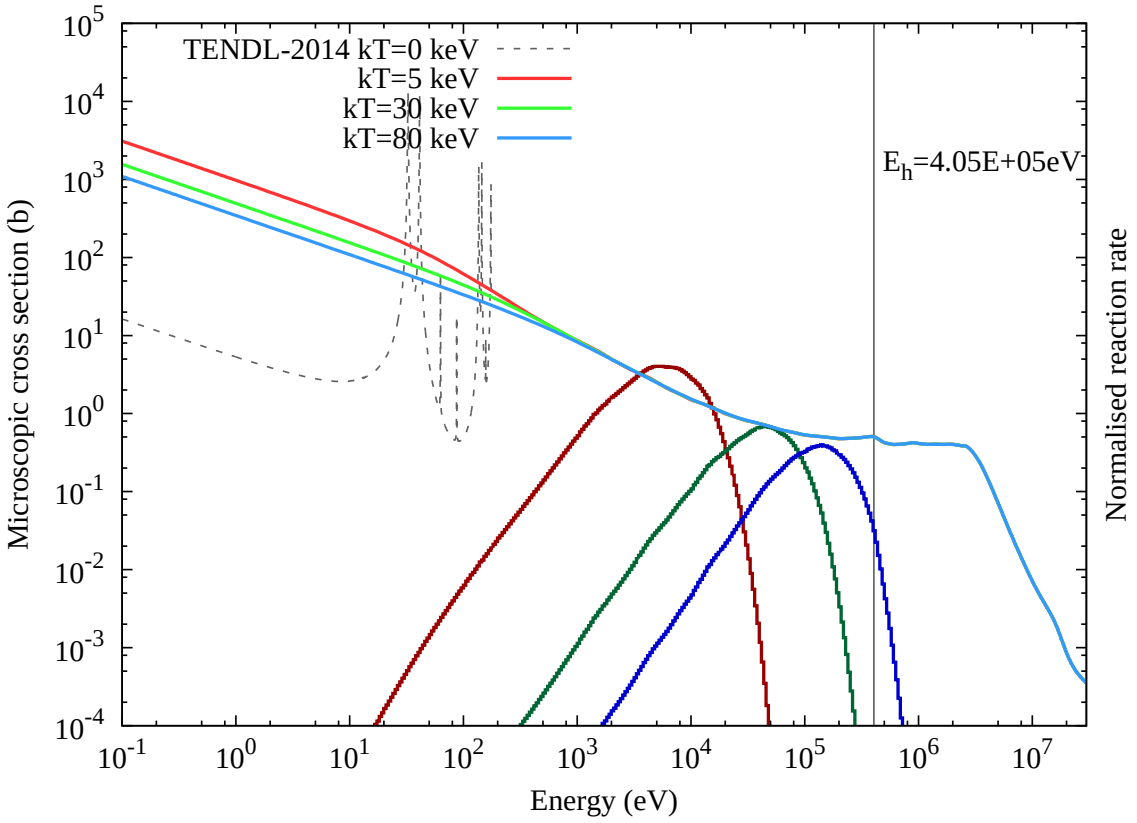


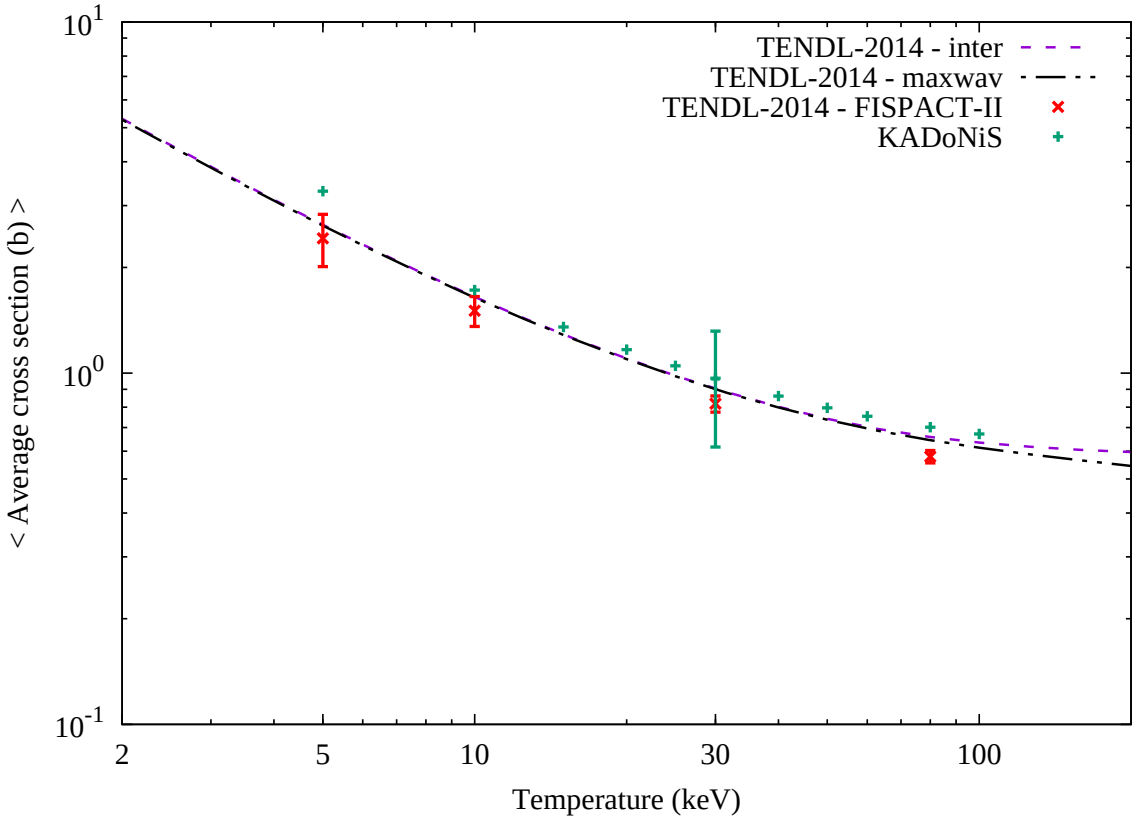
$^{133}Ce_{58}$ $[T_{1/2} = 1.62$ hours$]$ (KADoNiS=SMC)



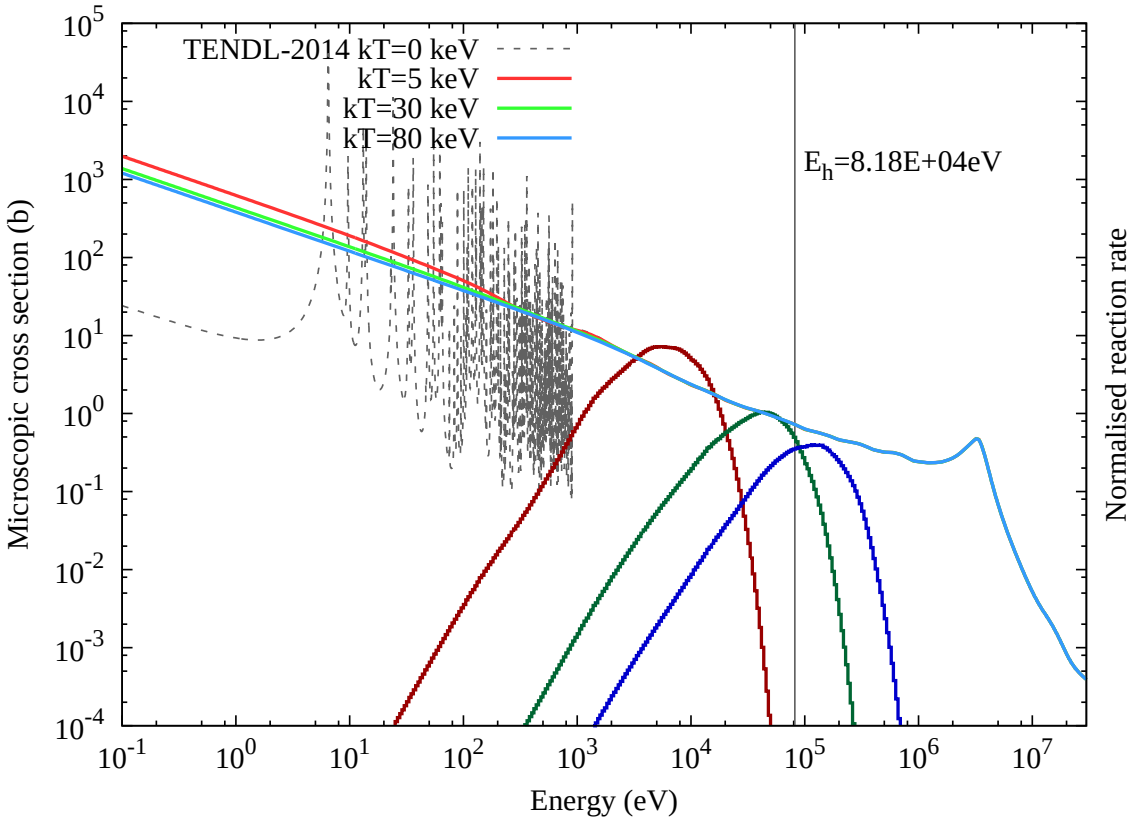


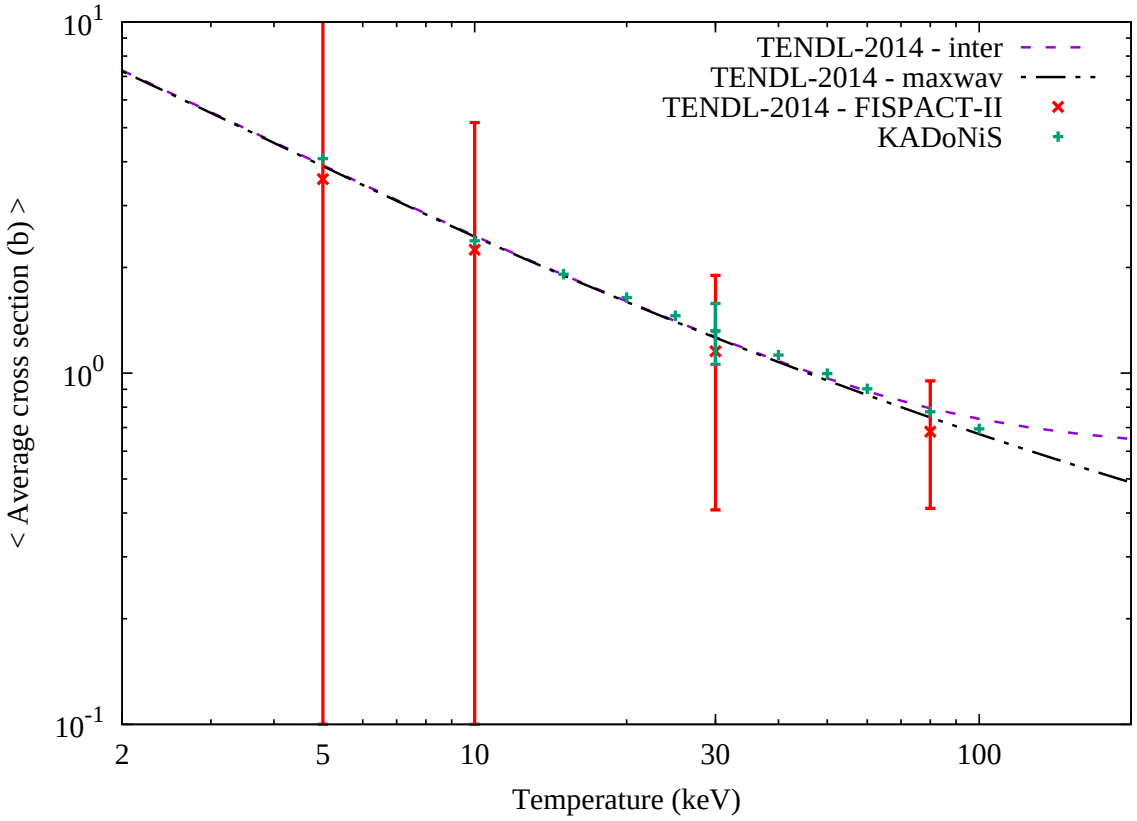
$^{134}Ce_{58}$ $[T_{1/2} = 3.16 \text{ days}]$ (KADoNiS=SMC)



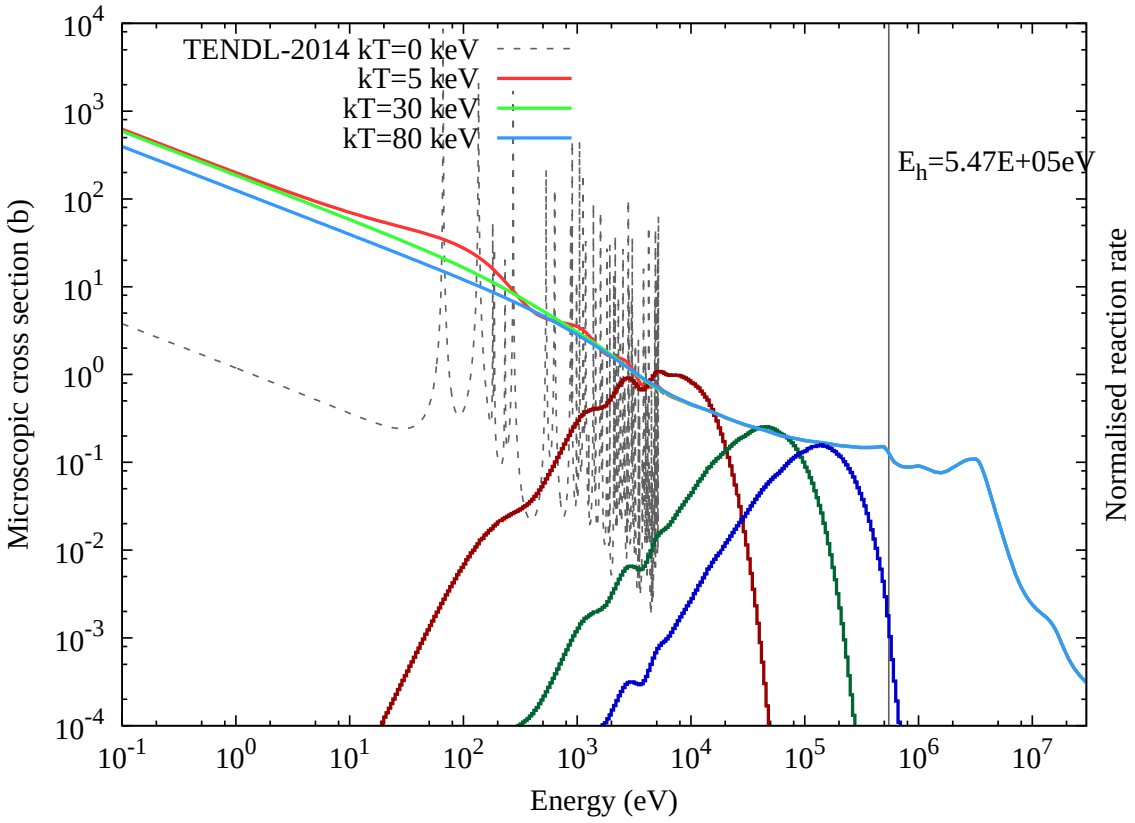


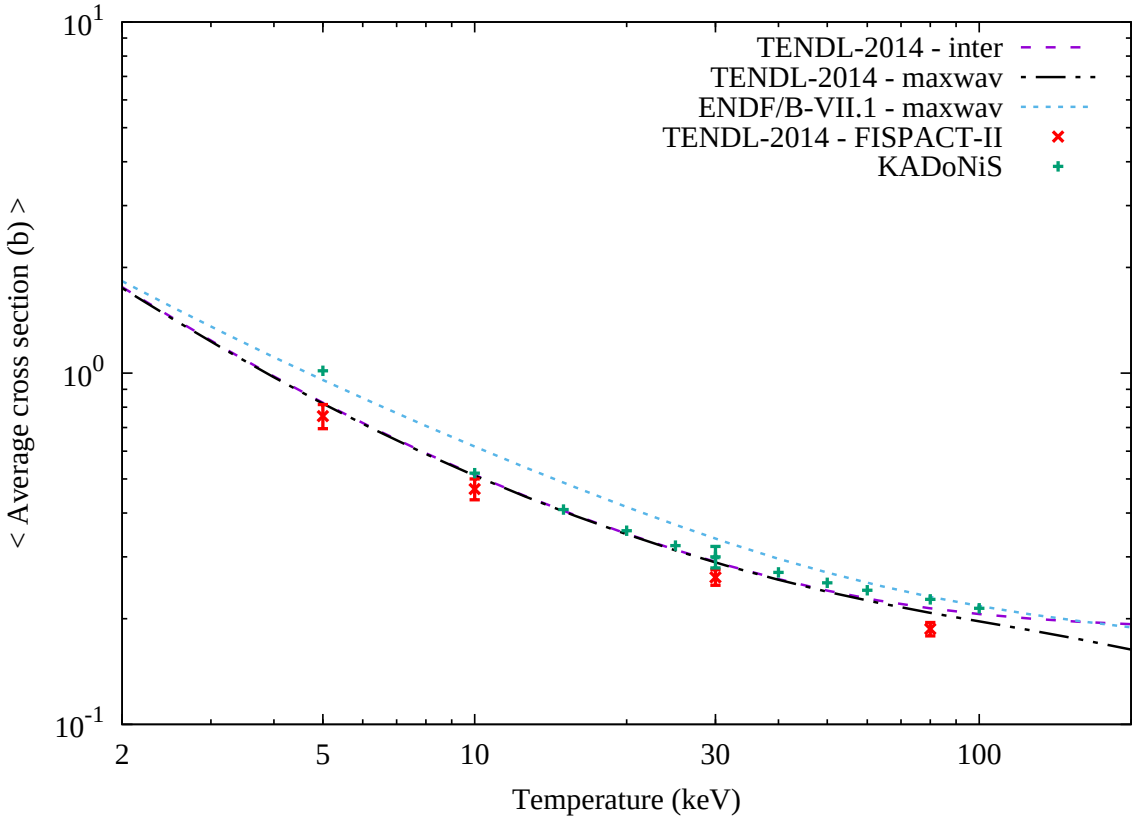
$^{135}Ce_{58}$ [$T_{1/2}$ = 17.70 hours] (KADoNiS=SMC)



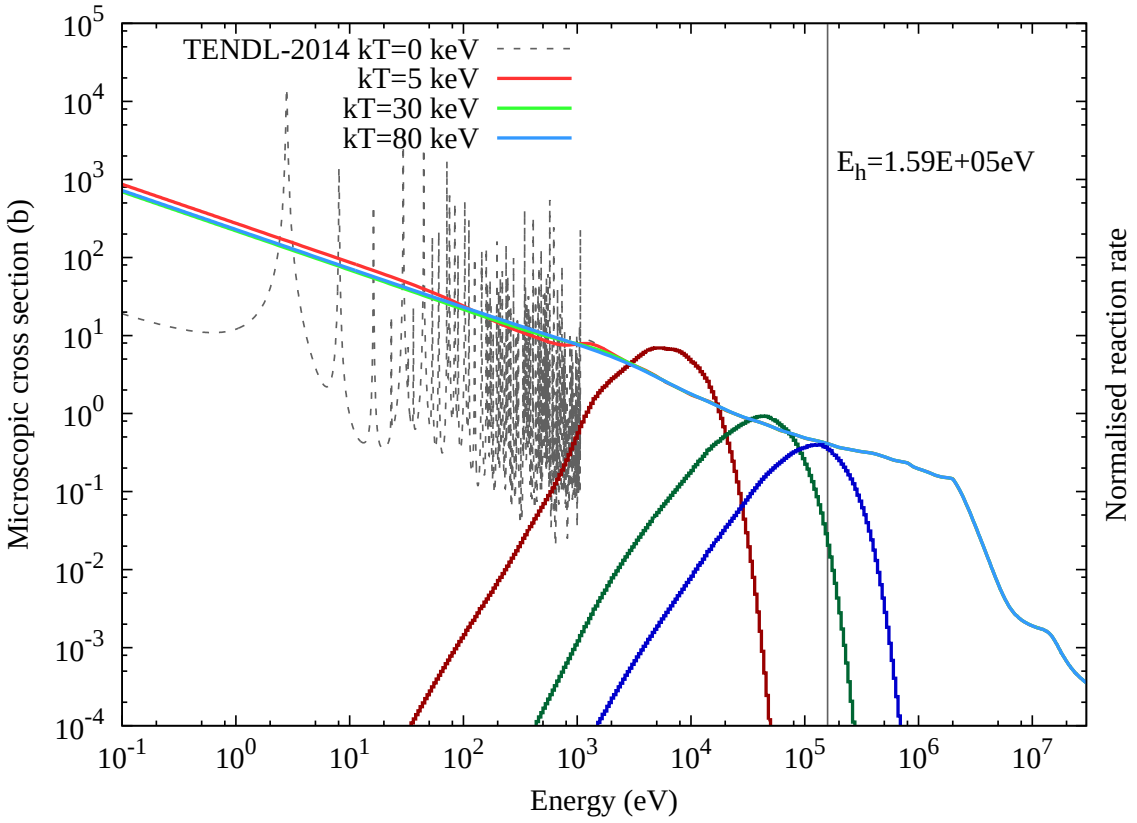


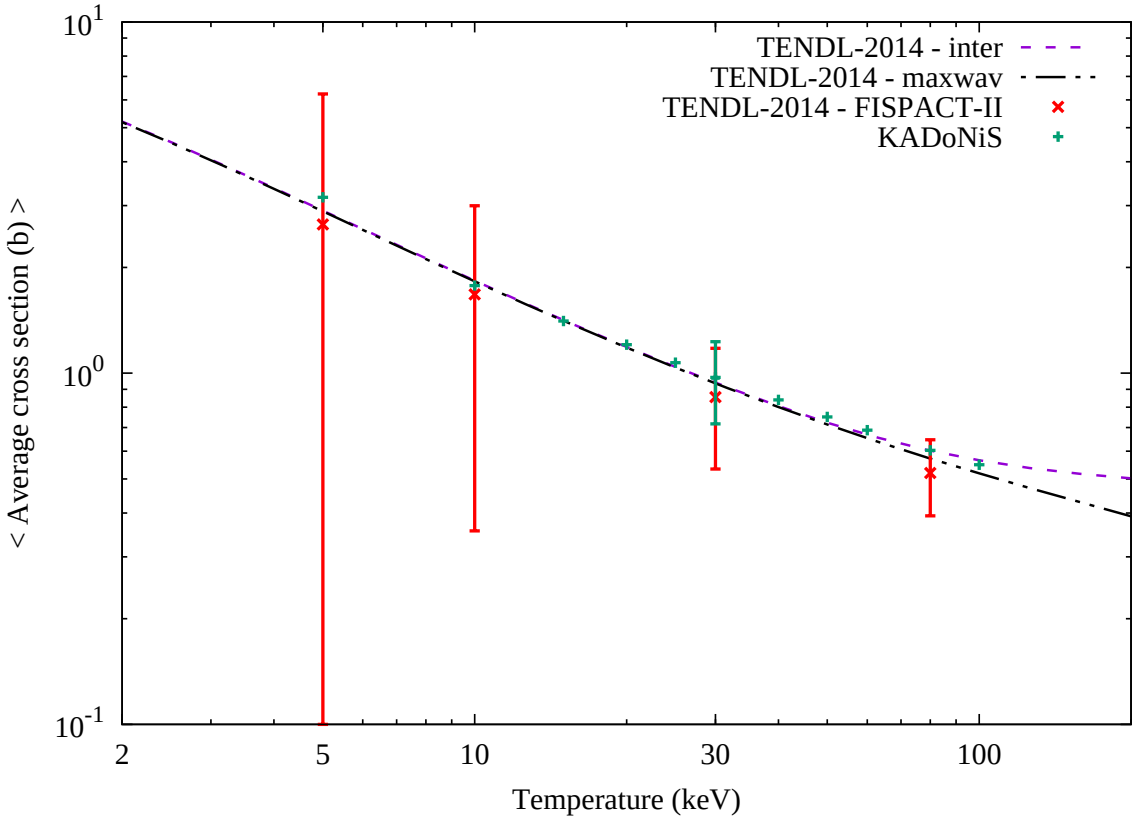
$^{136}Ce_{58}$ $[T_{1/2} = 7.00 \times 10^{13}$ years$]$



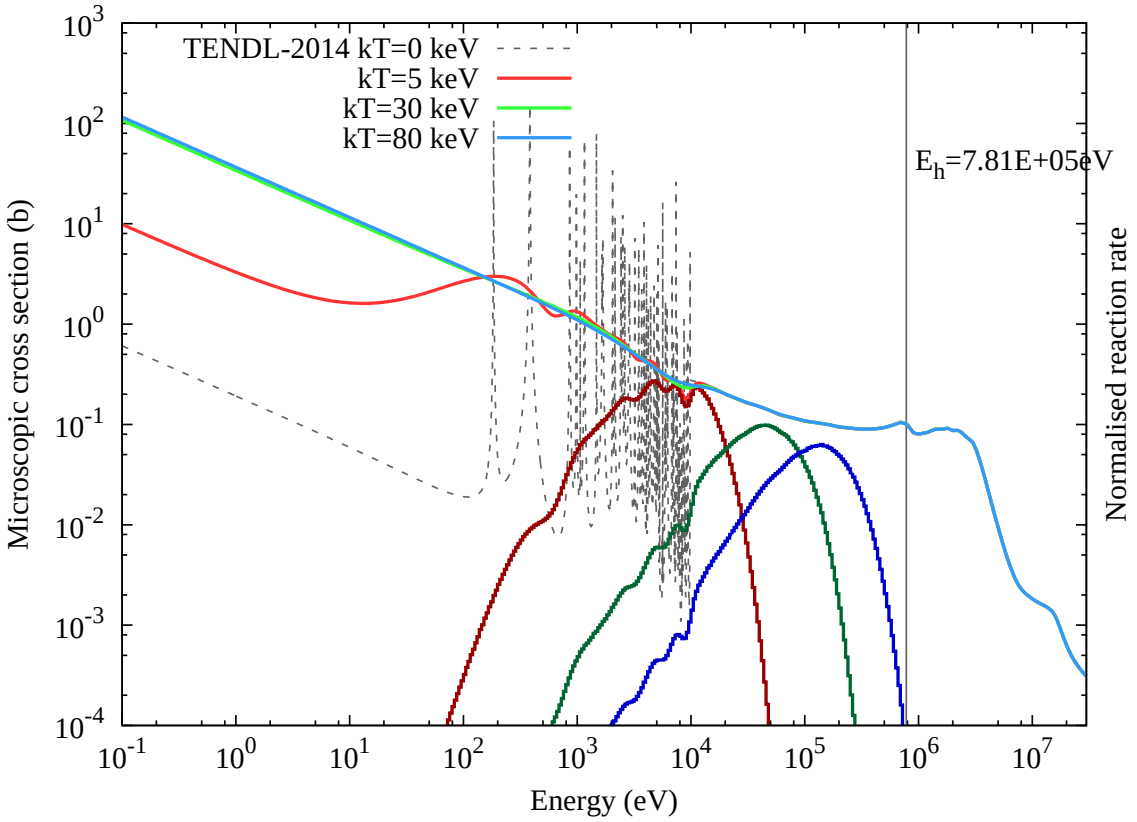


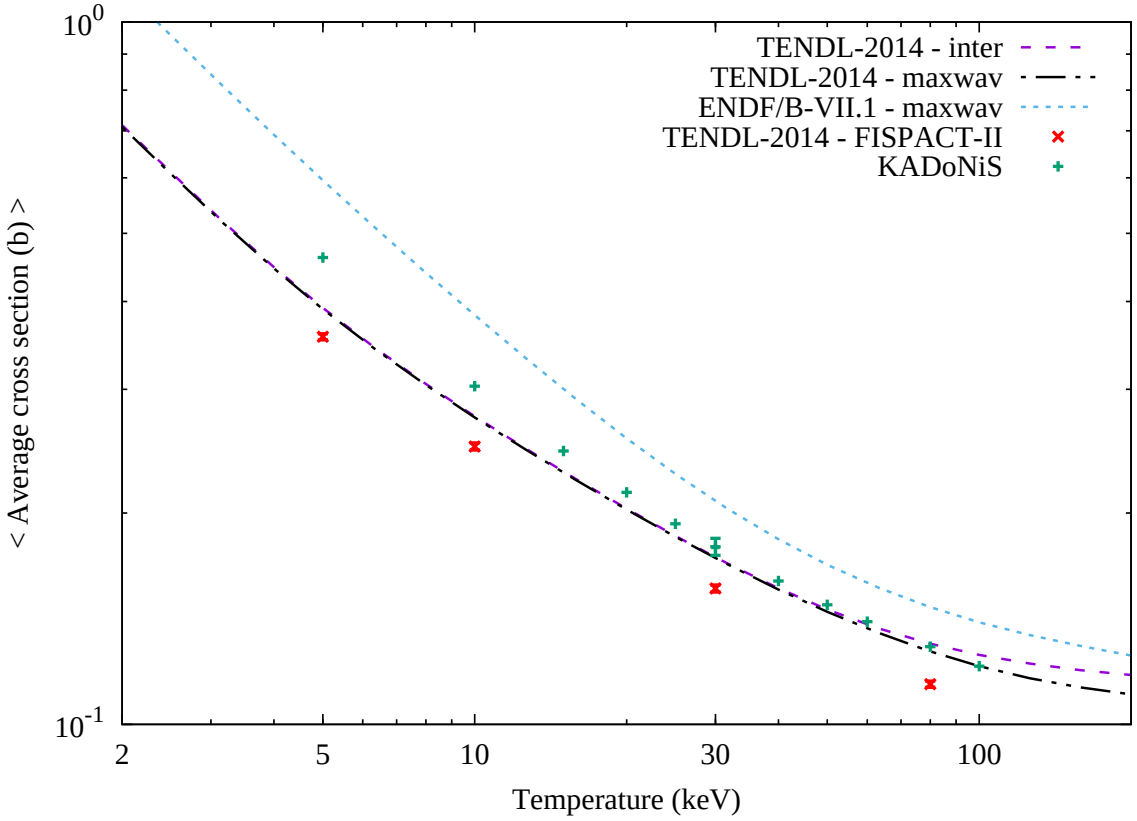
$^{137}Ce_{58}$ $[T_{1/2} = 9.00$ hours$]$ (KADoNiS=SMC)



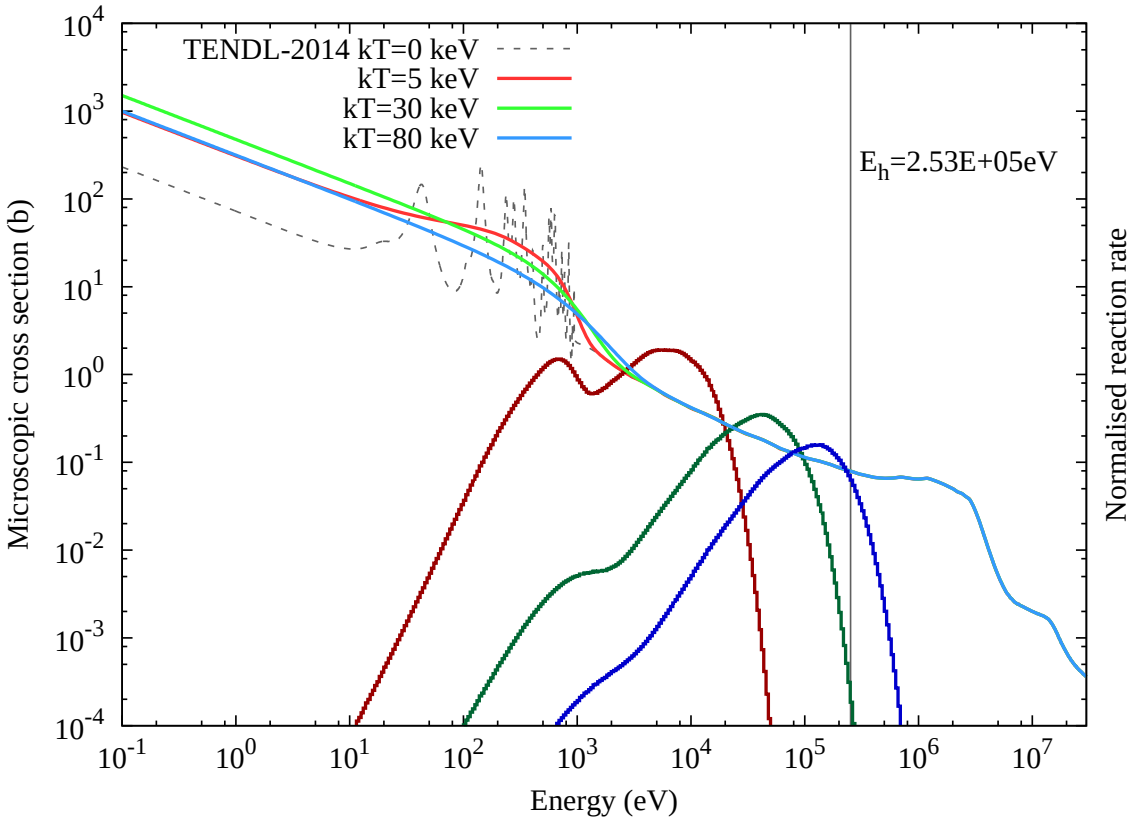


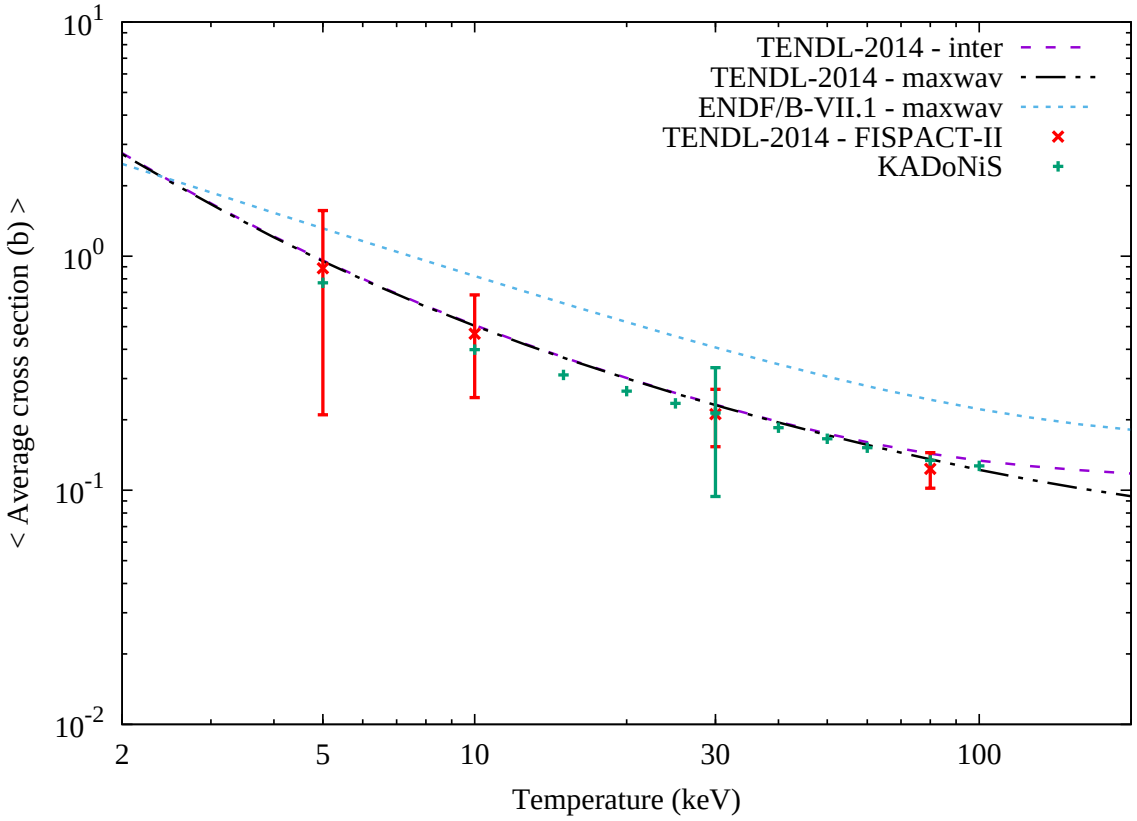
$^{138}Ce_{58}$ [Stable]



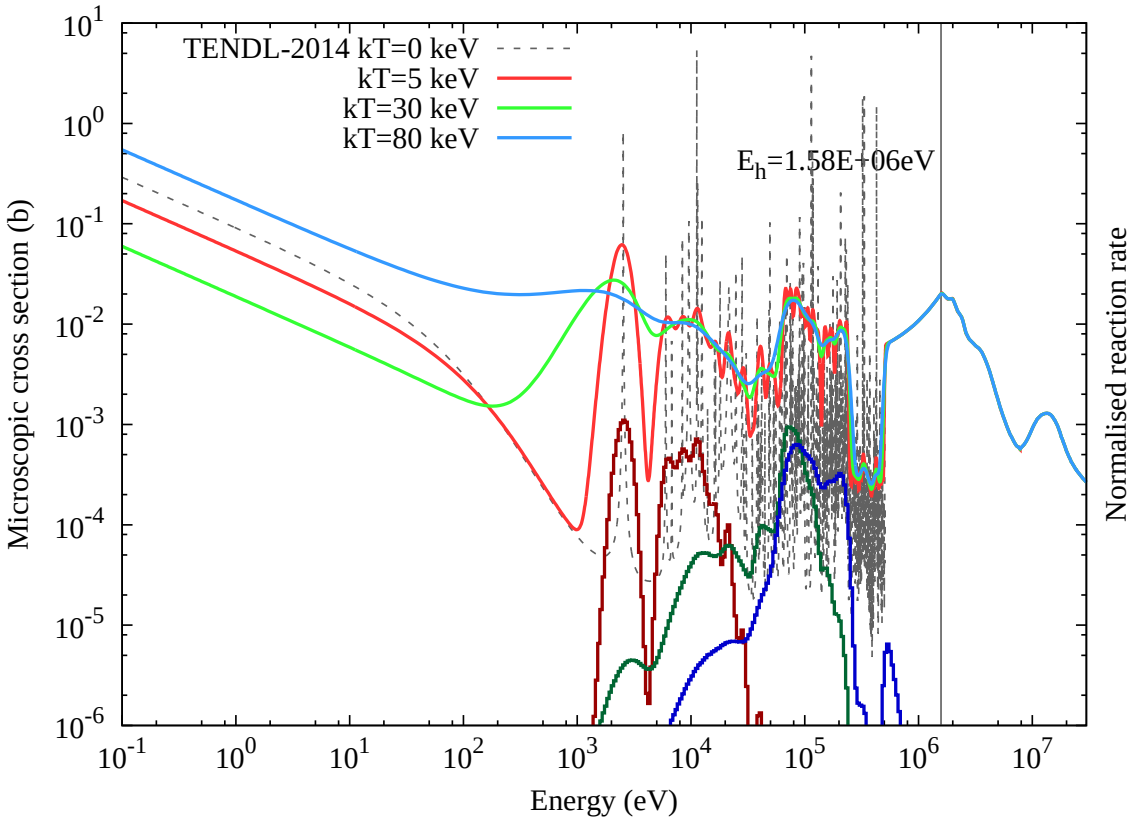


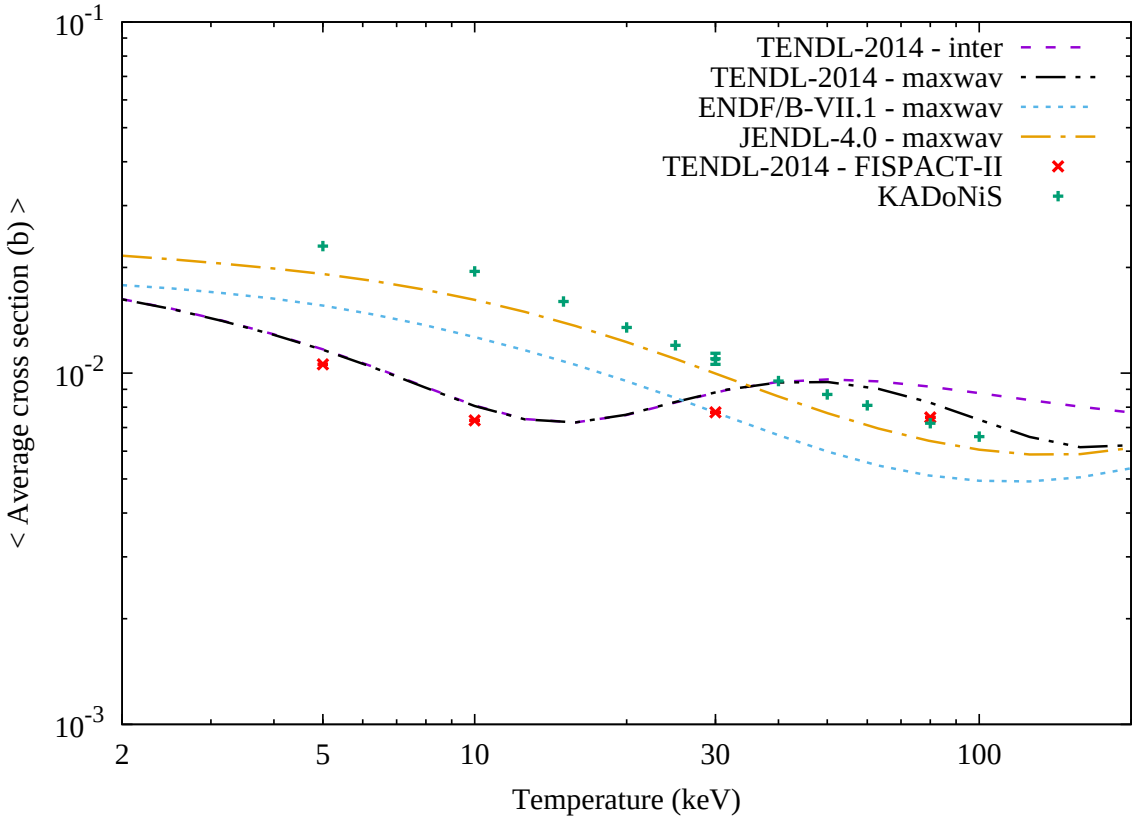
$^{139}Ce_{58}$ $[T_{1/2} = 137.64$ days$]$ (KADoNiS=SMC)



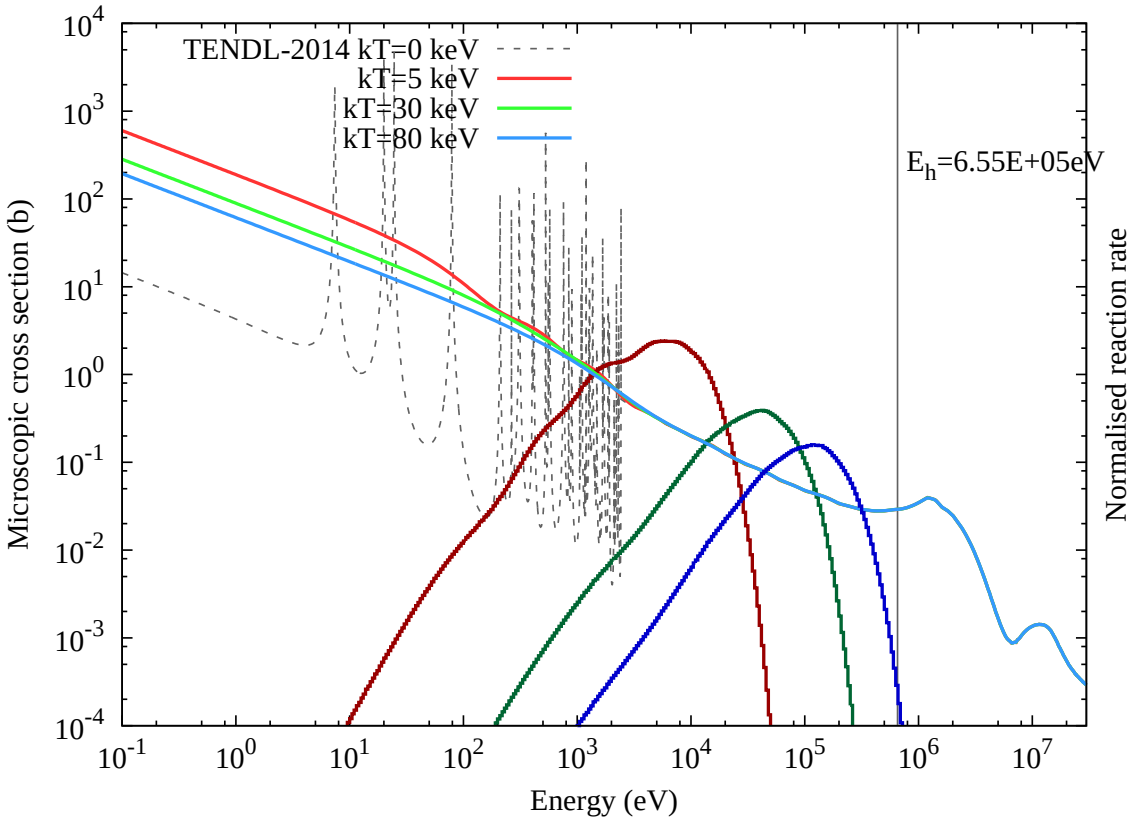


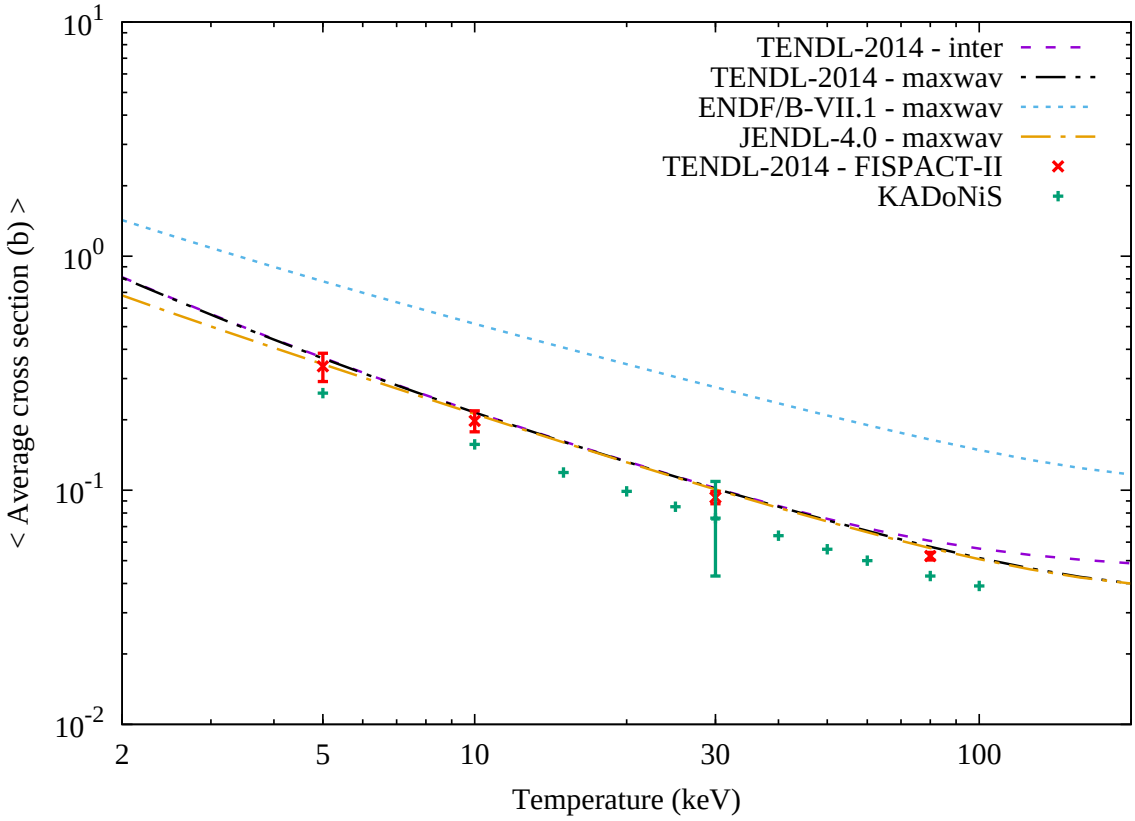
$^{140}Ce_{58}$ [Stable]



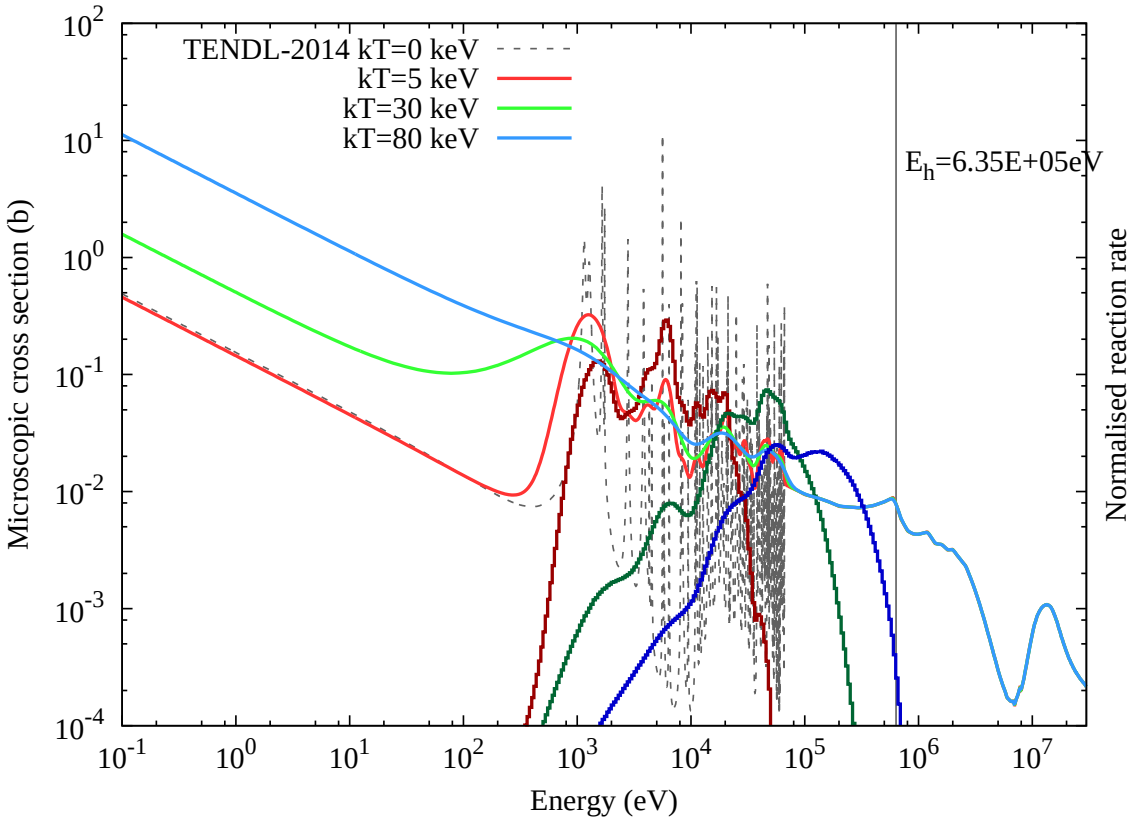


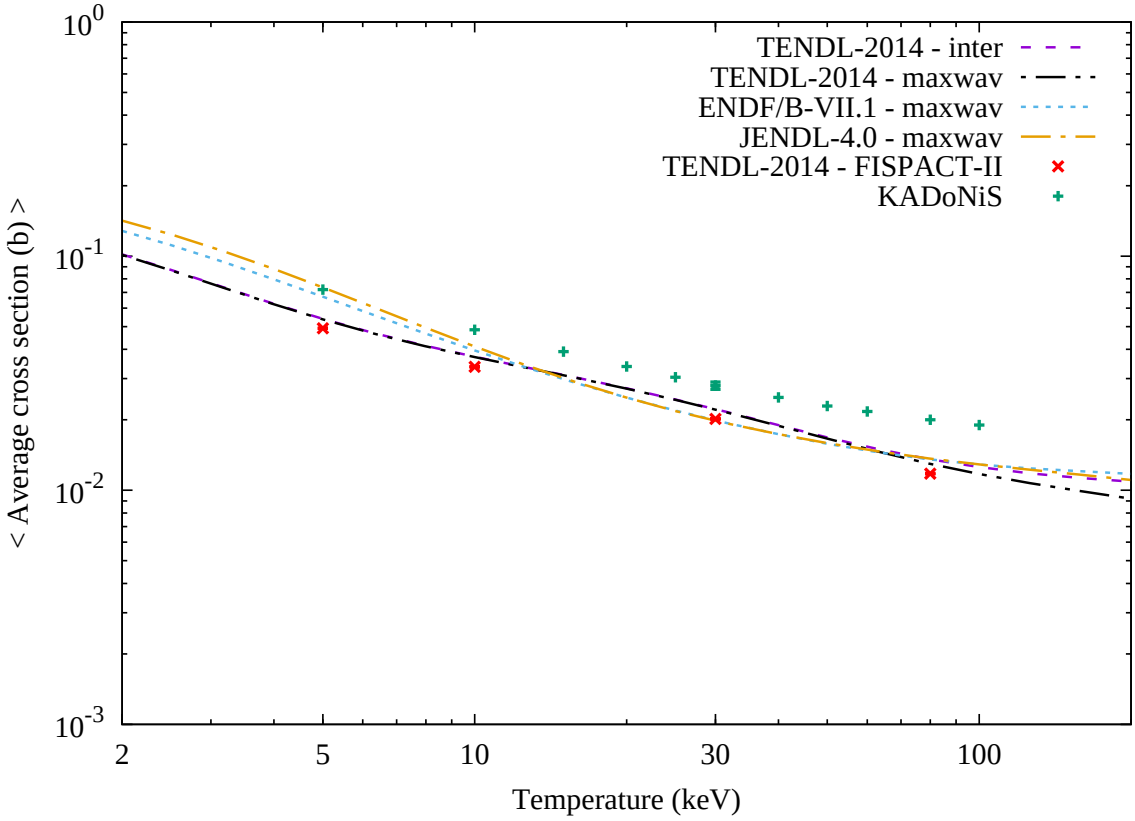
$^{141}Ce_{58}$ $[T_{1/2} = 32.50 \text{ days}]$ (KADoNiS=SMC)



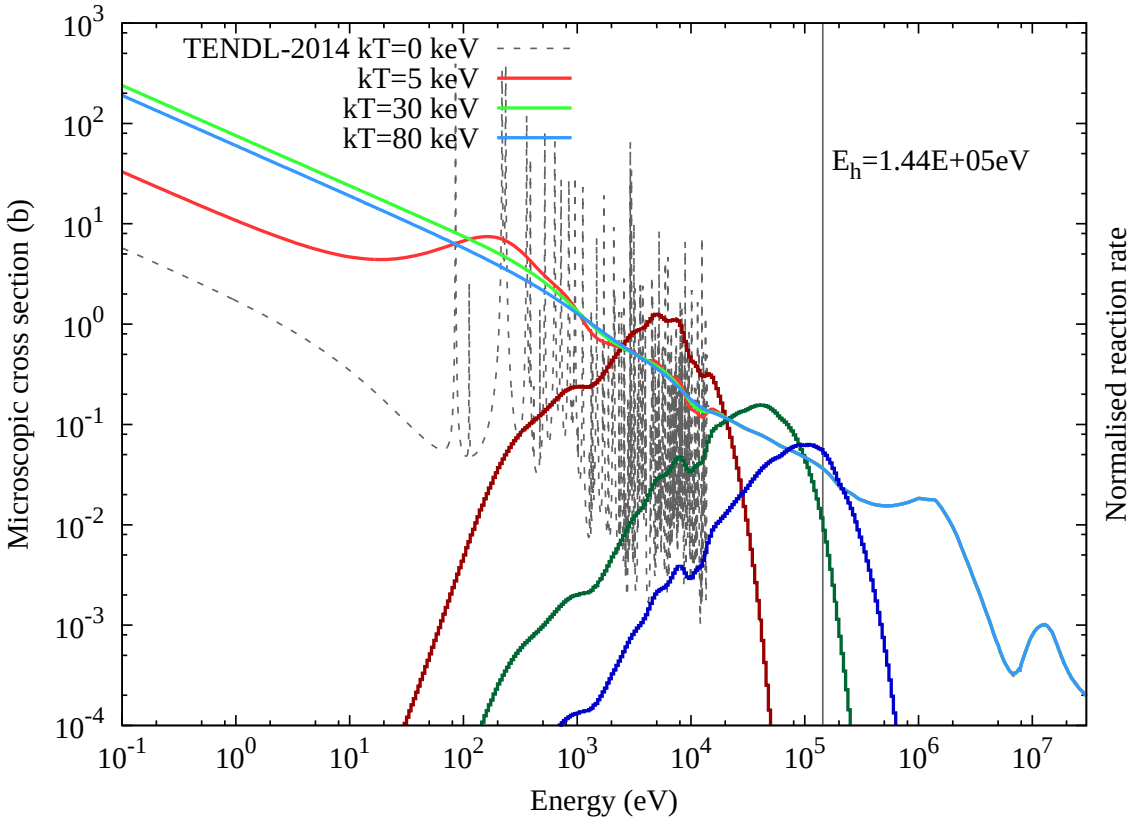


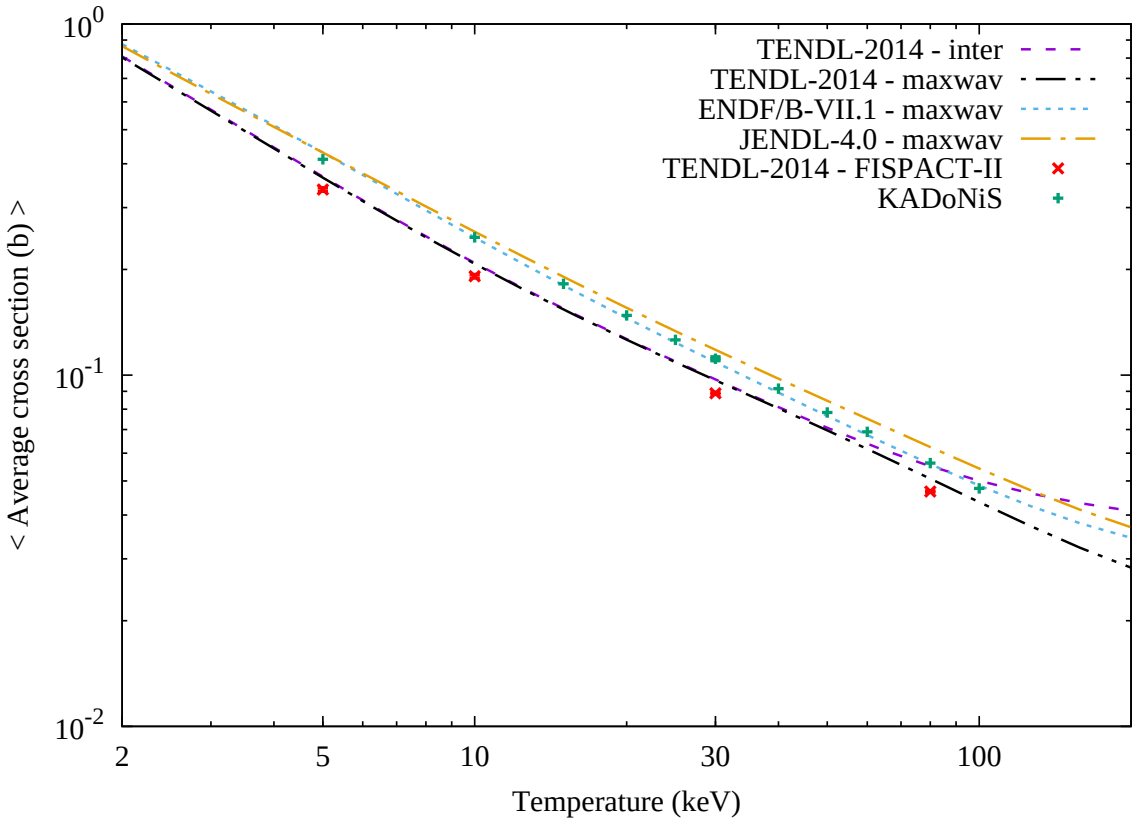
$^{142}Ce_{58}$ $[T_{1/2} = 5.00 \times 10^{16}$ years$]$



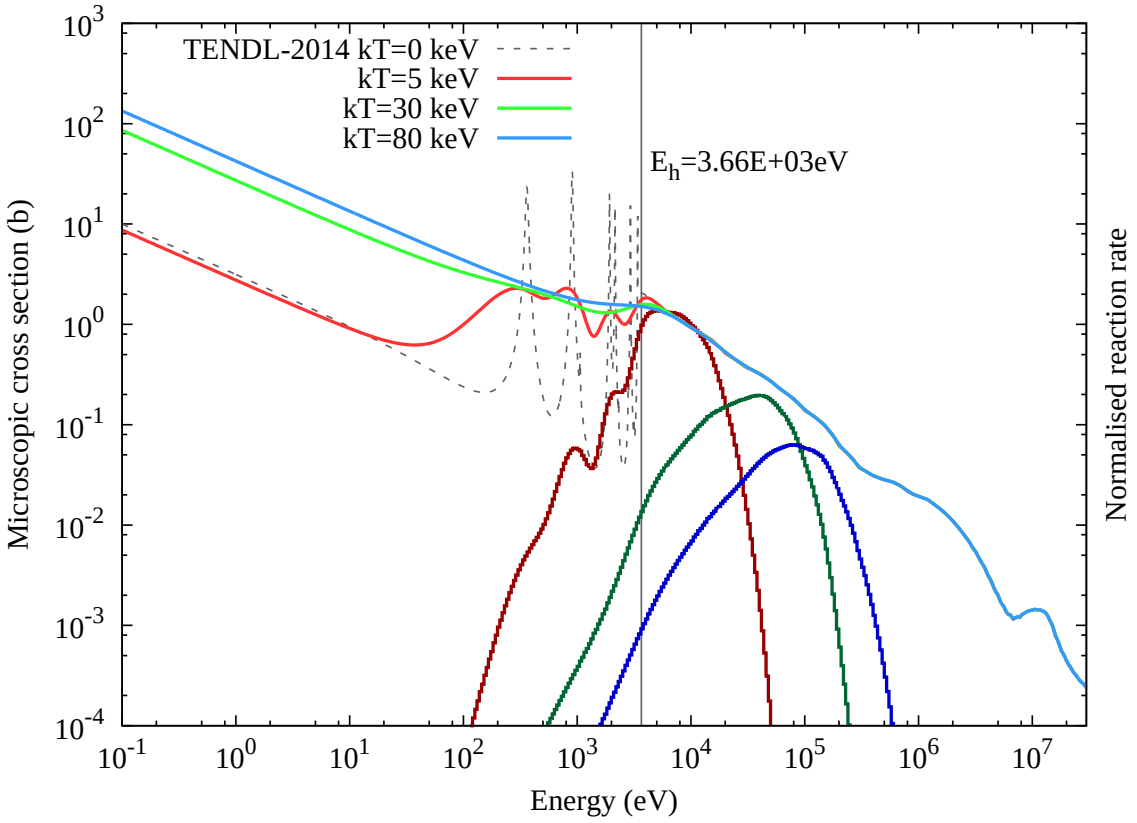


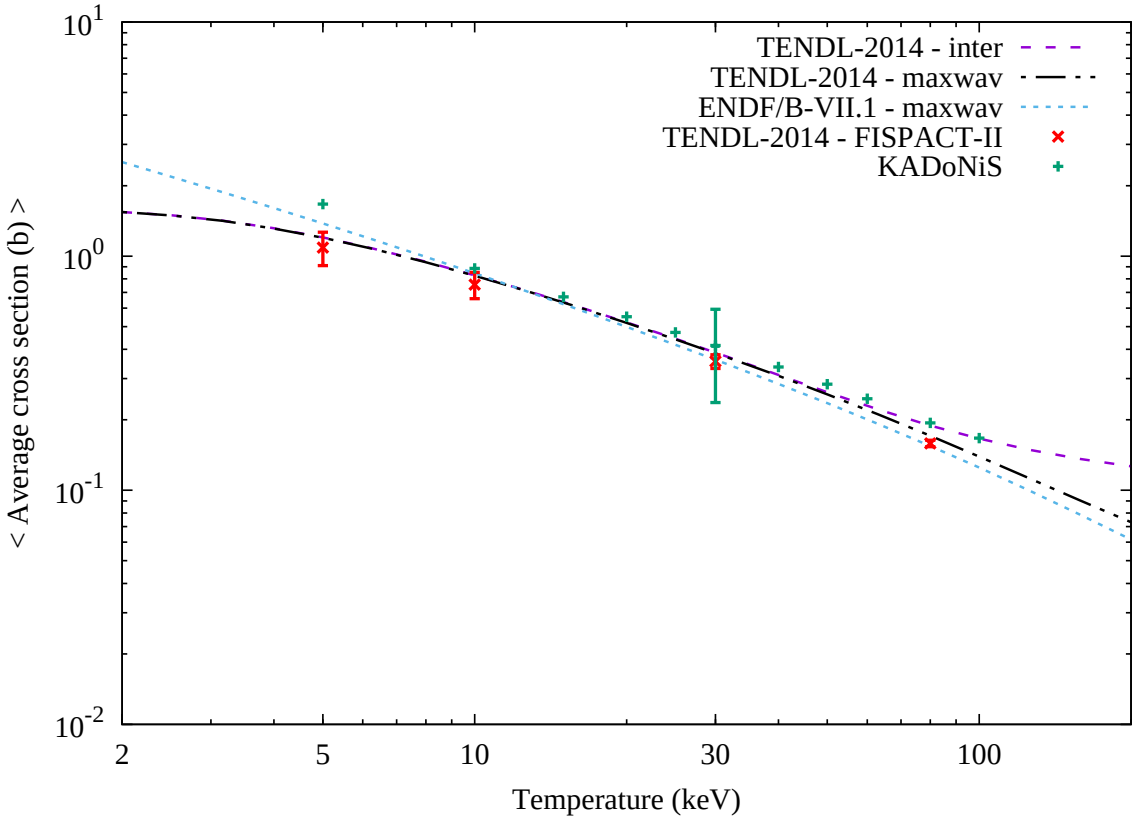
$^{141}Pr_{59}$ [Stable]



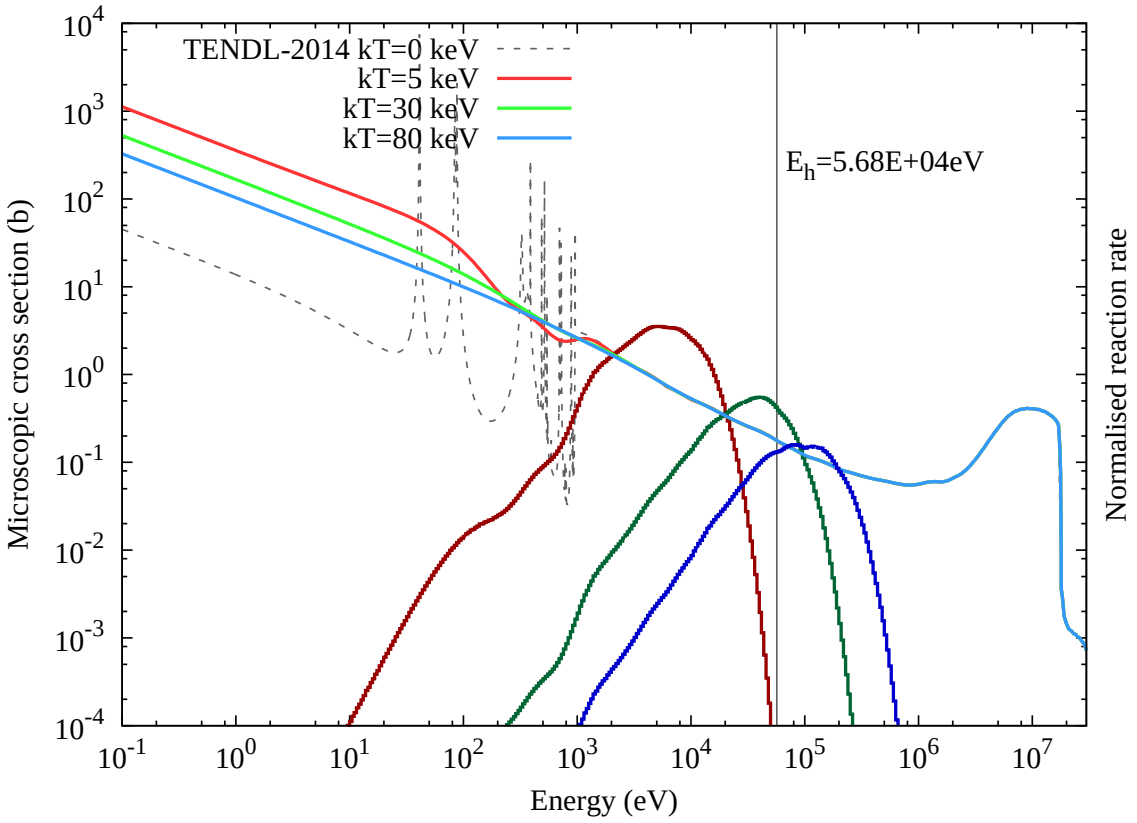


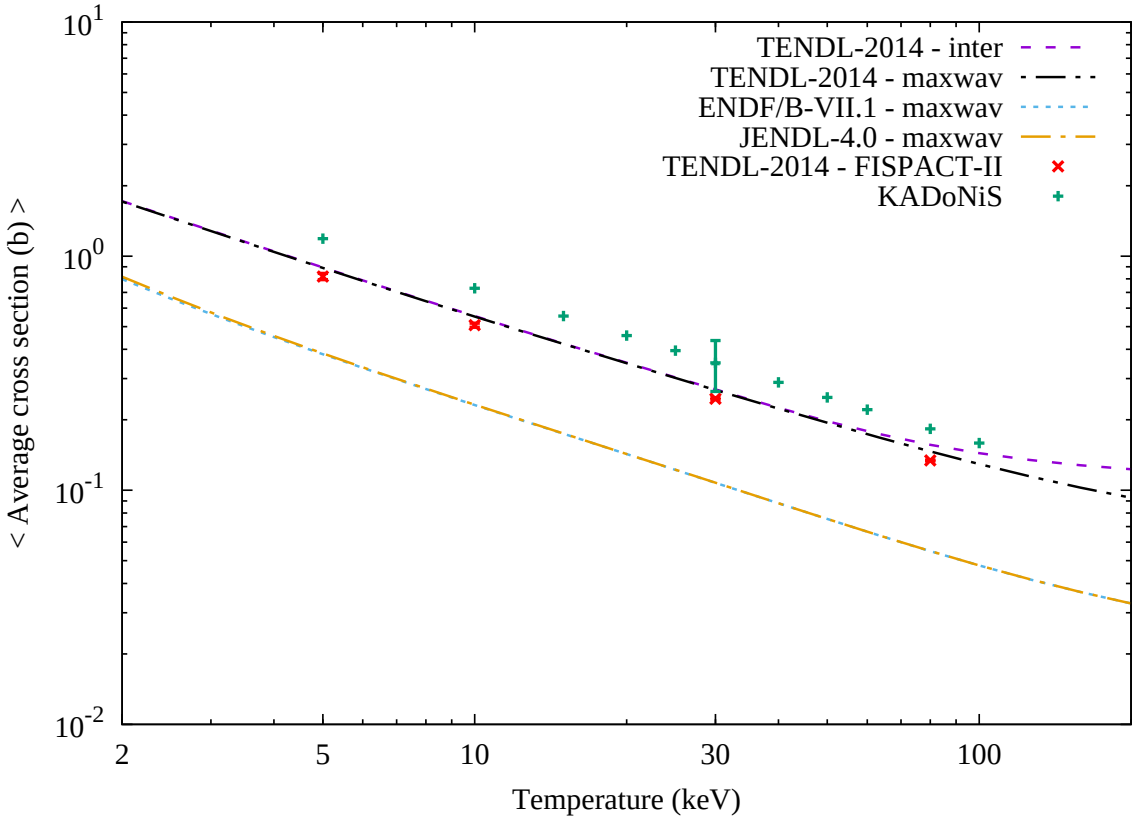
$^{142}Pr_{59}$ [$T_{1/2}$ = 19.12 hours] (KADoNiS=SMC)



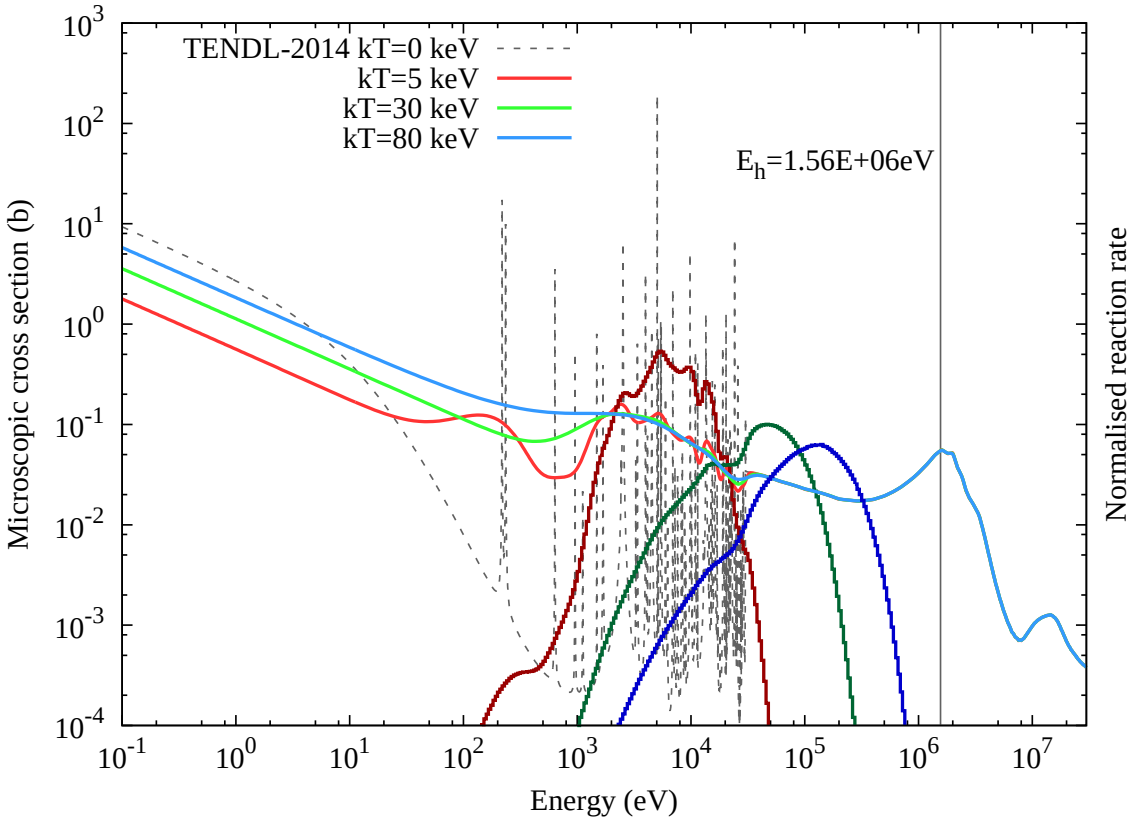


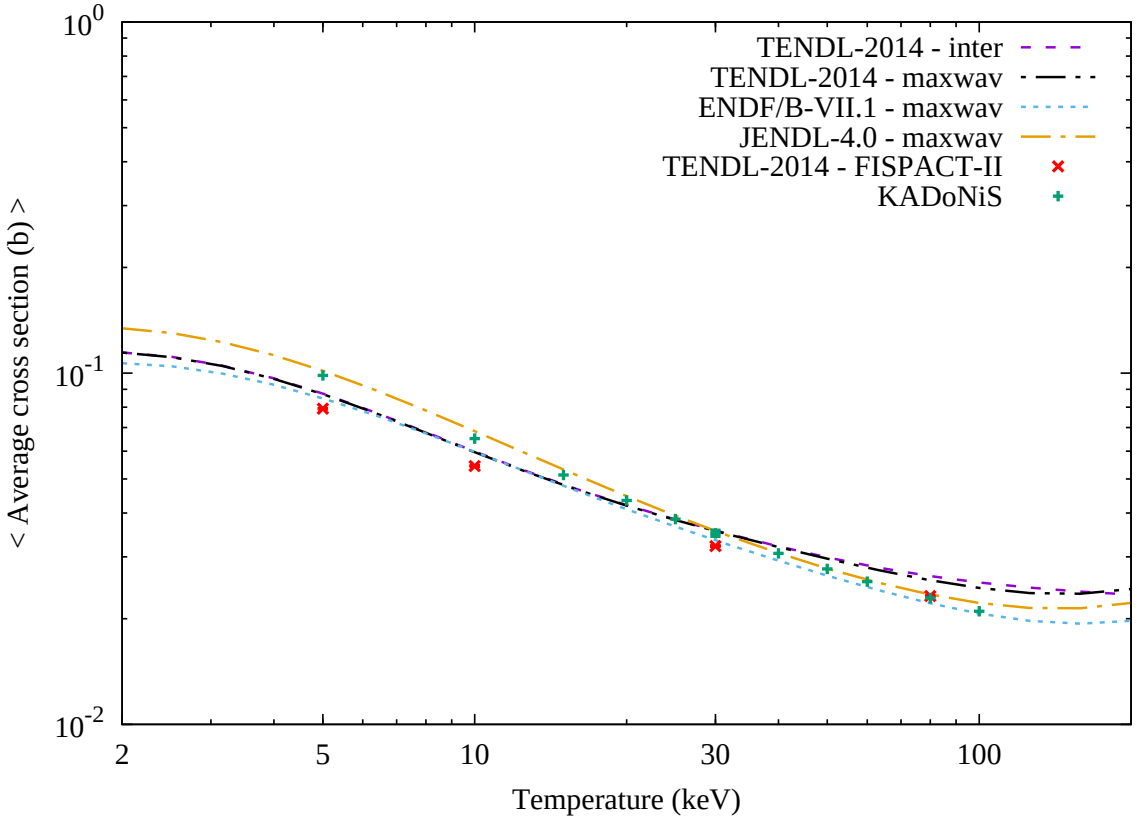
$^{143}Pr_{59}$ [$T_{1/2}$ = 13.56 days] (KADoNiS=SMC)



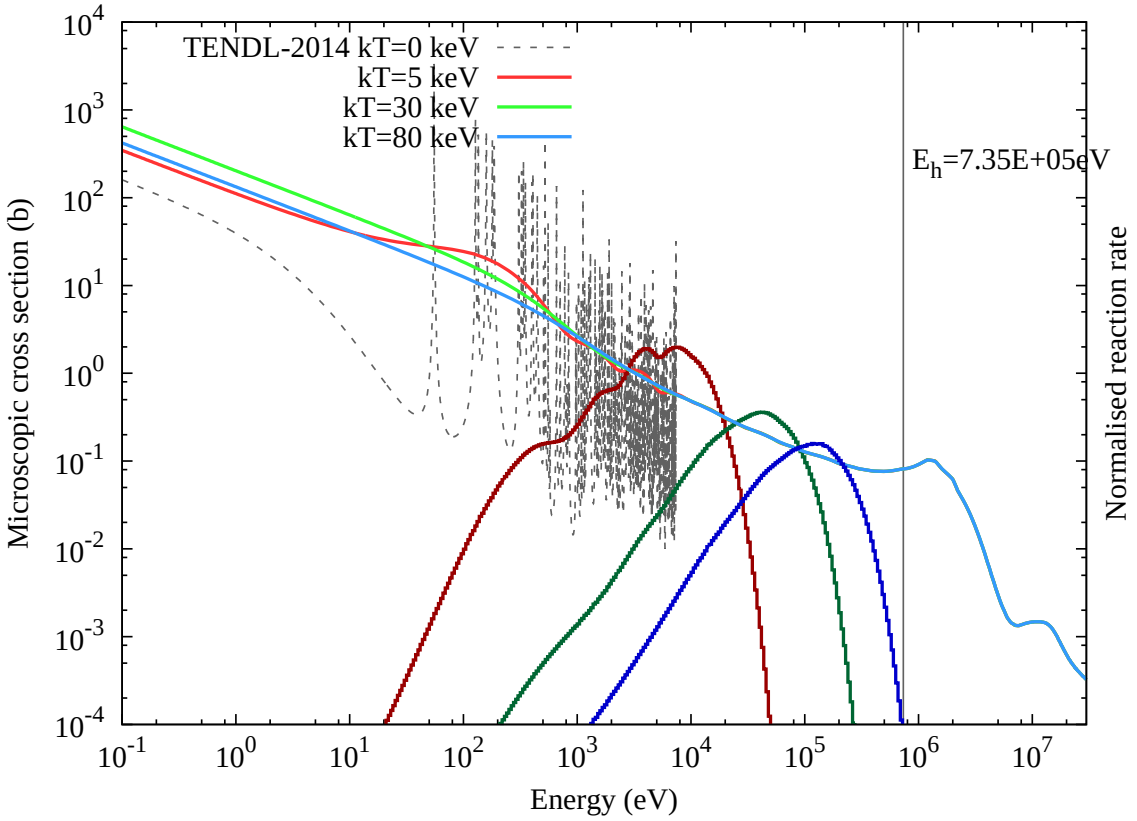


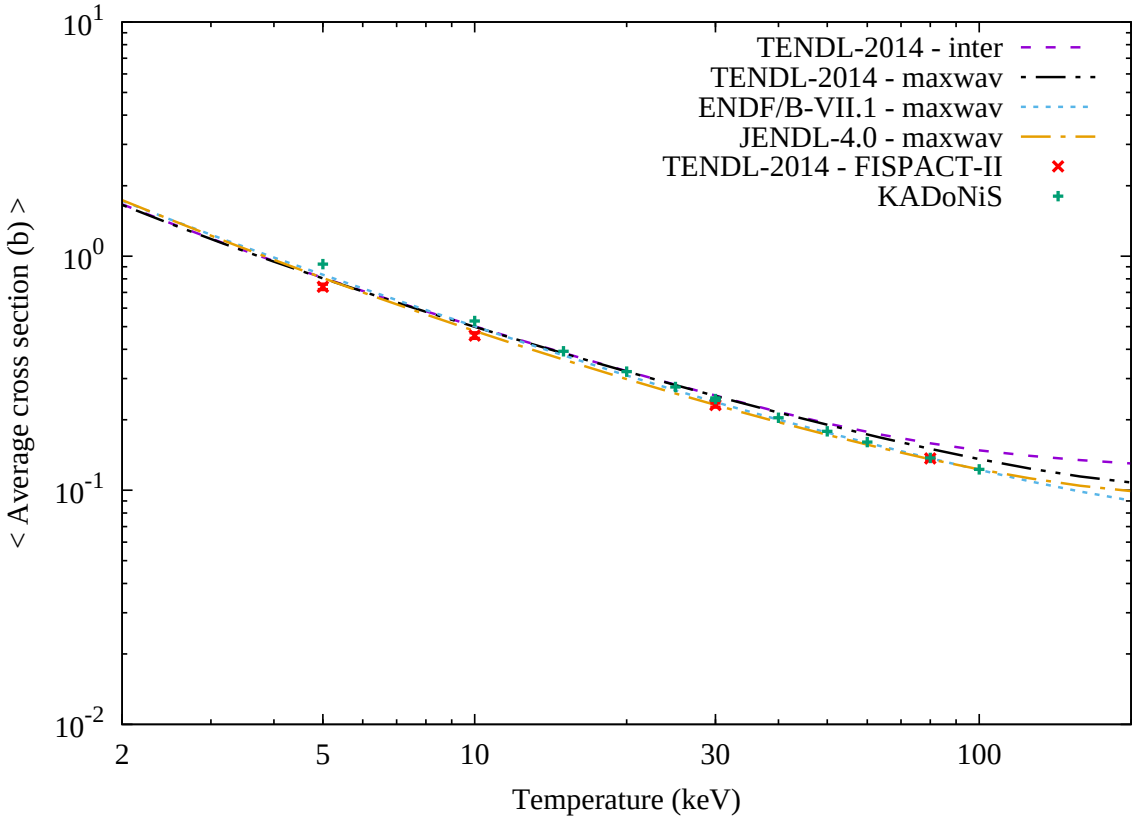
$^{142}Nd_{60}$ [Stable]



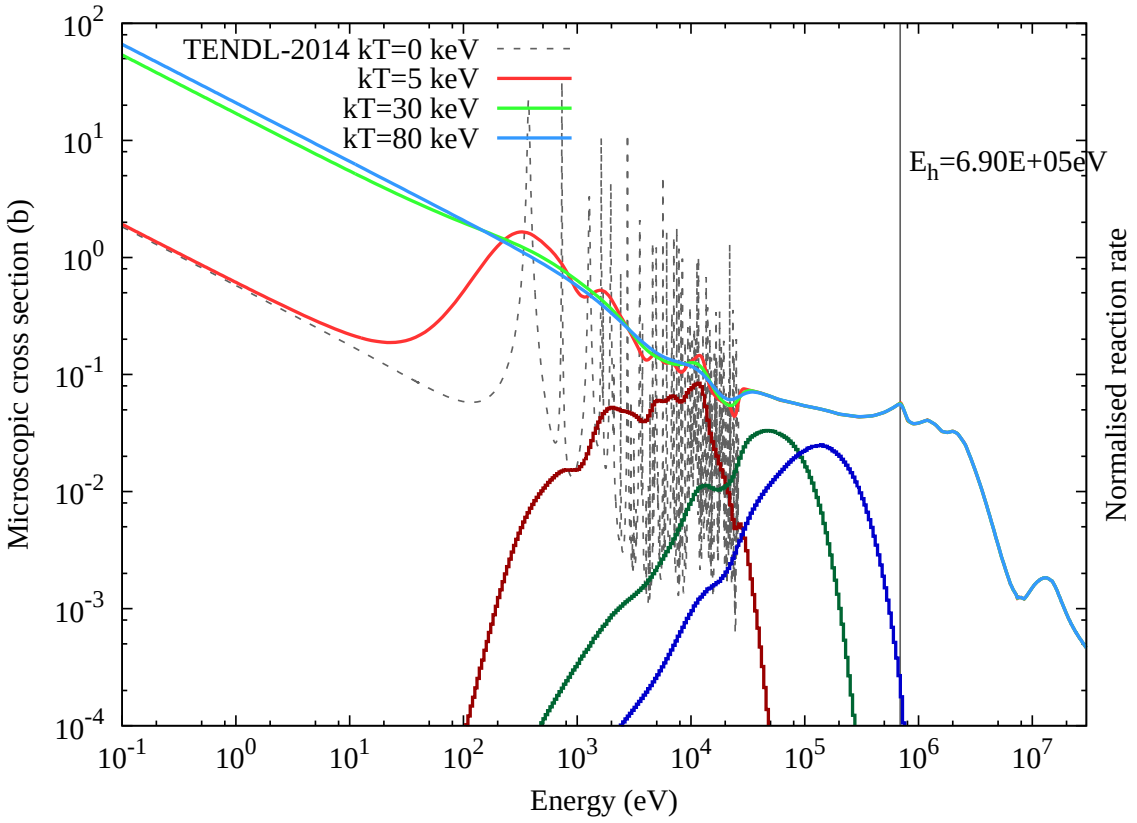


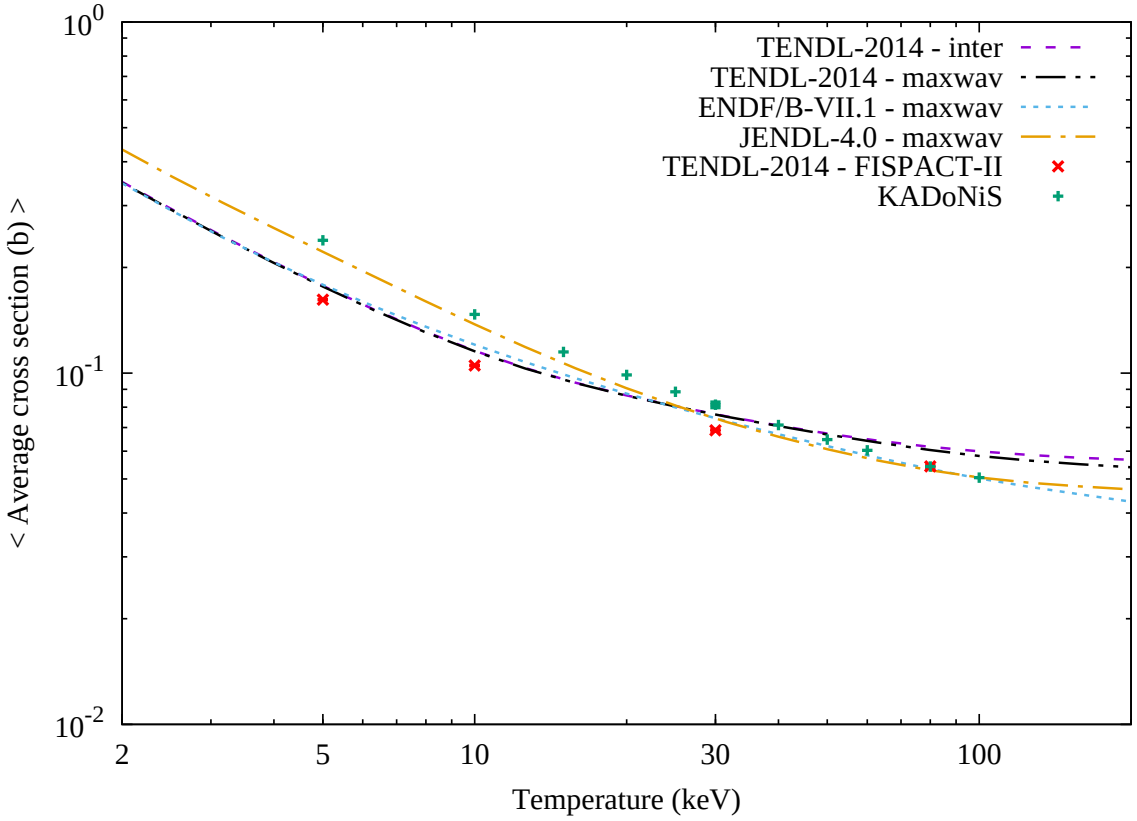
$^{143}Nd_{60}$ [Stable]



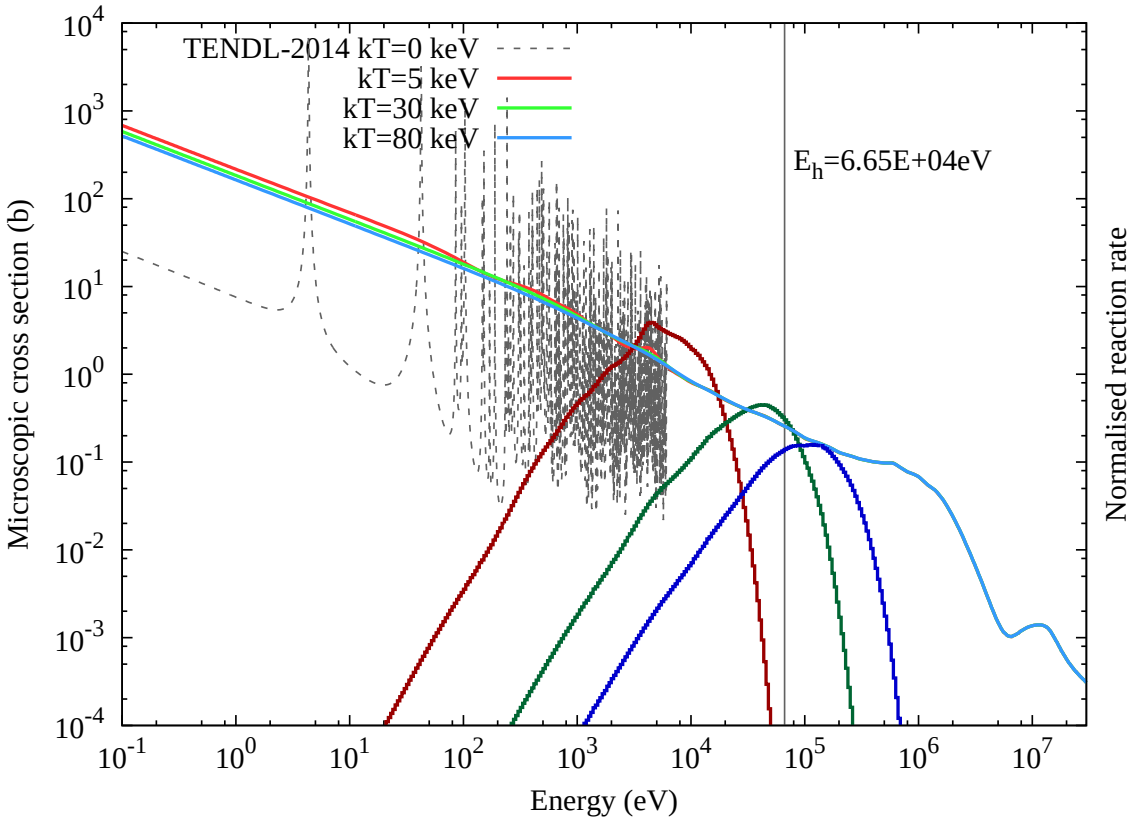


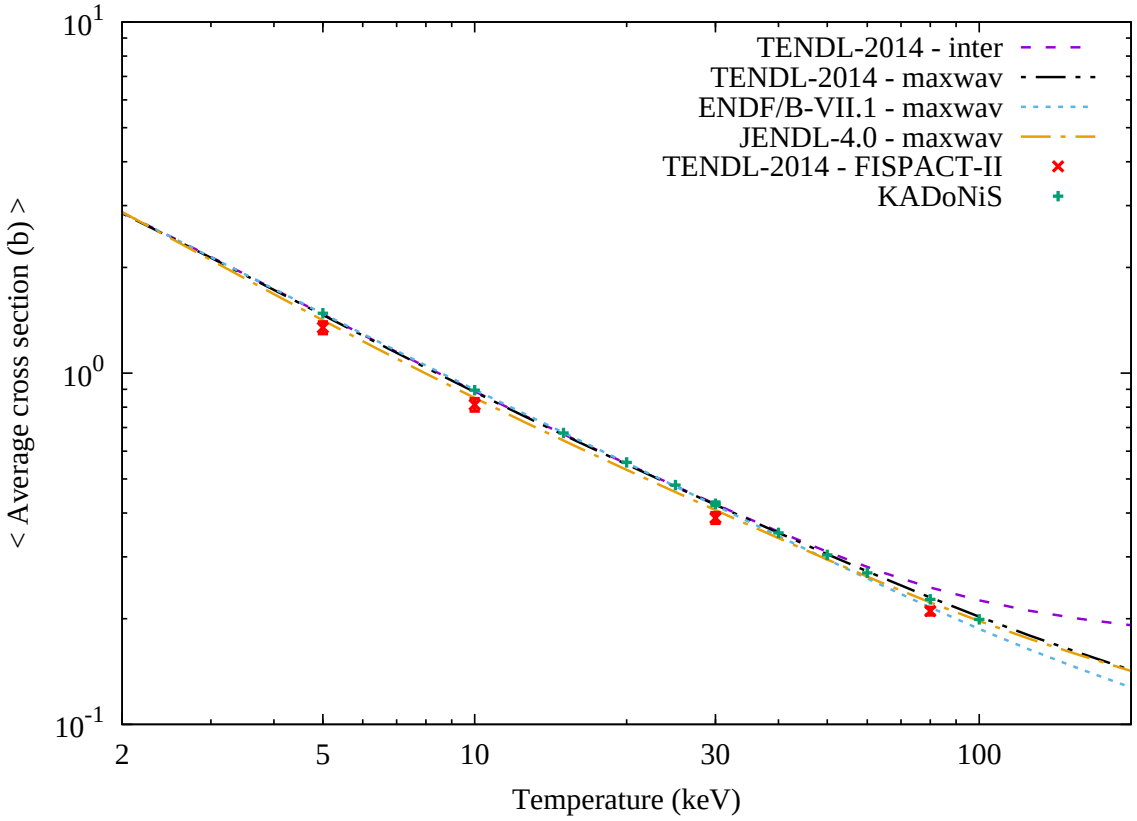
$^{144}Nd_{60}$ $[T_{1/2} = 2.29 \times 10^{15}$ years$]$



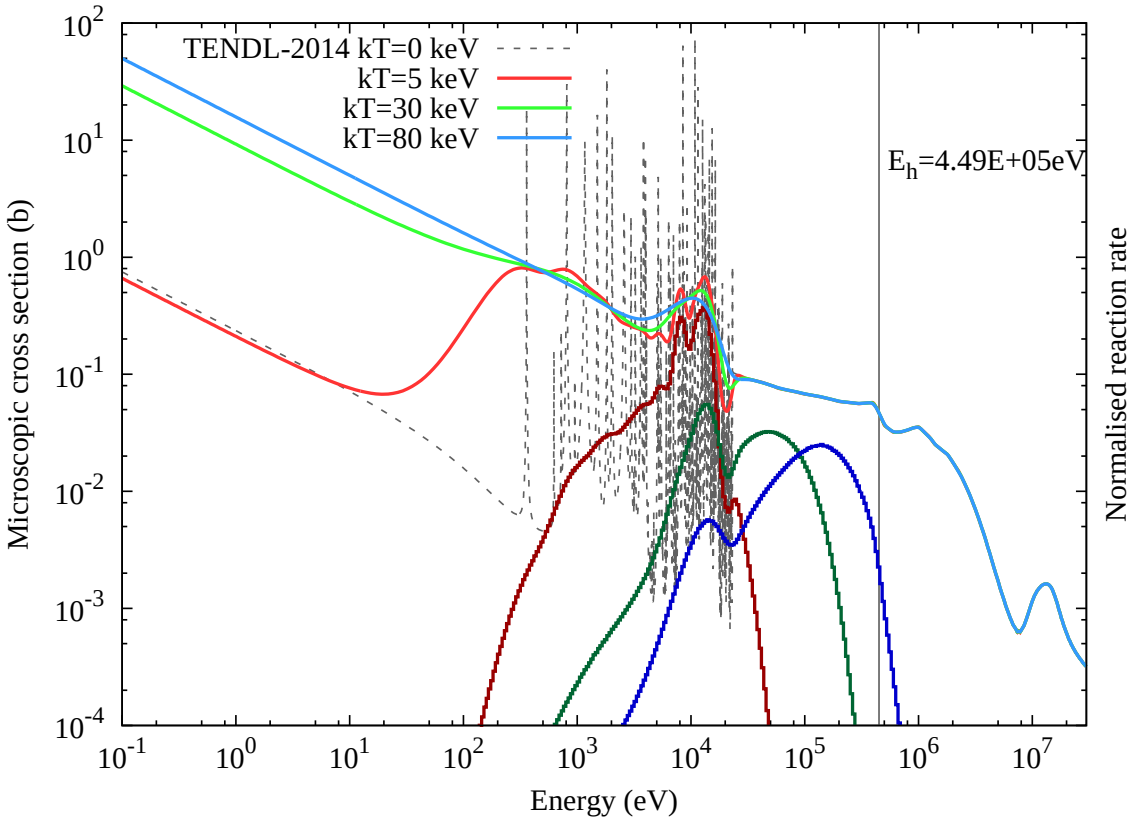


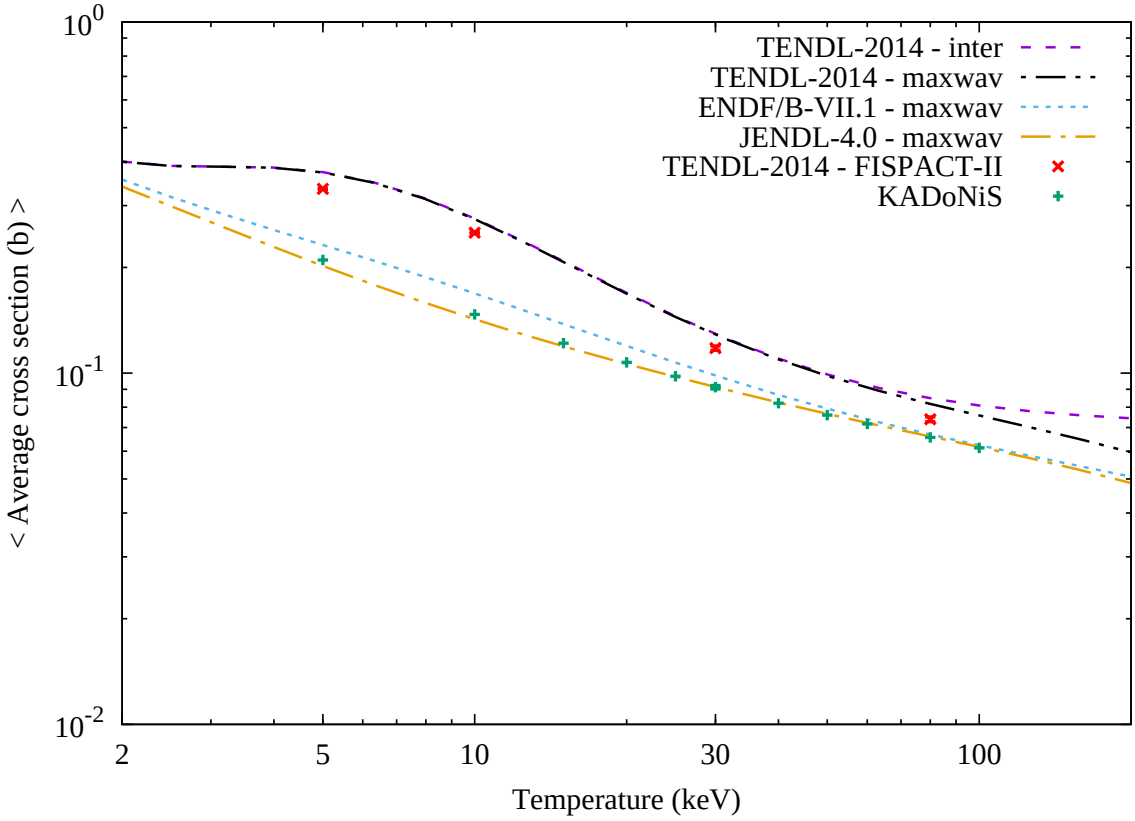
$^{145}Nd_{60}$ [Stable]



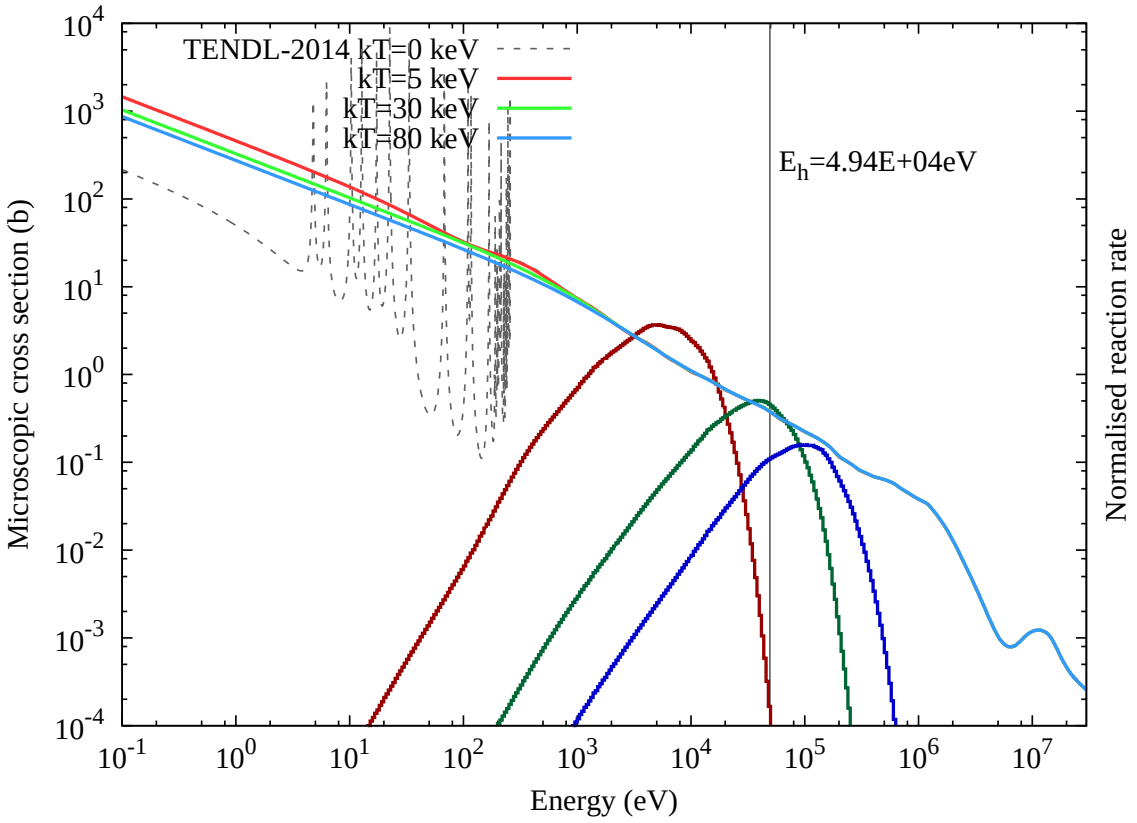


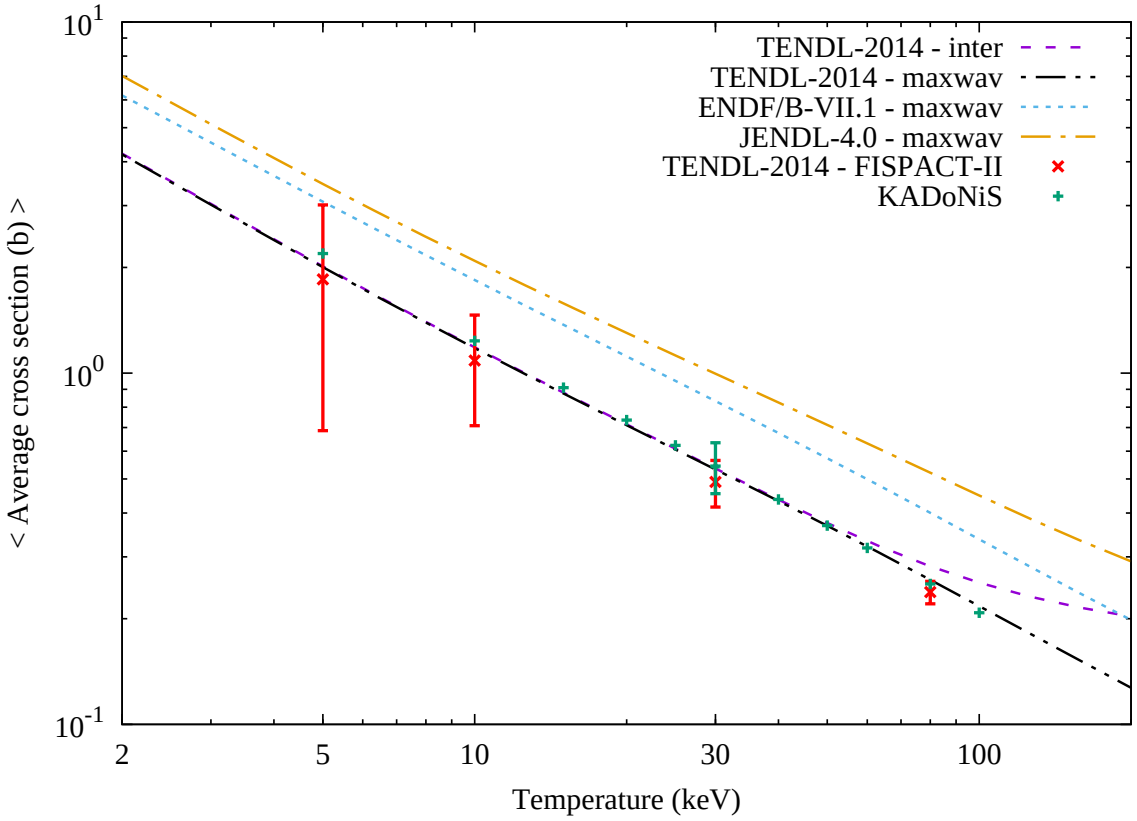
$^{146}Nd_{60}$ [Stable]



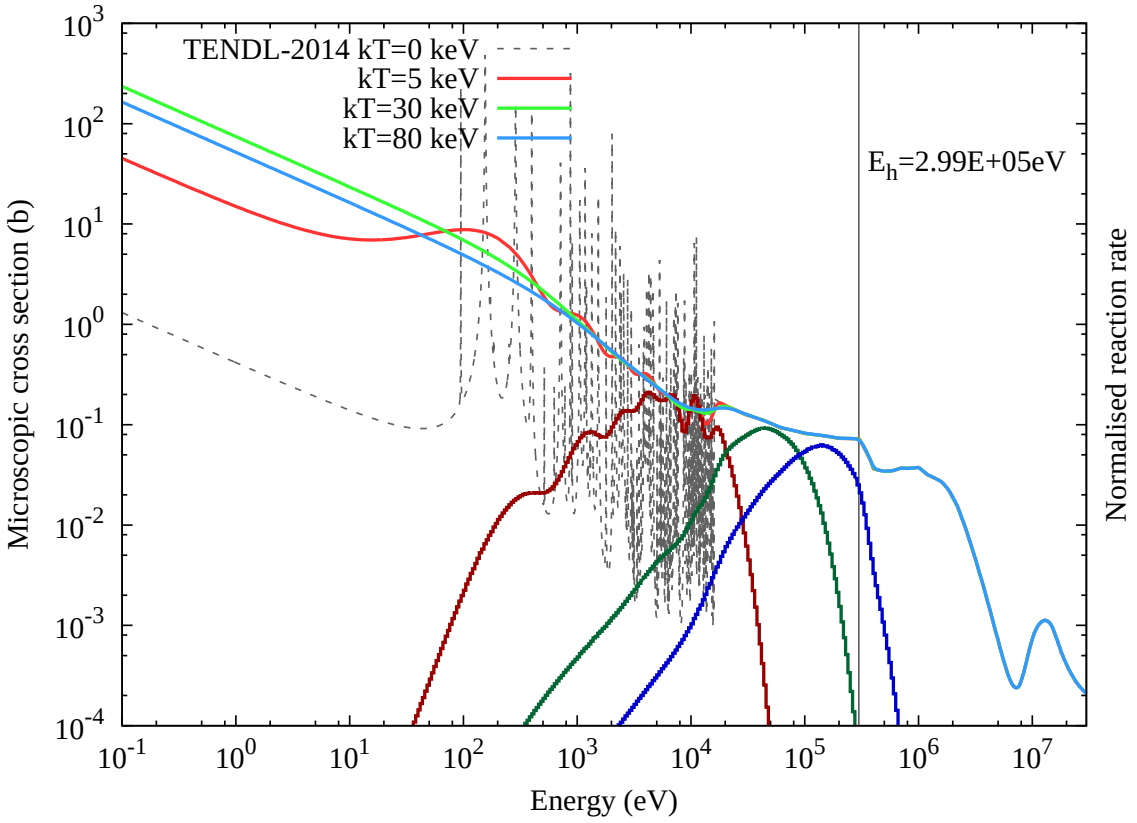


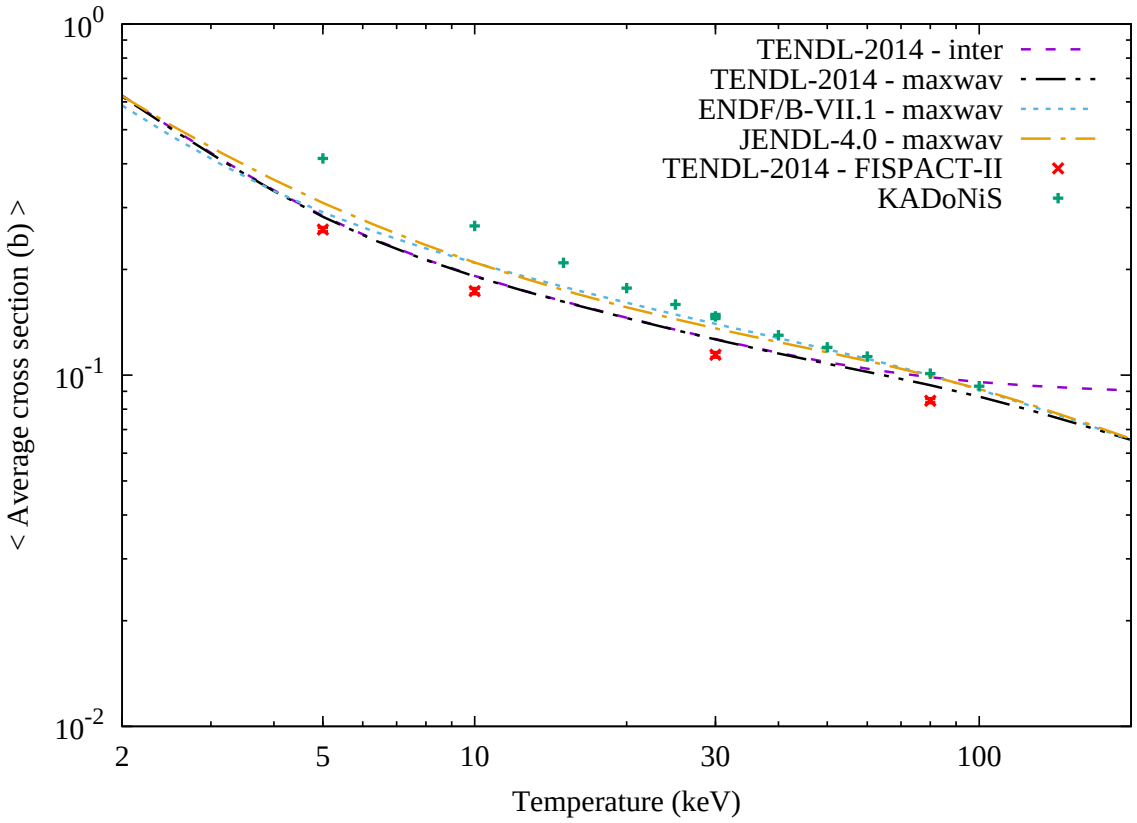
$^{147}Nd_{60}$ [$T_{1/2}$ = 10.98 days] (KADoNiS=SMC)



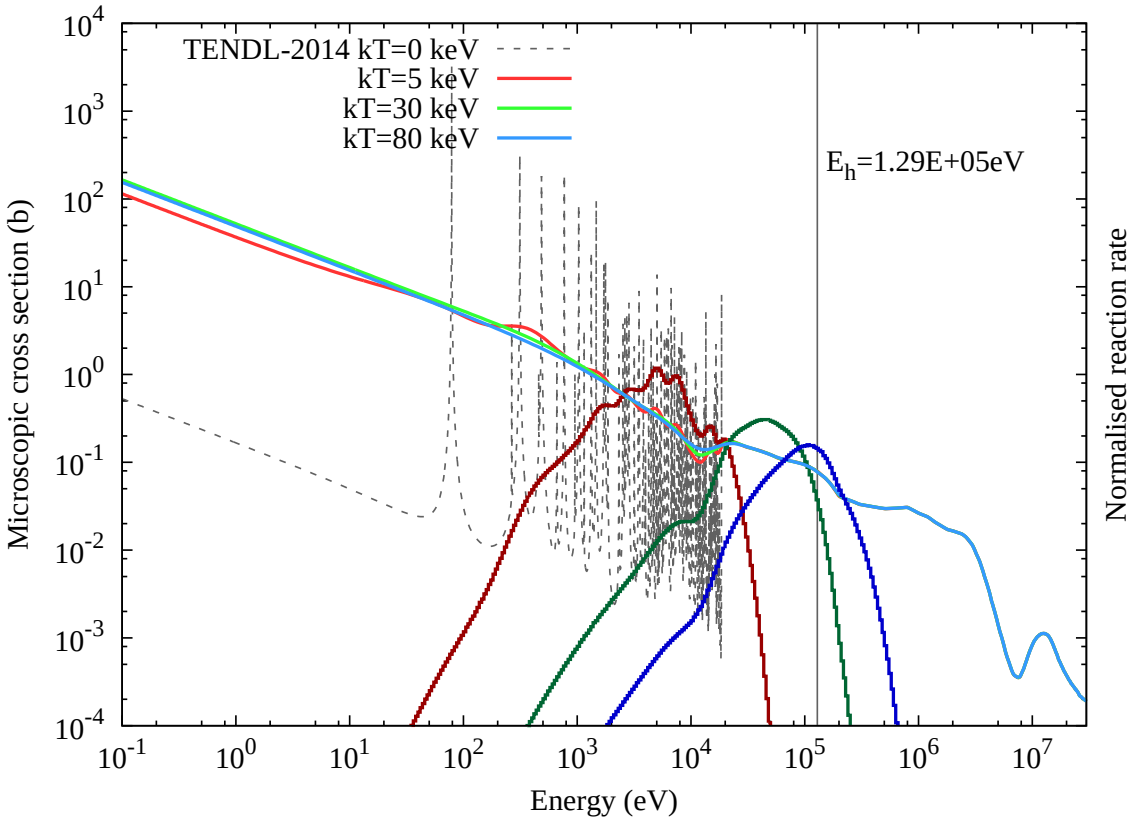


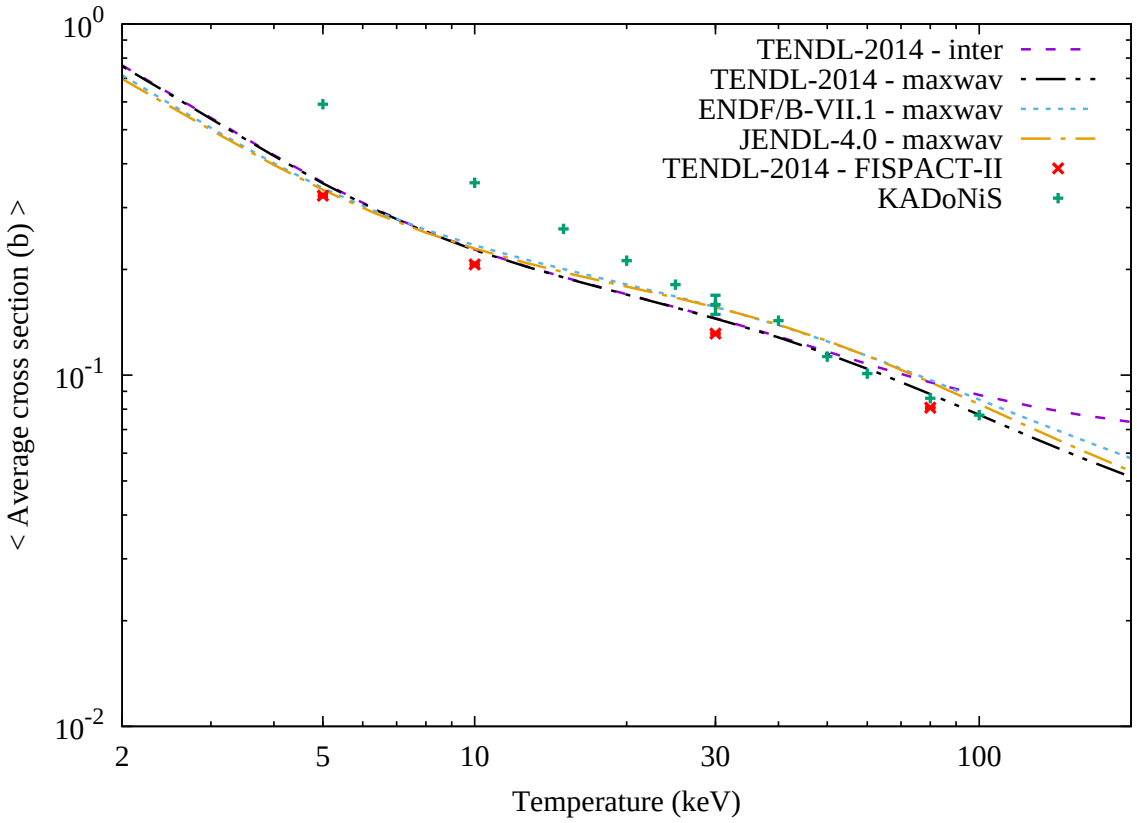
$^{148}Nd_{60}$ $[T_{1/2} = 2.70 \times 10^{18}$ years$]$



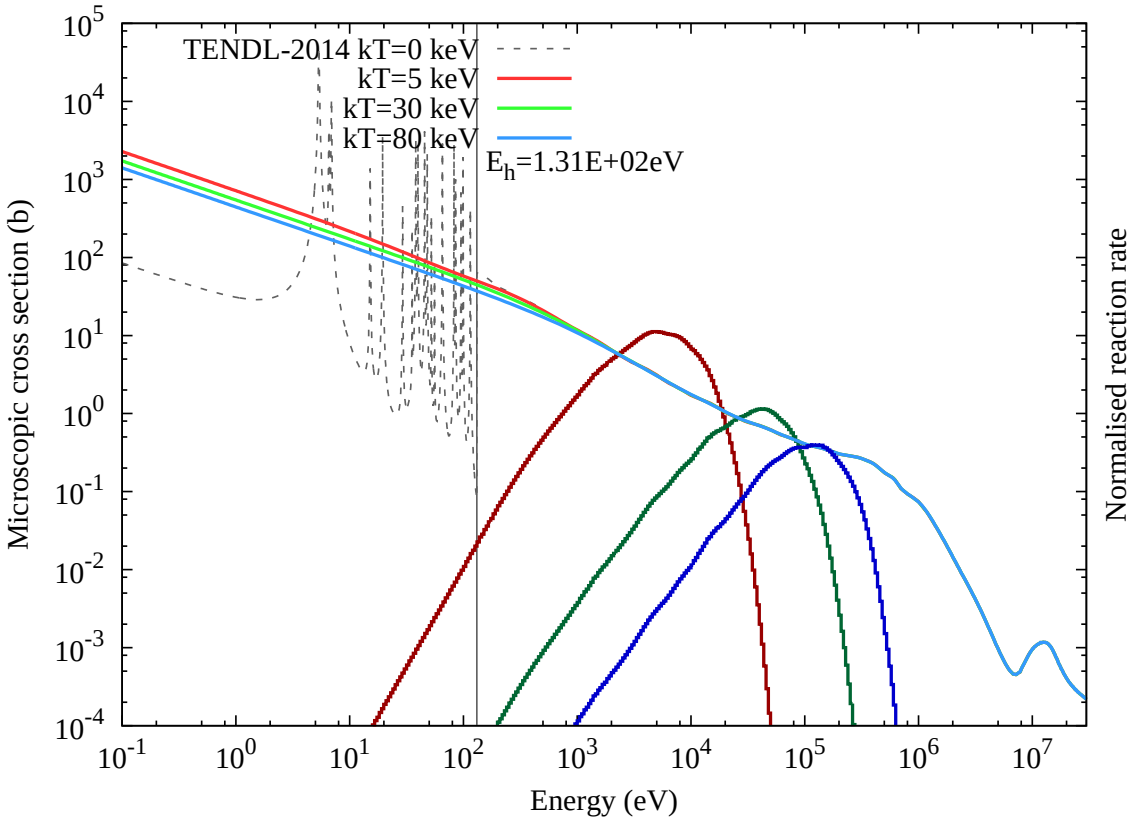


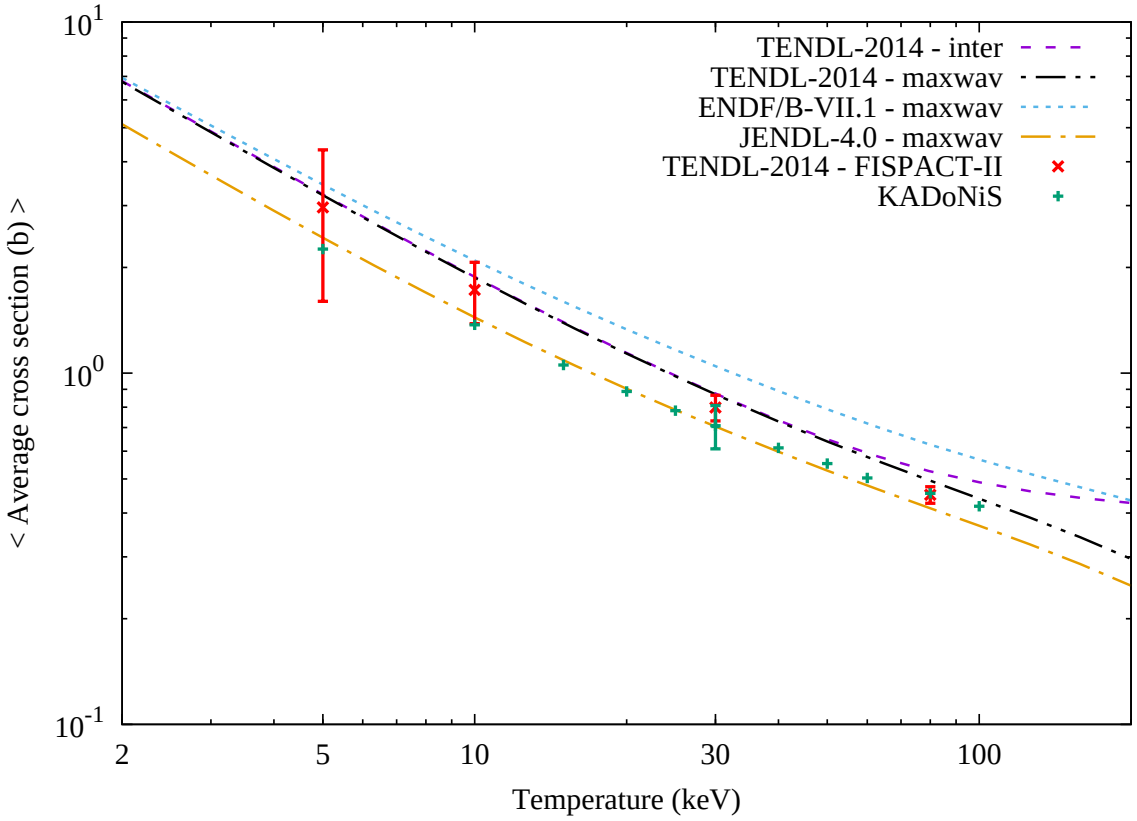
$^{150}Nd_{60}$ $[T_{1/2} = 2.10 \times 10^{19}$ years$]$



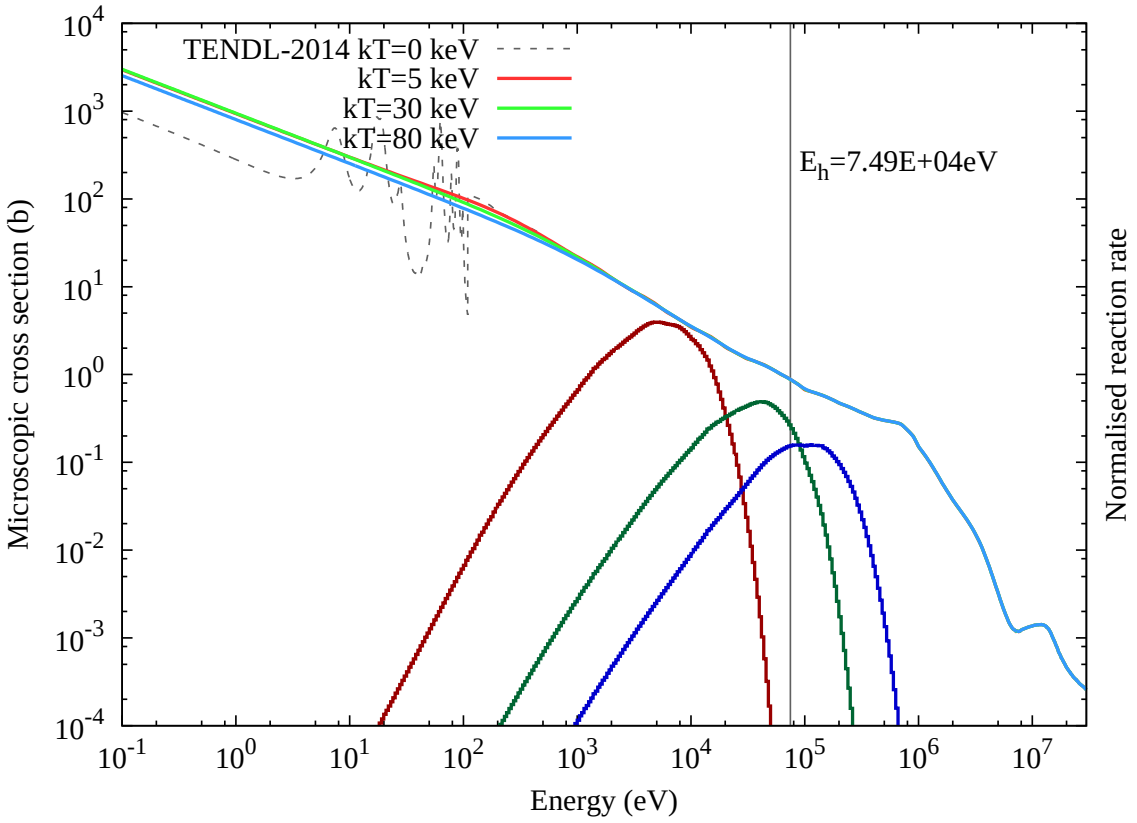


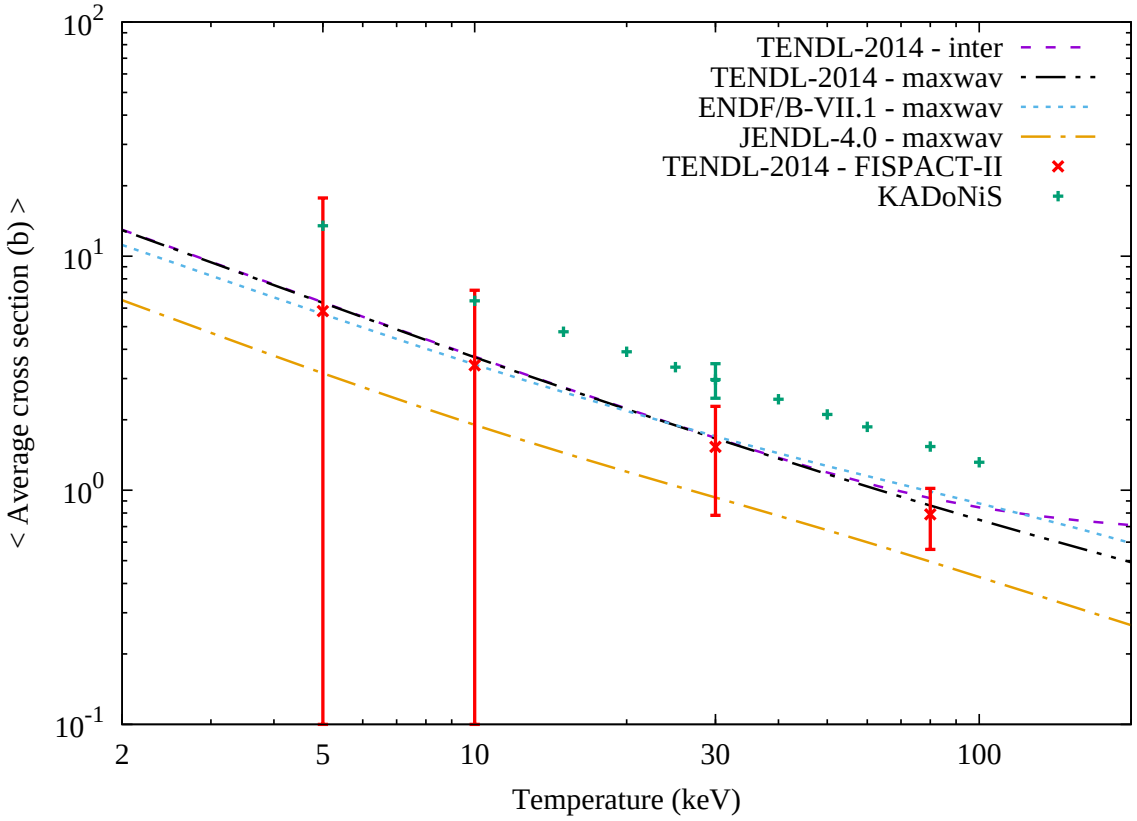
$^{147}Pm_{61}$ $[T_{1/2} = 2.62$ years$]$



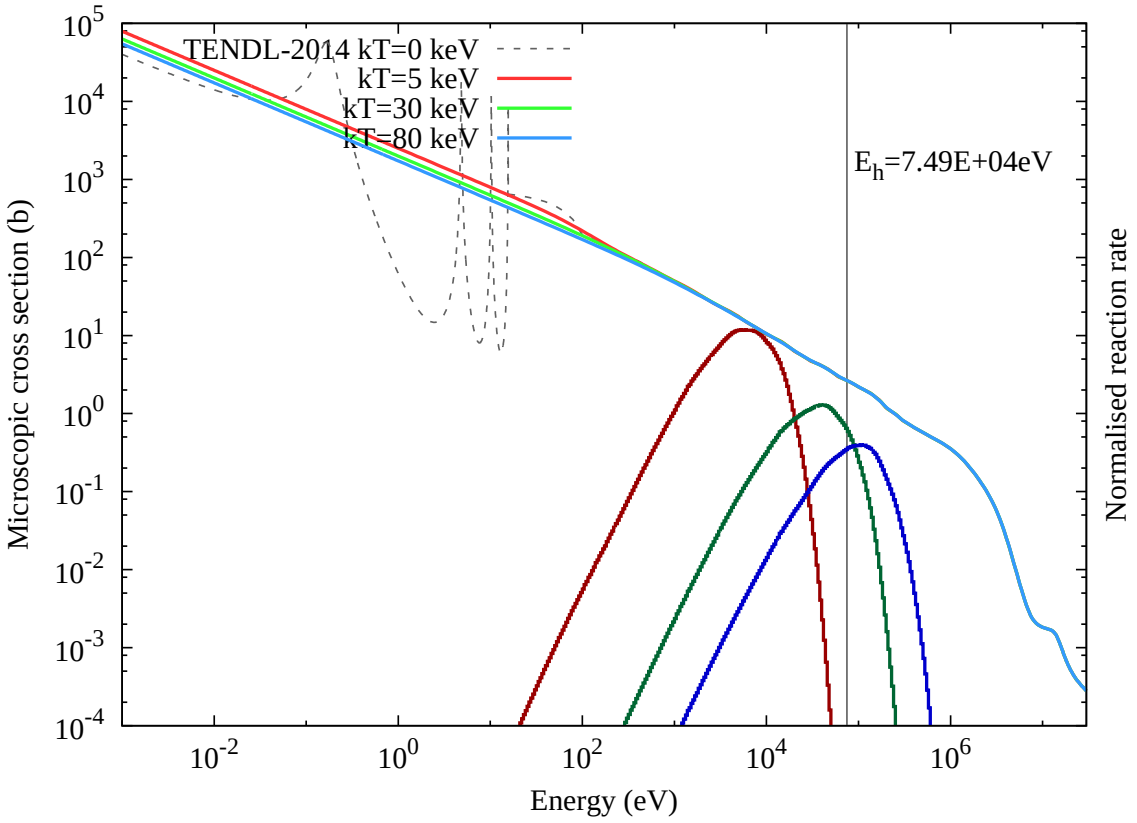


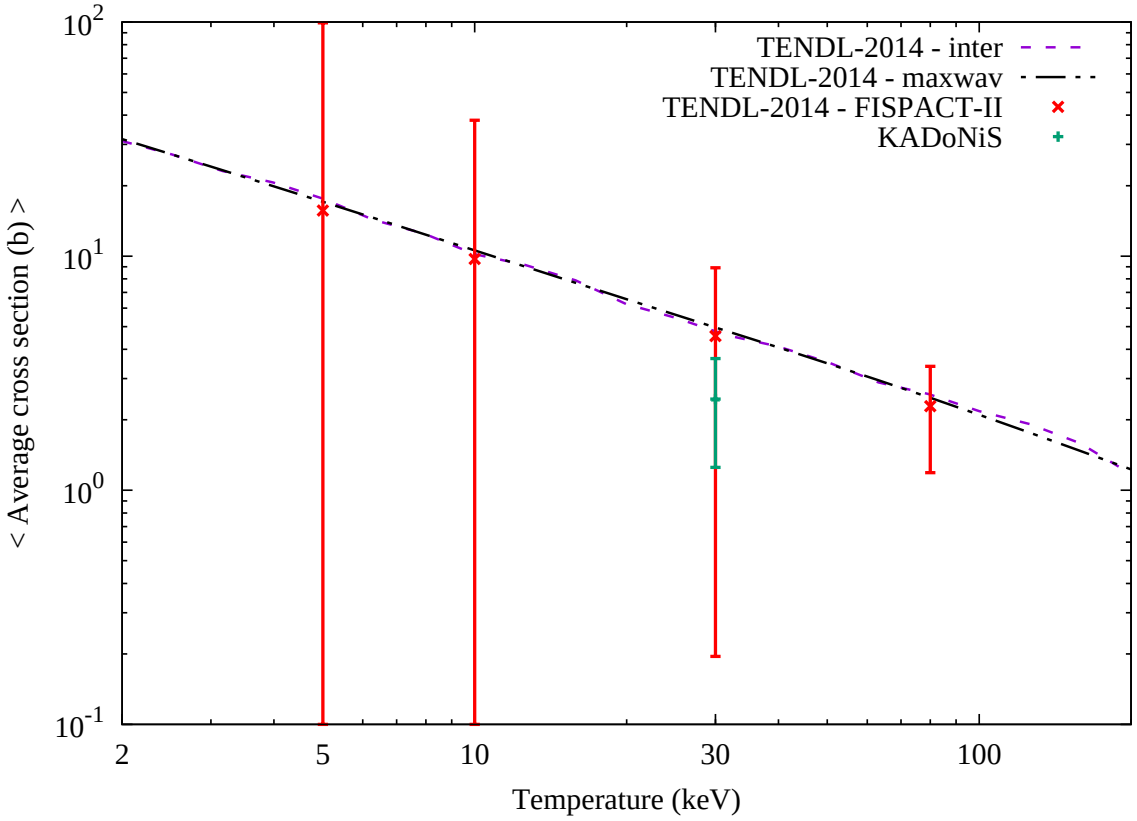
$^{148}Pm_{61}$ $[T_{1/2} = 5.37$ days$]$ (KADoNiS=SMC)



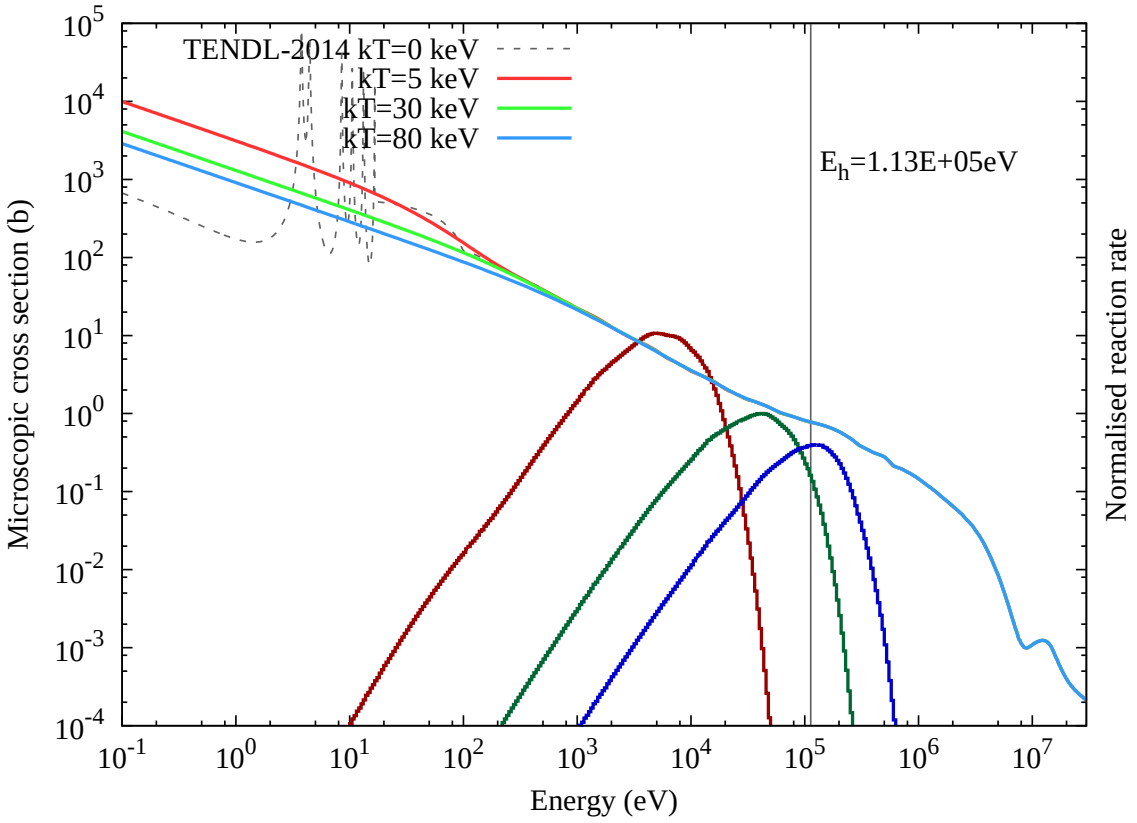


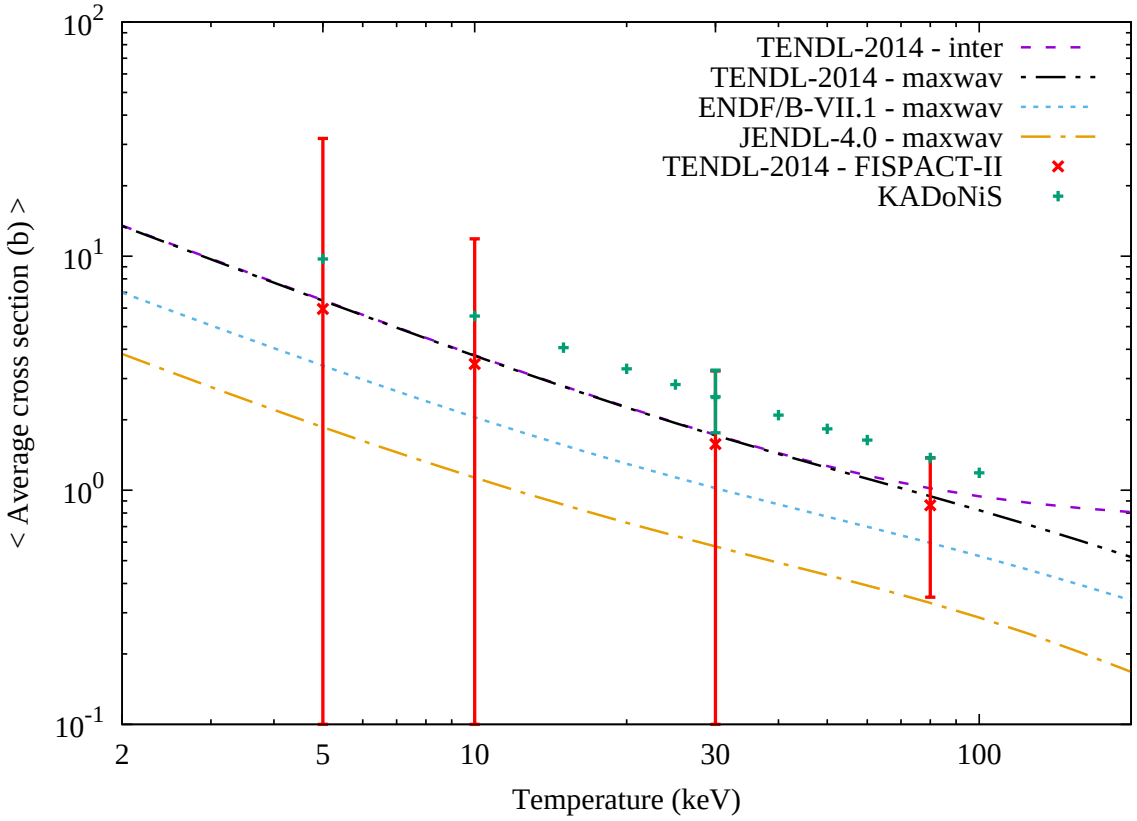
$^{148m}Pm_{61}$ [$T_{1/2}$ = 41.05 days] (KADoNiS=SMC)



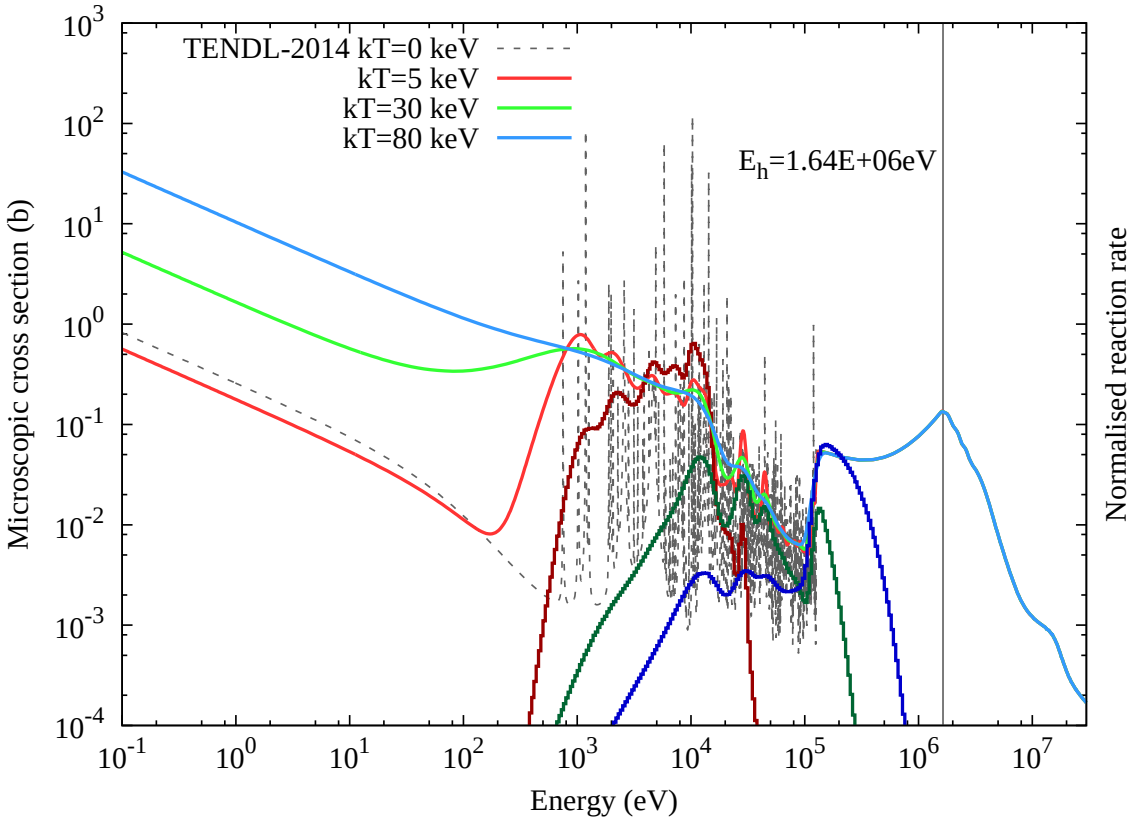


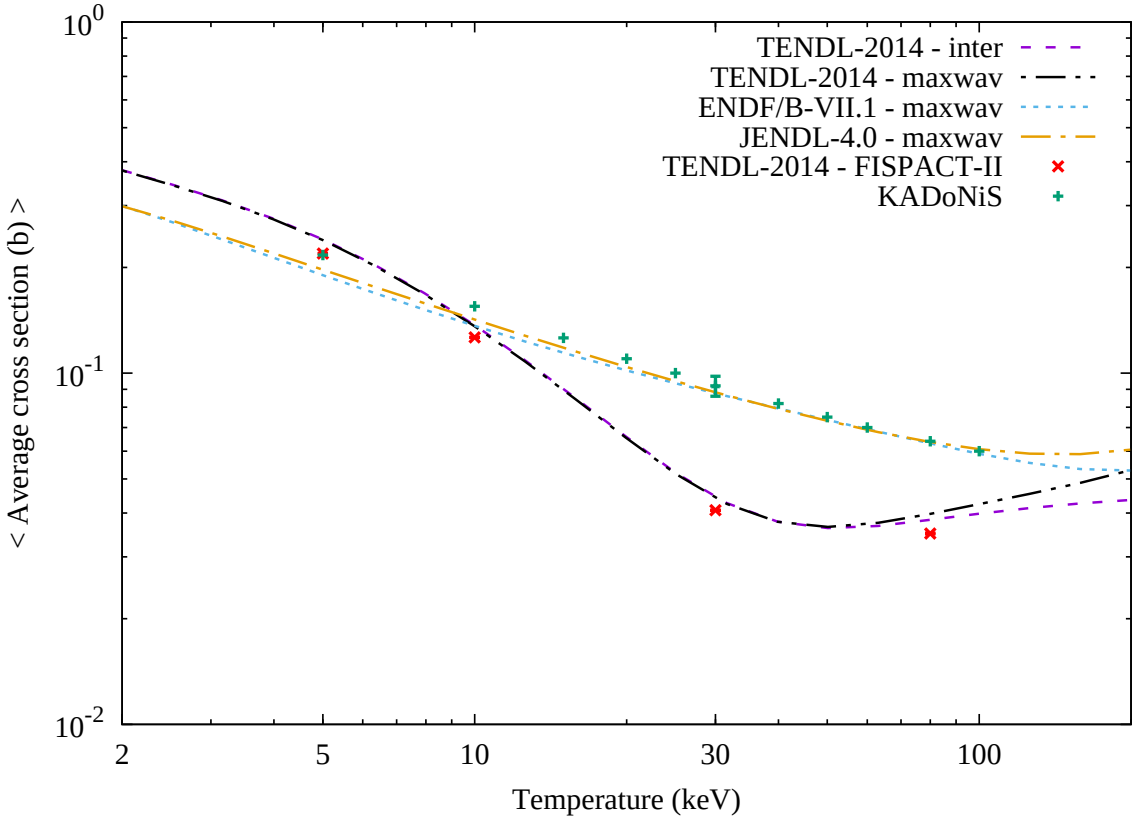
$^{149}Pm_{61}$ $[T_{1/2} = 2.21$ days$]$ (KADoNiS=SMC)



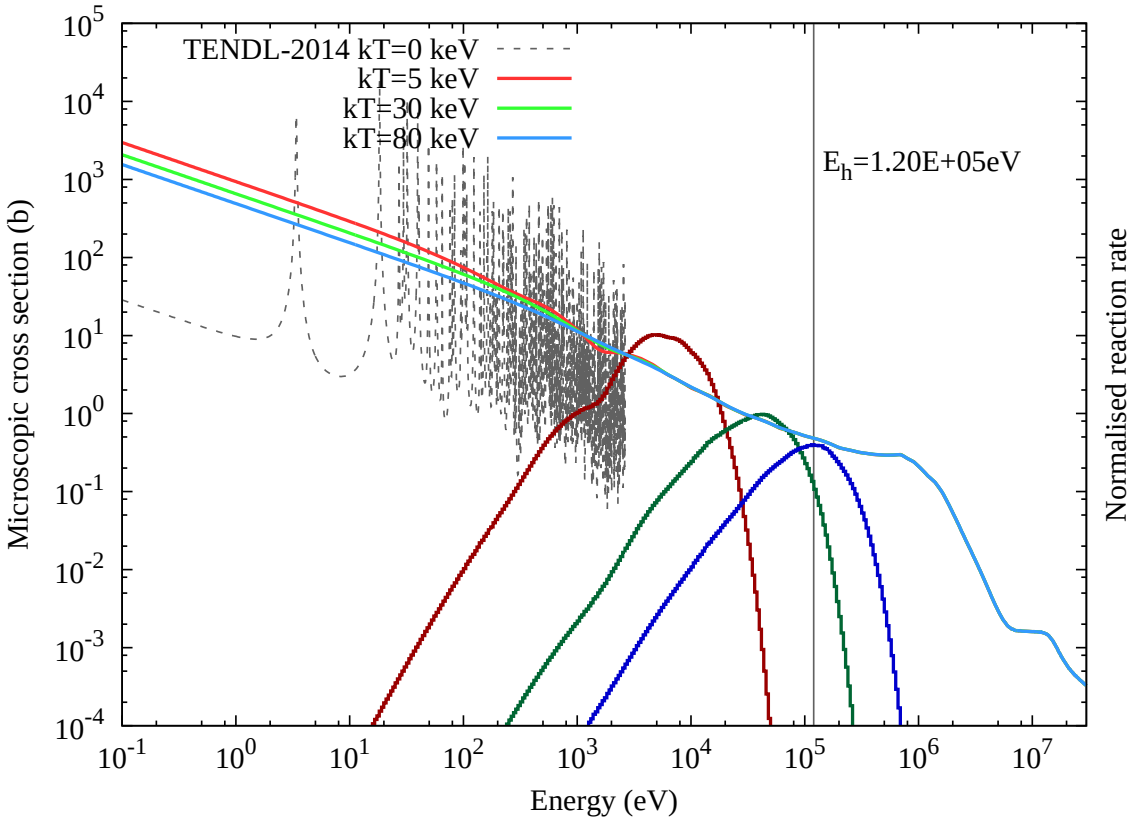


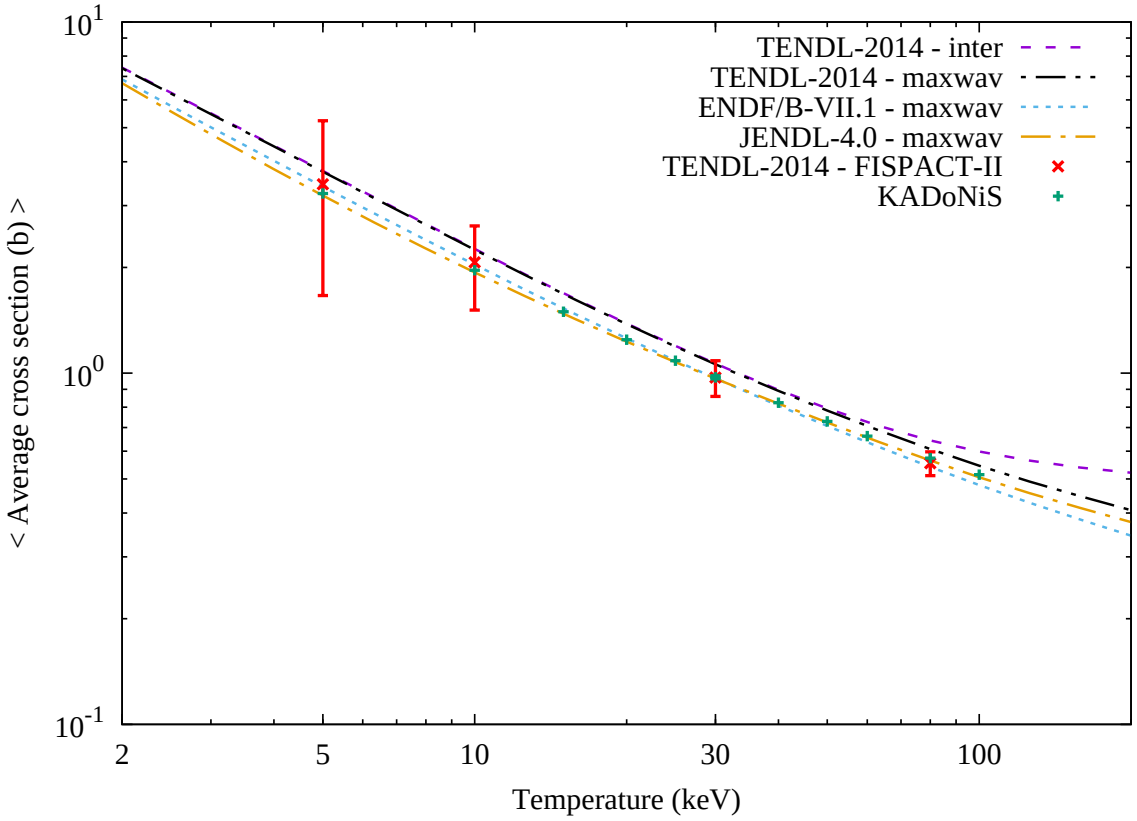
$^{144}Sm_{62}$ [Stable]



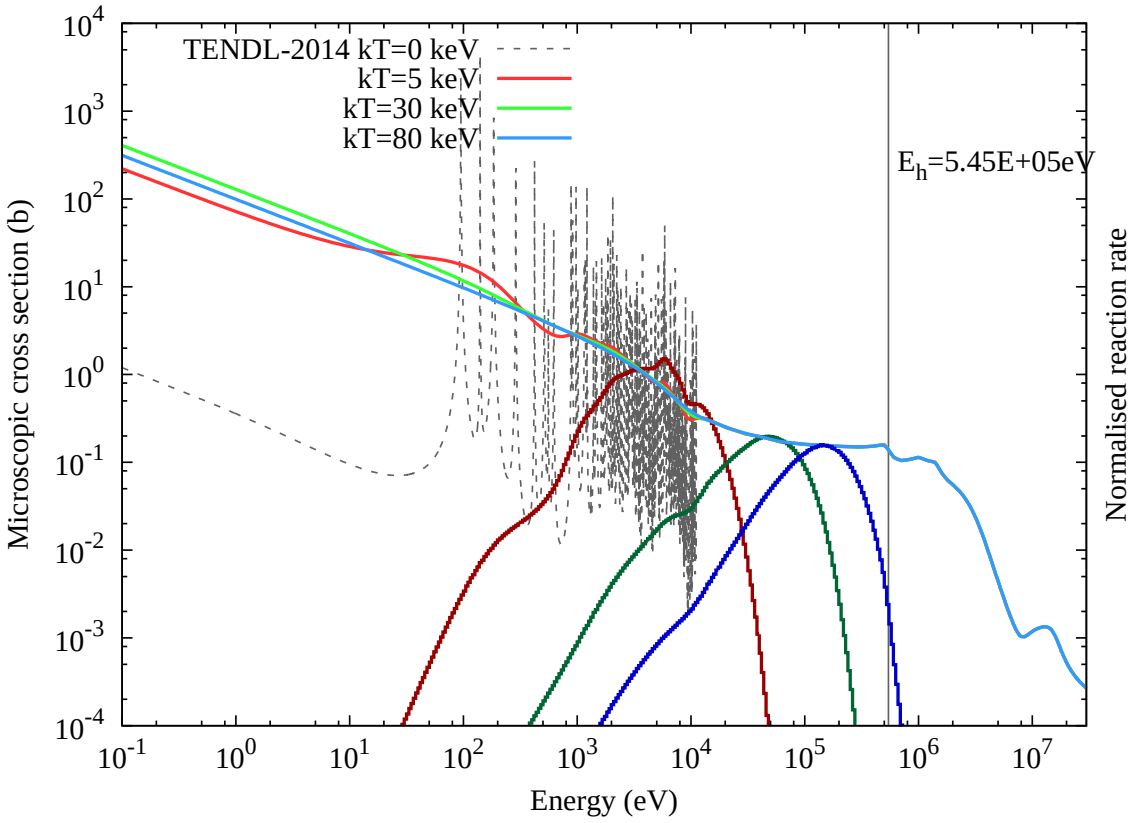


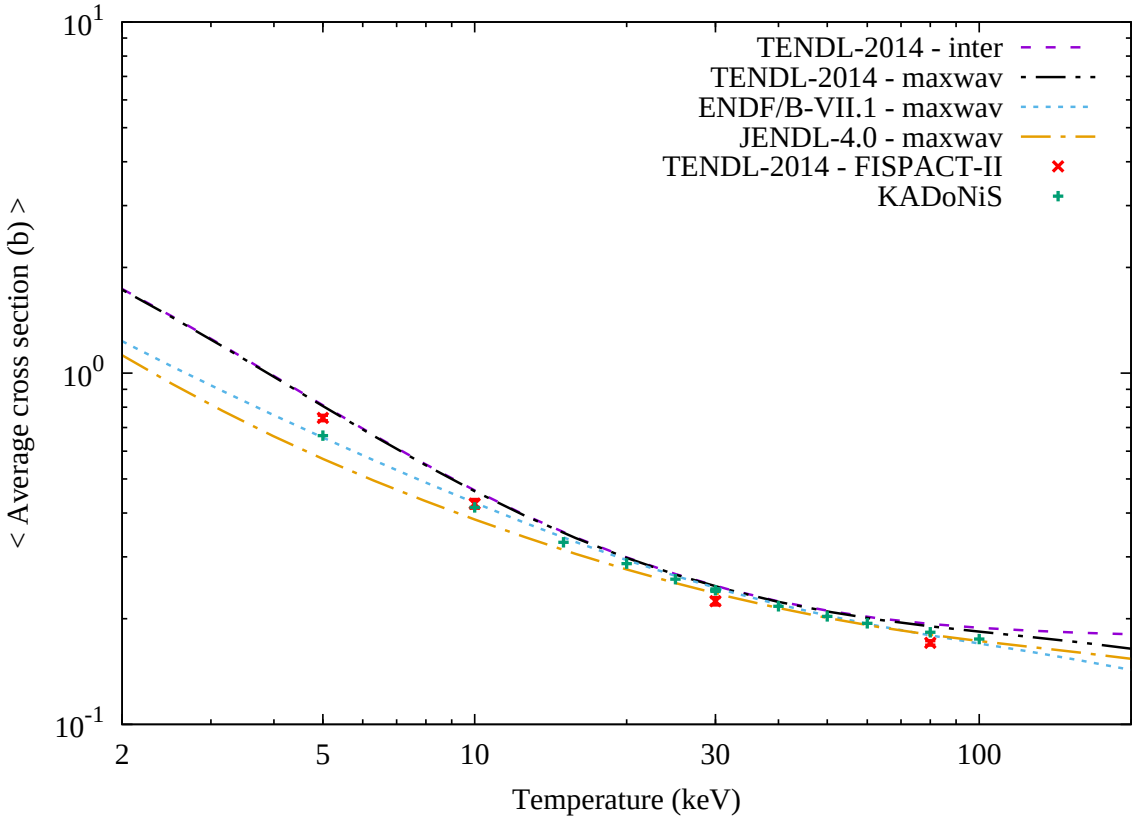
$^{147}Sm_{62}$ $[T_{1/2} = 1.06 \times 10^{11}$ years$]$



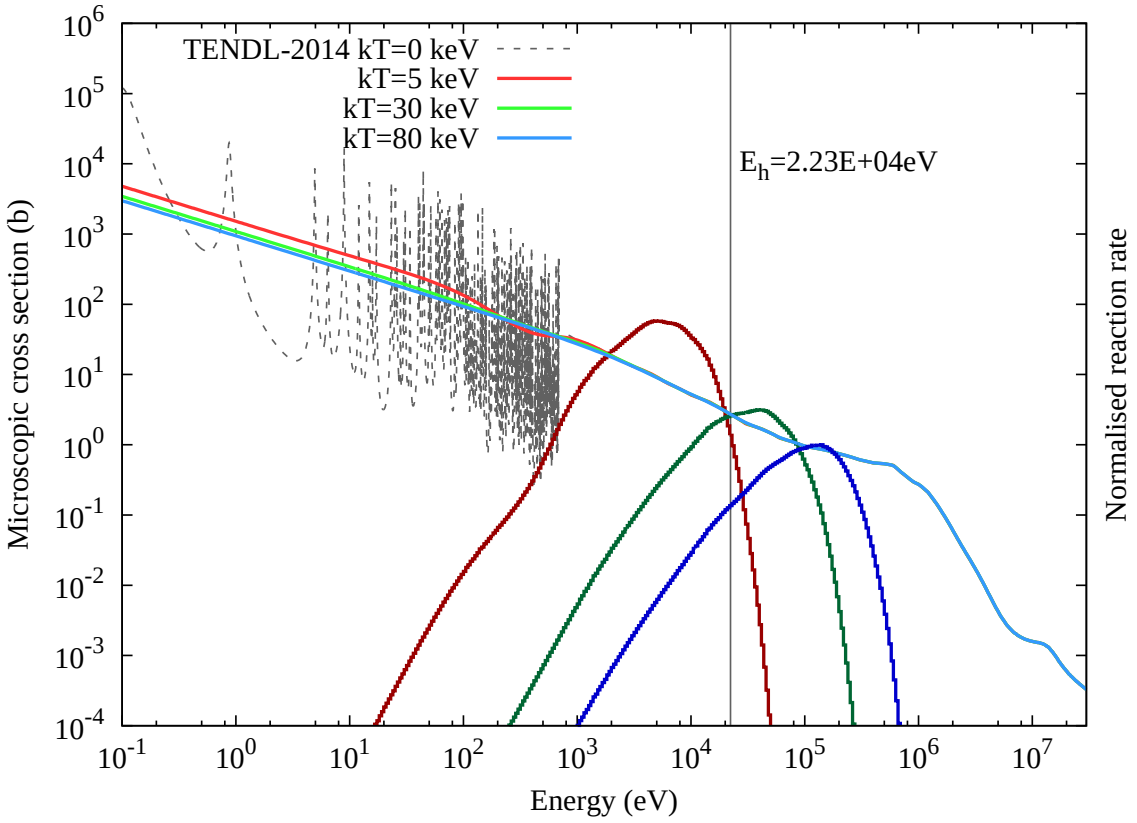


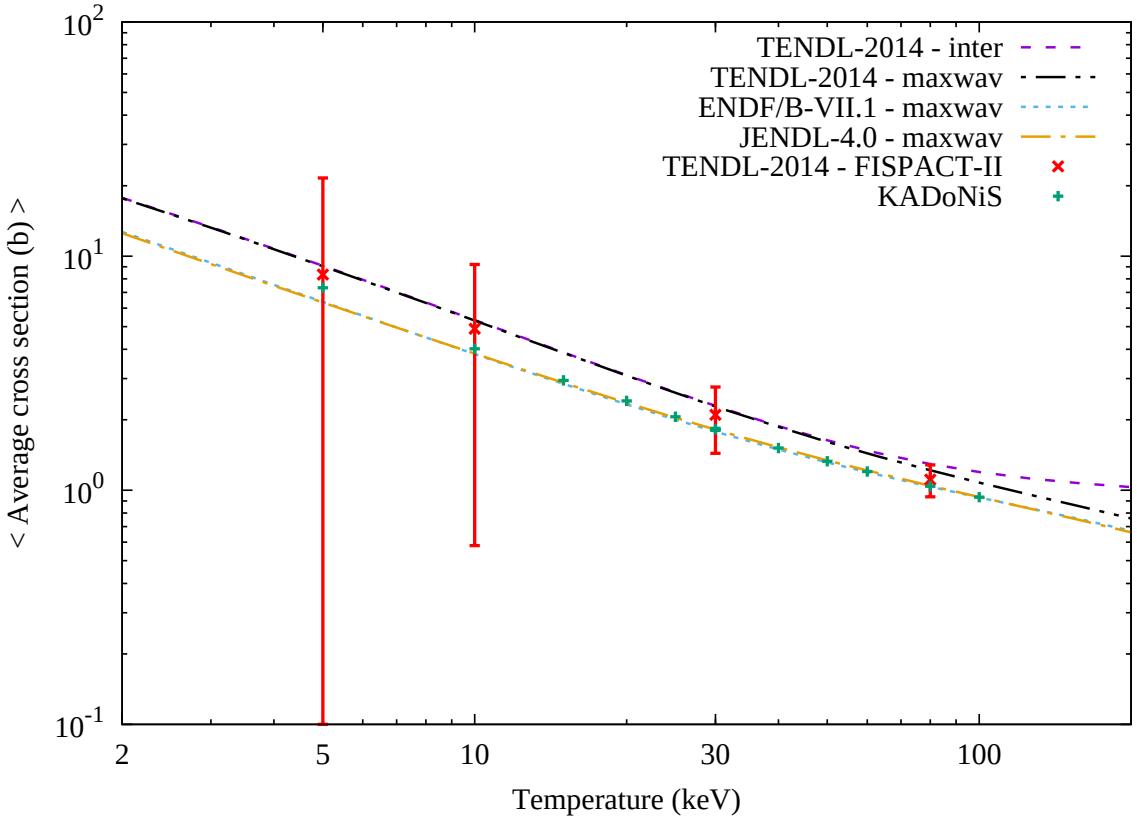
$^{148}Sm_{62}$ $[T_{1/2} = 7.00 \times 10^{15}$ years$]$



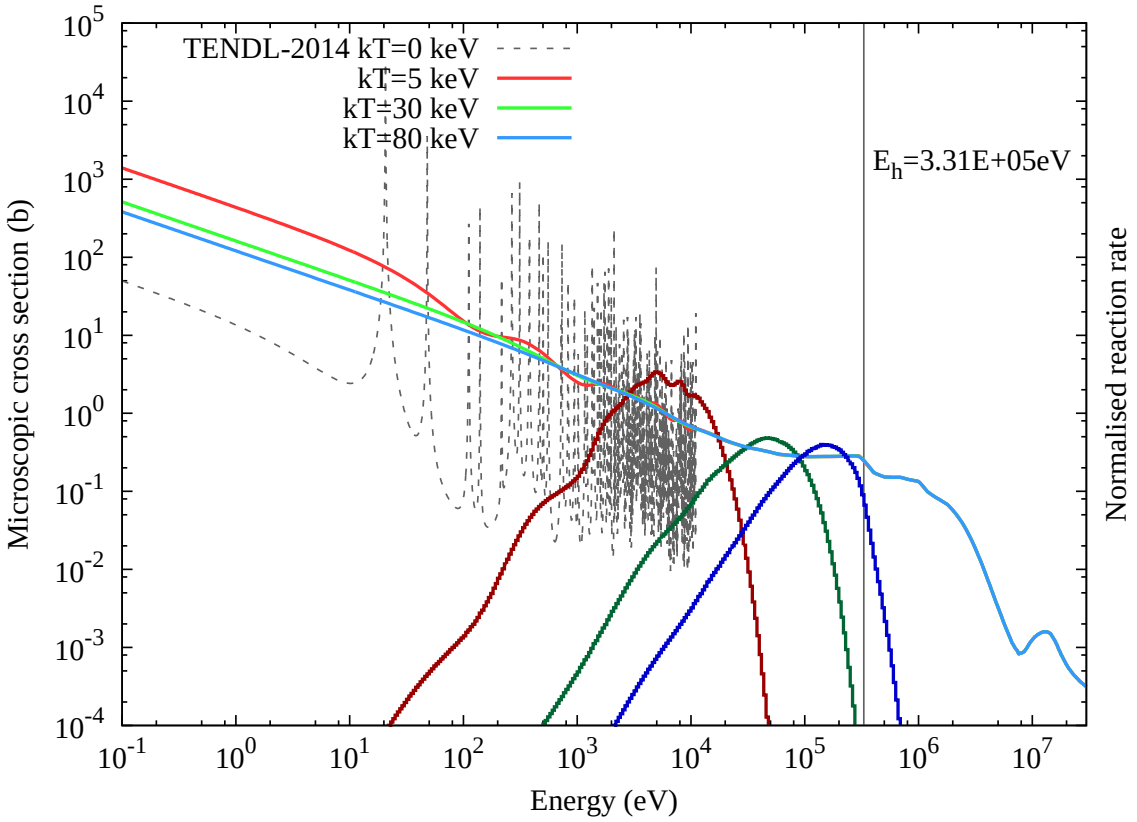


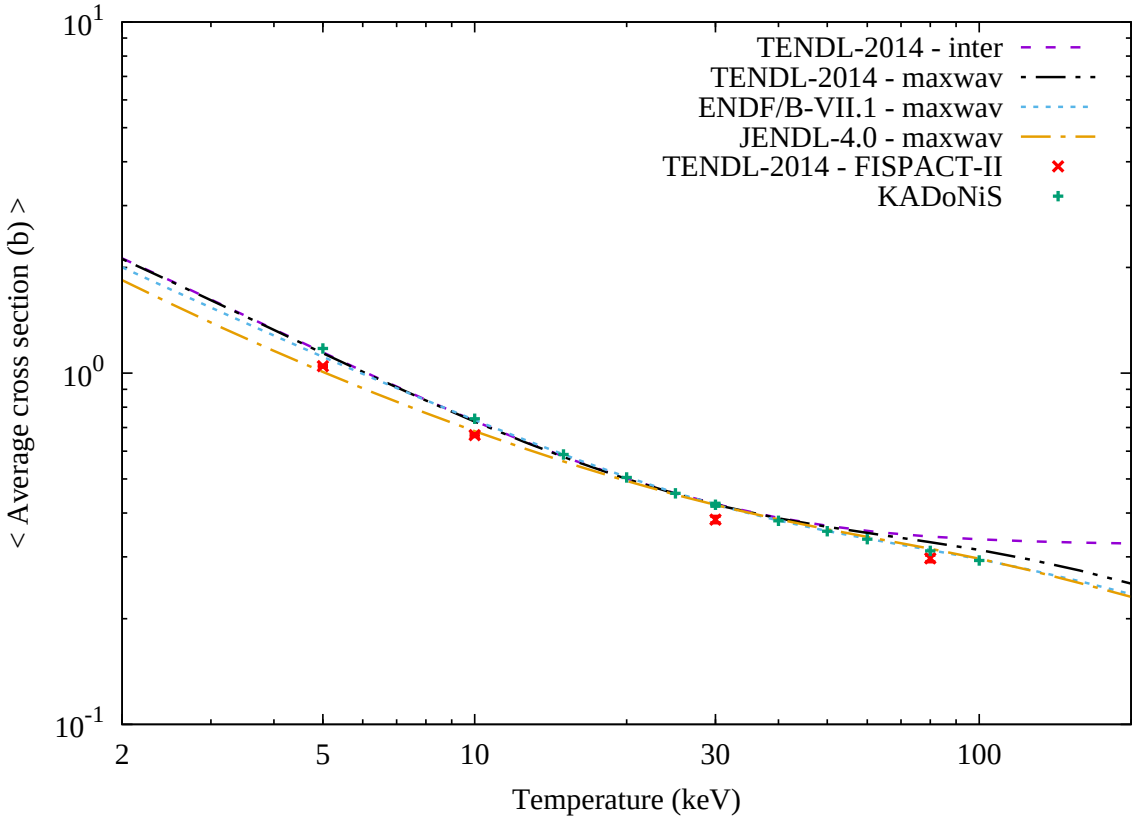
$^{149}Sm_{62}$ $[T_{1/2} = 2.00 \times 10^{15}$ years$]$



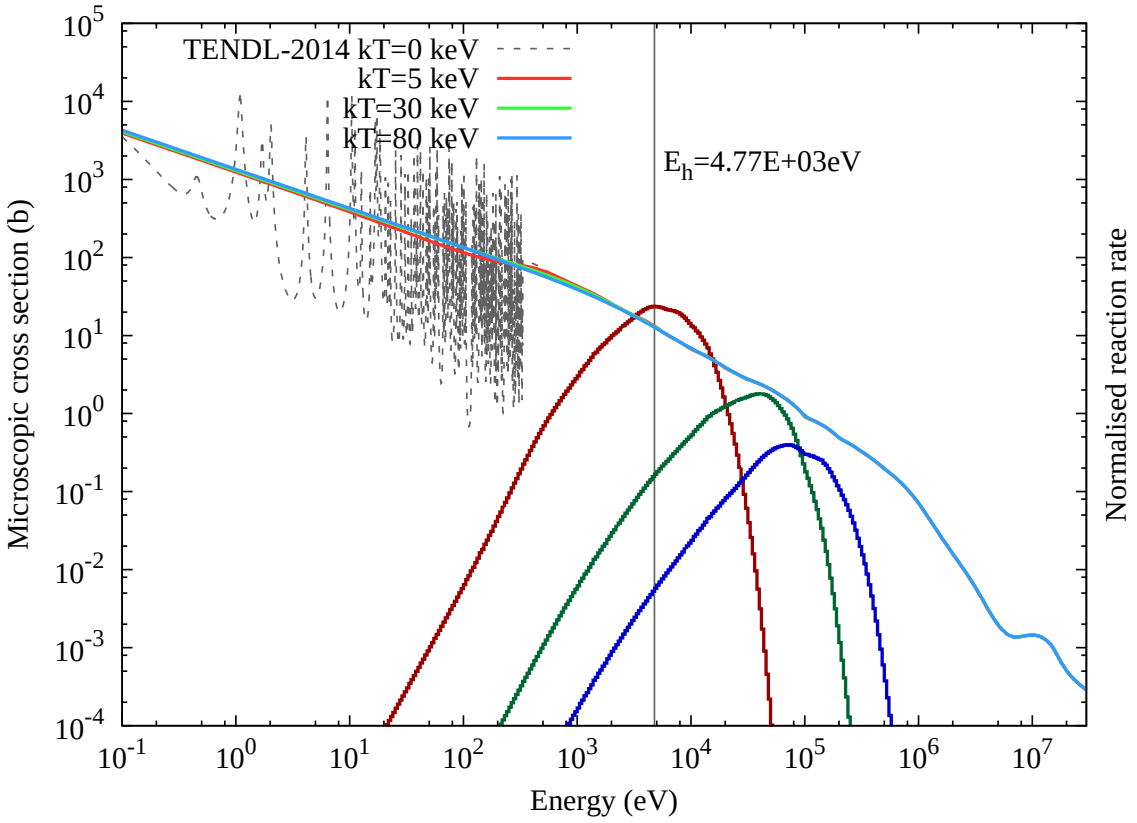


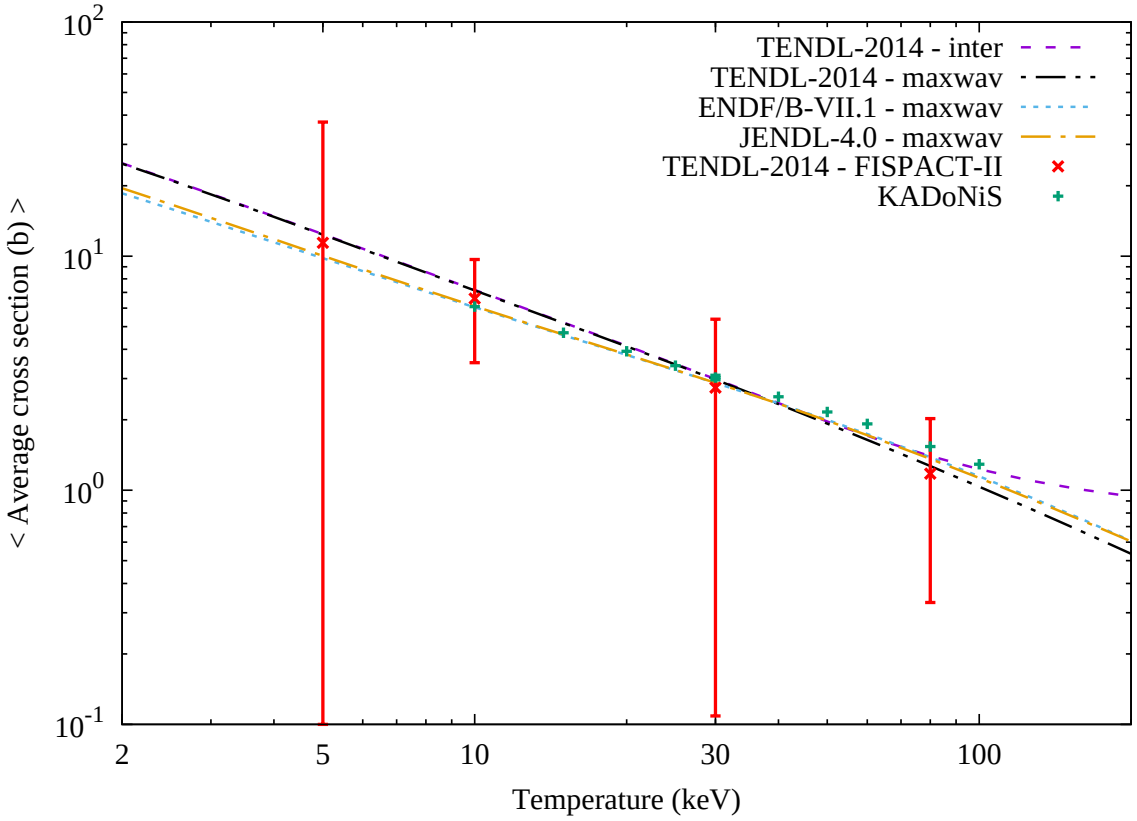
$^{150}Sm_{62}$ [Stable]



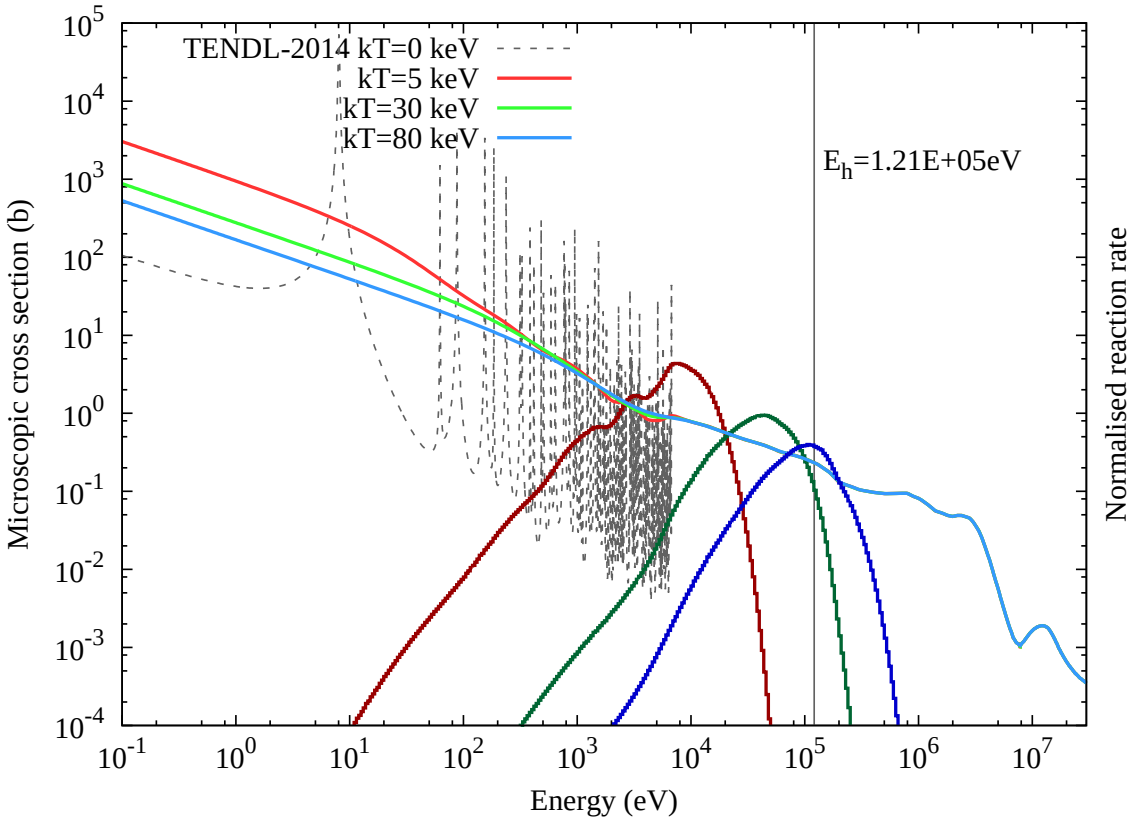


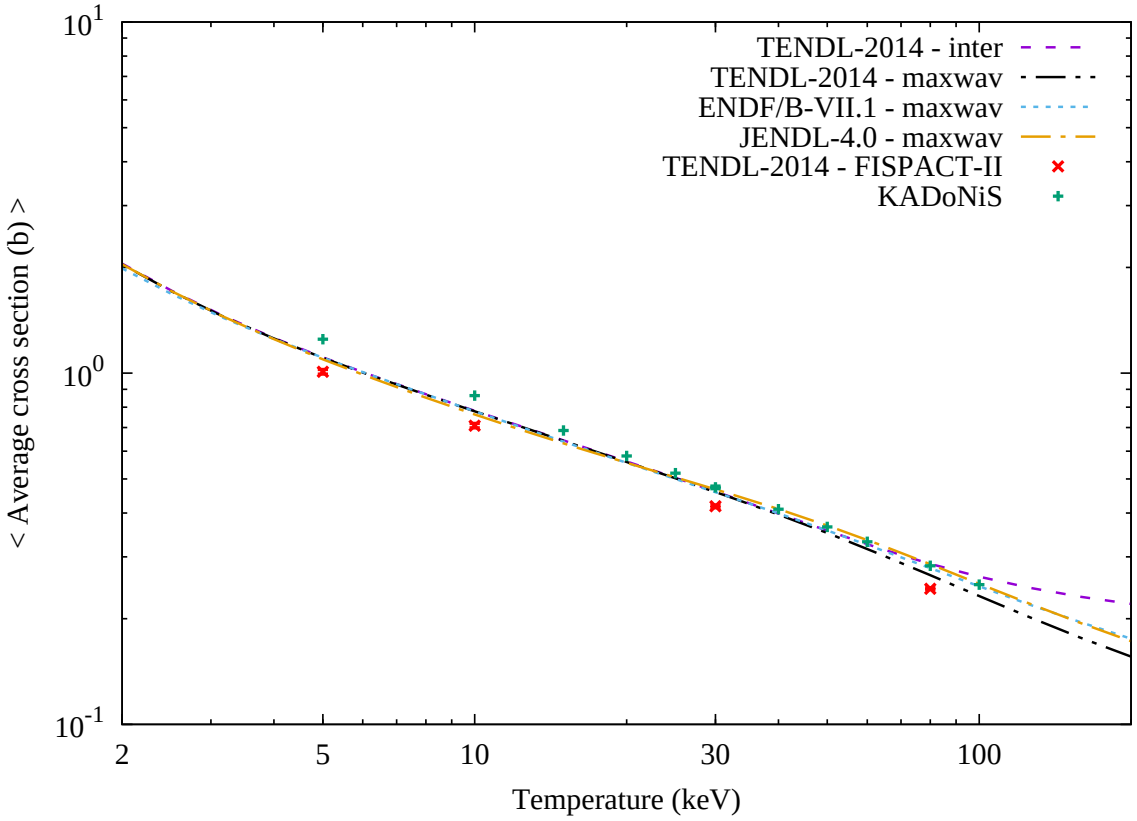
$^{151}Sm_{62}$ $[T_{1/2} = 90.00$ years$]$



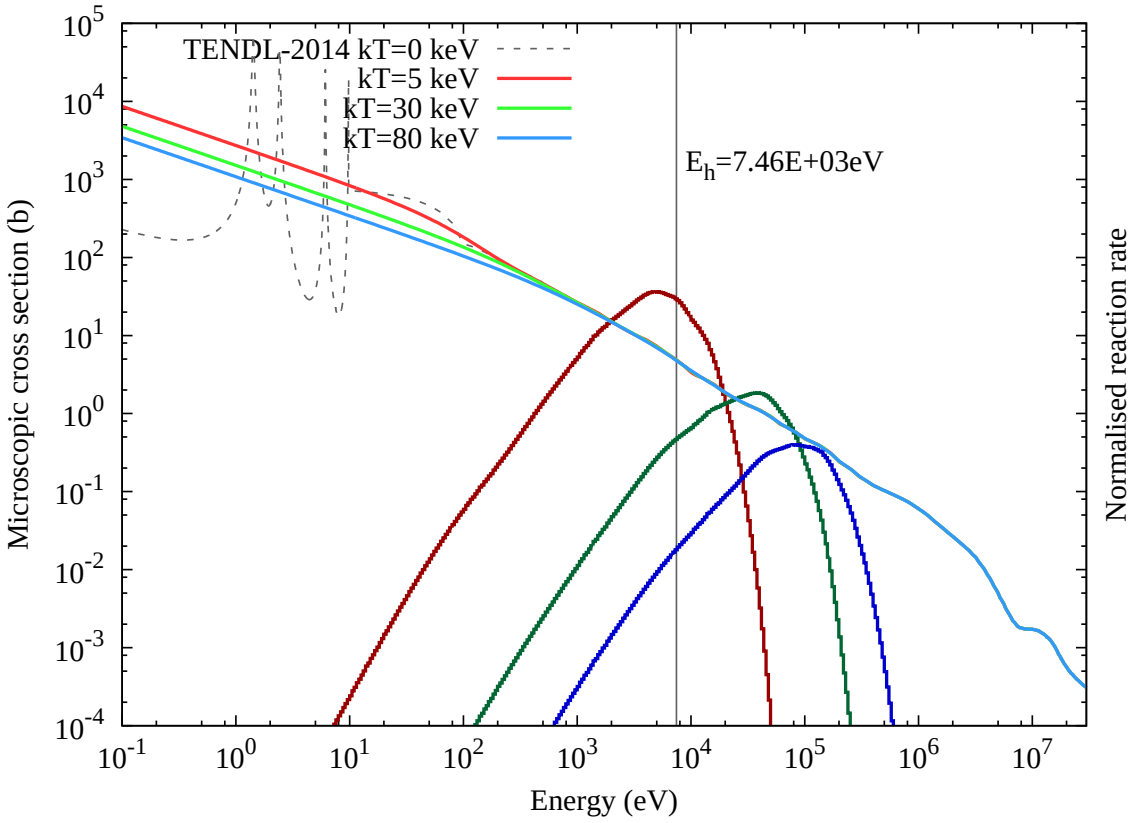


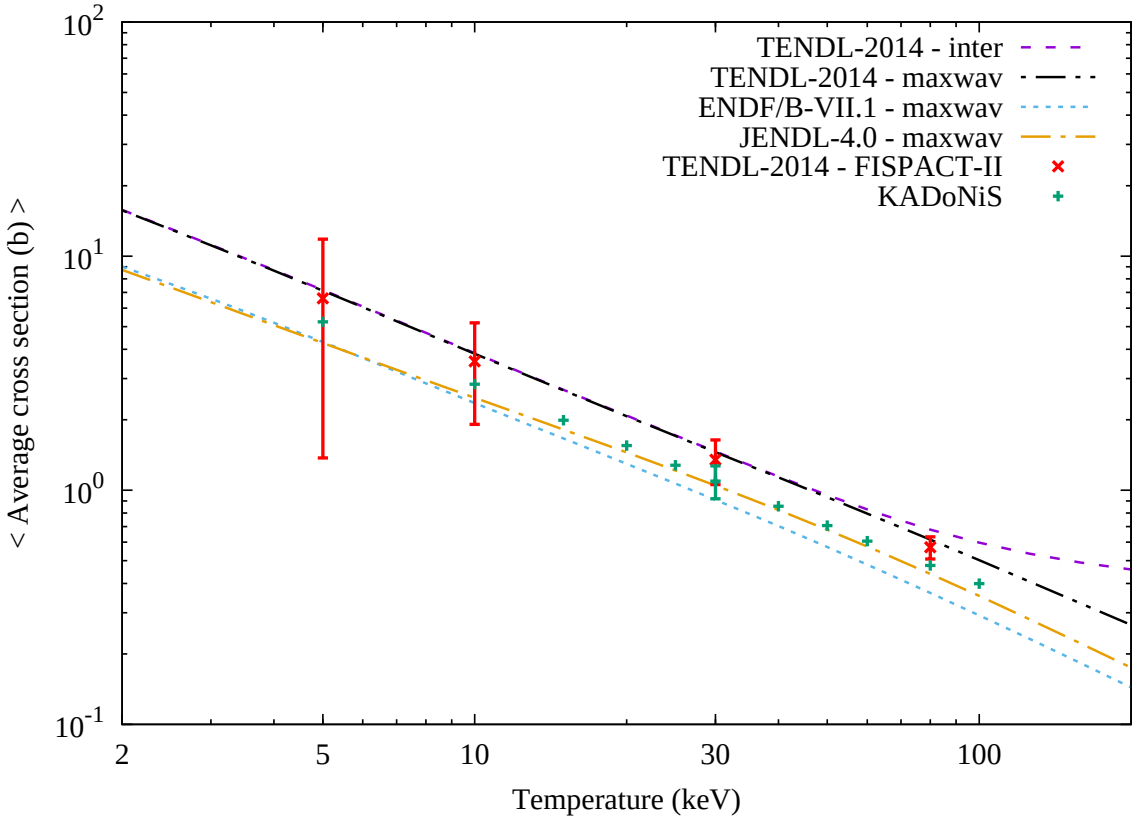
$^{152}Sm_{62}$ [Stable]



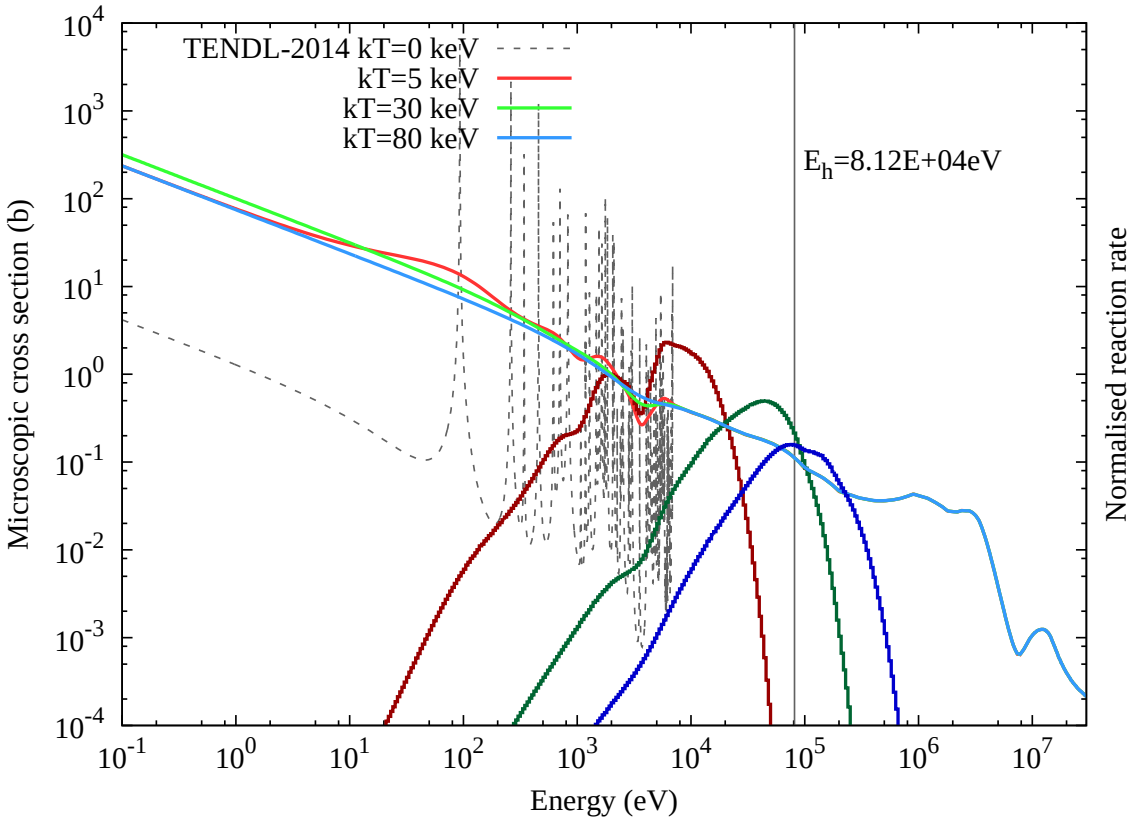


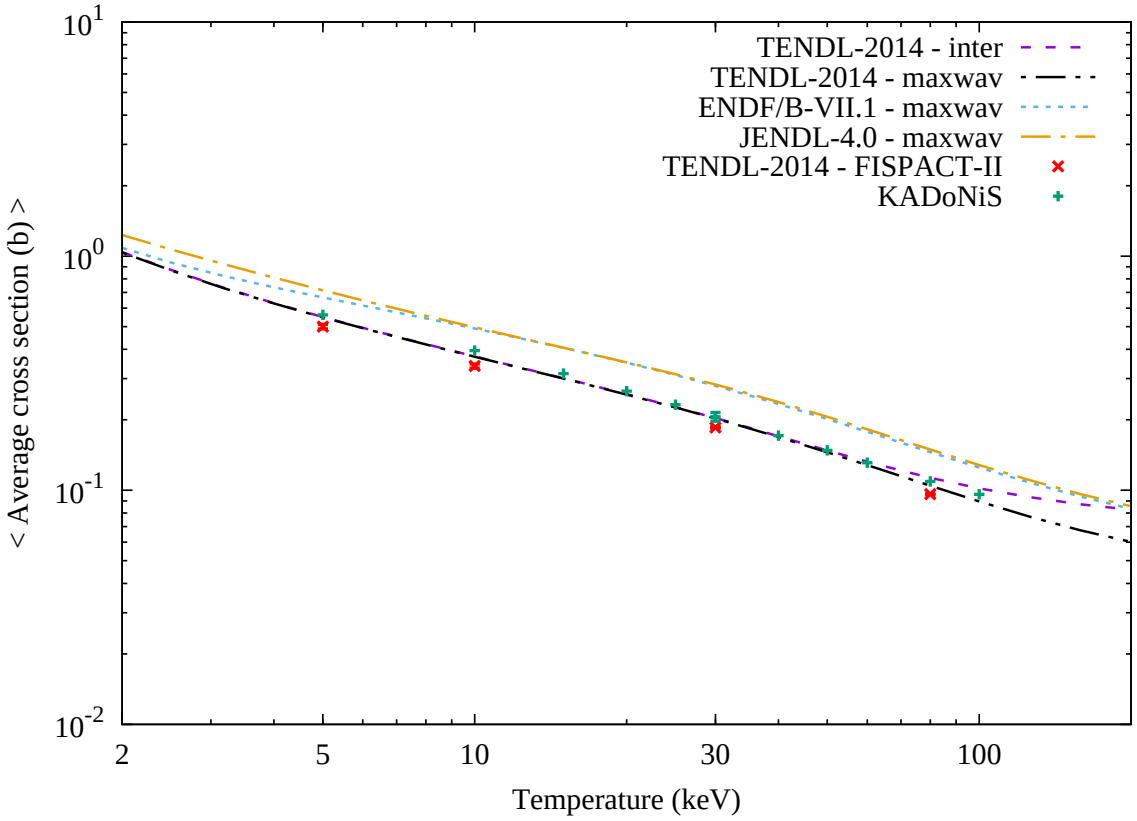
$^{153}Sm_{62}$ $[T_{1/2} = 1.93$ days$]$ (KADoNiS=SMC)



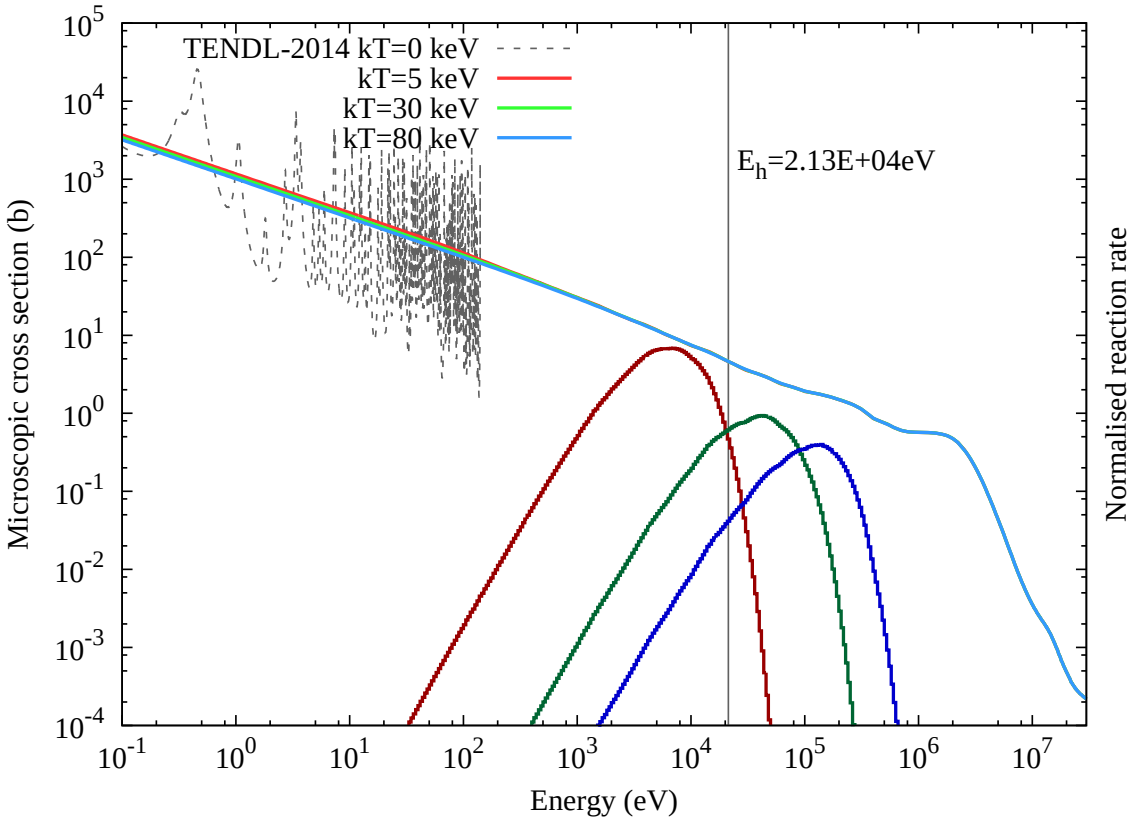


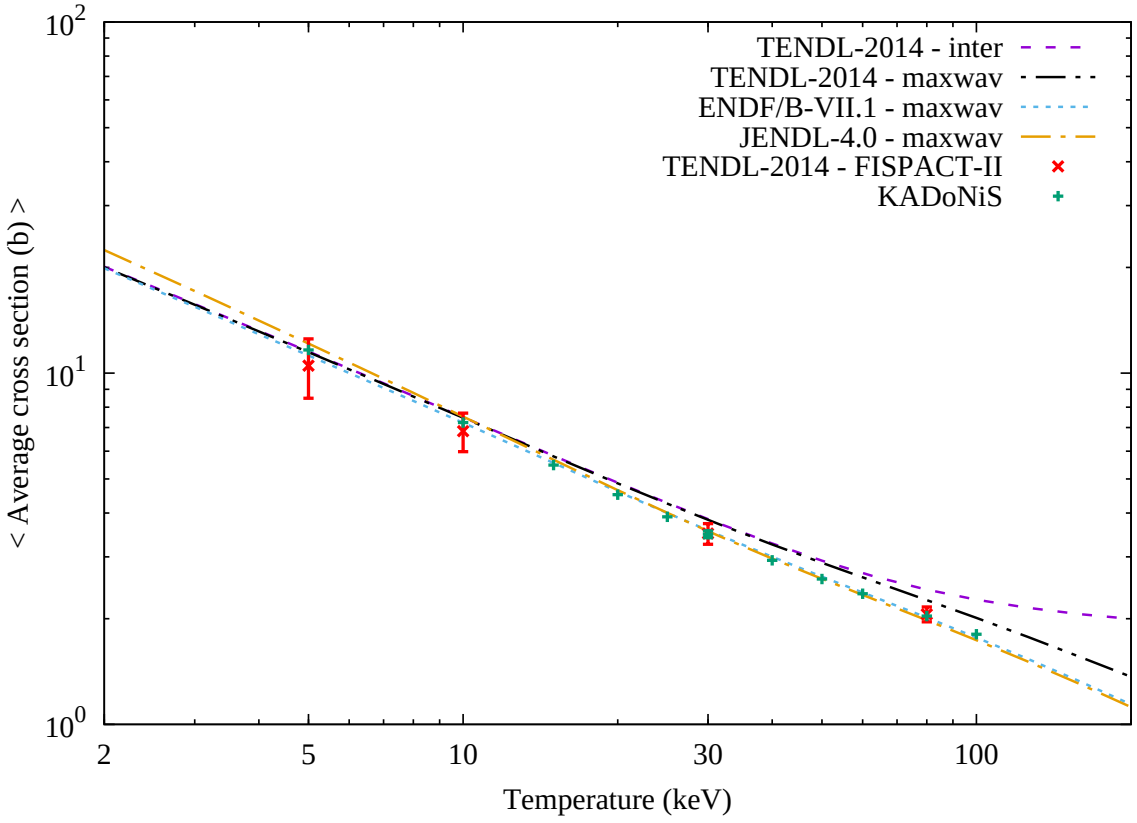
$^{154}Sm_{62}$ [Stable]



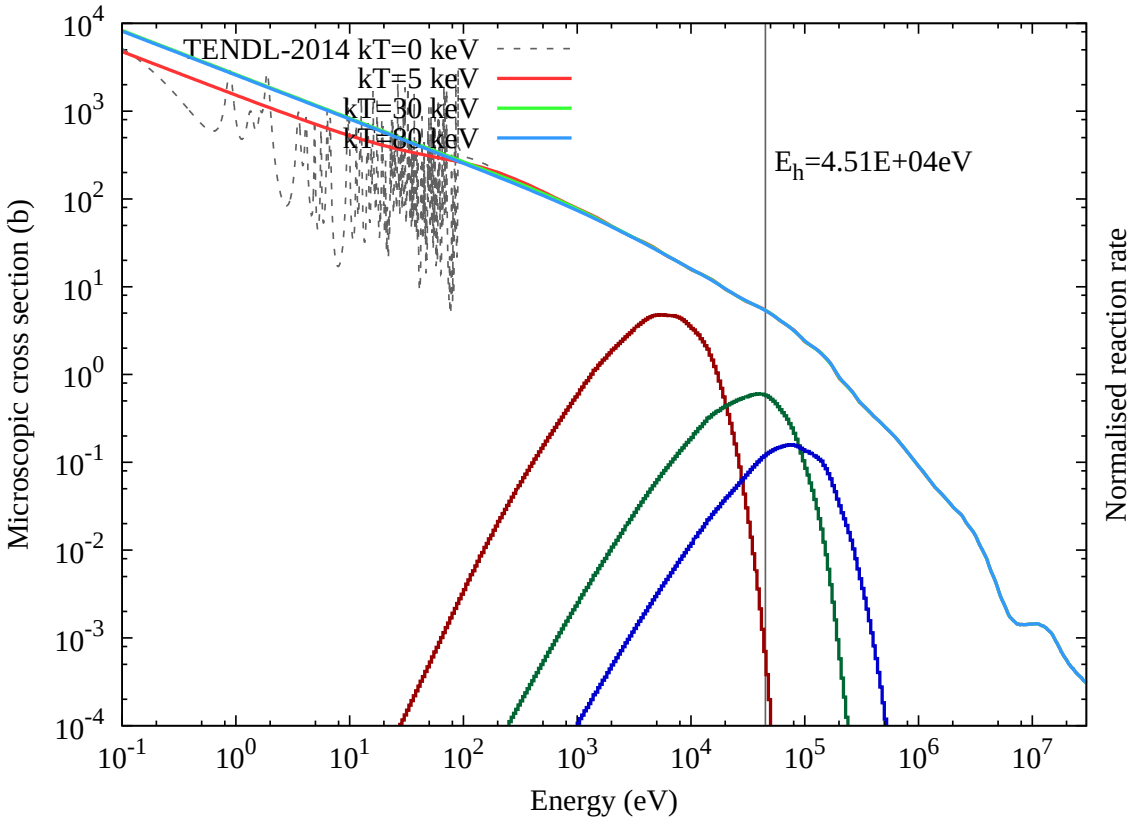


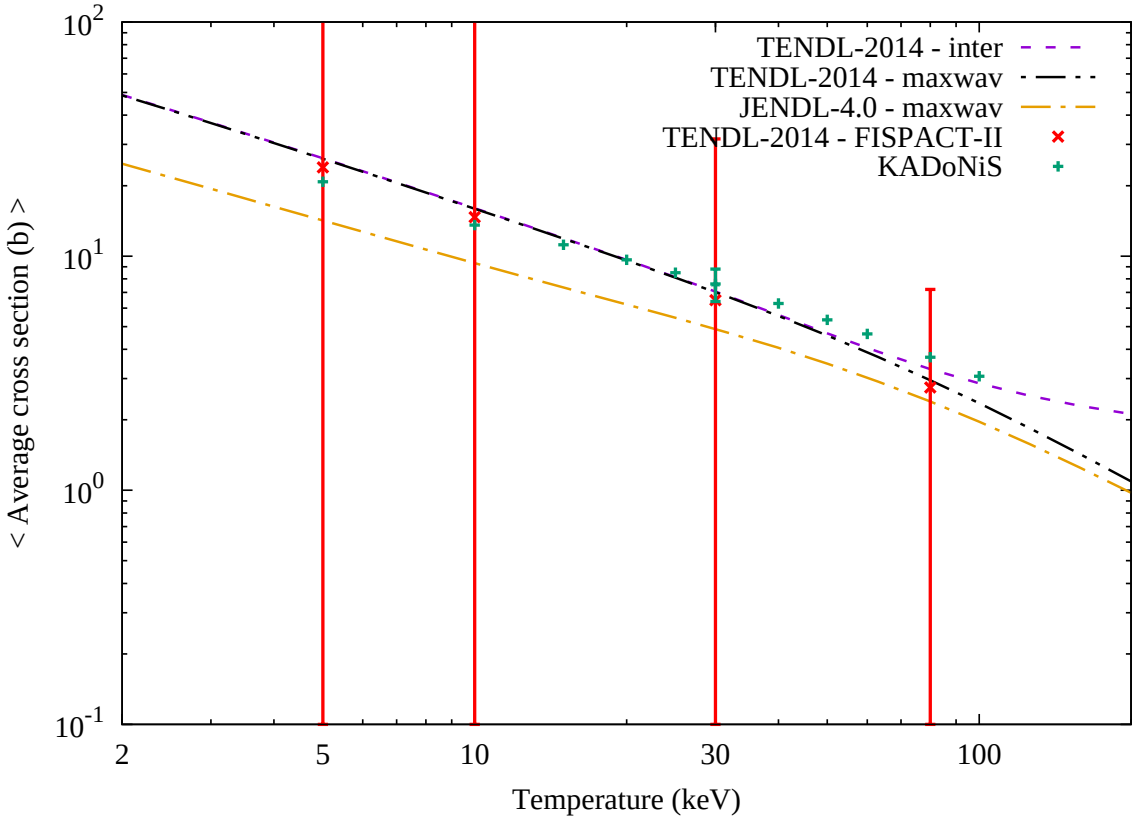
$^{151}Eu_{63}$ [Stable]



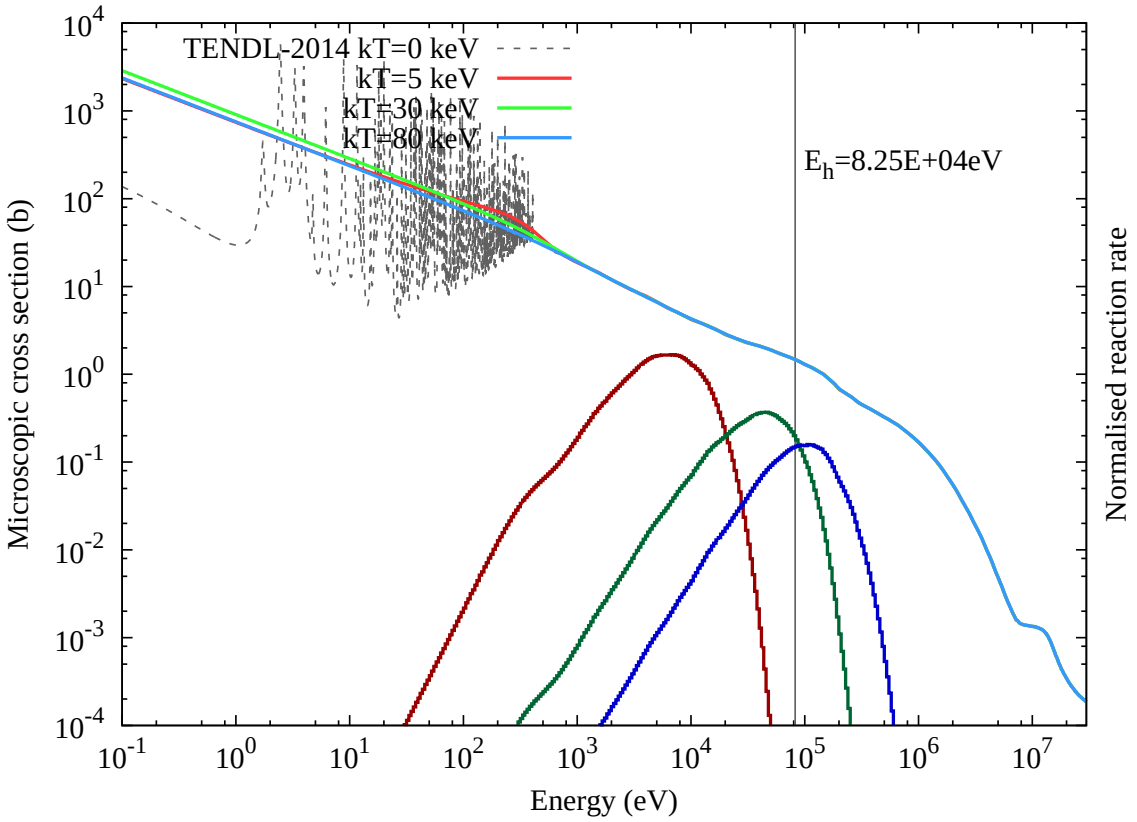


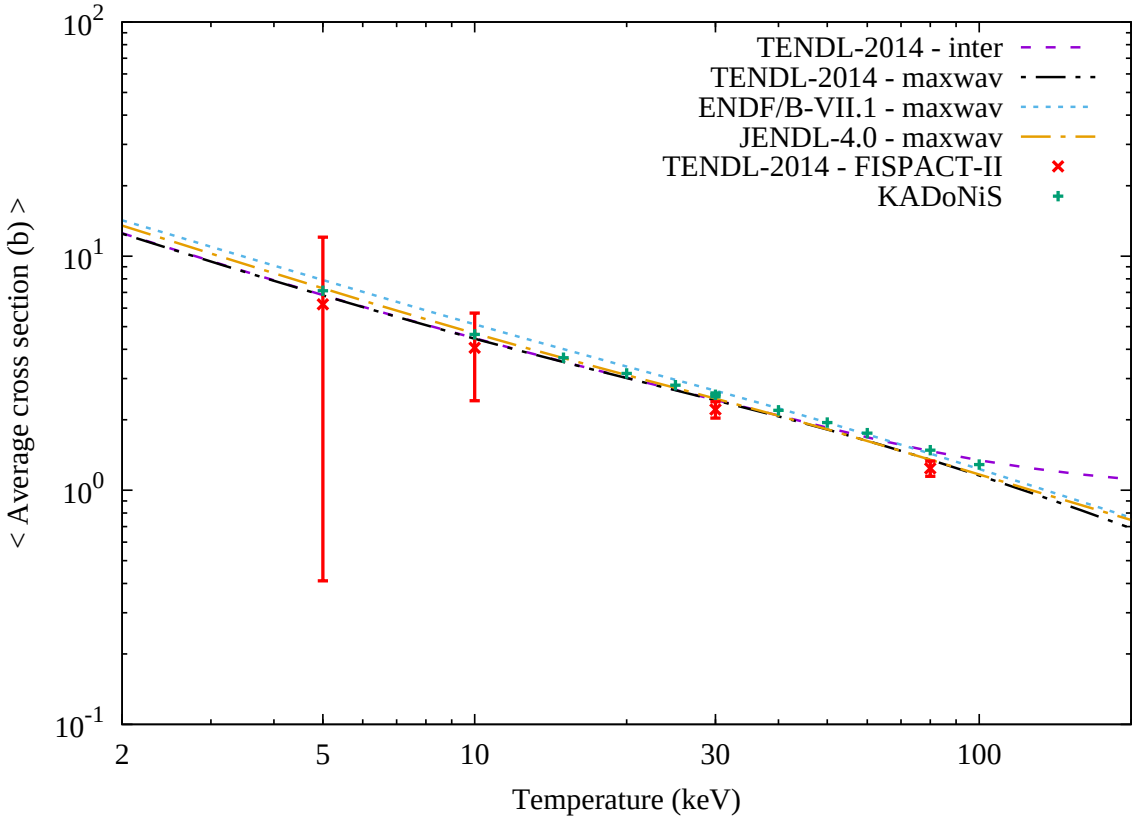
$^{152}Eu_{63}$ [$T_{1/2}$ = 13.52 years] (KADoNiS=SMC)



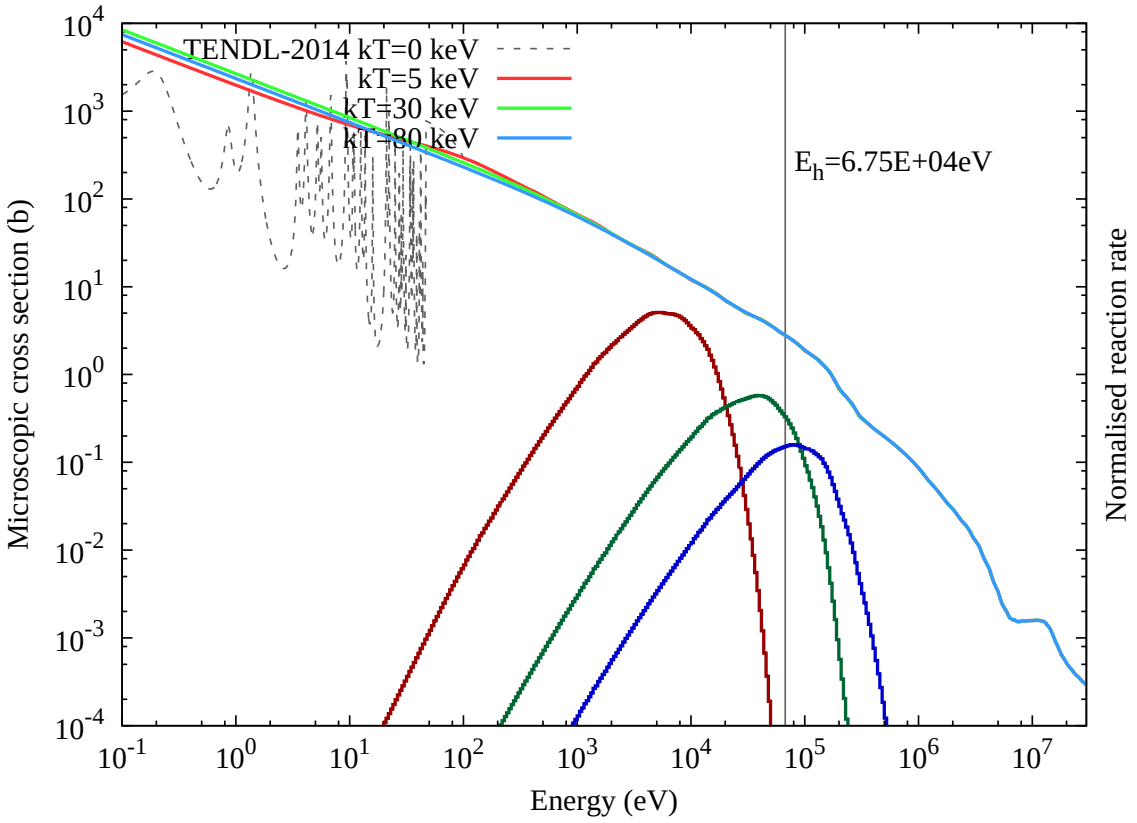


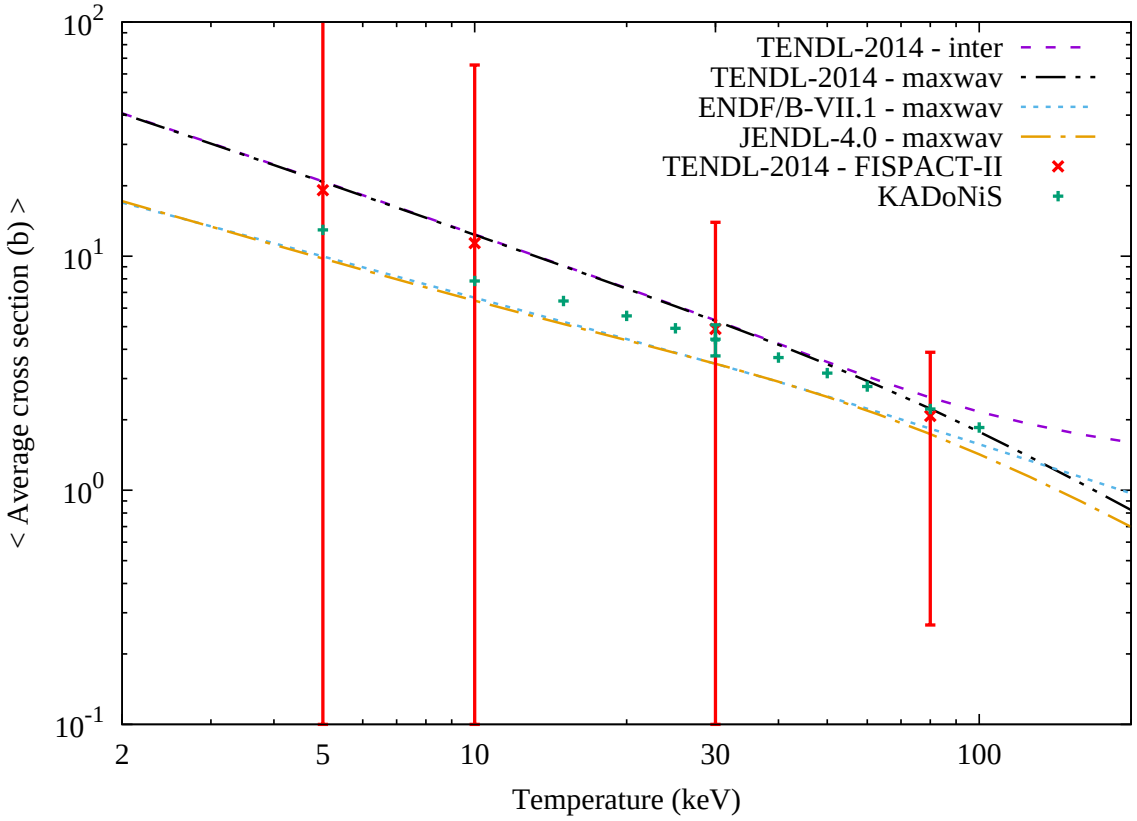
$^{153}Eu_{63}$ [Stable]



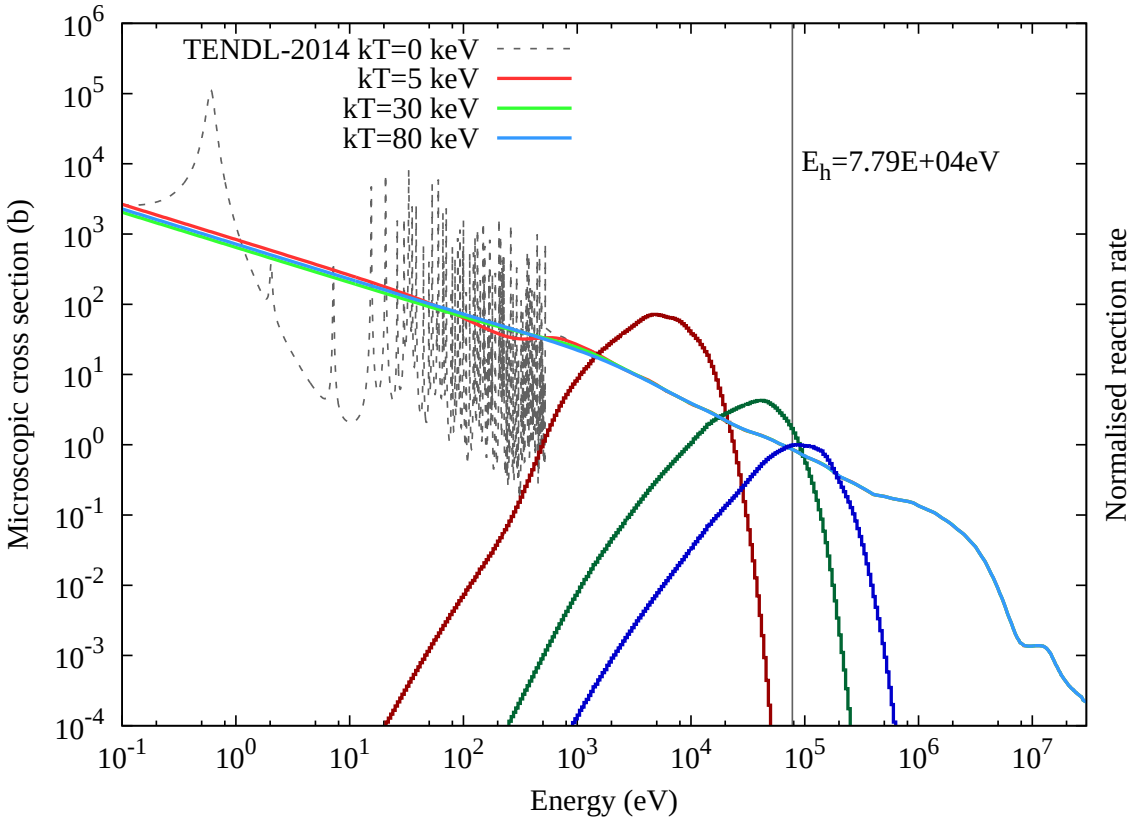


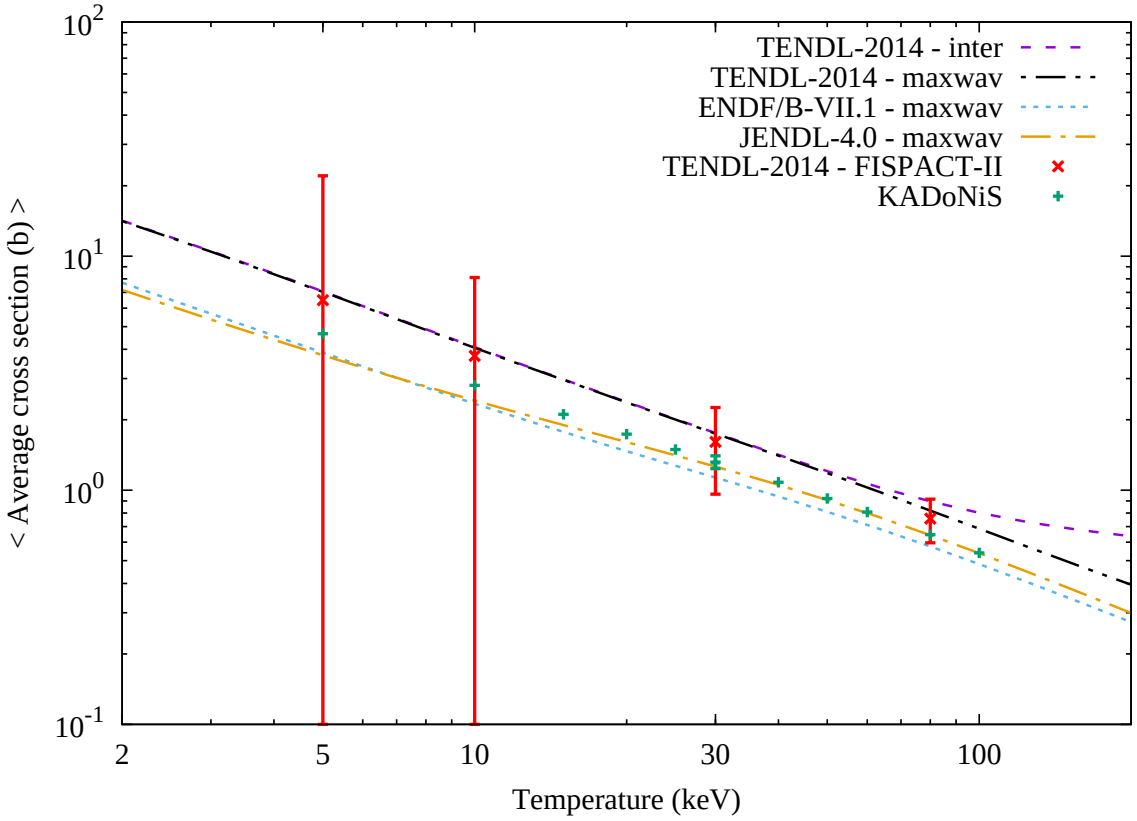
$^{154}Eu_{63}$ $[T_{1/2} = 8.59$ years$]$



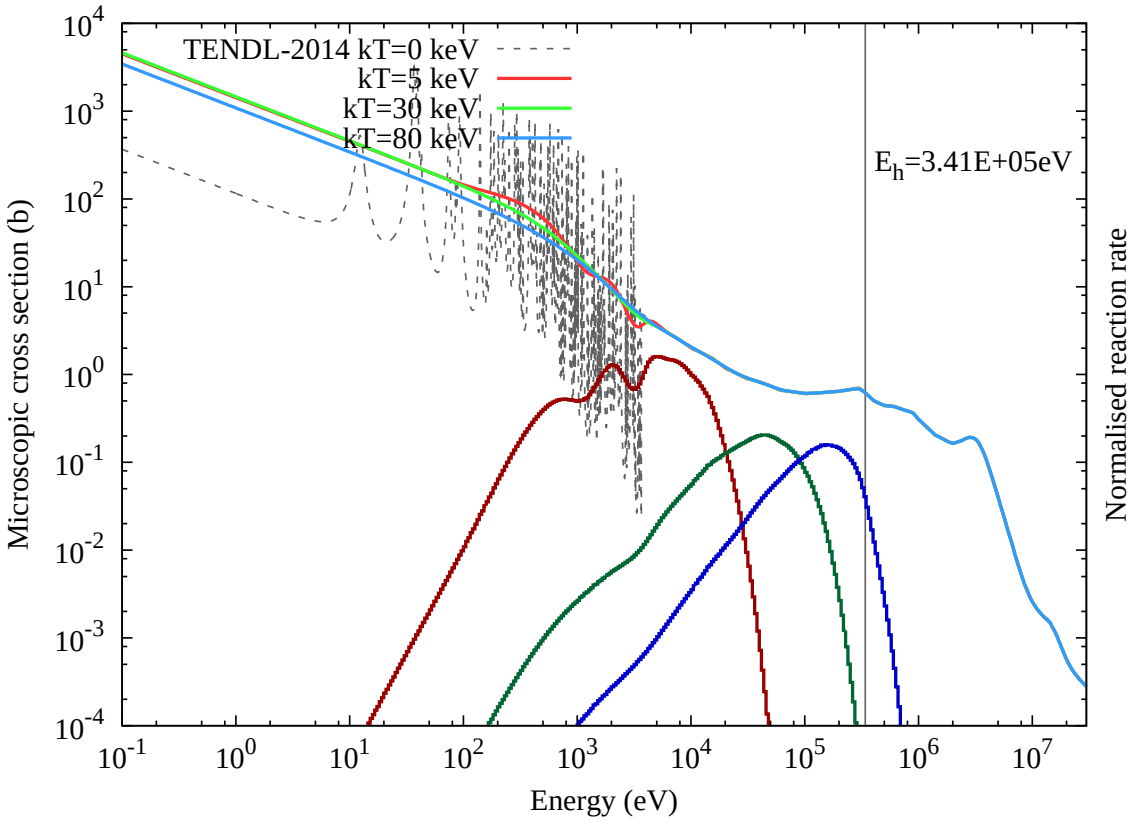


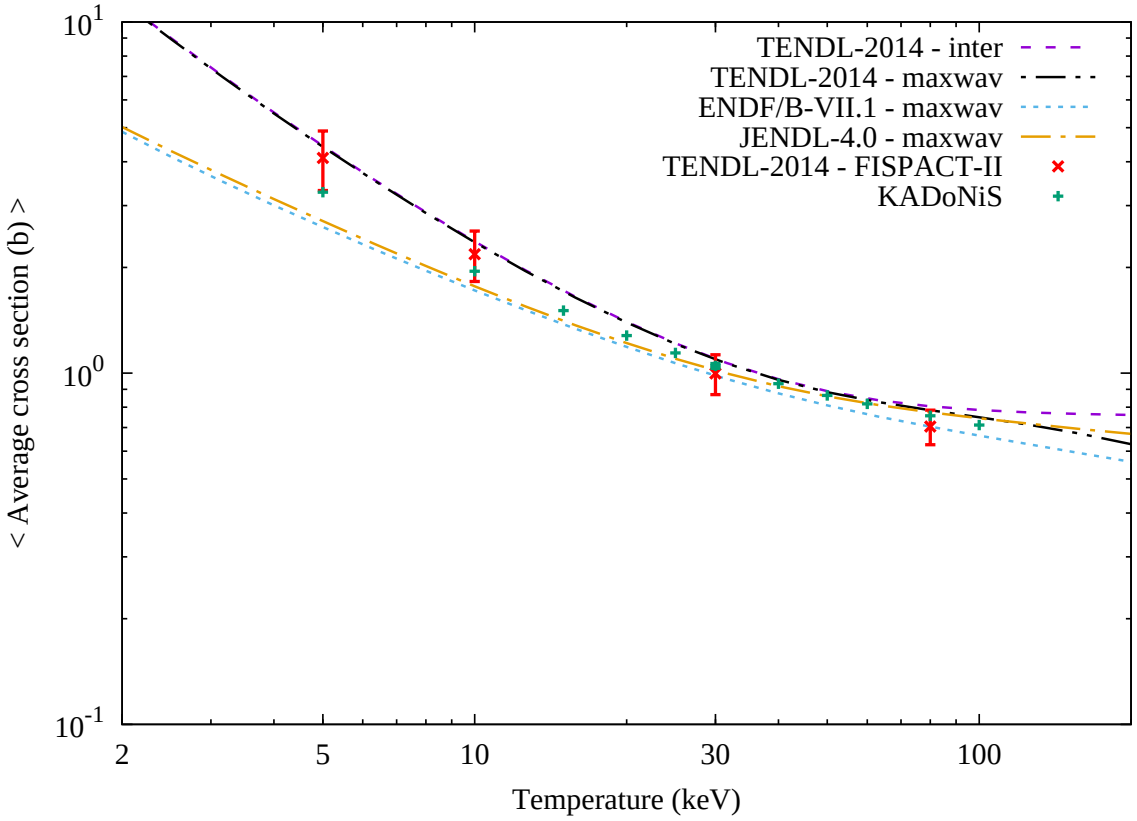
$^{155}Eu_{63}$ $[T_{1/2} = 4.75$ years$]$



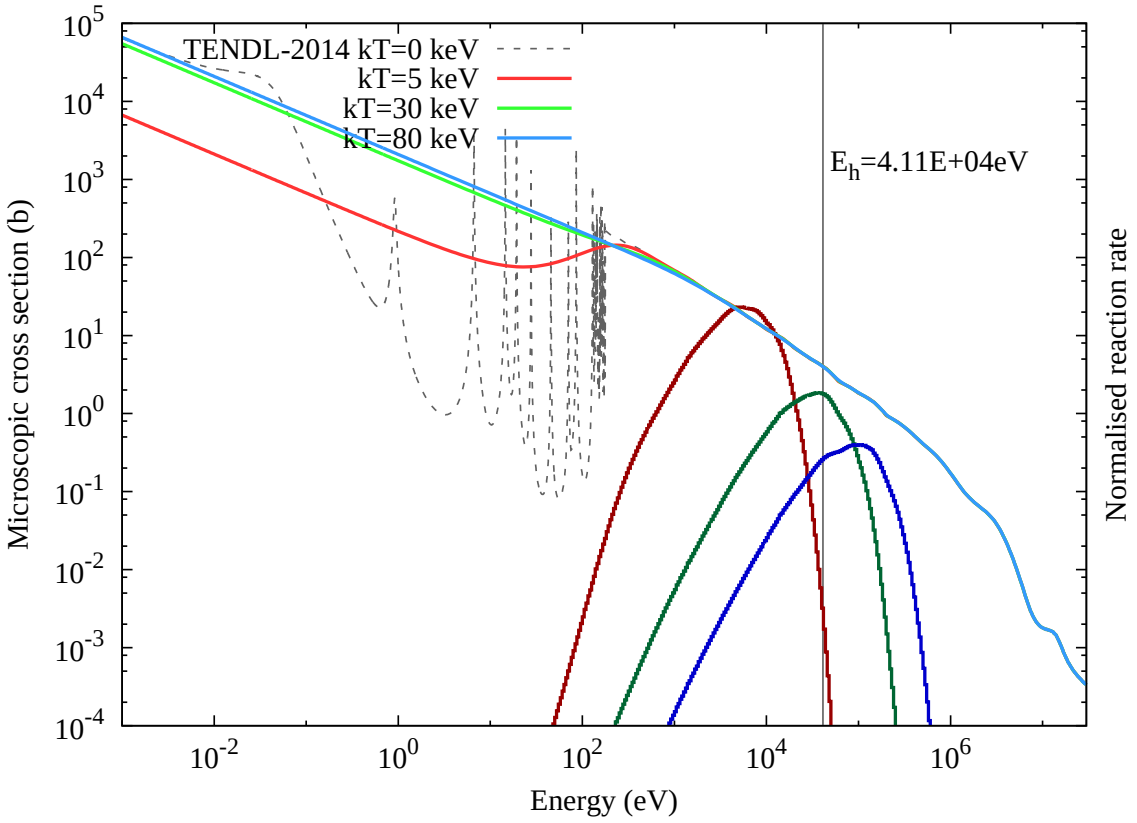


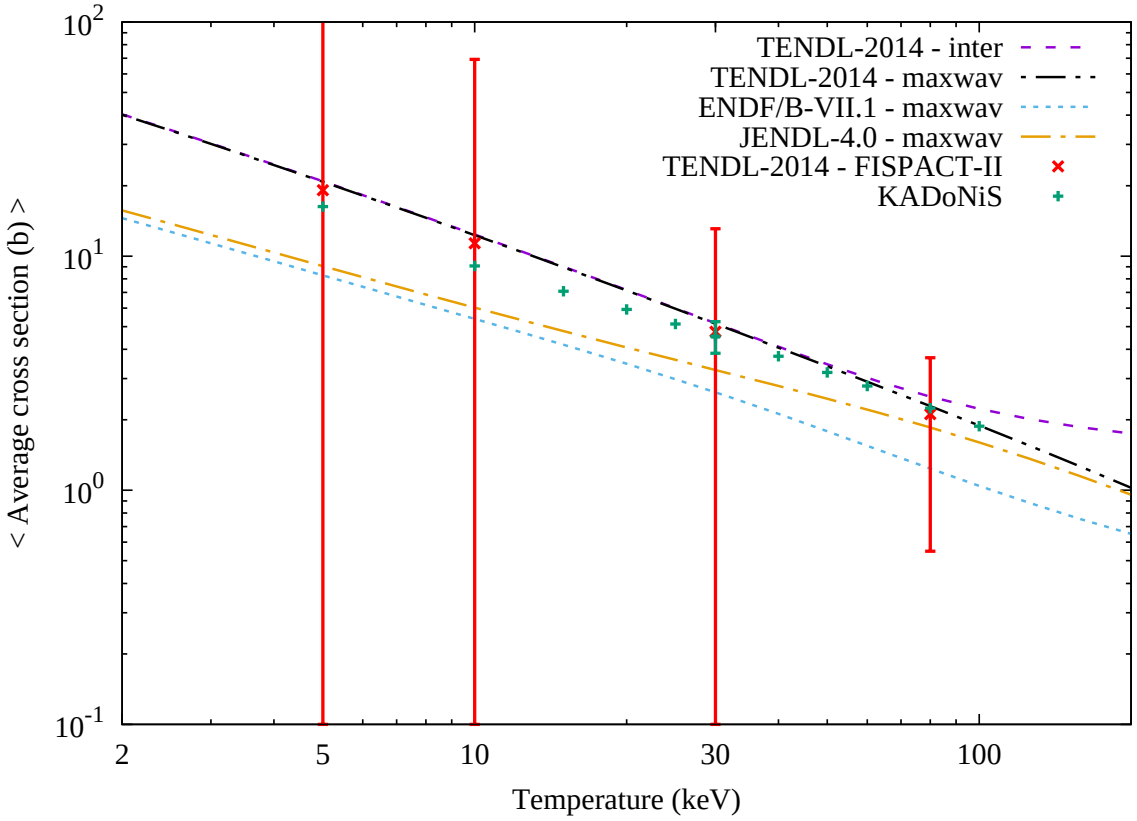
$^{152}Gd_{64}$ $[T_{1/2} = 1.08 \times 10^{14}$ years$]$



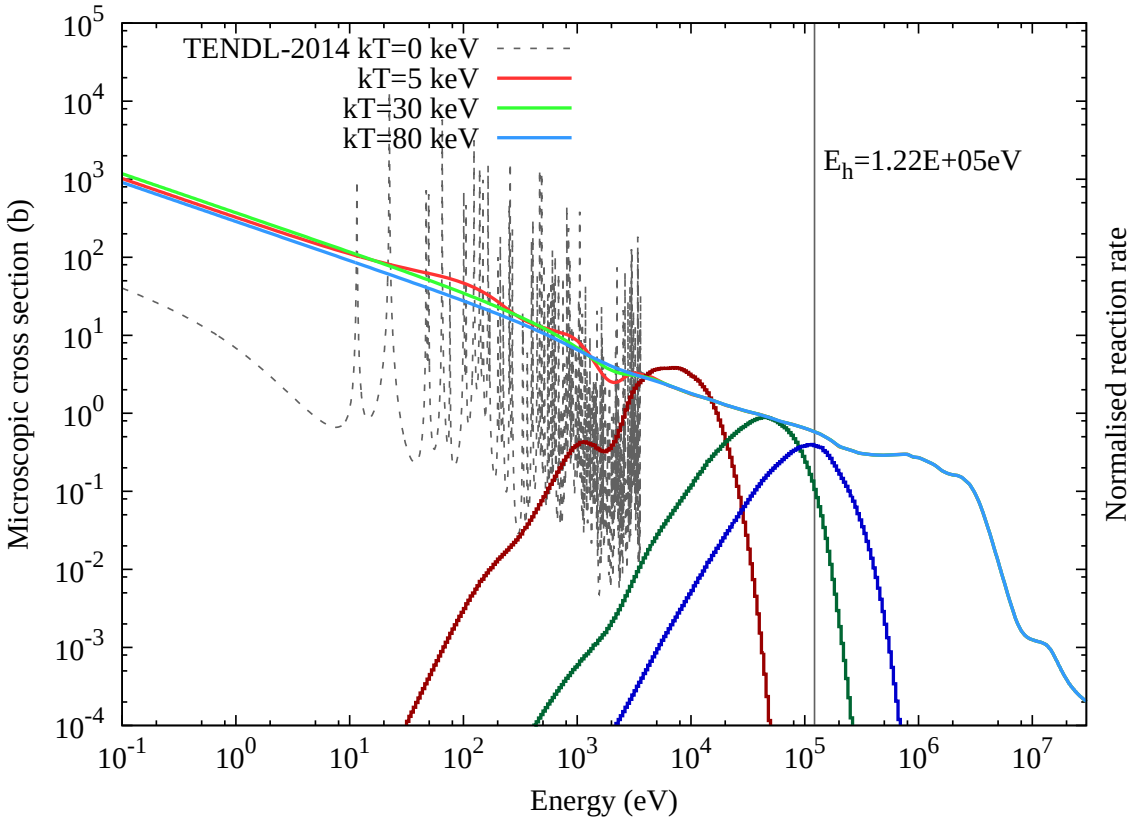


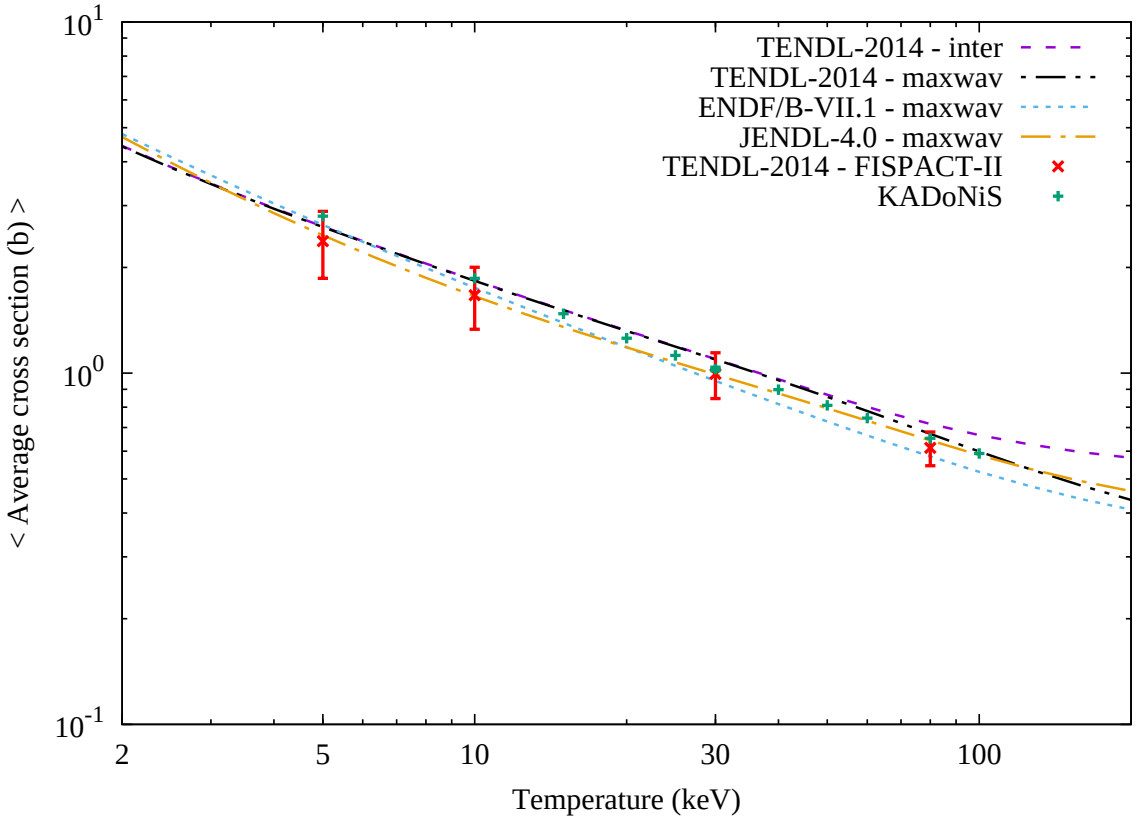
$^{153}Gd_{64}$ $[T_{1/2} = 240.40$ days$]$ (KADoNiS=SMC)



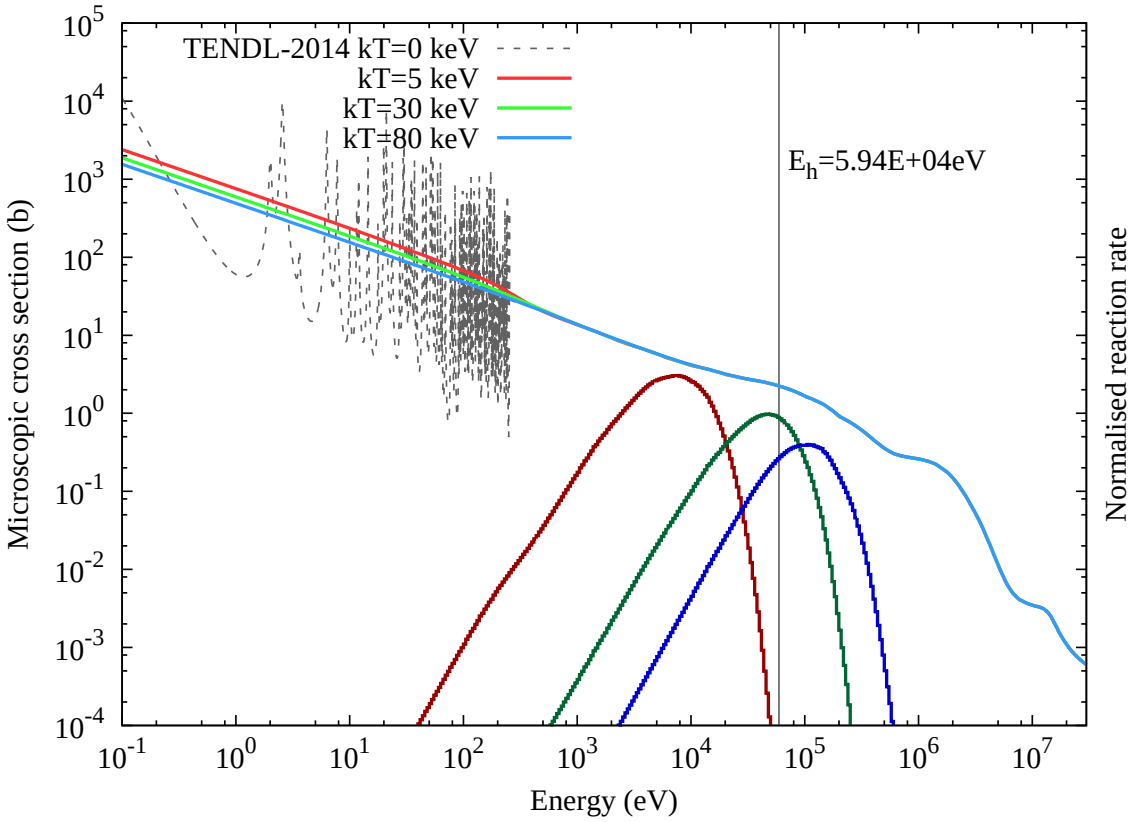


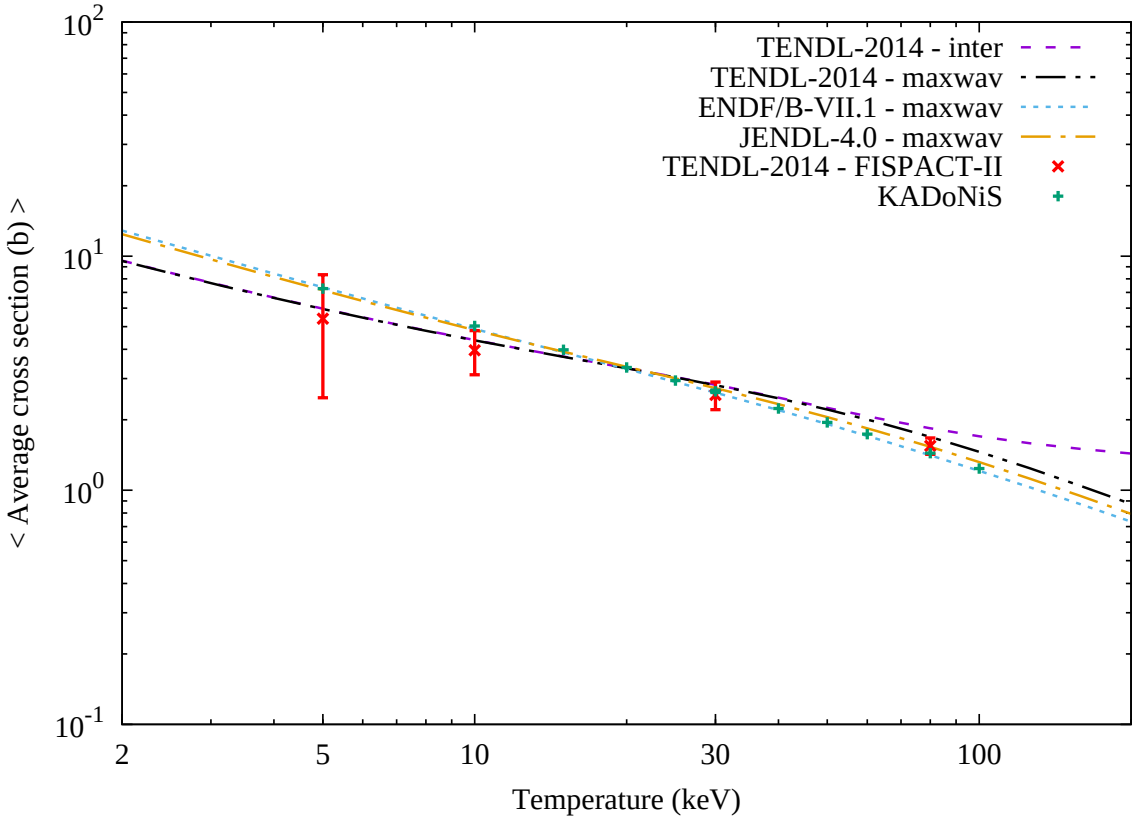
$^{154}Gd_{64}$ [Stable]



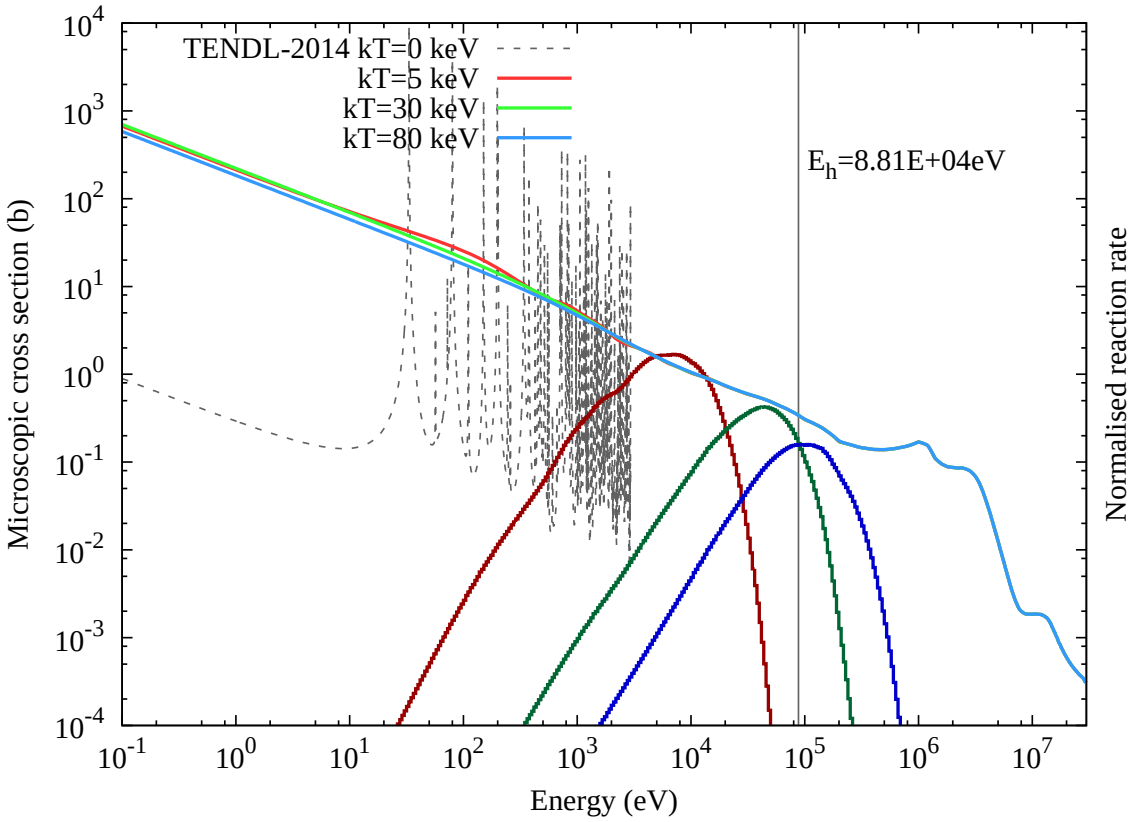


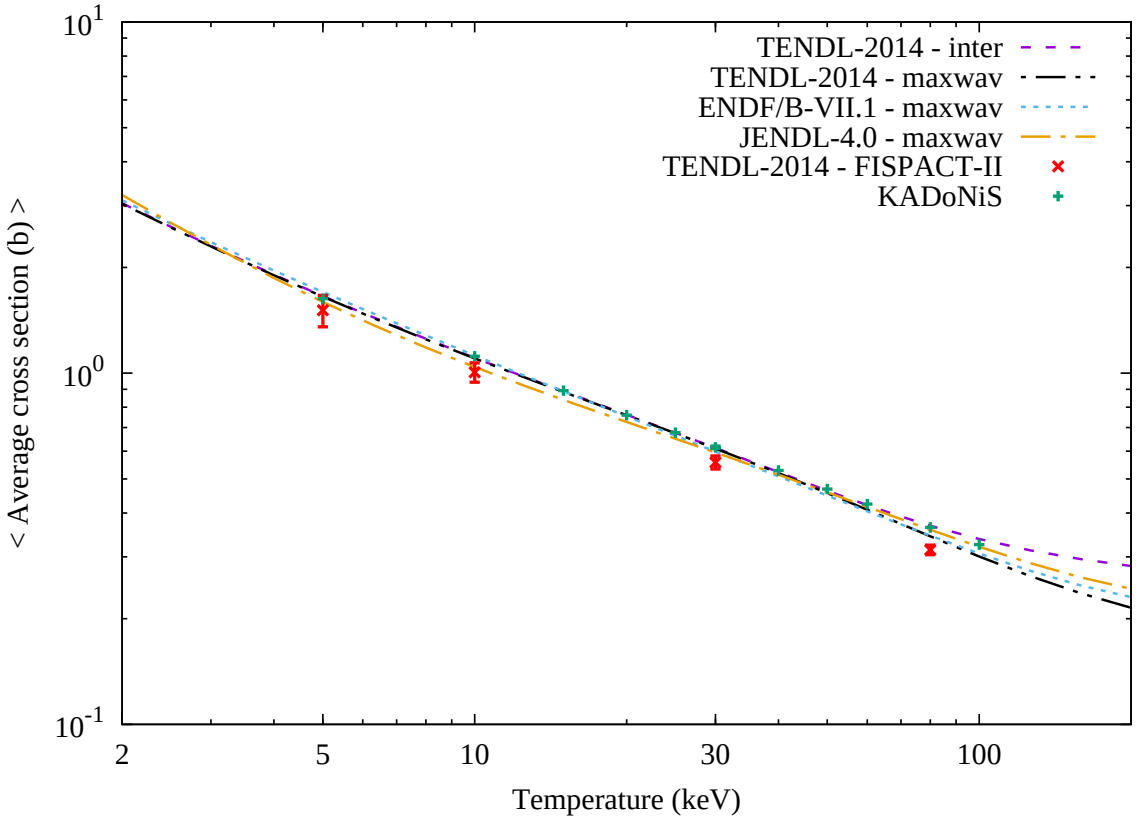
$^{155}Gd_{64}$ [Stable]



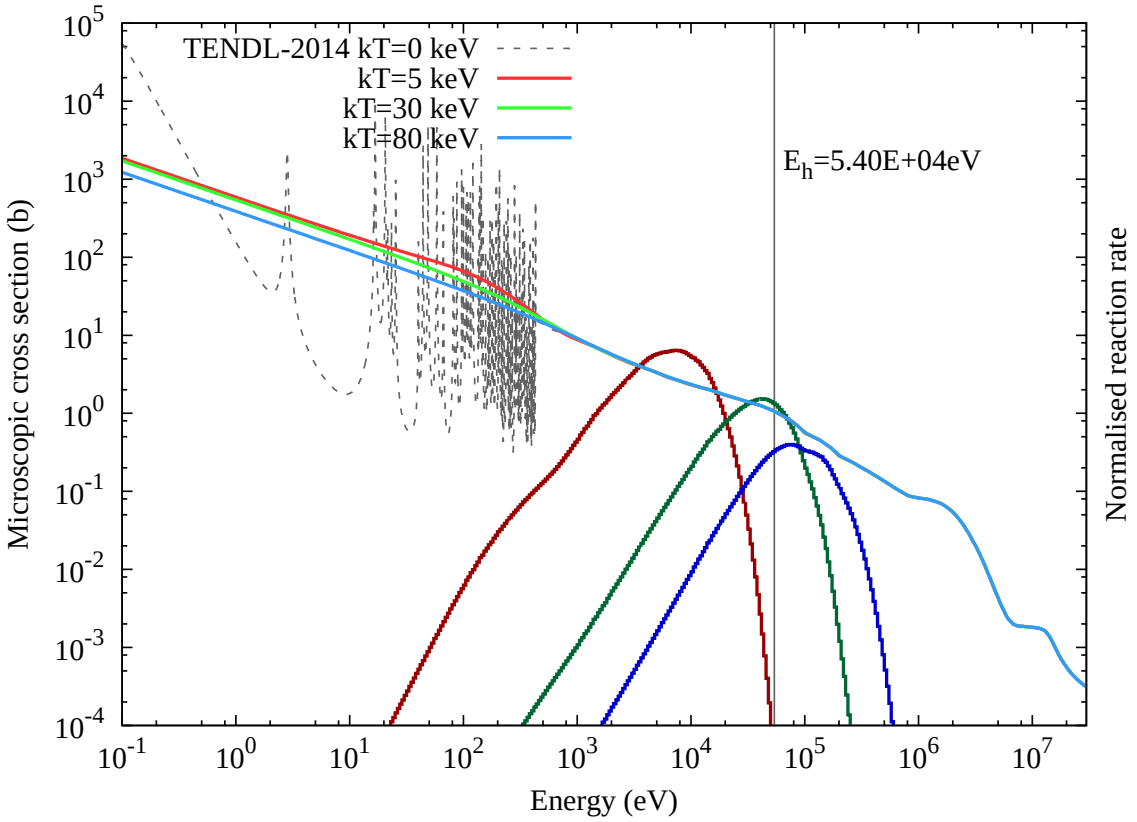


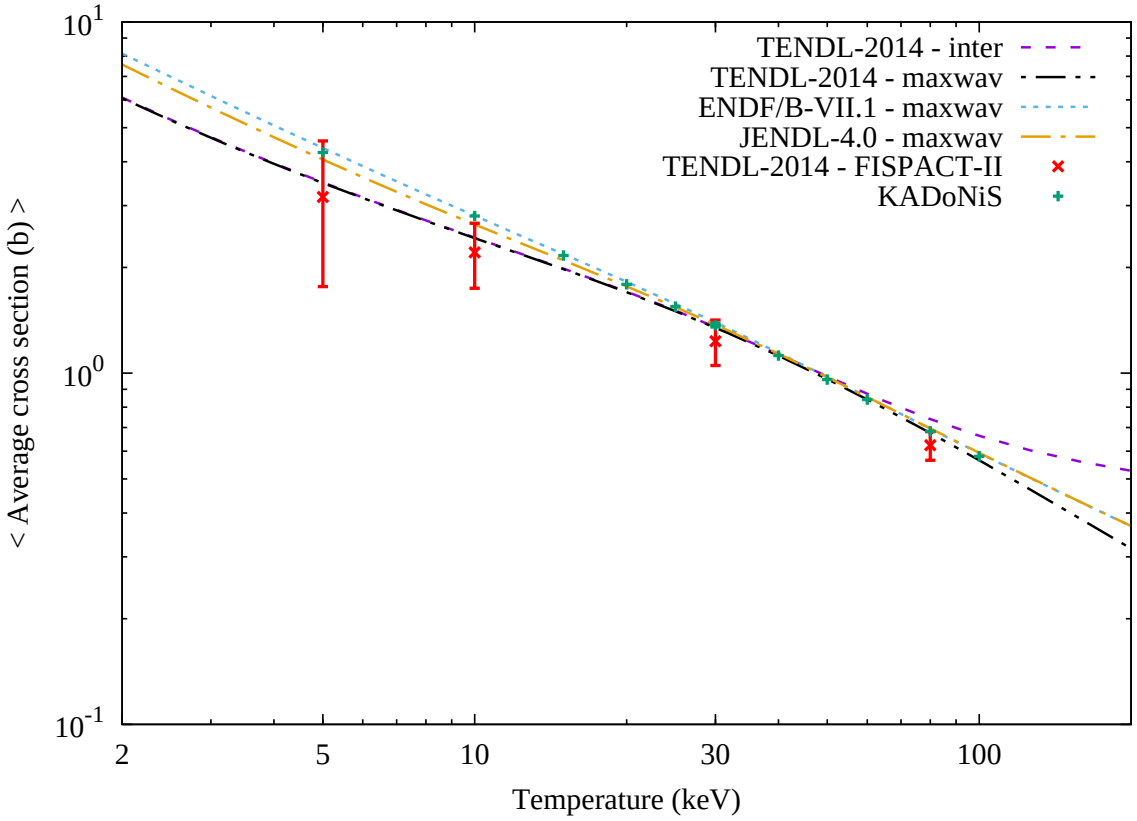
$^{156}Gd_{64}$ [Stable]



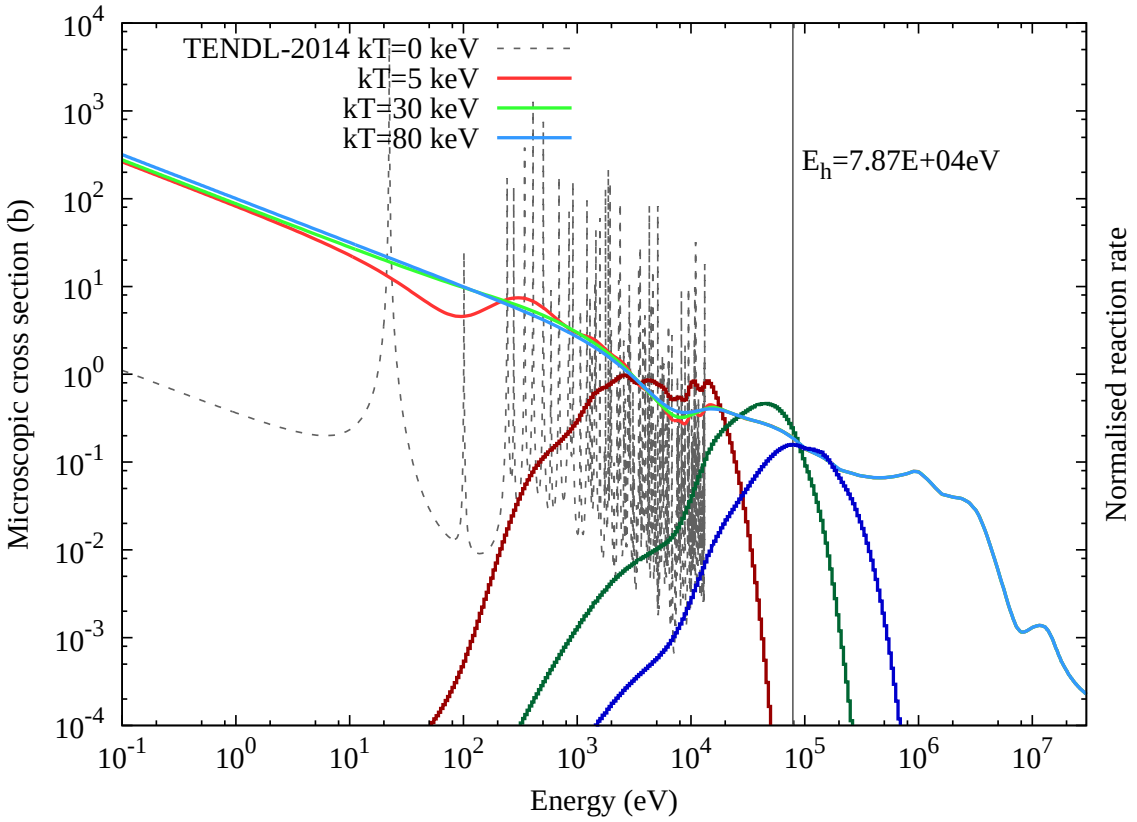


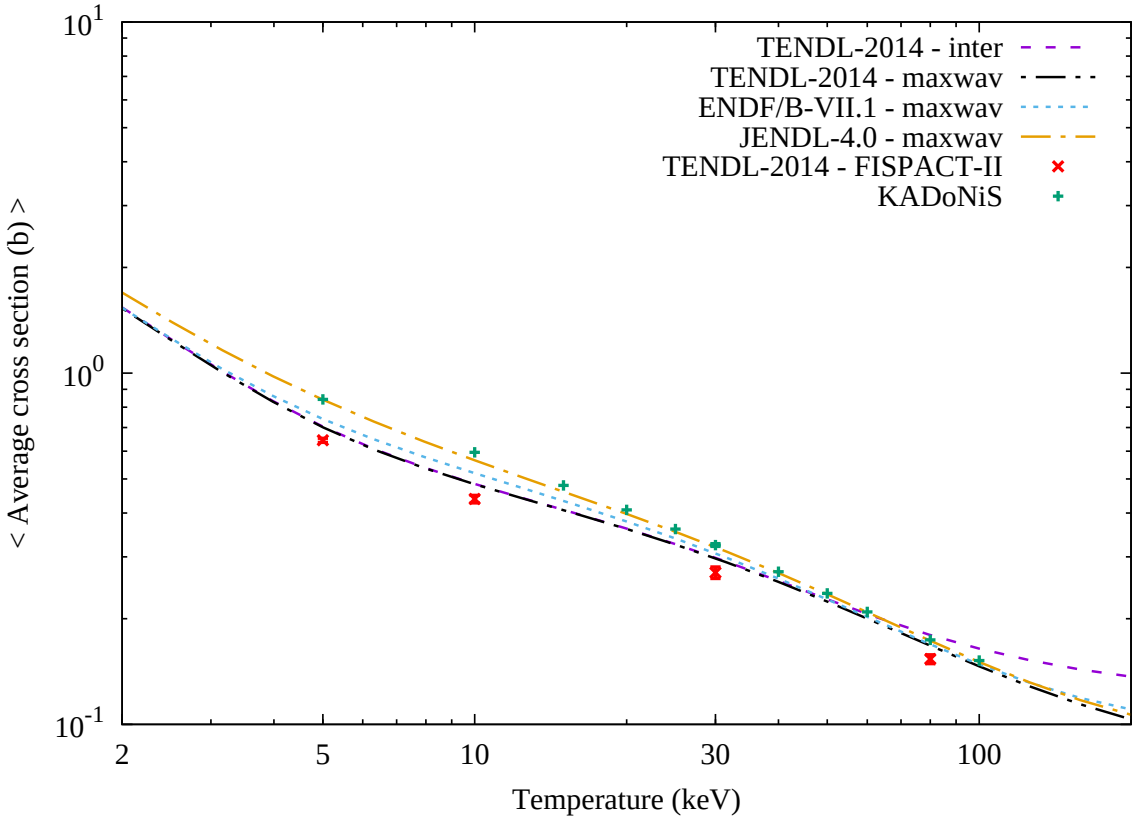
$^{157}Gd_{64}$ [Stable]



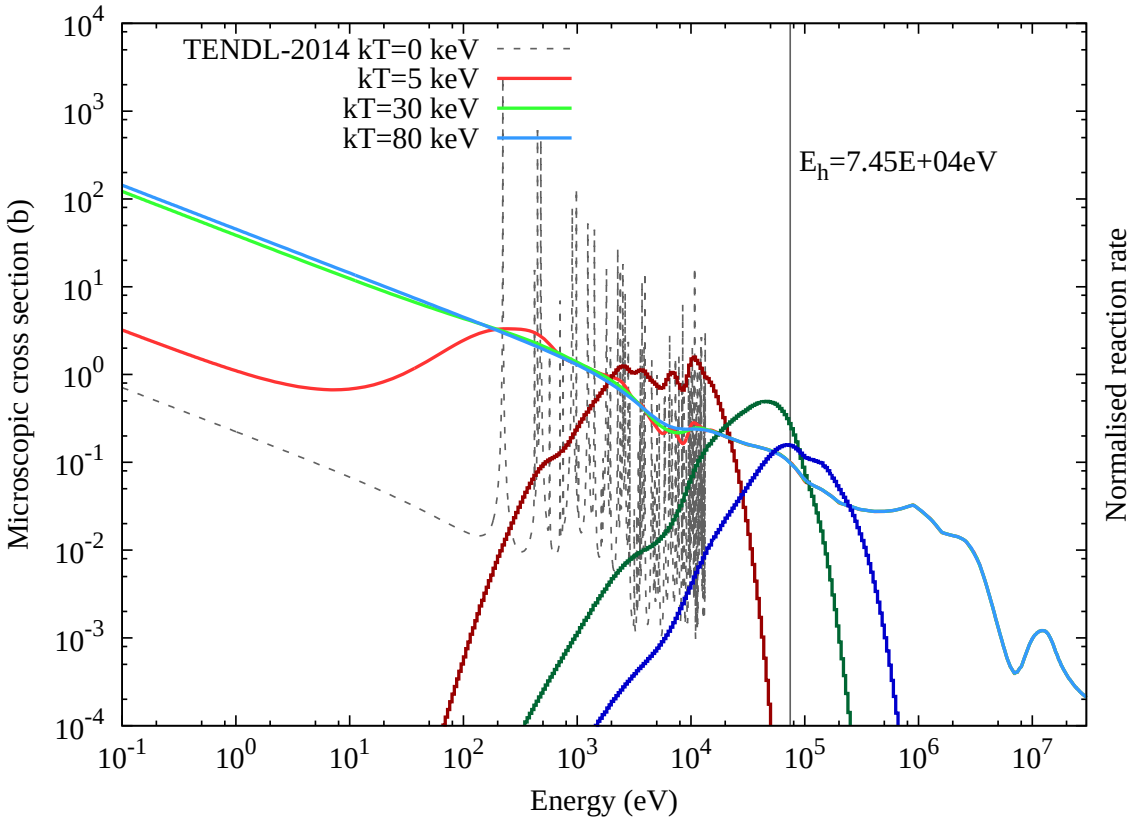


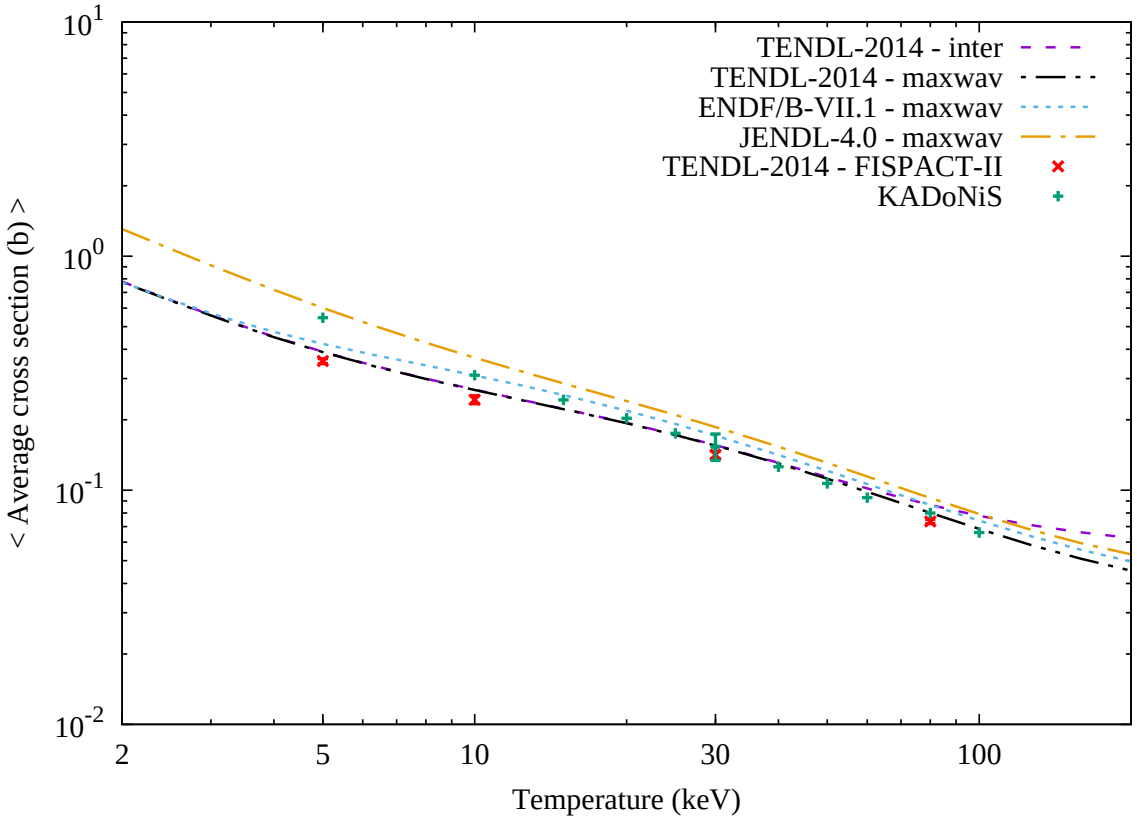
$^{158}Gd_{64}$ [Stable]



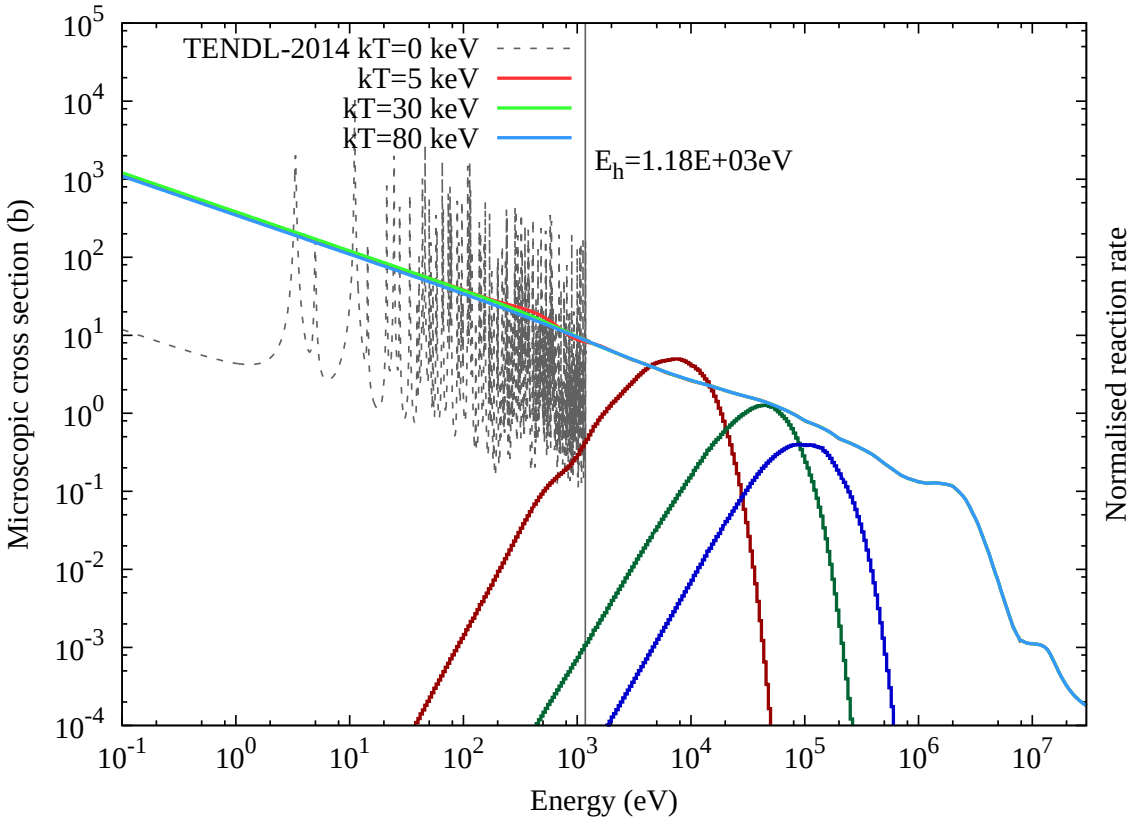


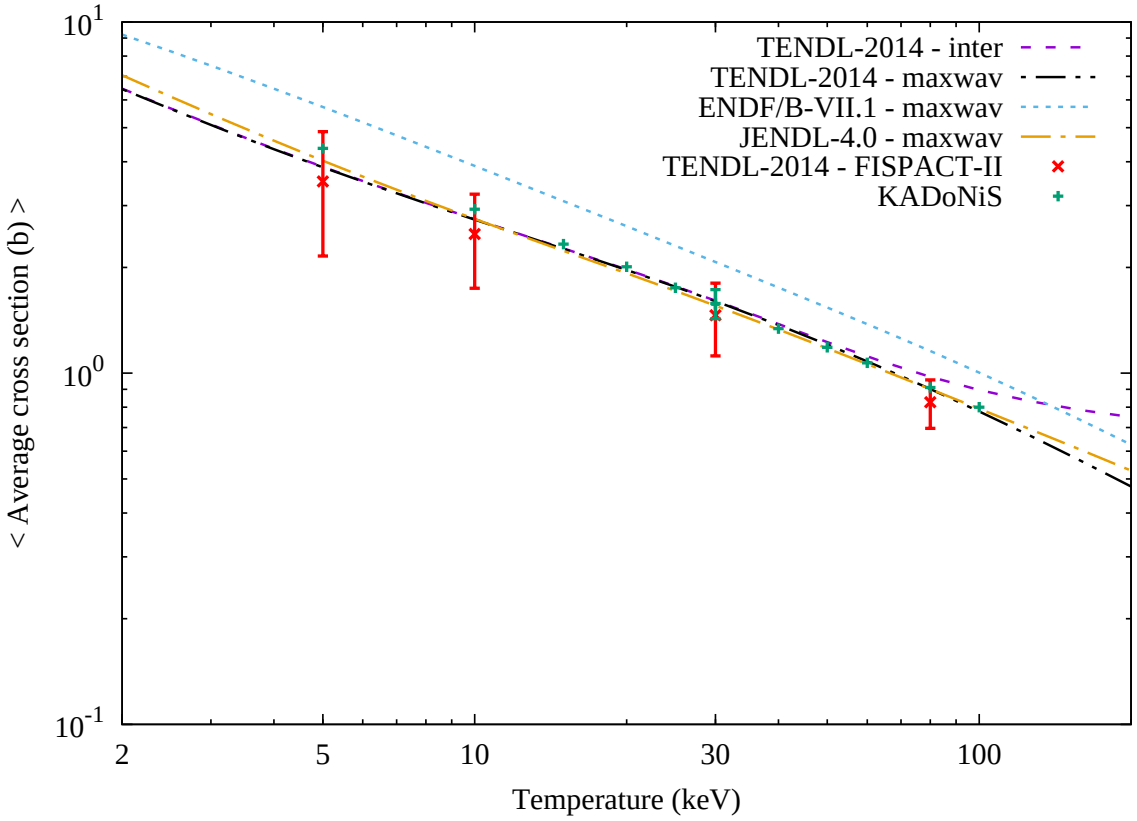
$^{160}Gd_{64}$ $[T_{1/2} = 1.30 \times 10^{17}$ years$]$



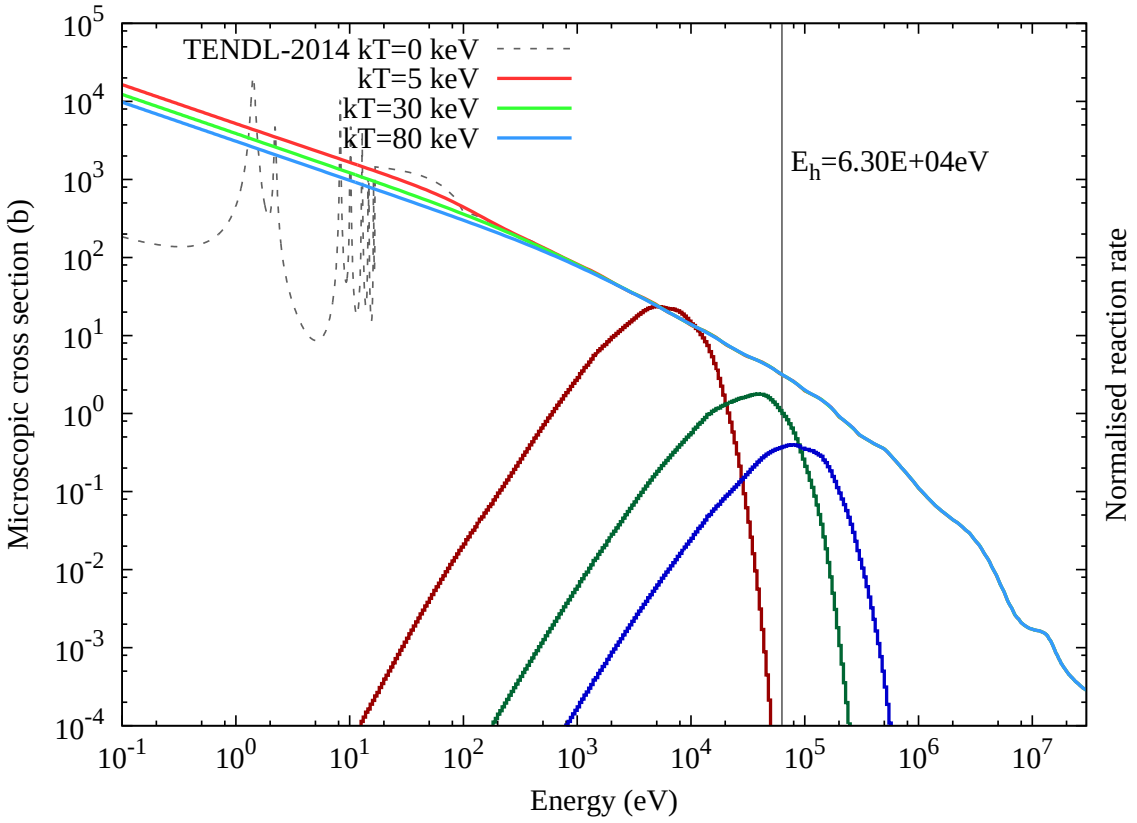


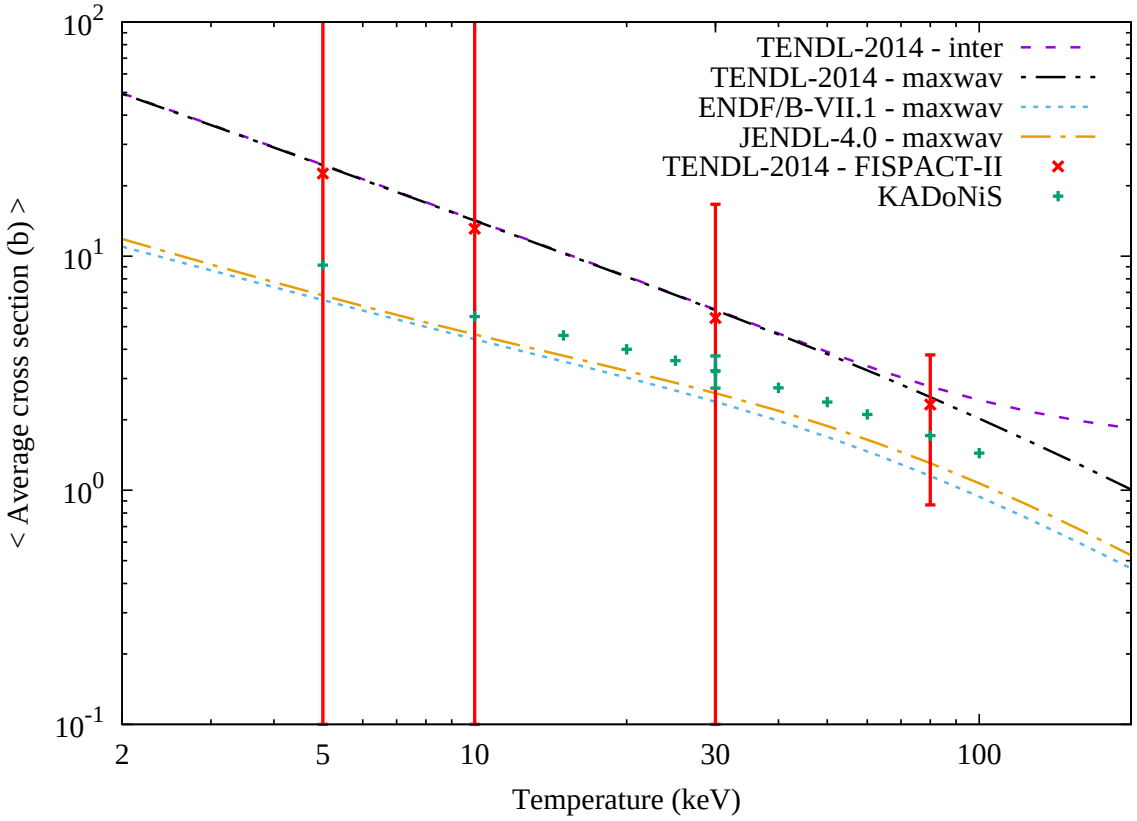
$^{159}Tb_{65}$ [Stable]



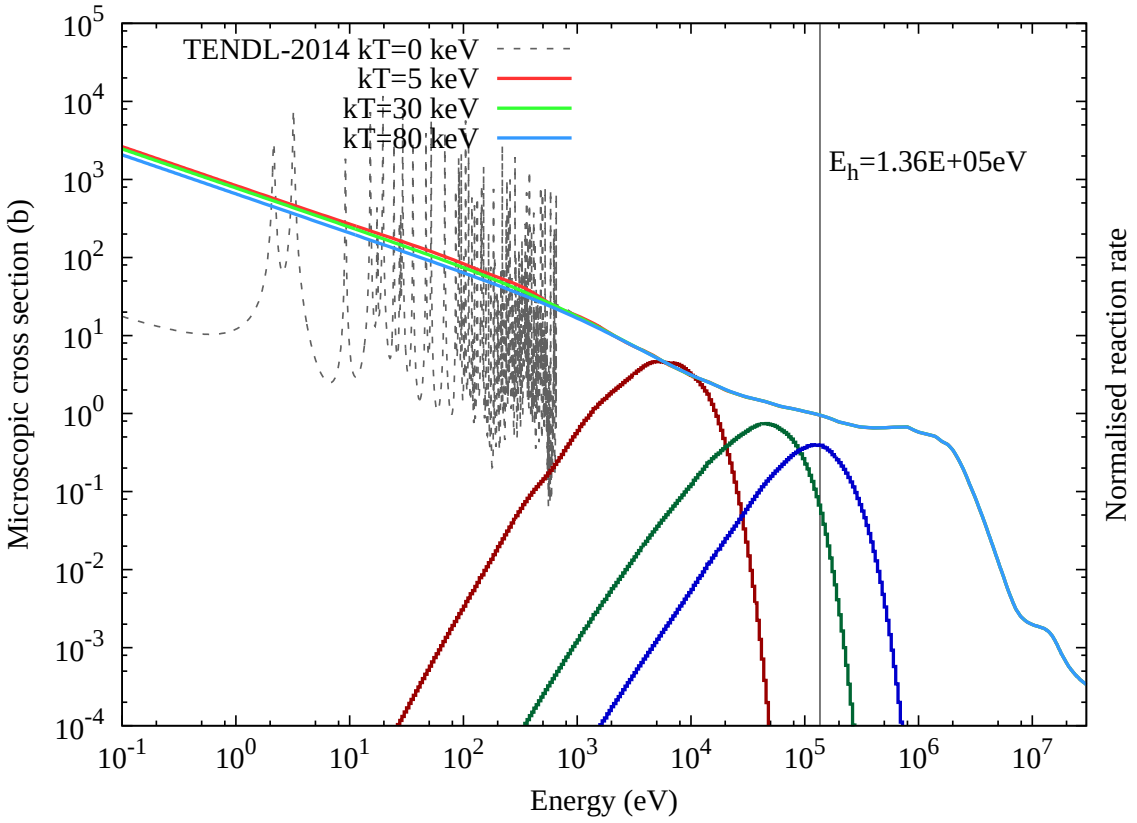


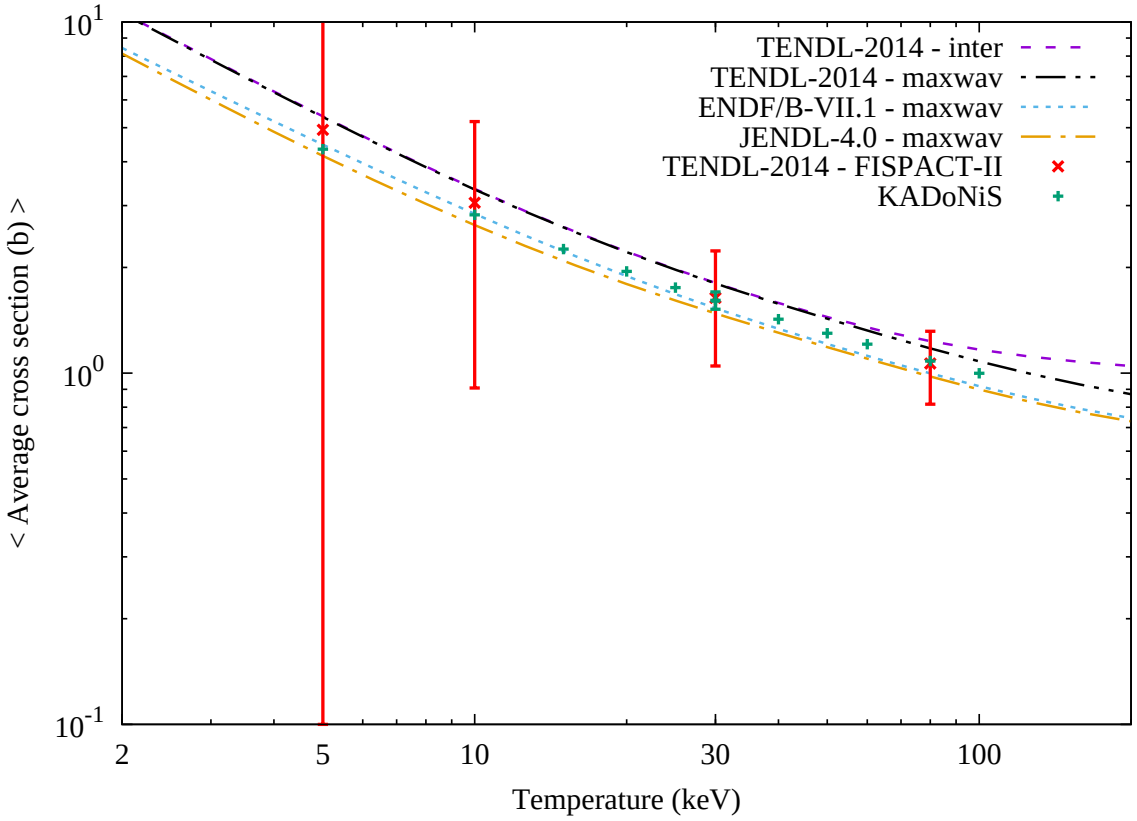
$^{160}Tb_{65}$ [$T_{1/2}$ = 72.30 days] (KADoNiS=SMC)



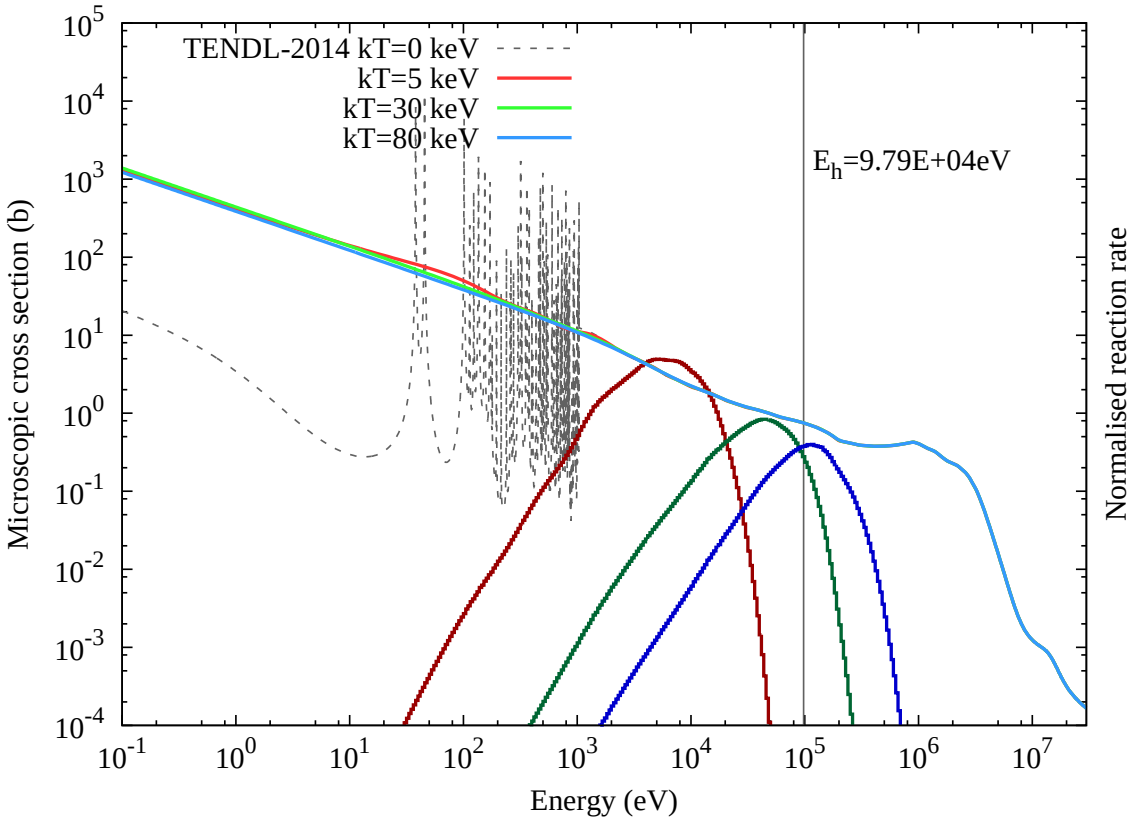


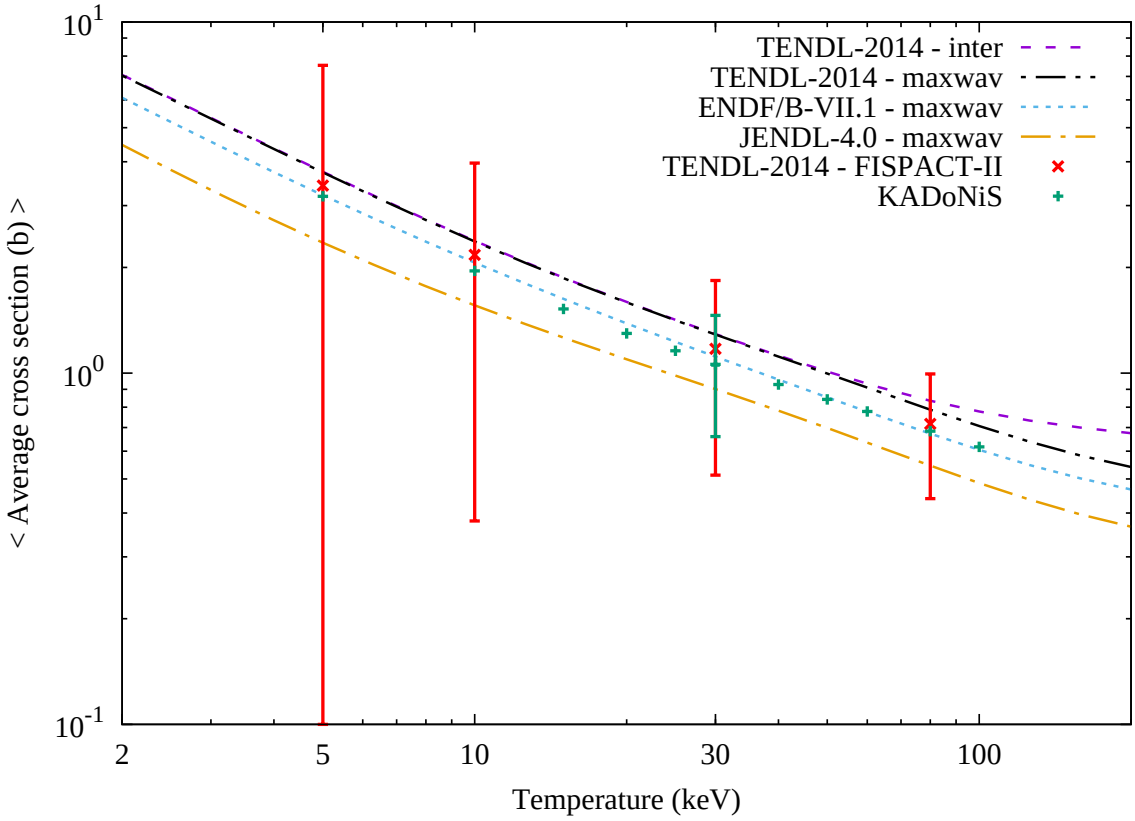
$^{156}Dy_{66}$ $[T_{1/2} = 1.00 \times 10^{18}$ years$]$



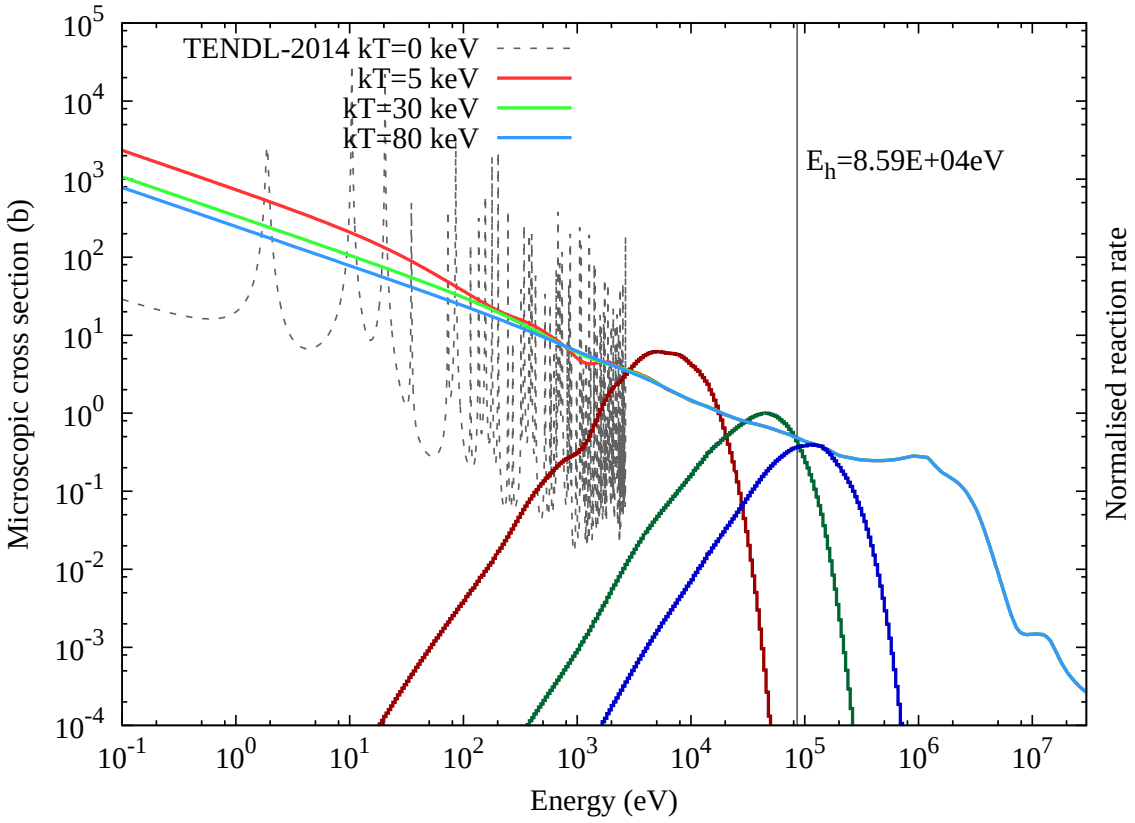


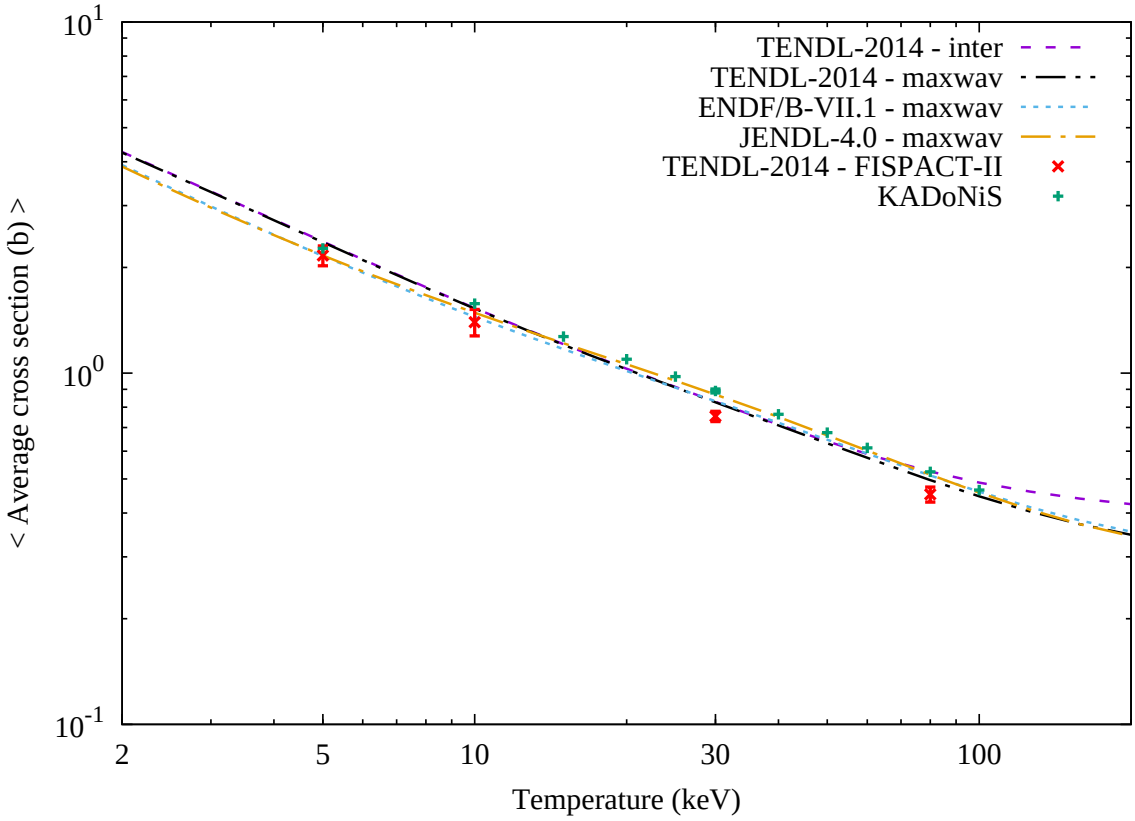
$^{158}Dy_{66}$ [Stable] (KADoNiS=SMC)



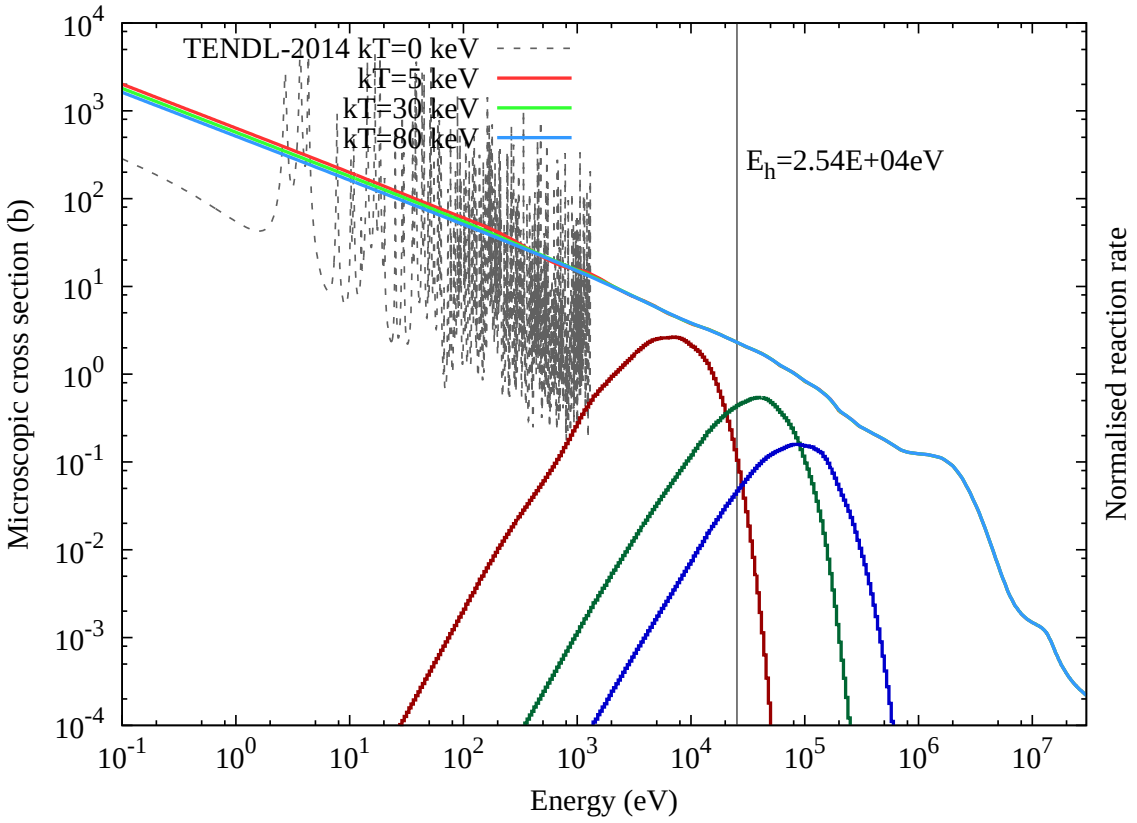


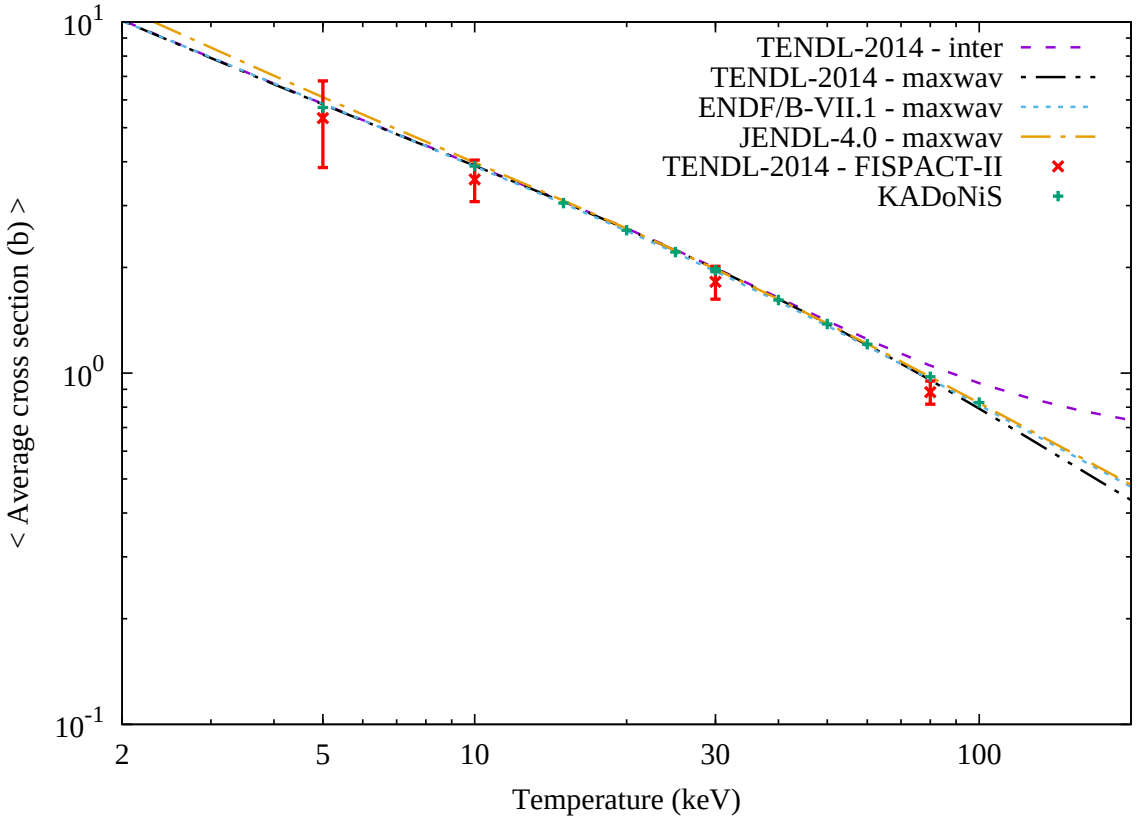
$^{160}Dy_{66}$ [Stable]



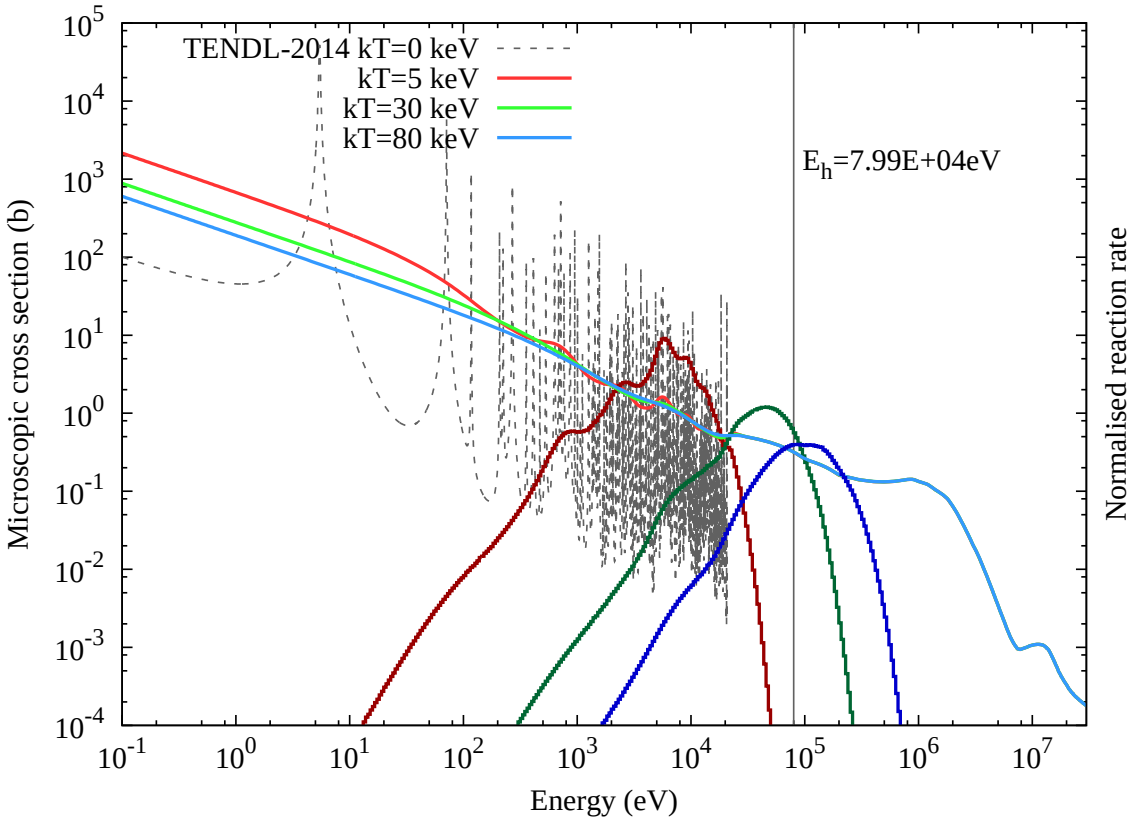


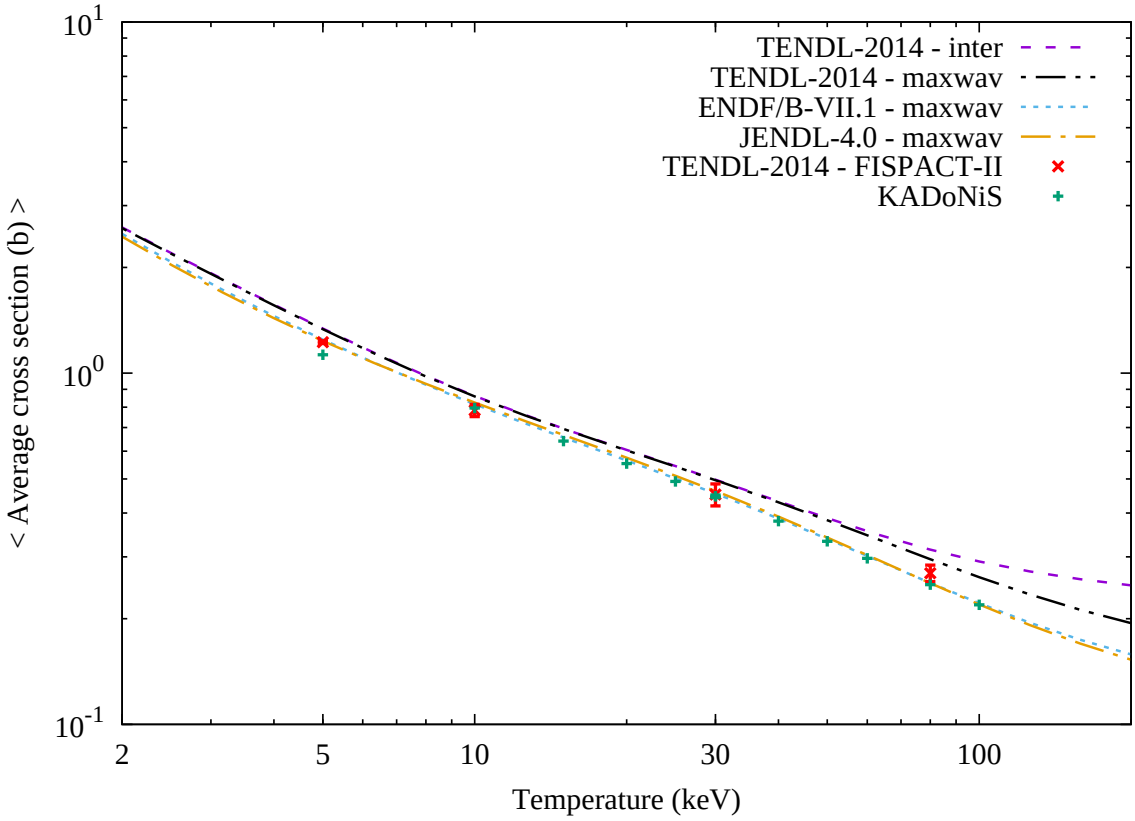
$^{161}Dy_{66}$ [Stable]



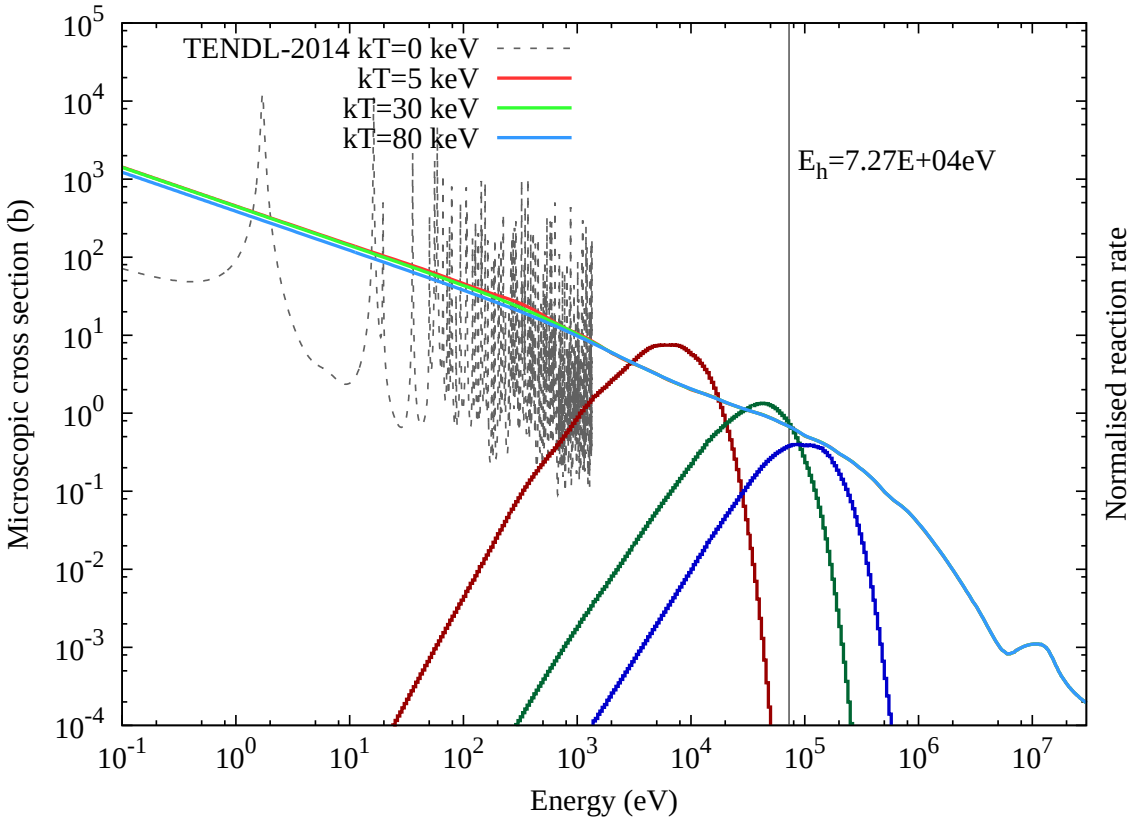


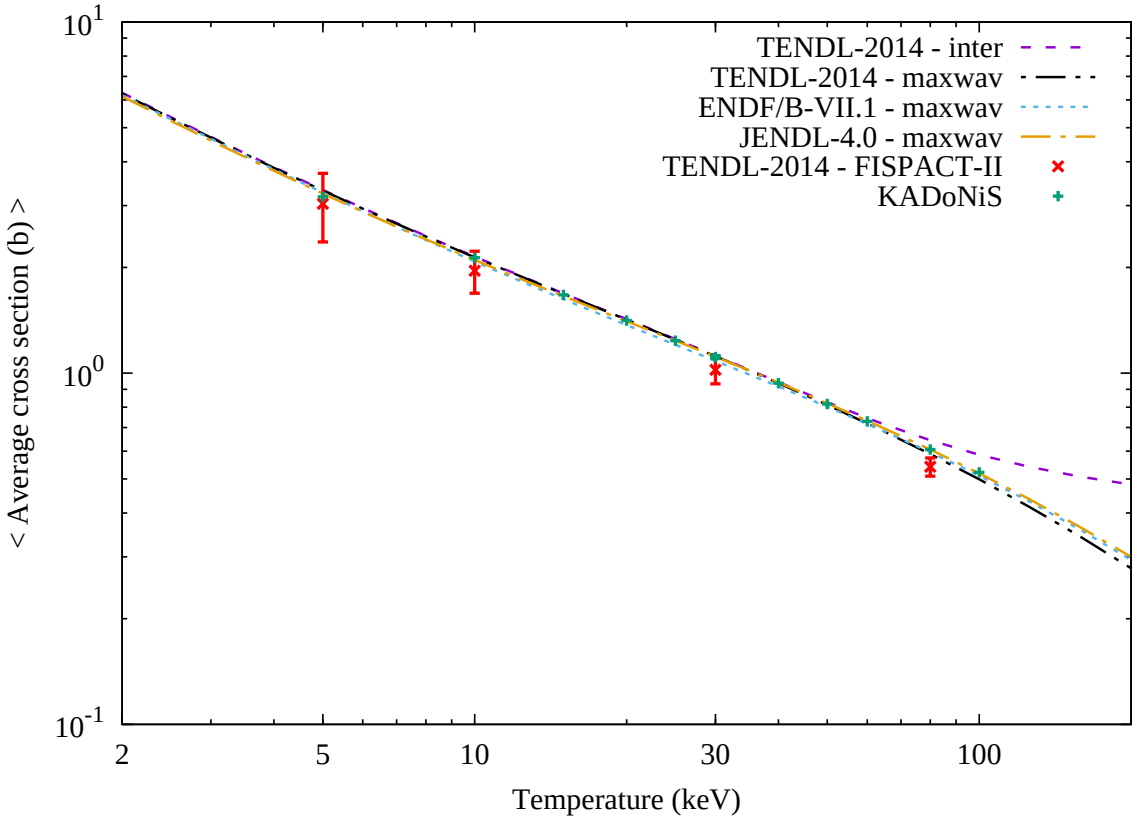
$^{162}Dy_{66}$ [Stable]



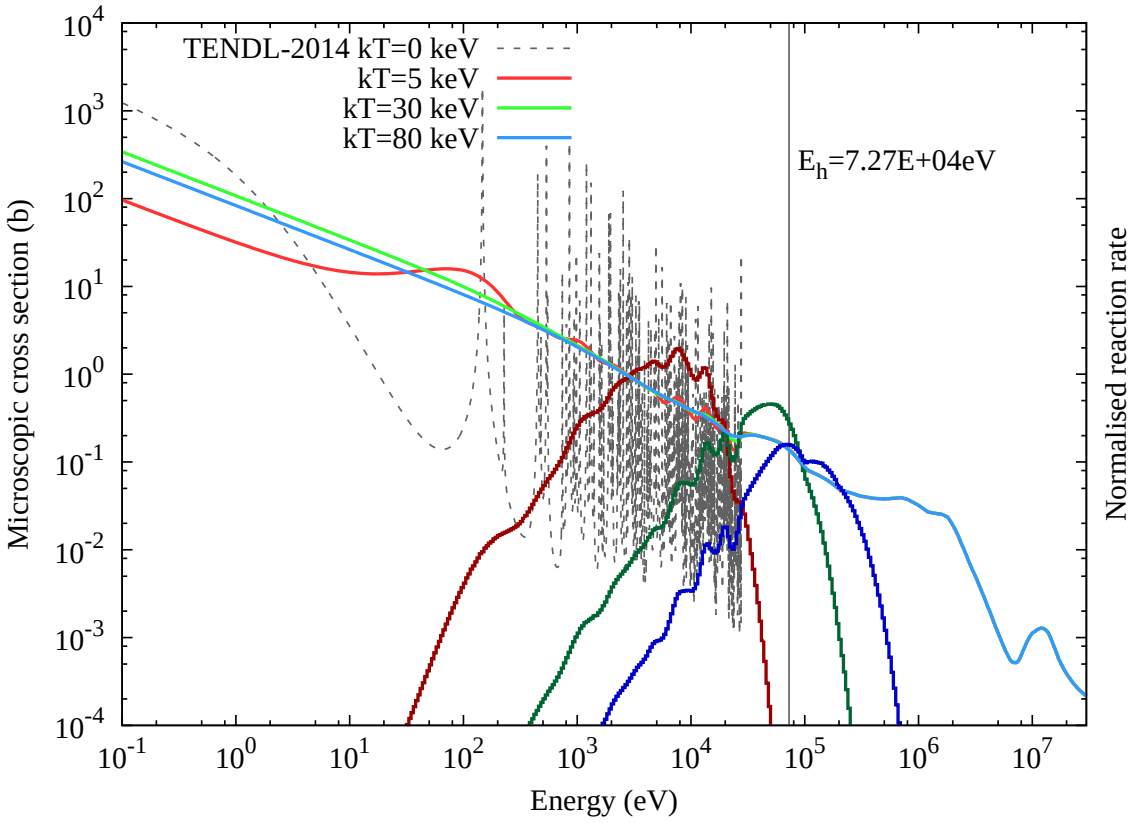


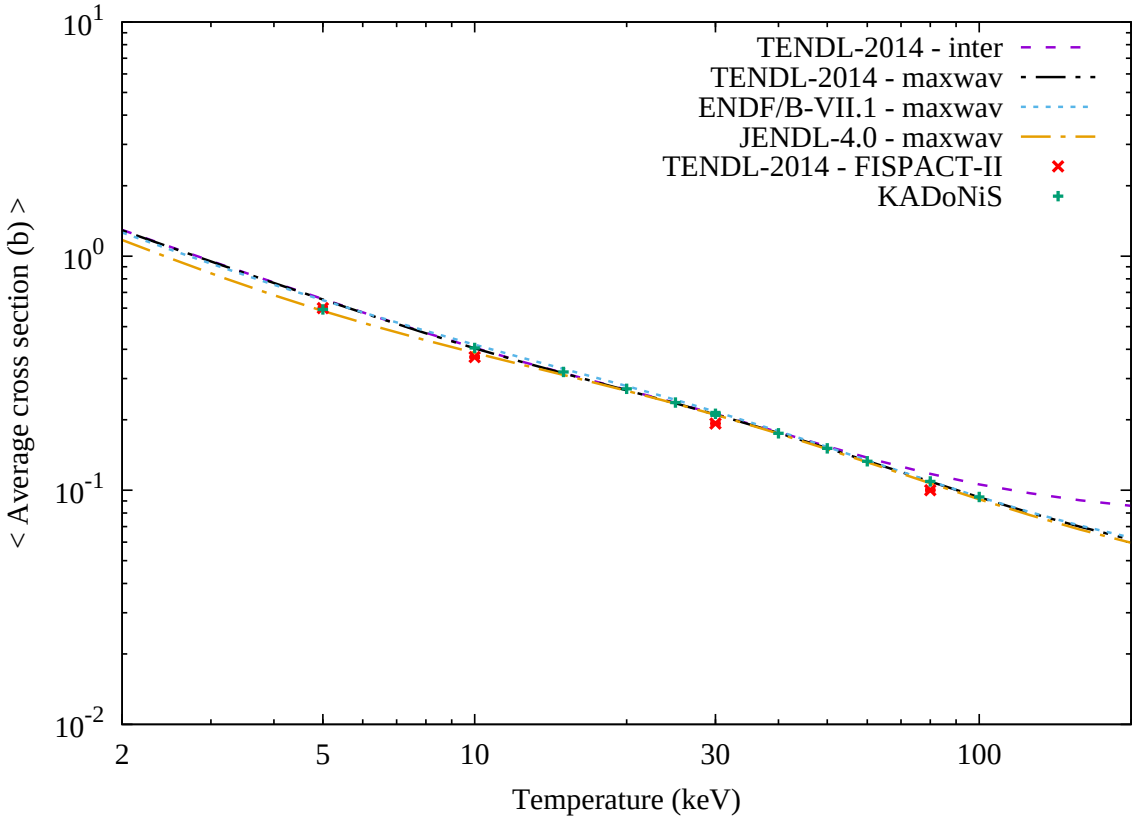
$^{163}Dy_{66}$ [Stable]



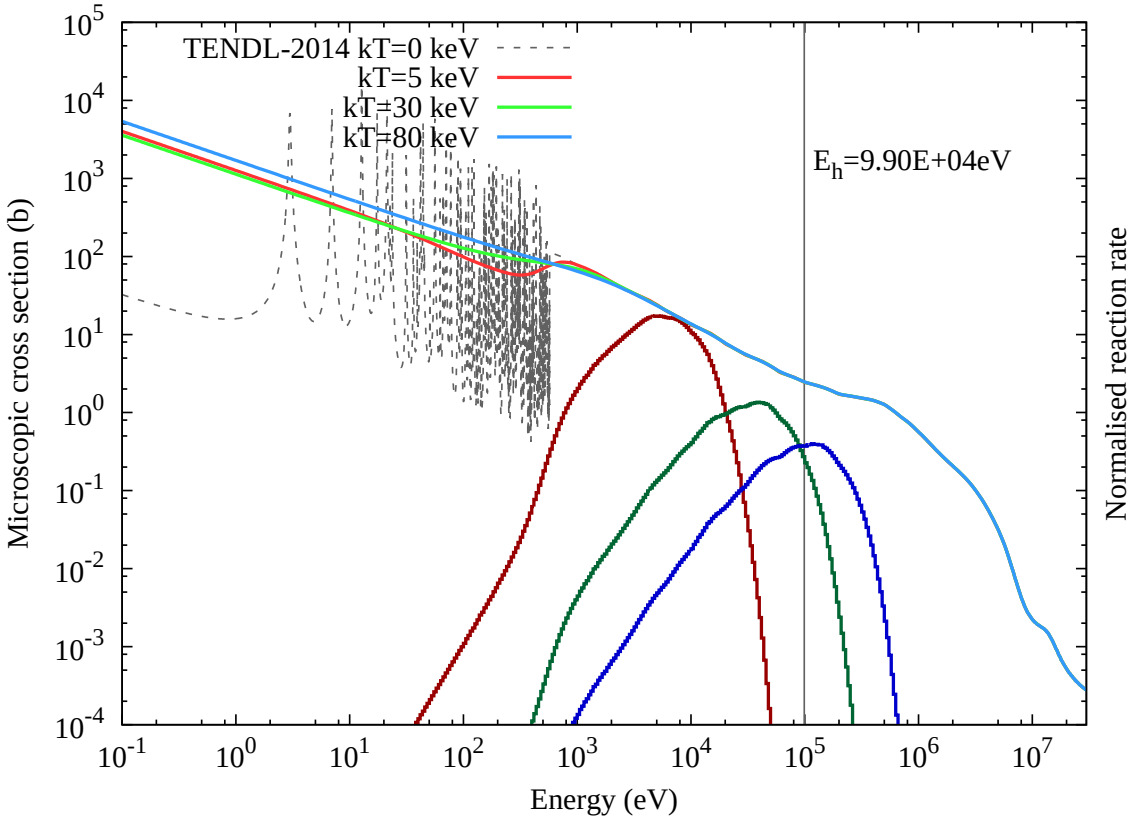


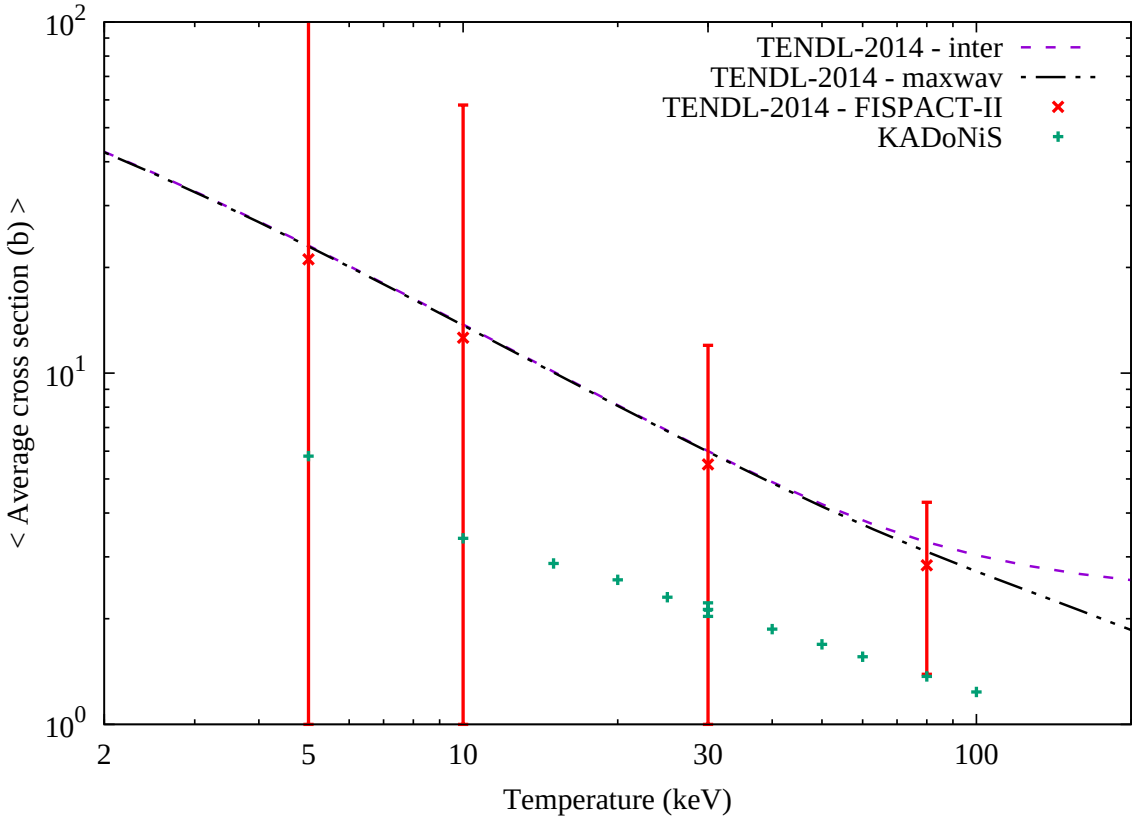
$^{164}Dy_{66}$ [Stable]



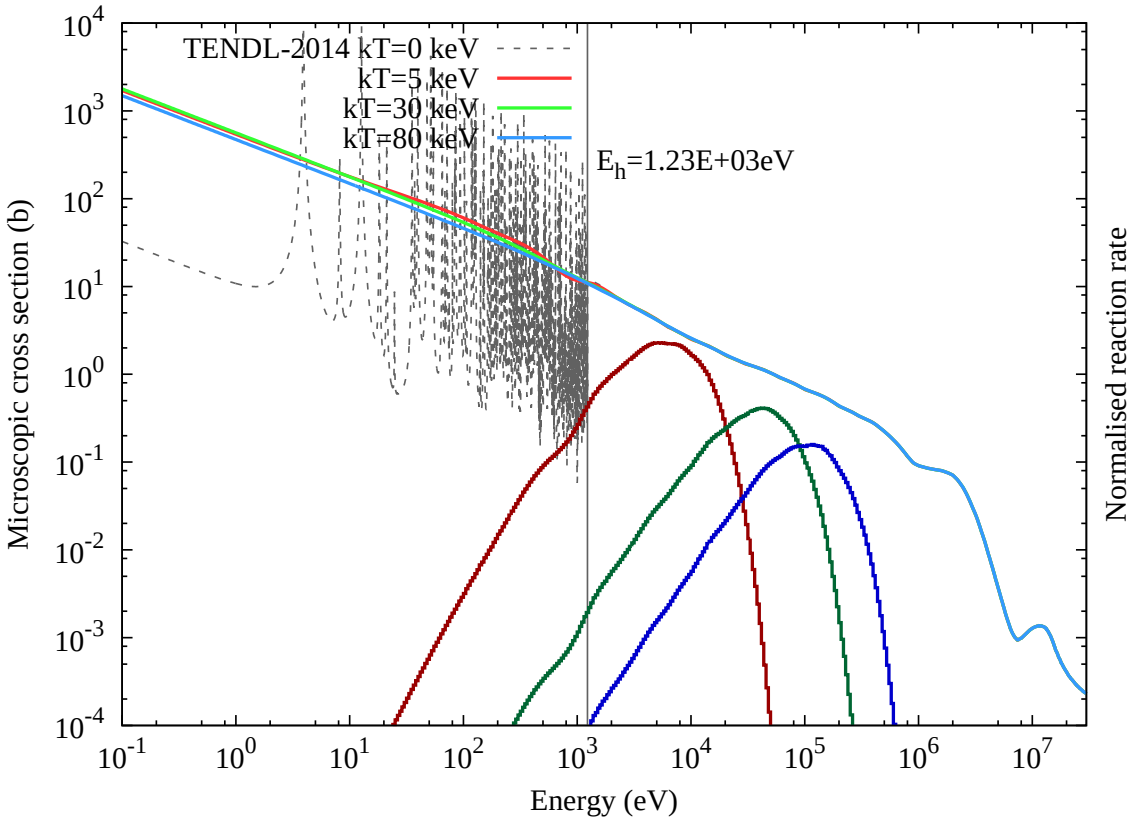


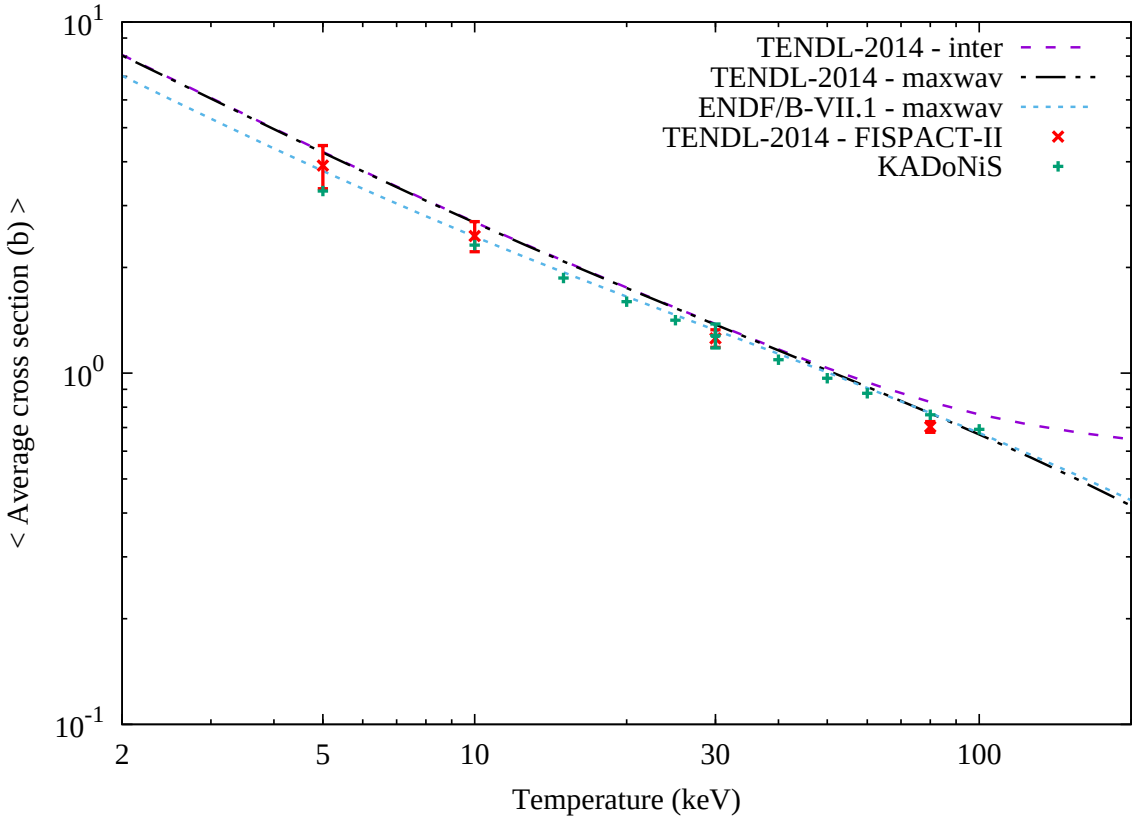
$^{163}Ho_{67}$ $[T_{1/2} = 4.57 \times 10^3$ years$]$



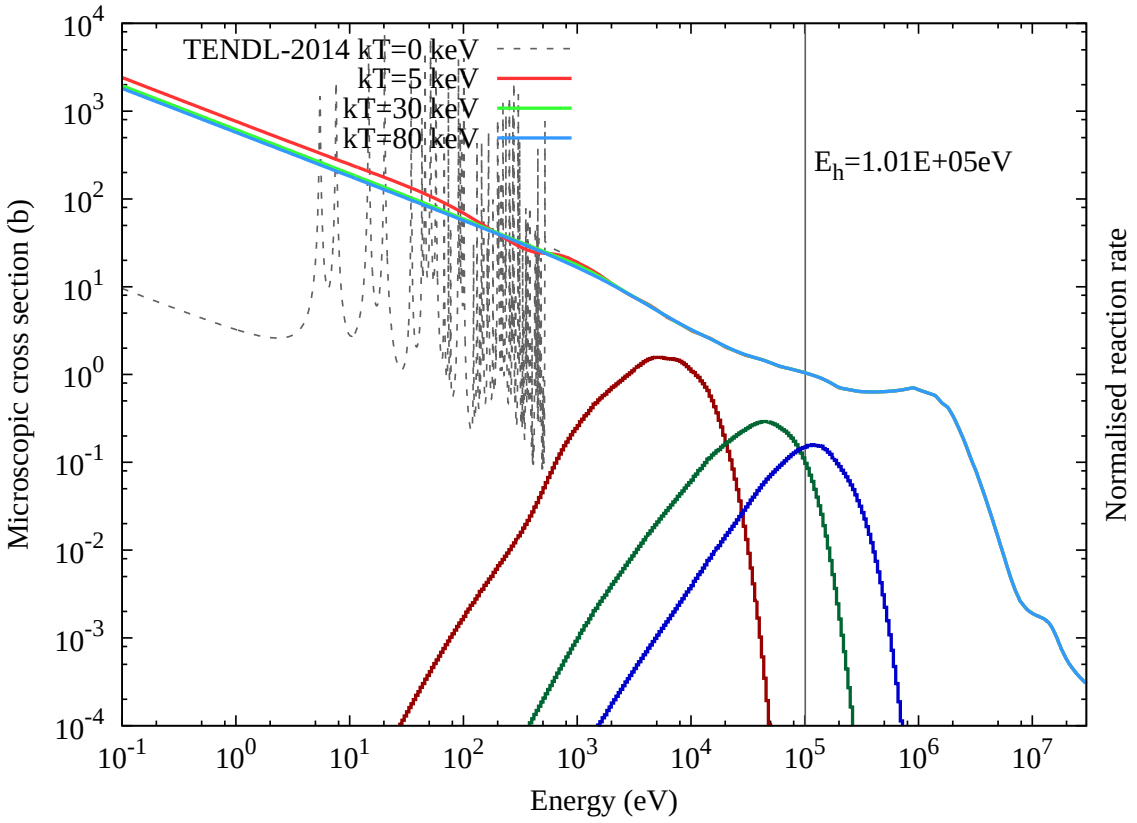


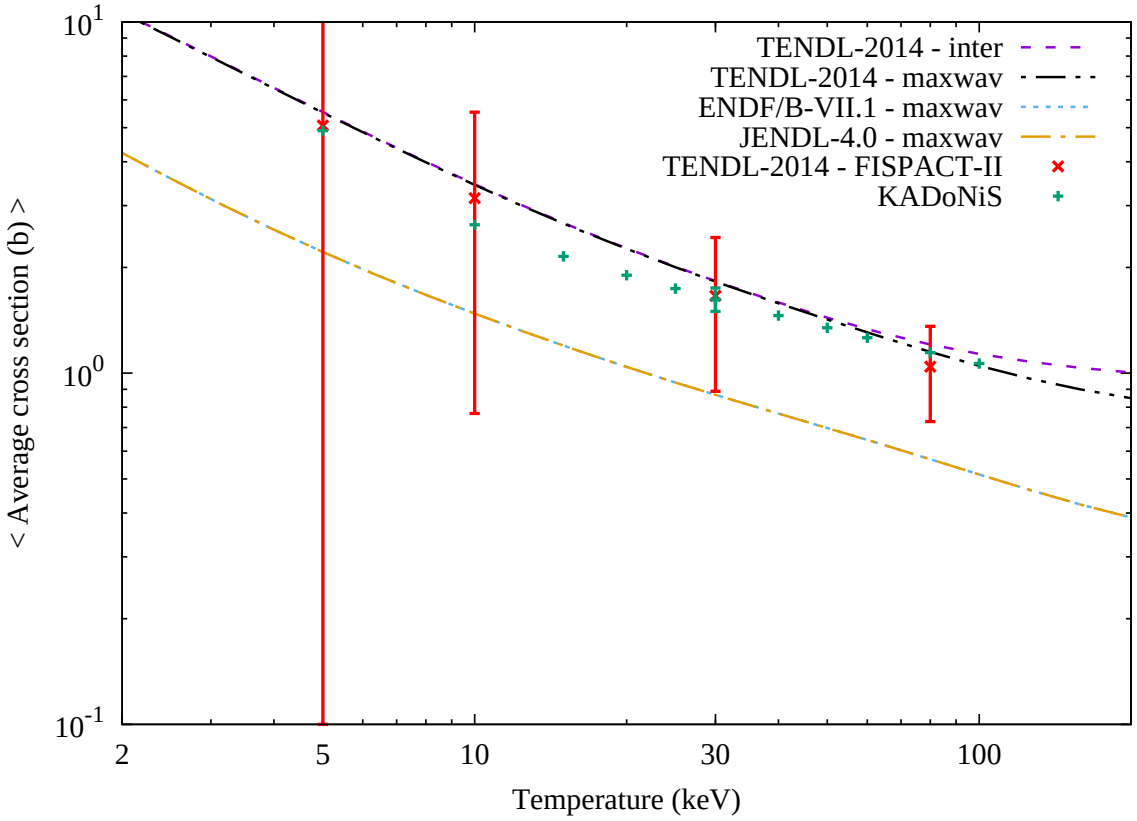
$^{165}Ho_{67}$ [Stable]



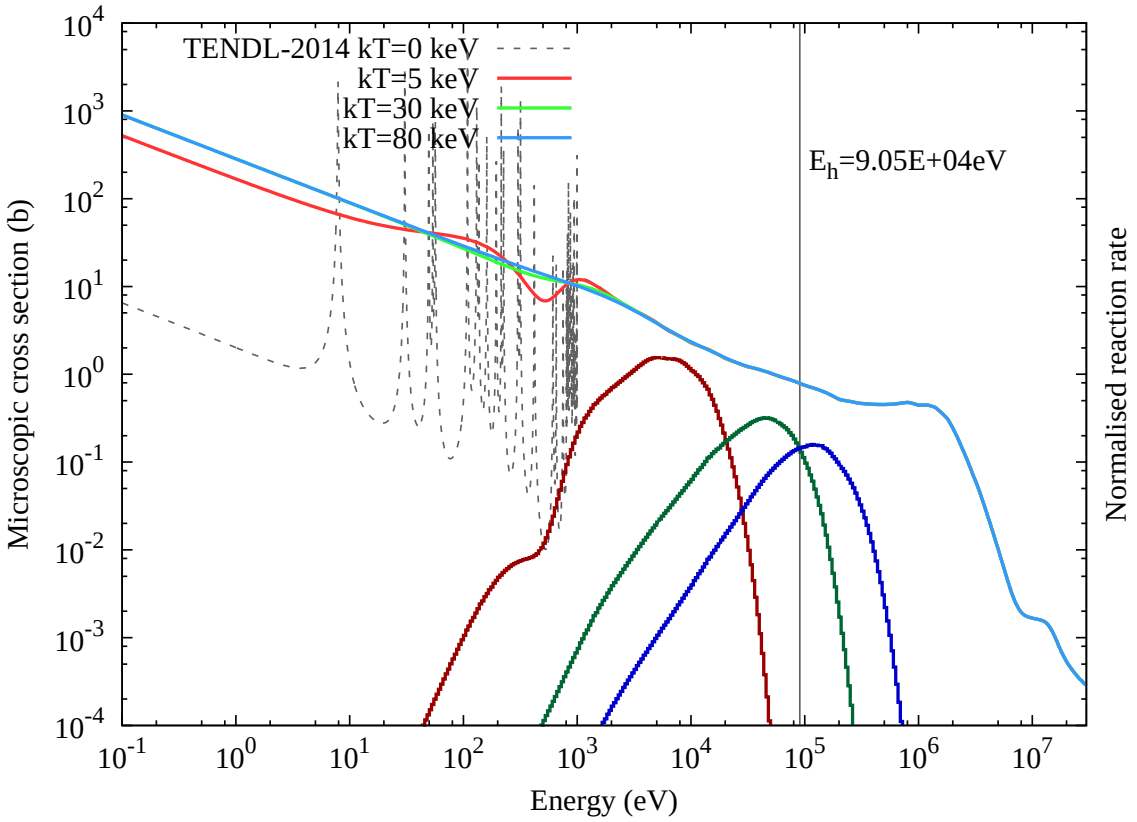


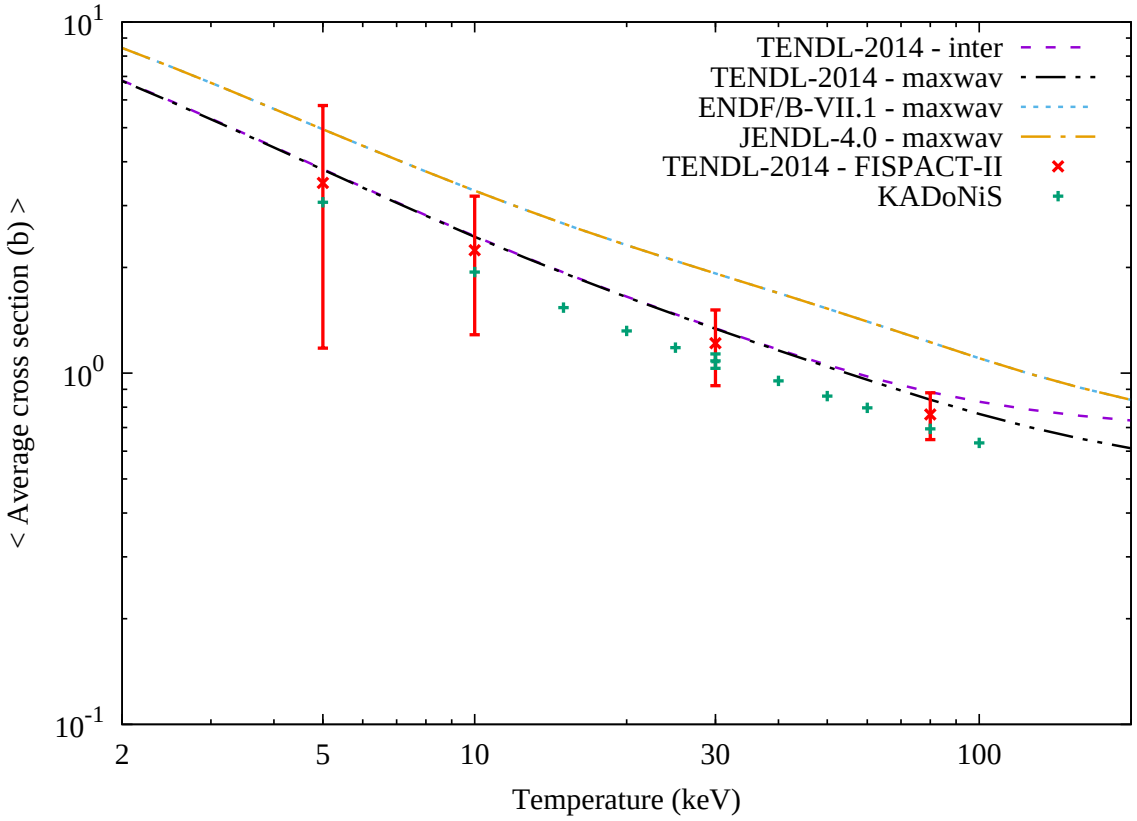
$^{162}Er_{68}$ $[T_{1/2} = 1.40 \times 10^{14}$ years$]$



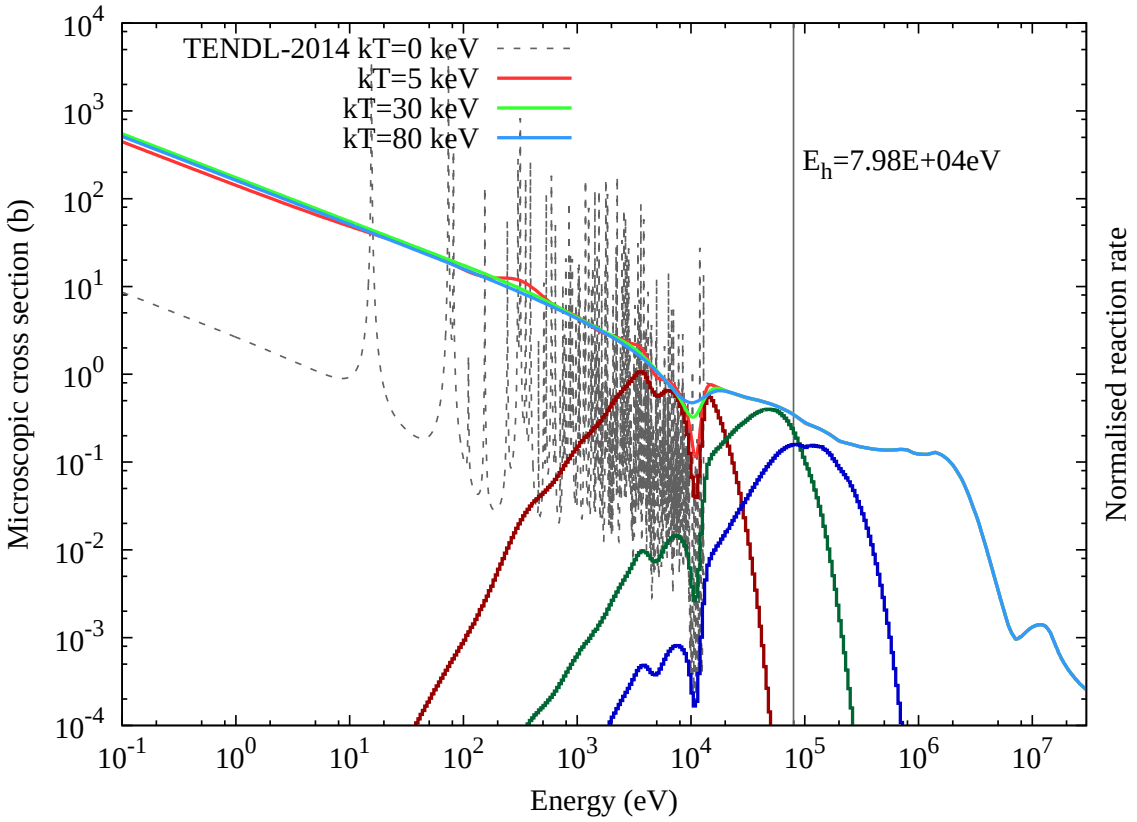


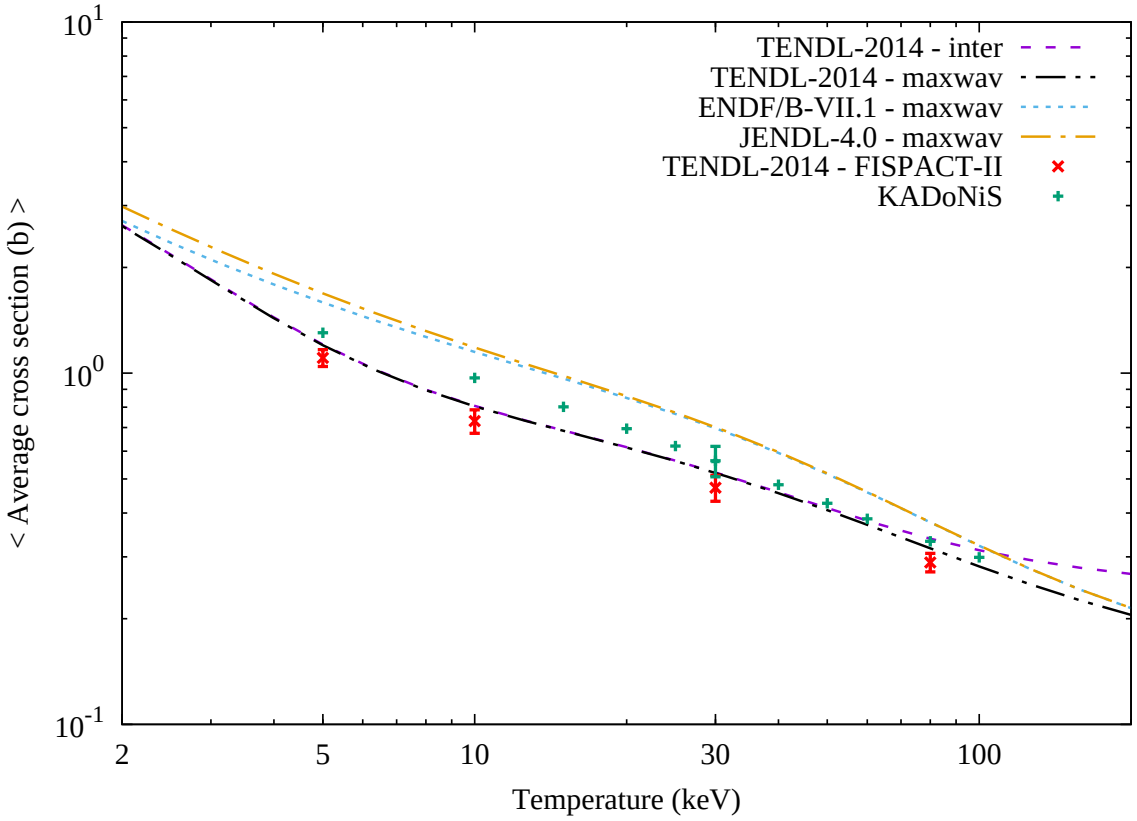
$^{164}Er_{68}$ [Stable]



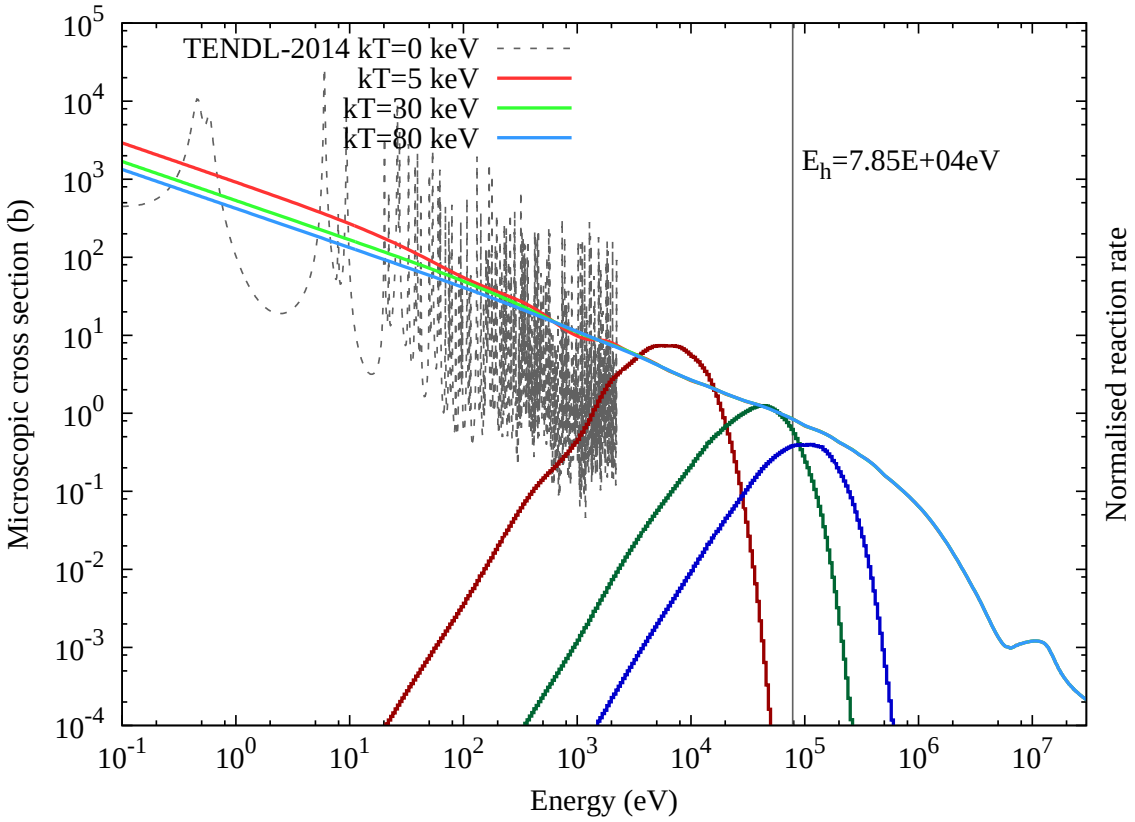


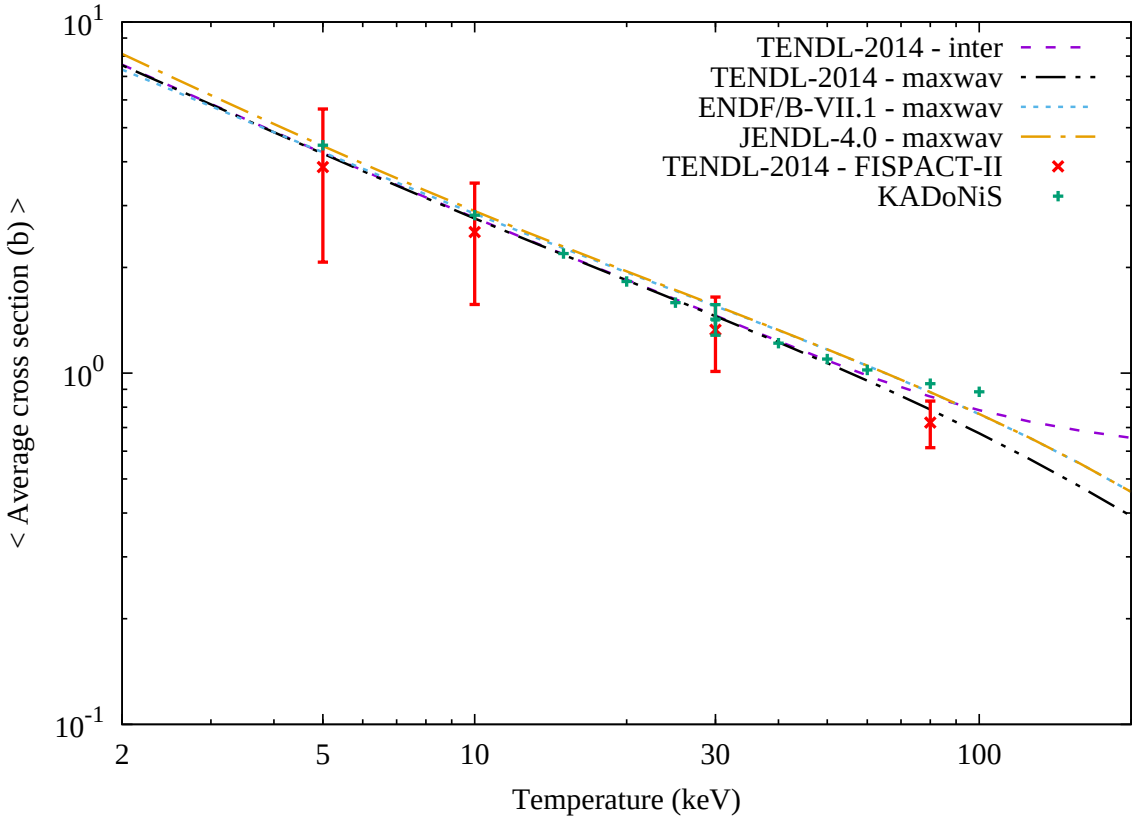
$^{166}Er_{68}$ [Stable]



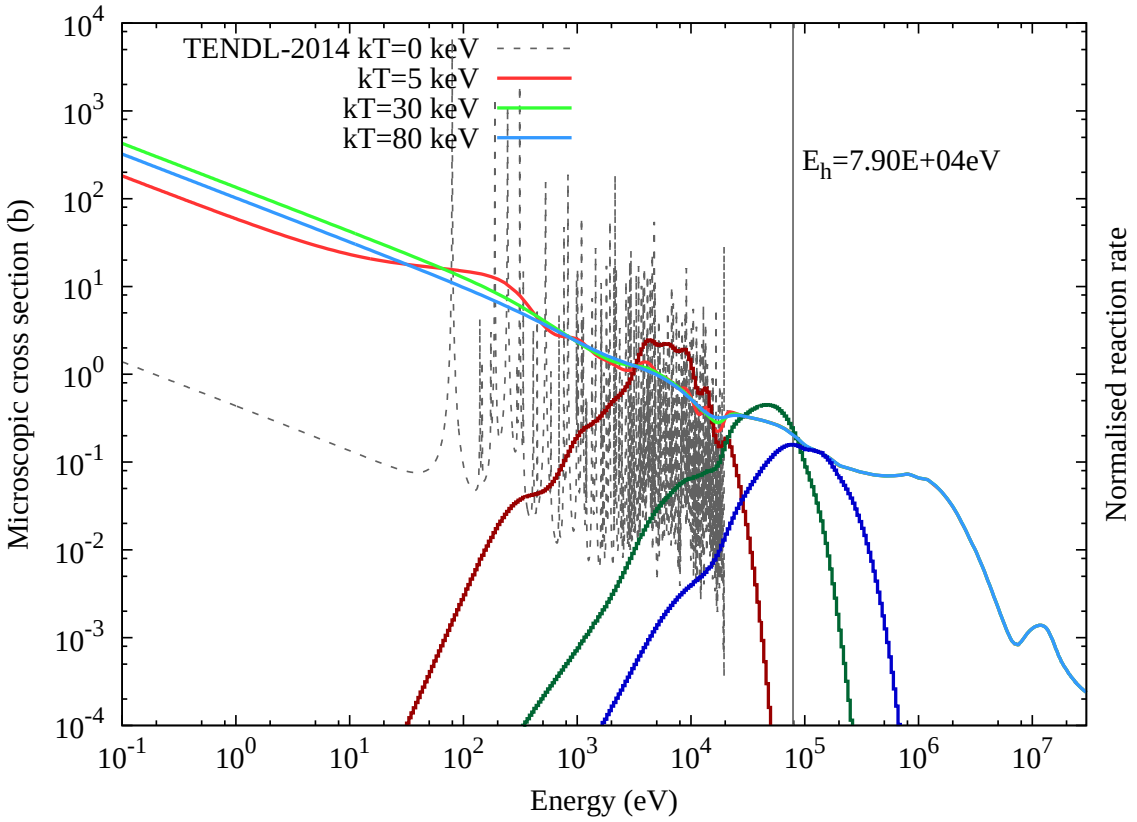


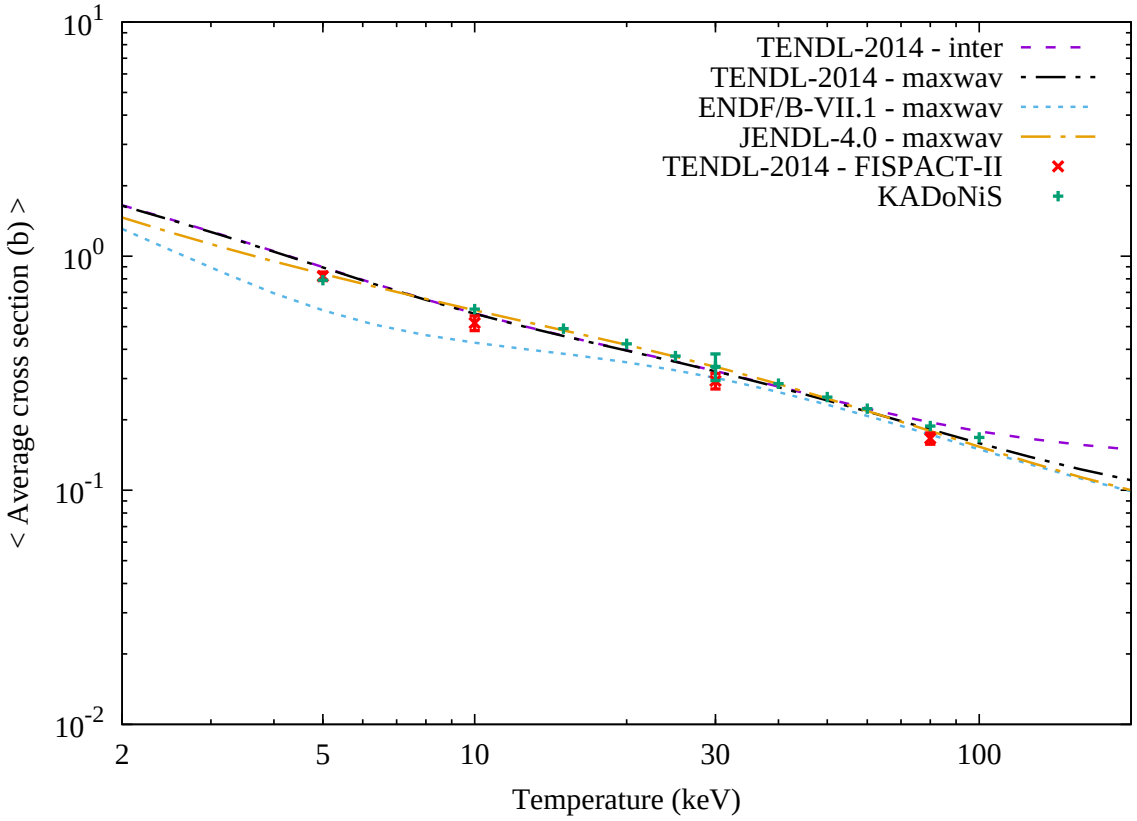
$^{167}Er_{68}$ [Stable]



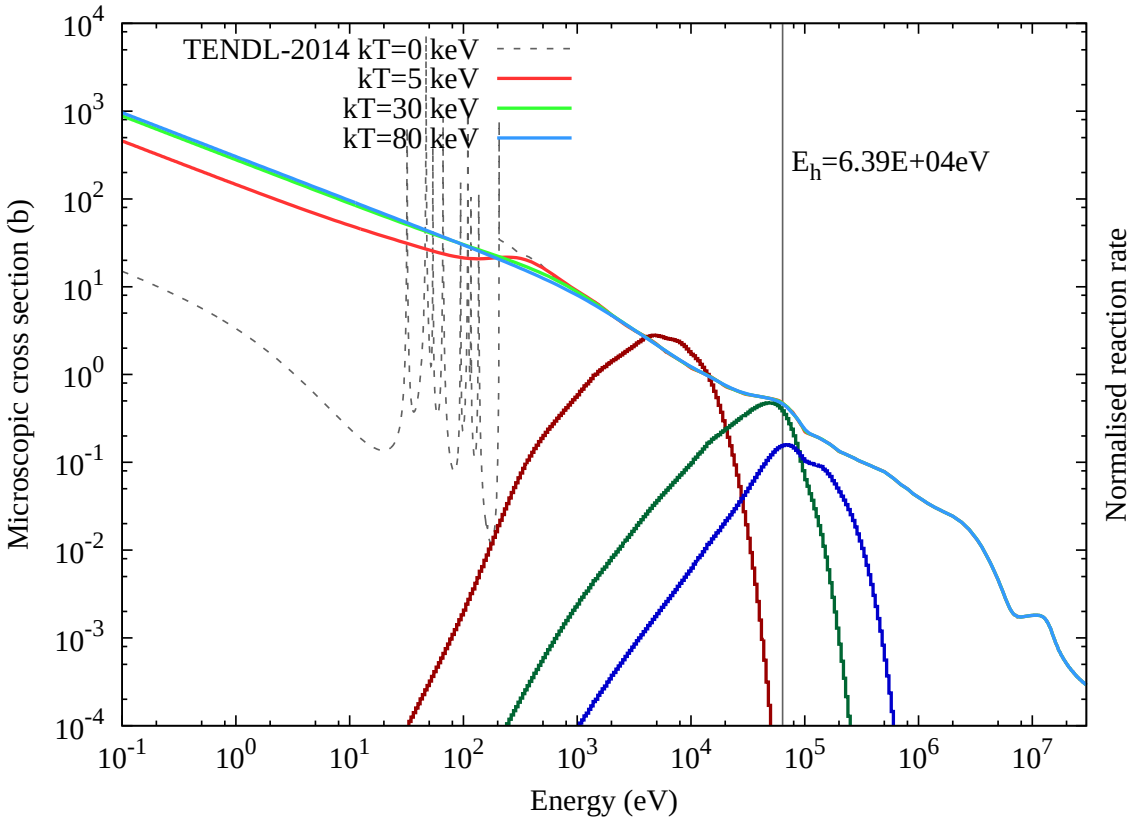


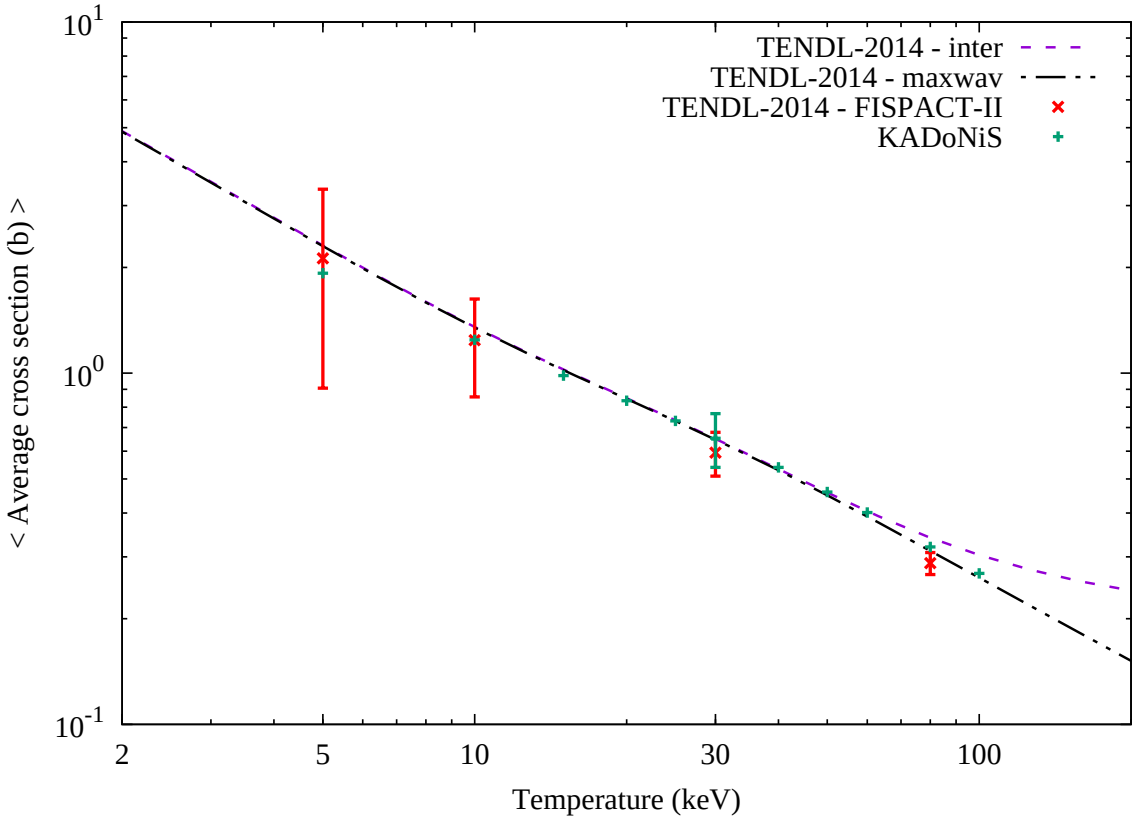
$^{168}Er_{68}$ [Stable]



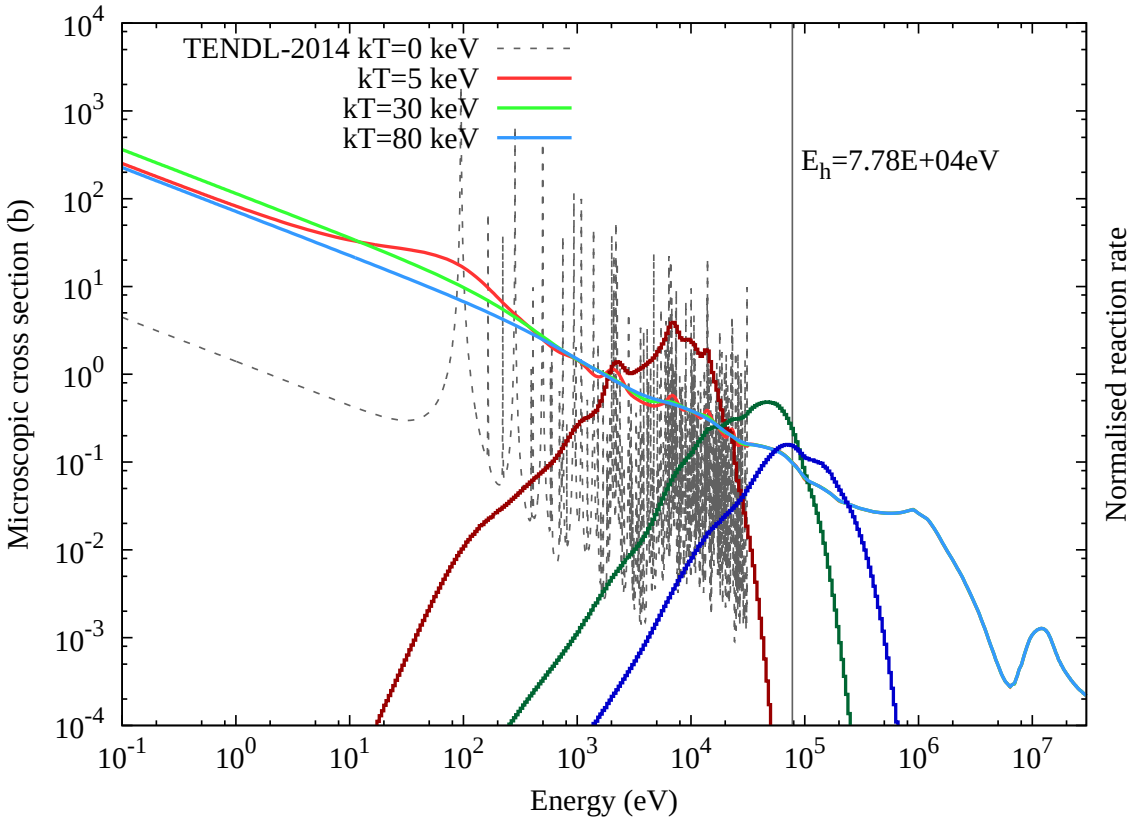


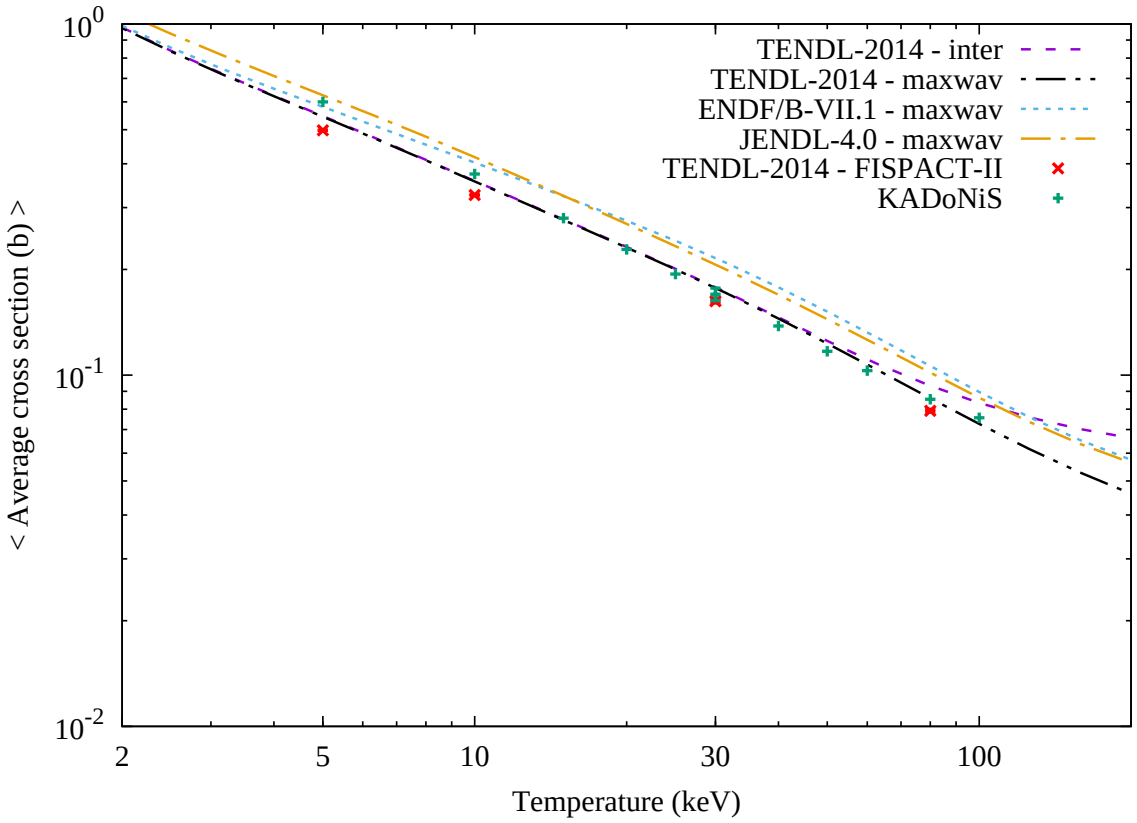
$^{169}Er_{68}$ $[T_{1/2} = 9.40$ days$]$ (KADoNiS=SMC)



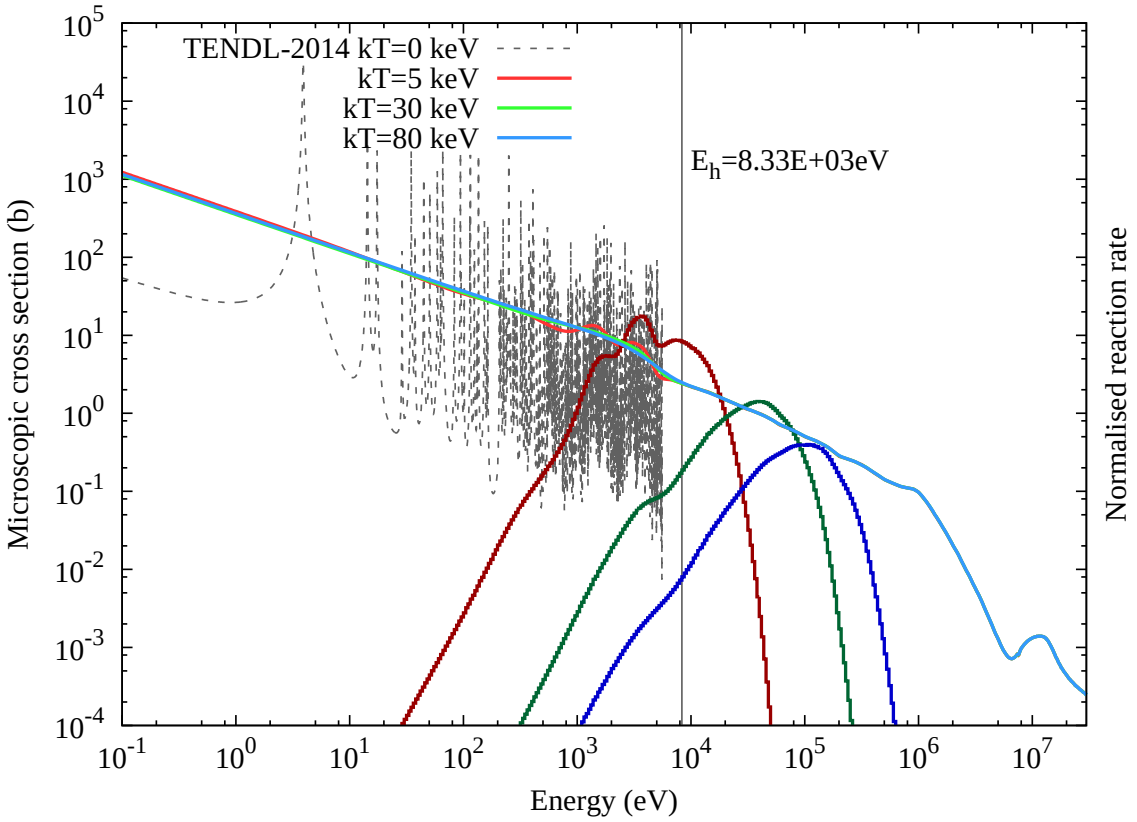


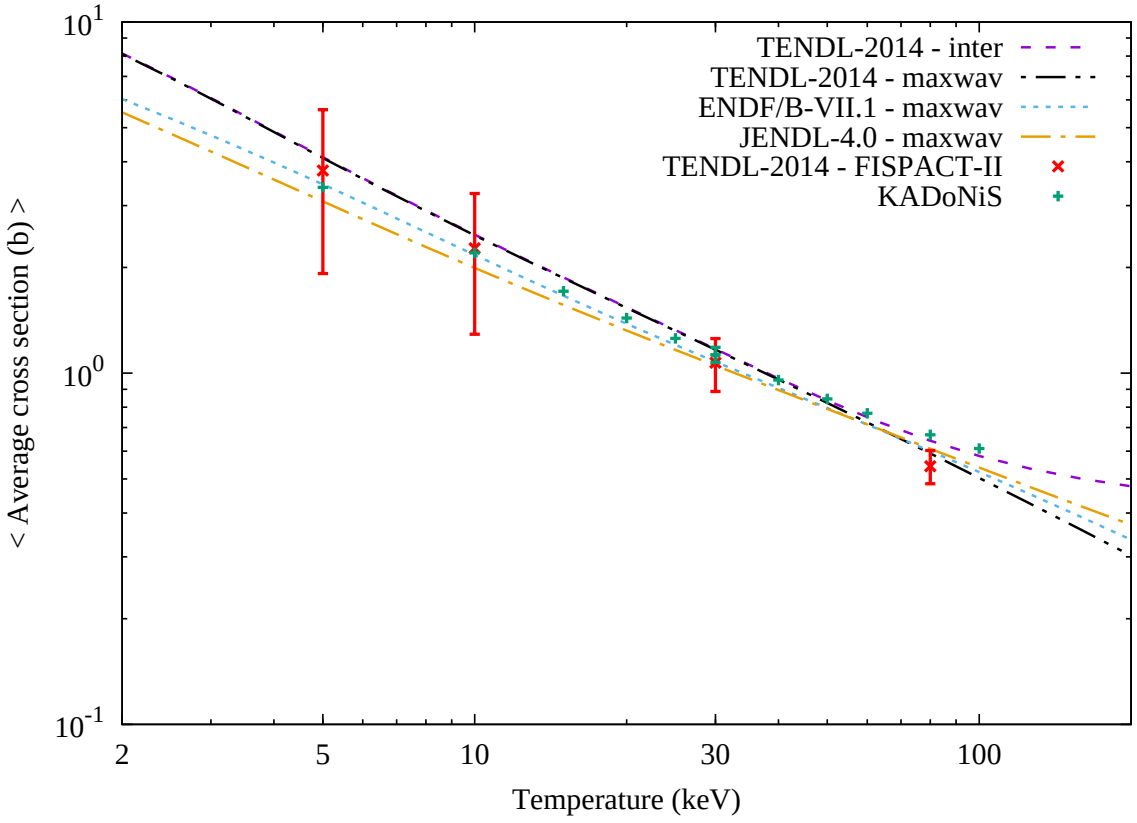
$^{170}Er_{68}$ [Stable]



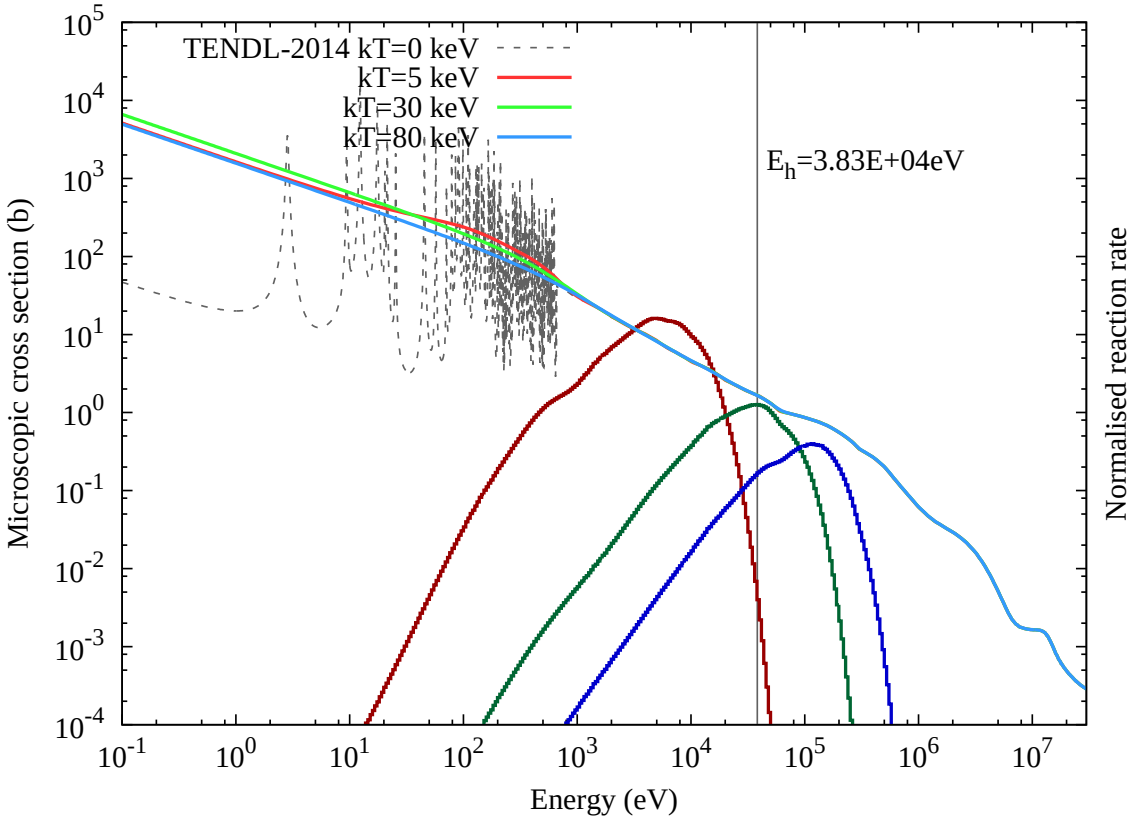


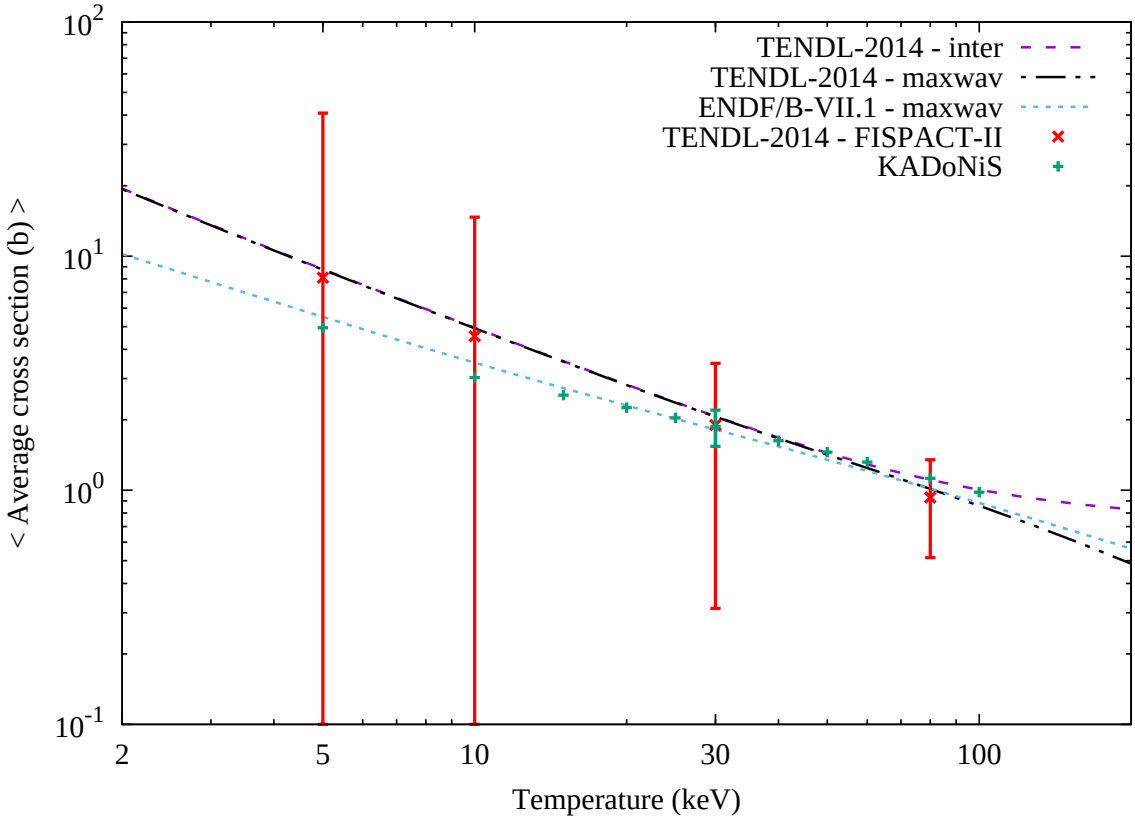
$^{169}Tm_{69}$ [Stable]



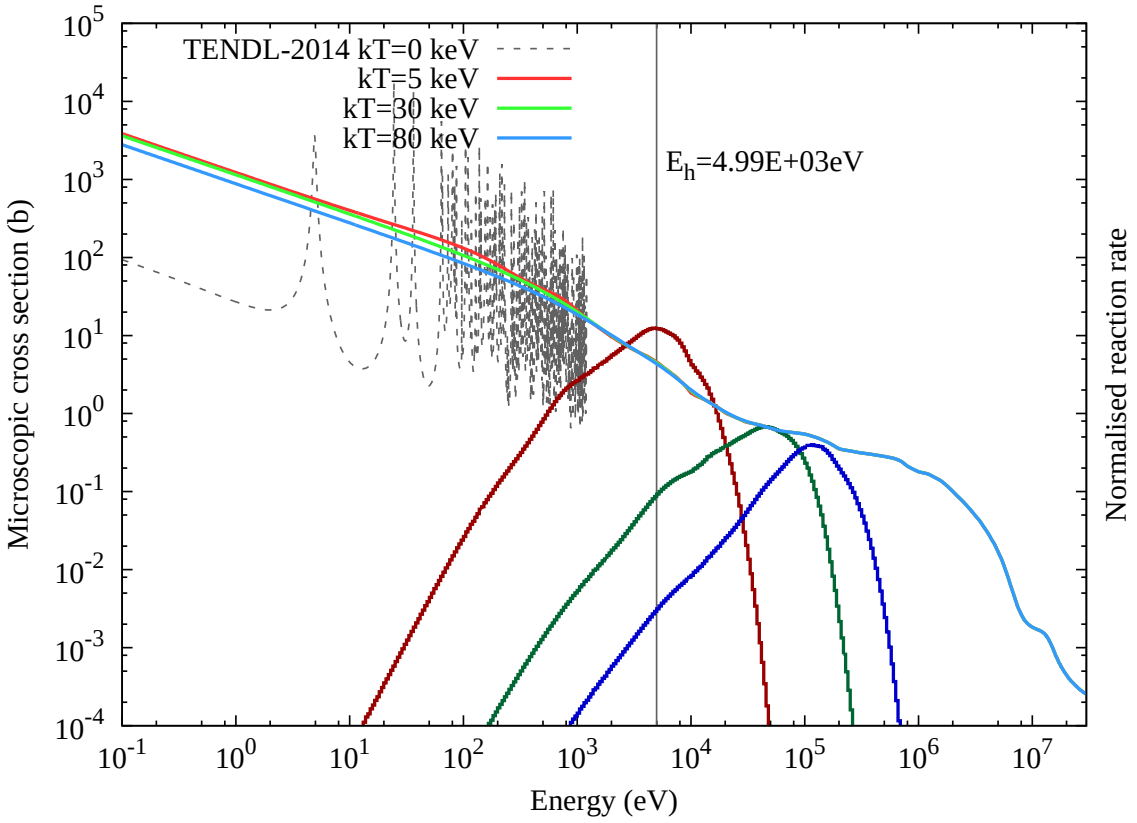


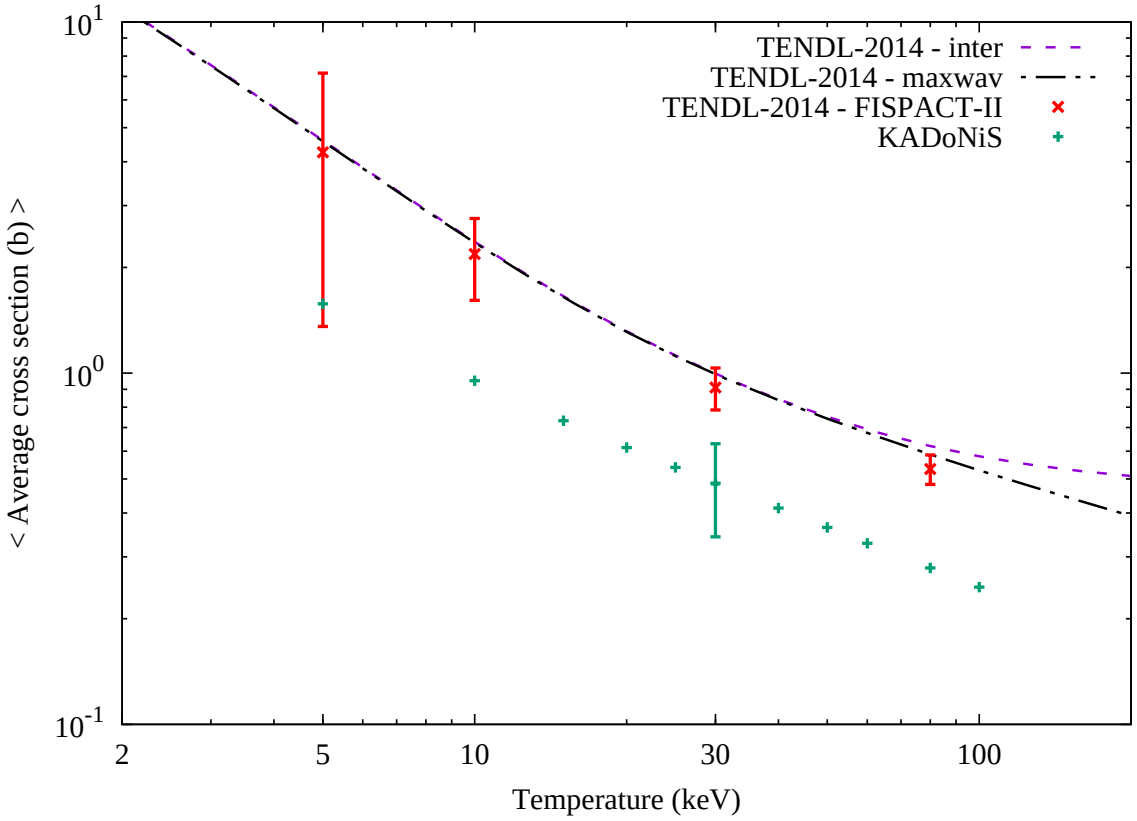
$^{170}Tm_{69}$ $[T_{1/2} = 128.60$ days$]$ (KADoNiS=SMC)



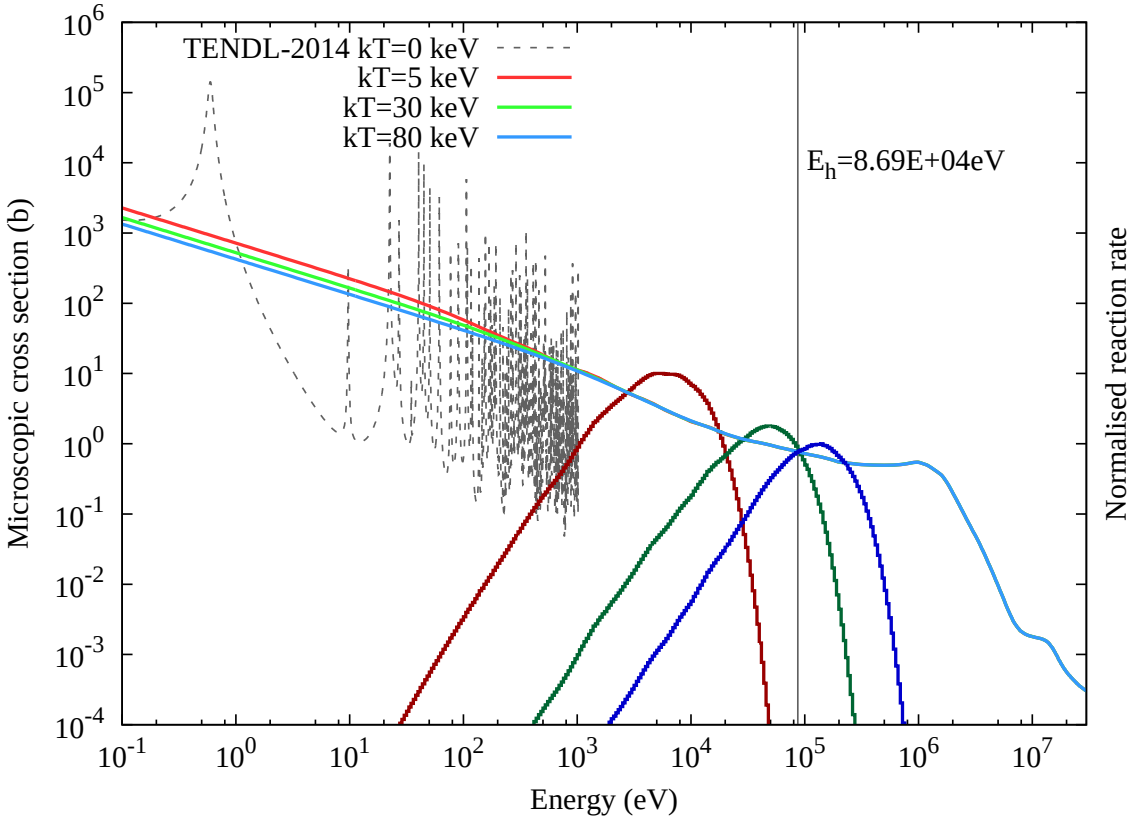


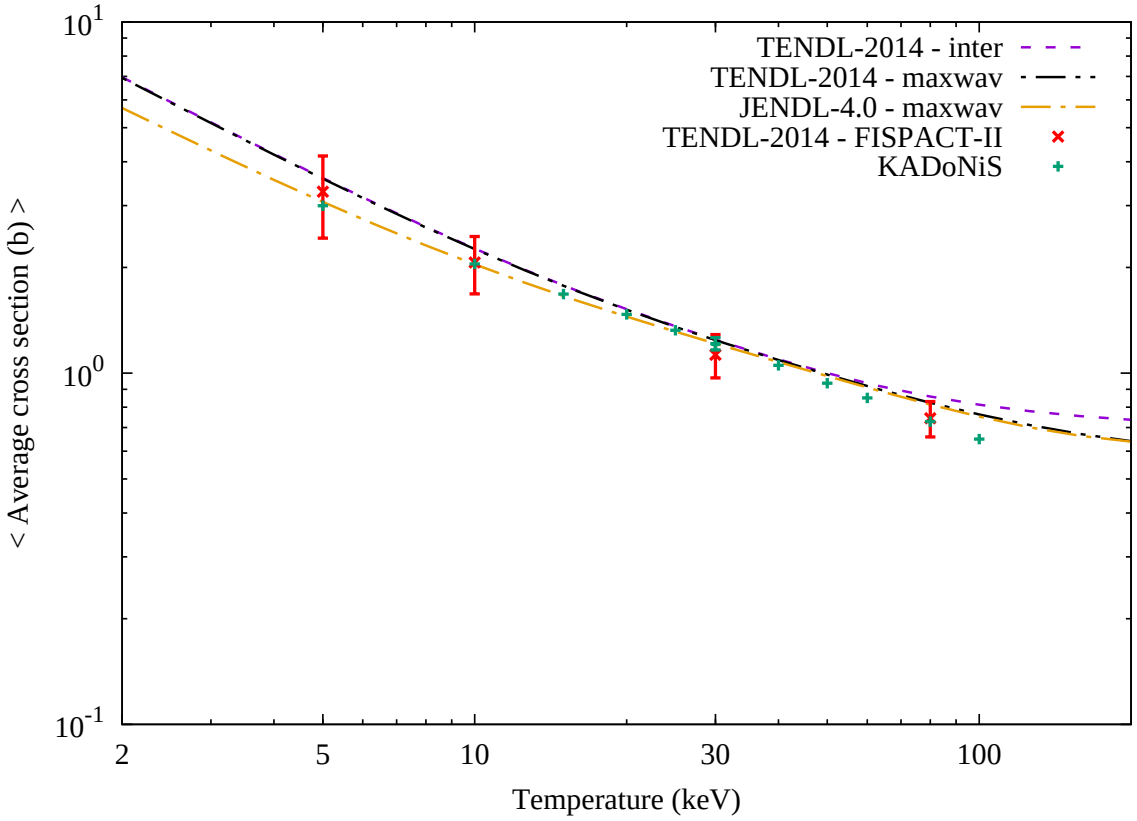
$^{171}Tm_{69}$ $[T_{1/2} = 1.92$ years$]$ (KADoNiS=SMC)



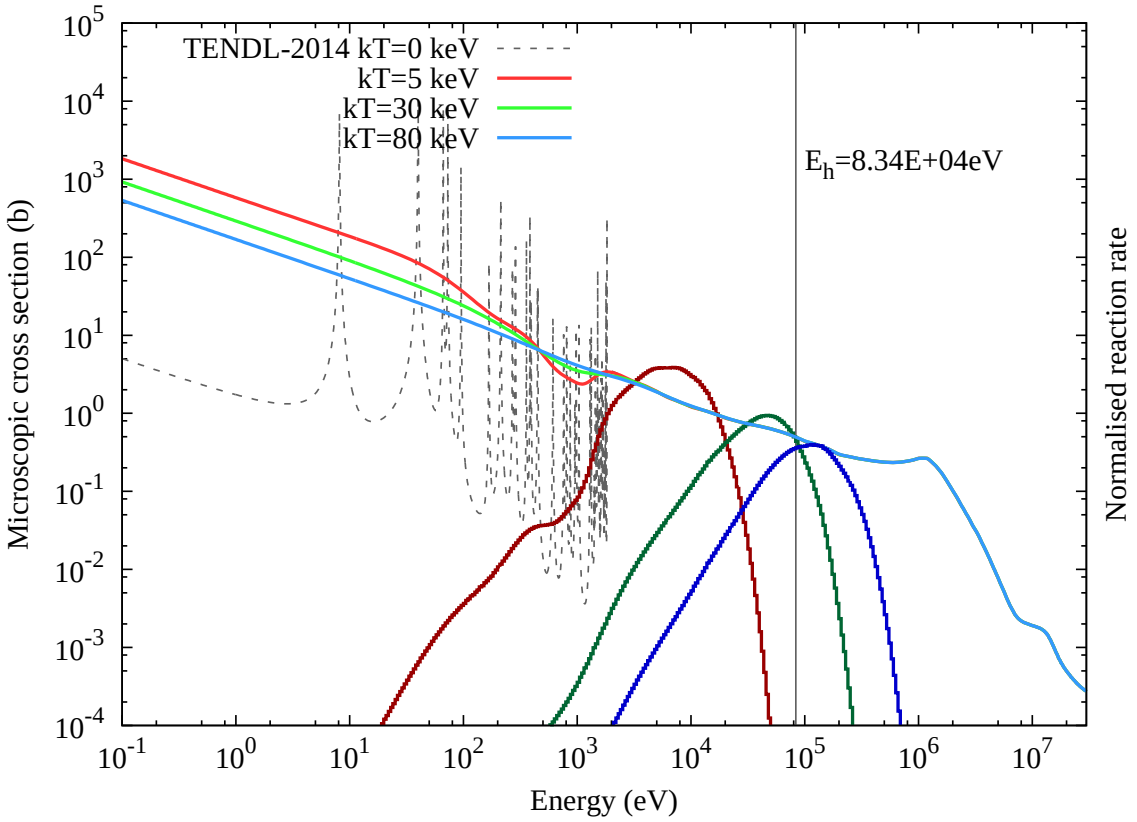


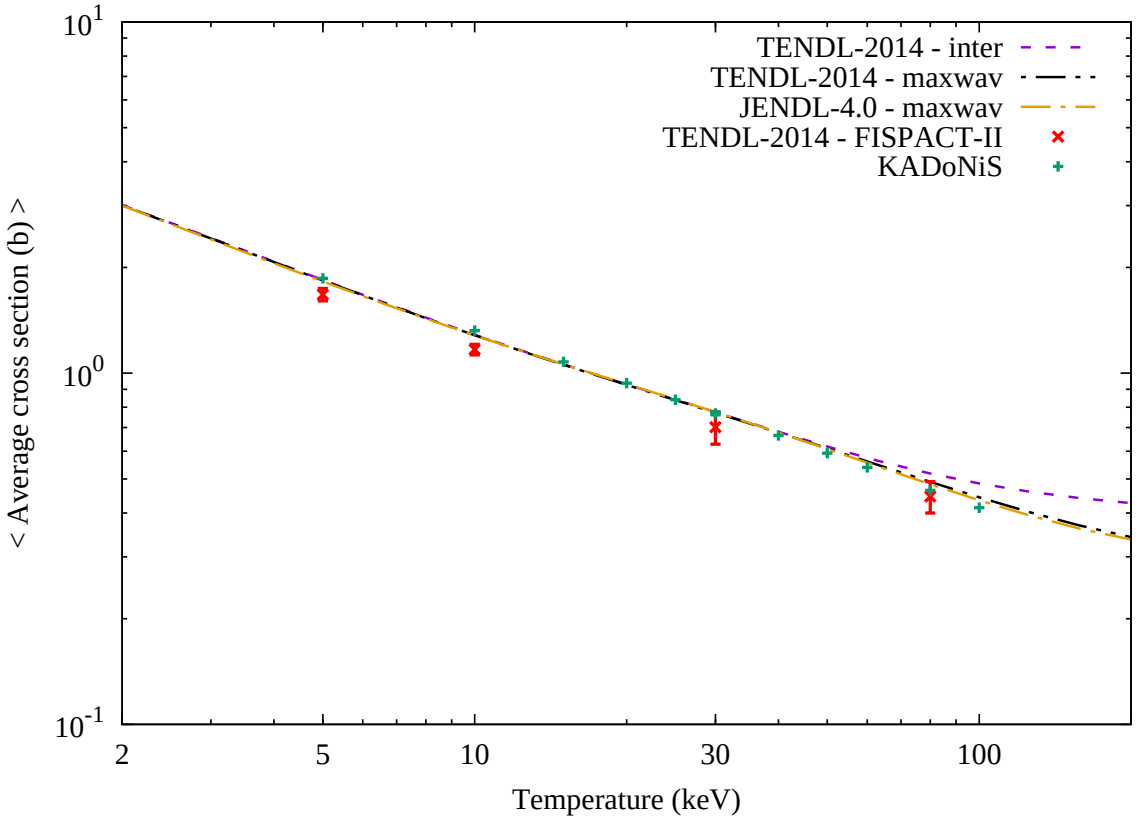
$^{168}Yb_{70}$ $[T_{1/2} = 1.30 \times 10^{14}$ years$]$



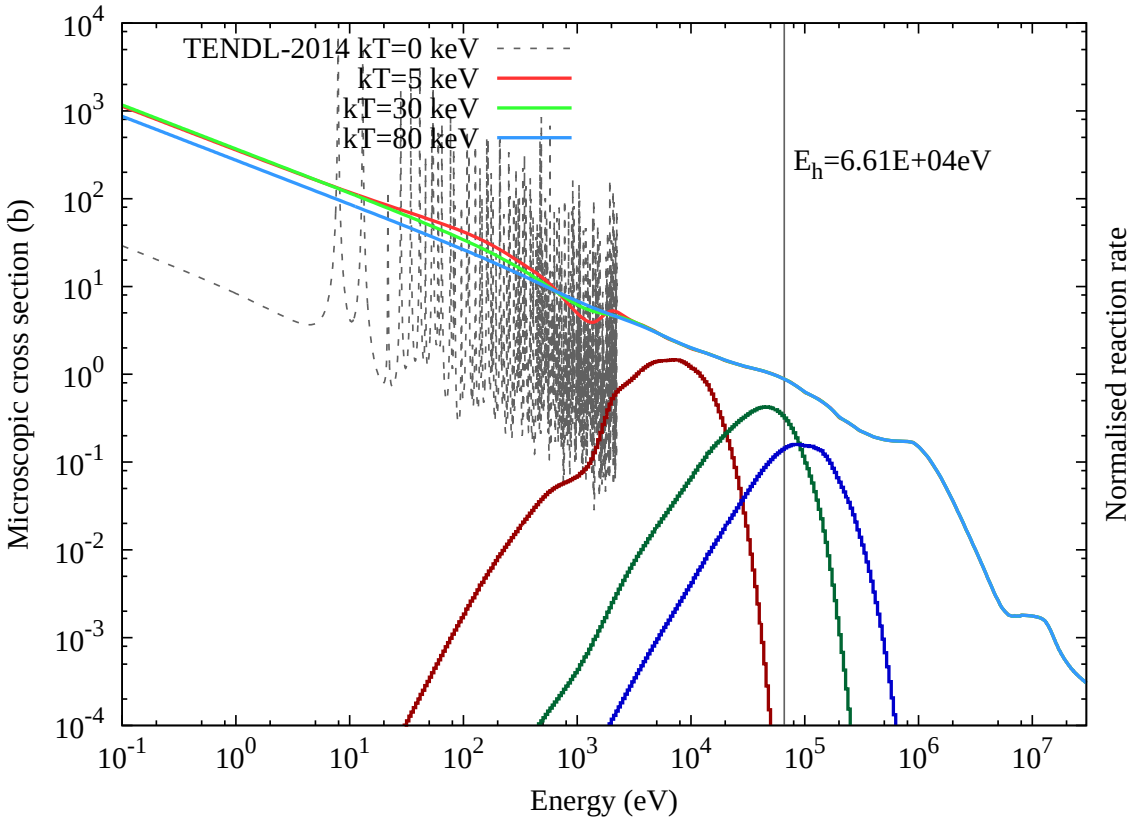


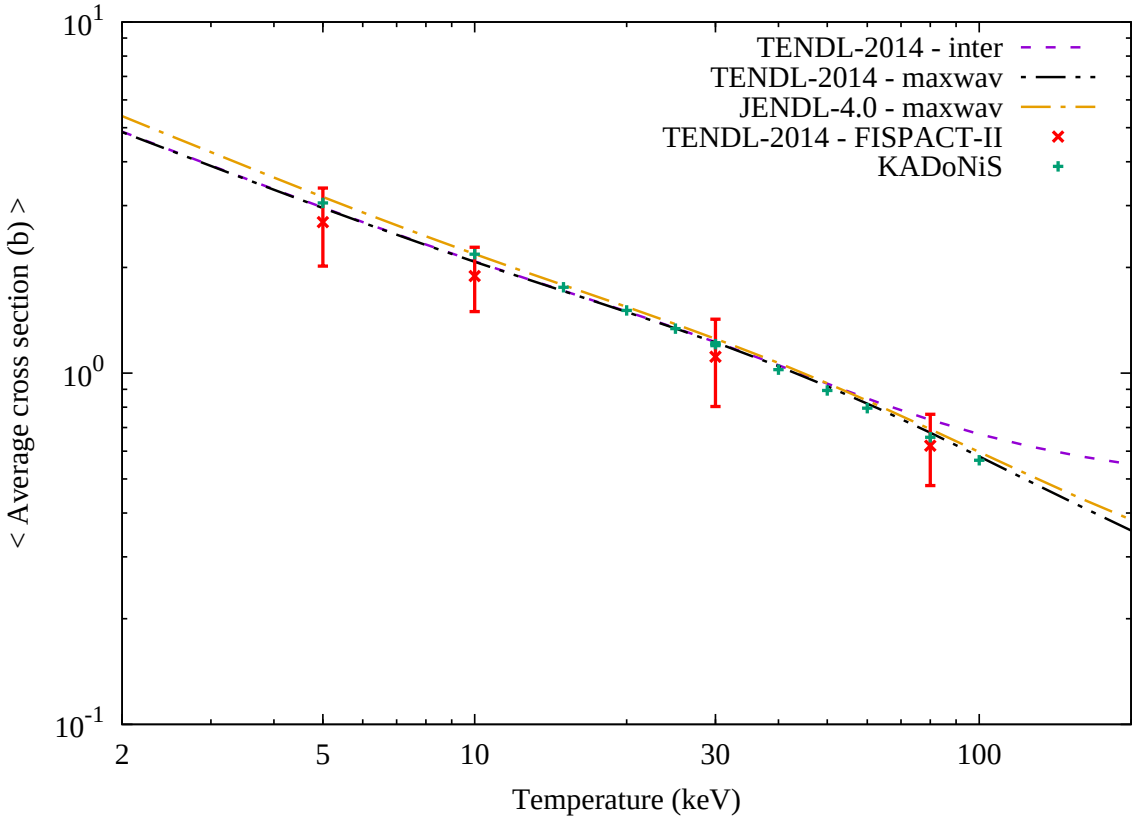
$^{170}Yb_{70}$ [Stable]



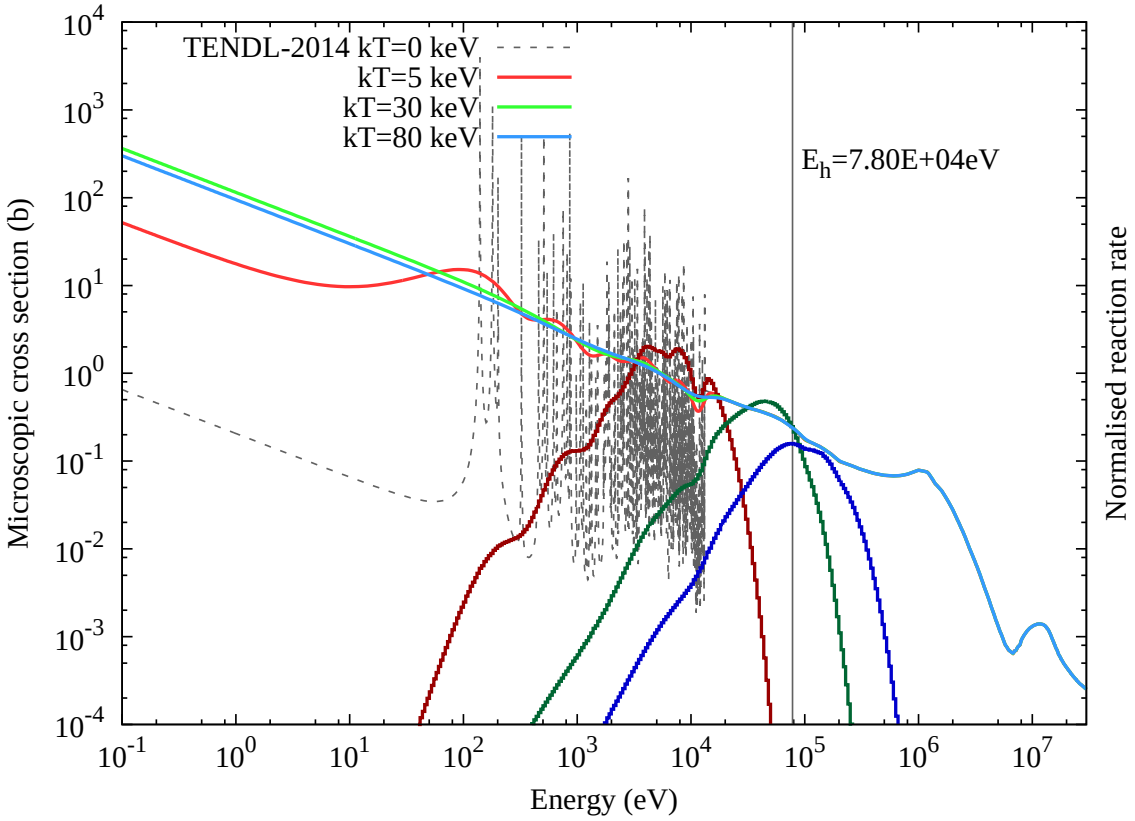


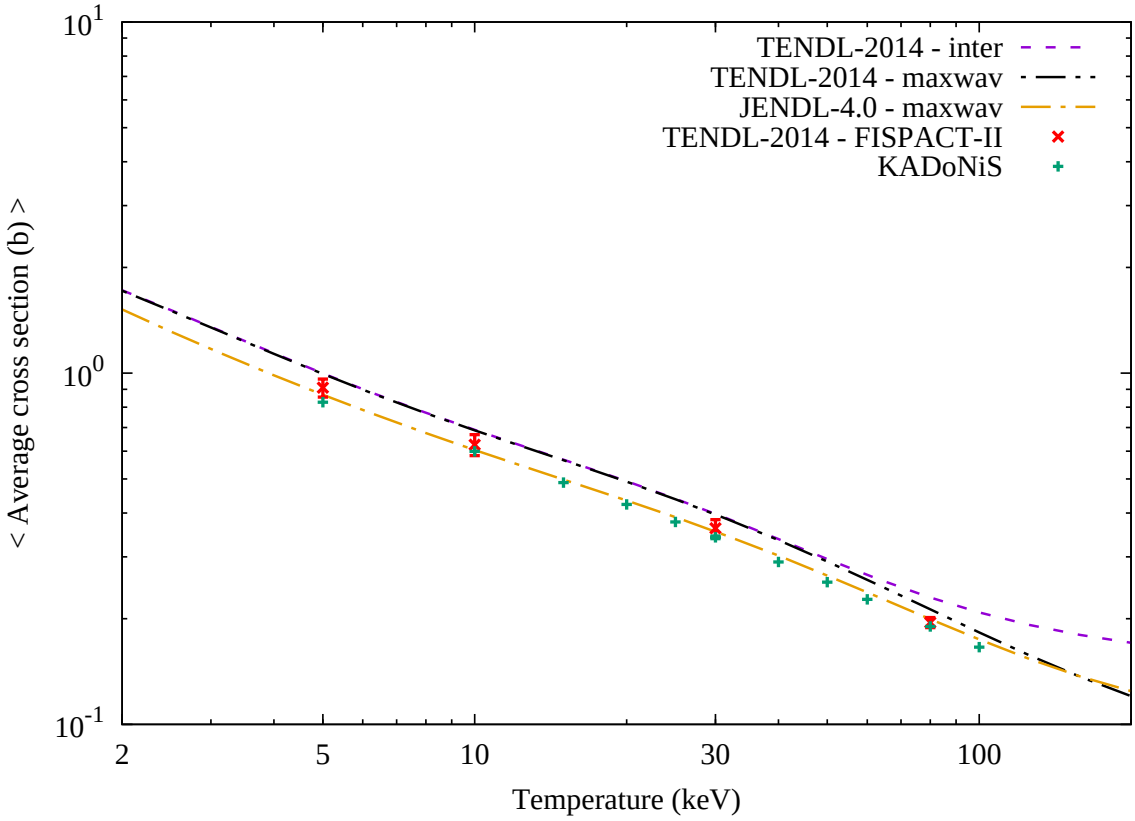
$^{171}Yb_{70}$ [Stable]



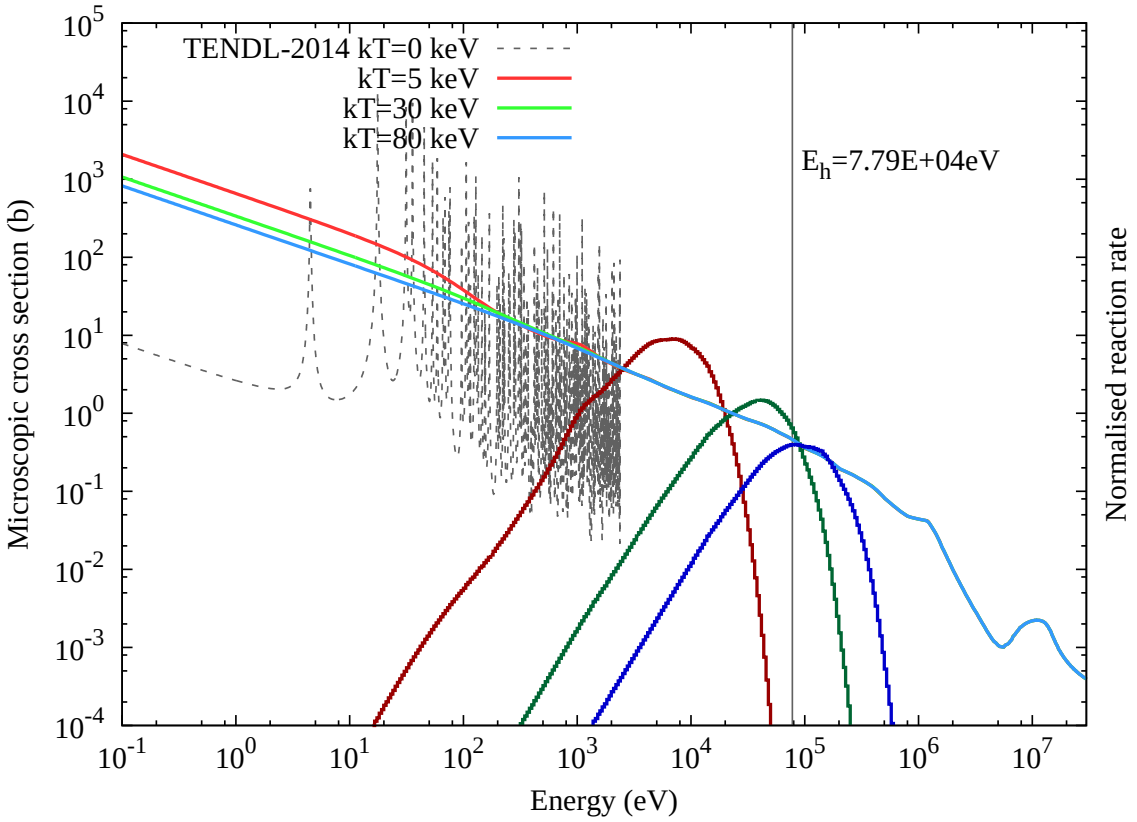


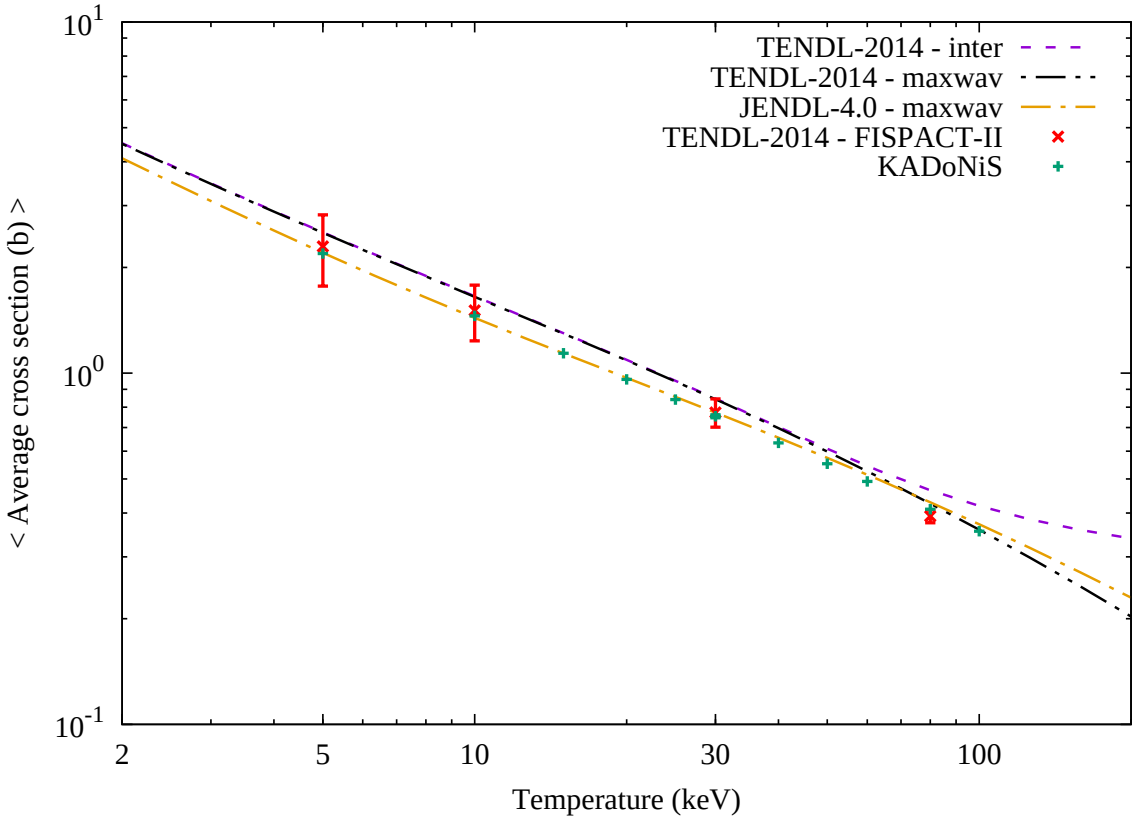
$^{172}Yb_{70}$ [Stable]



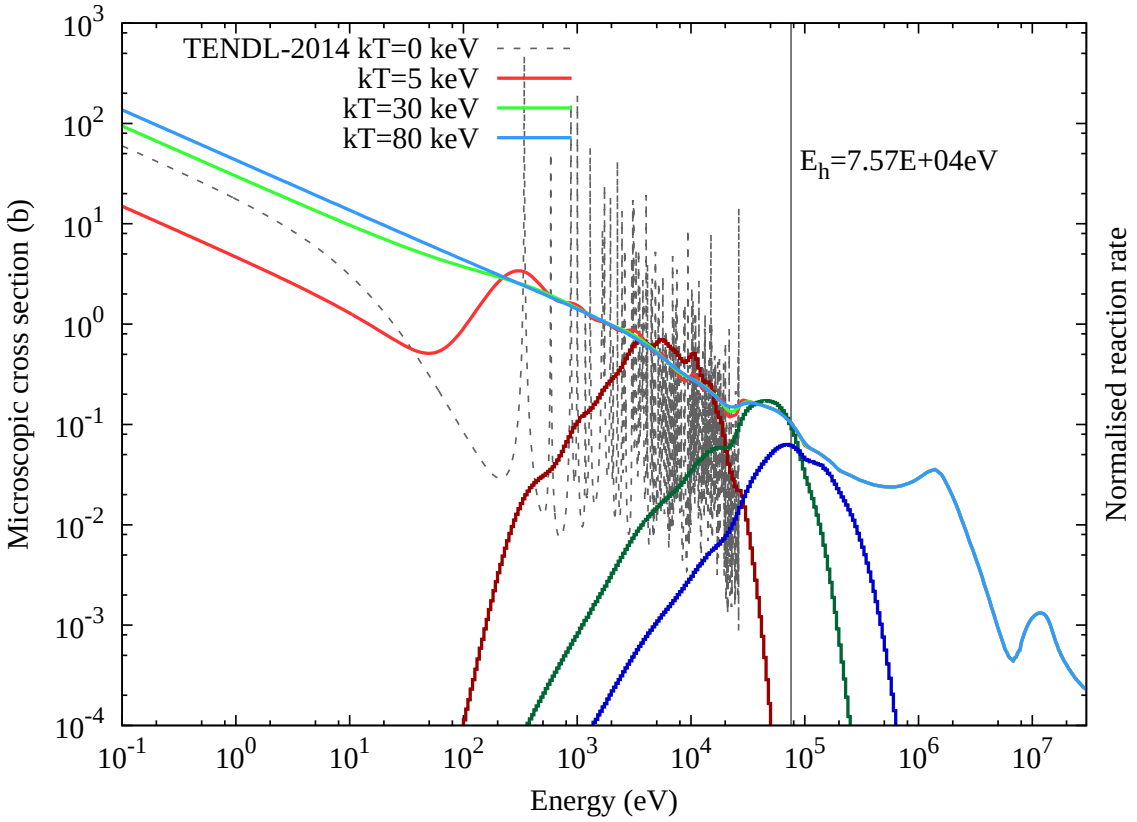


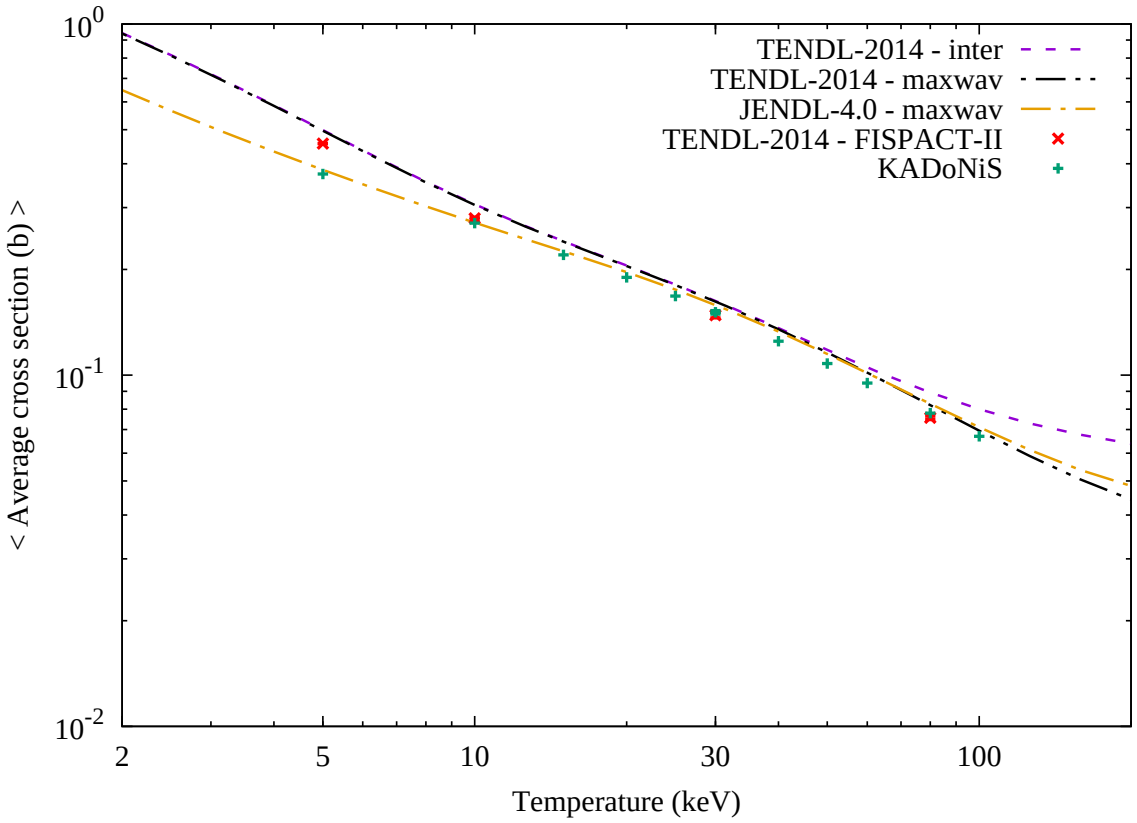
$^{173}Yb_{70}$ [Stable]



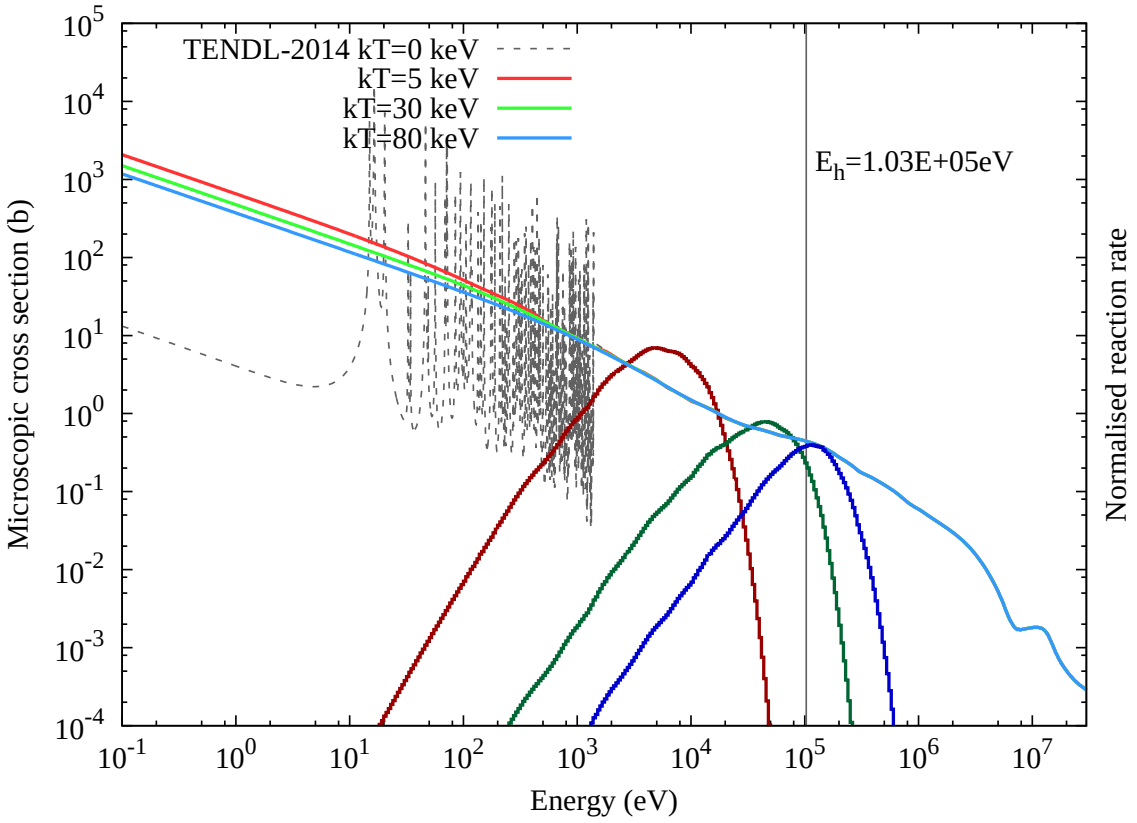


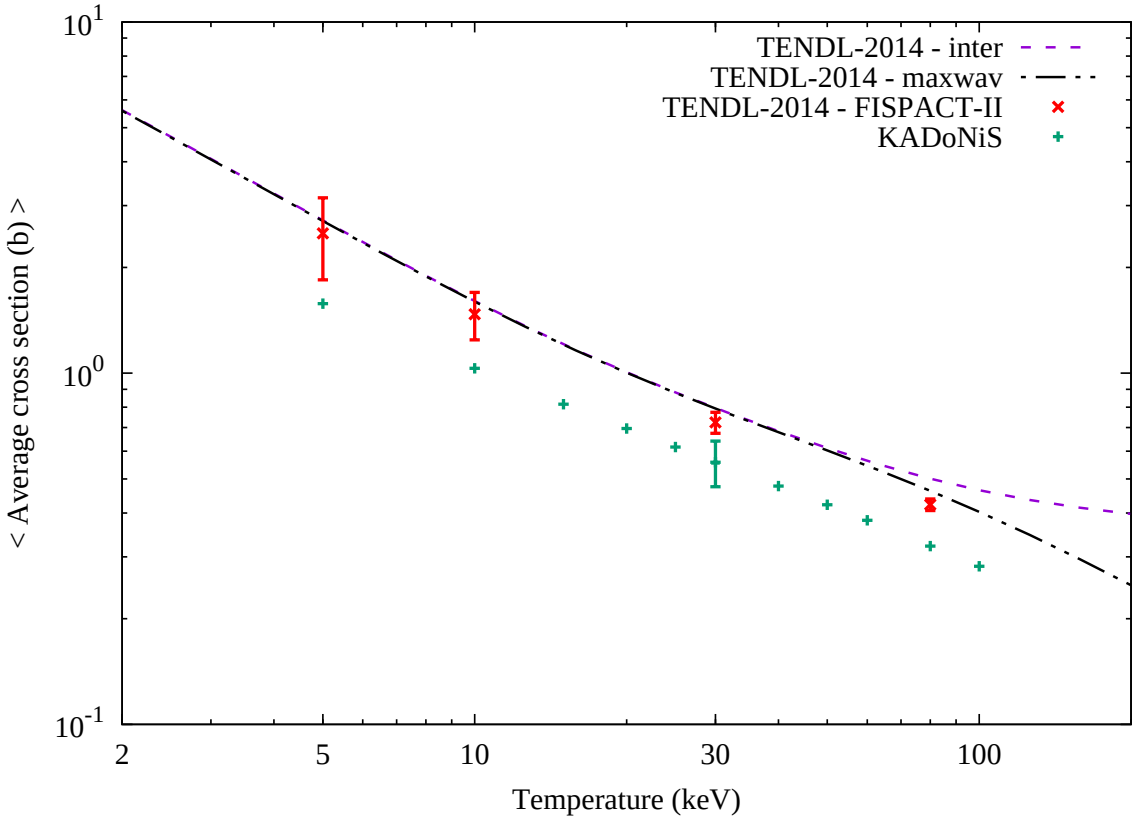
$^{174}Yb_{70}$ [Stable]



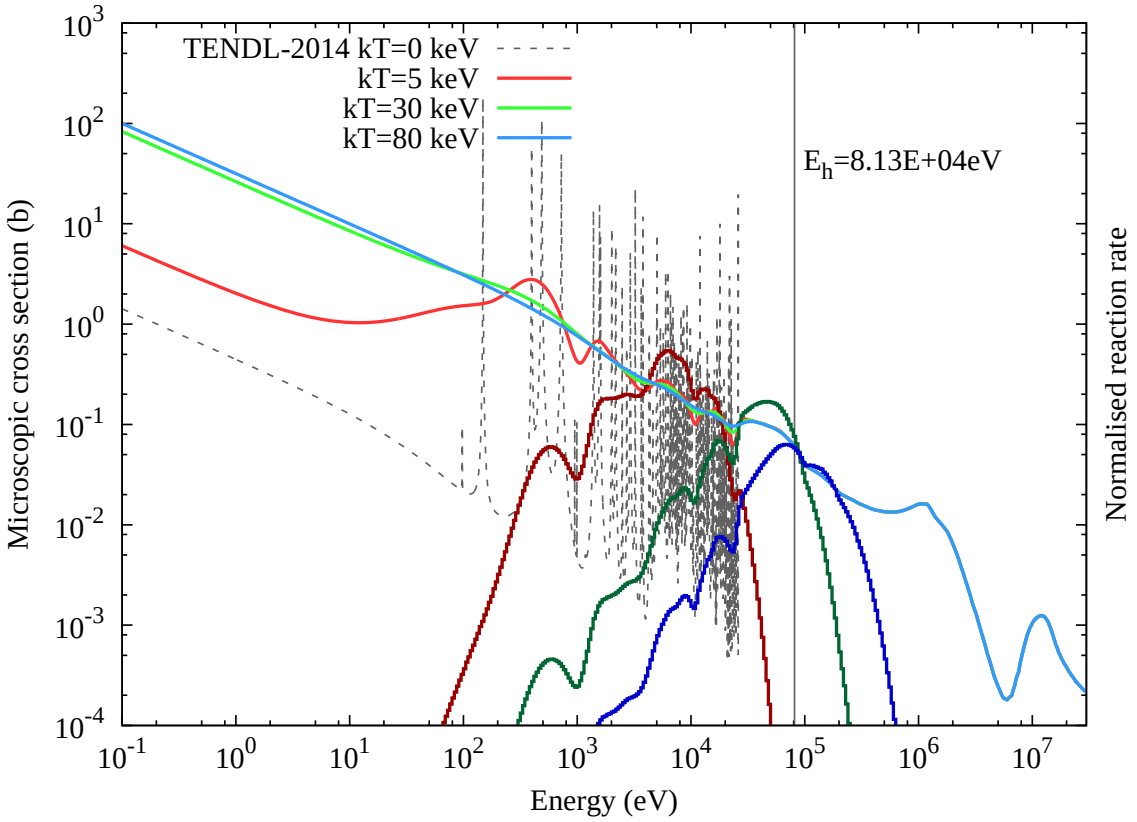


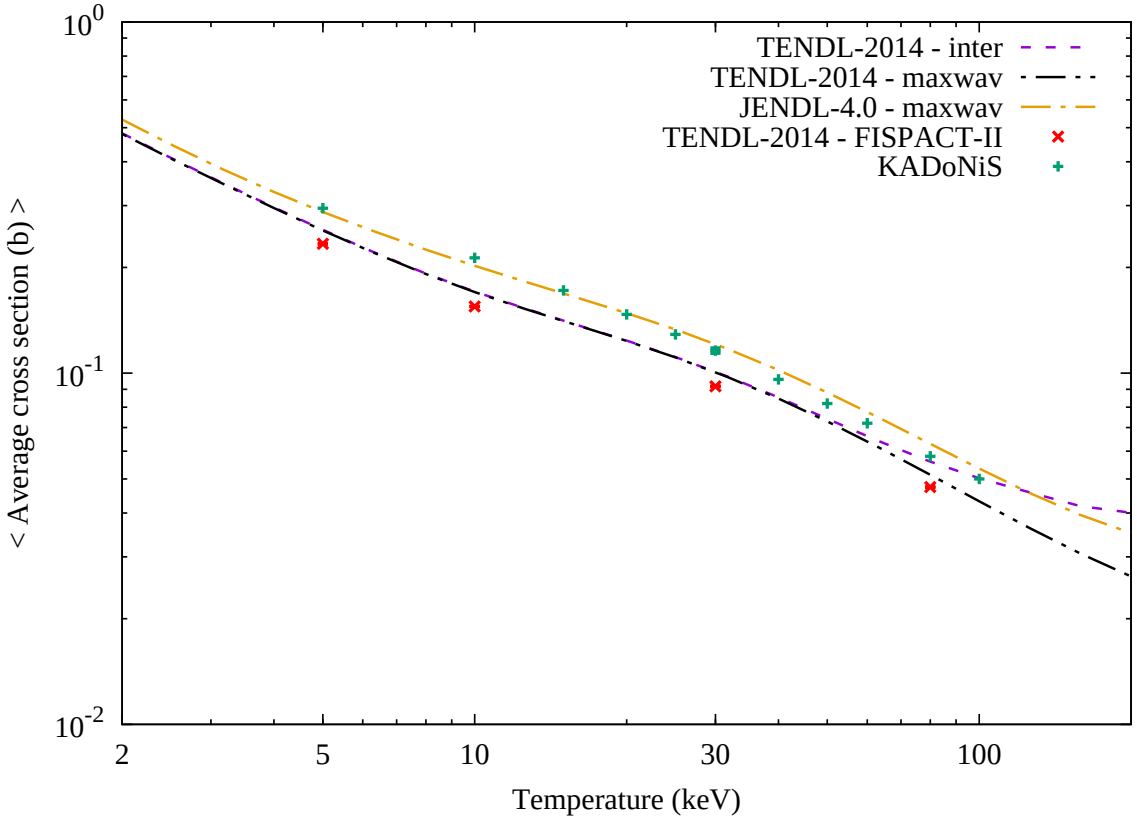
$^{175}Yb_{70}$ $[T_{1/2} = 4.18 \text{ days}]$ (KADoNiS=SMC)



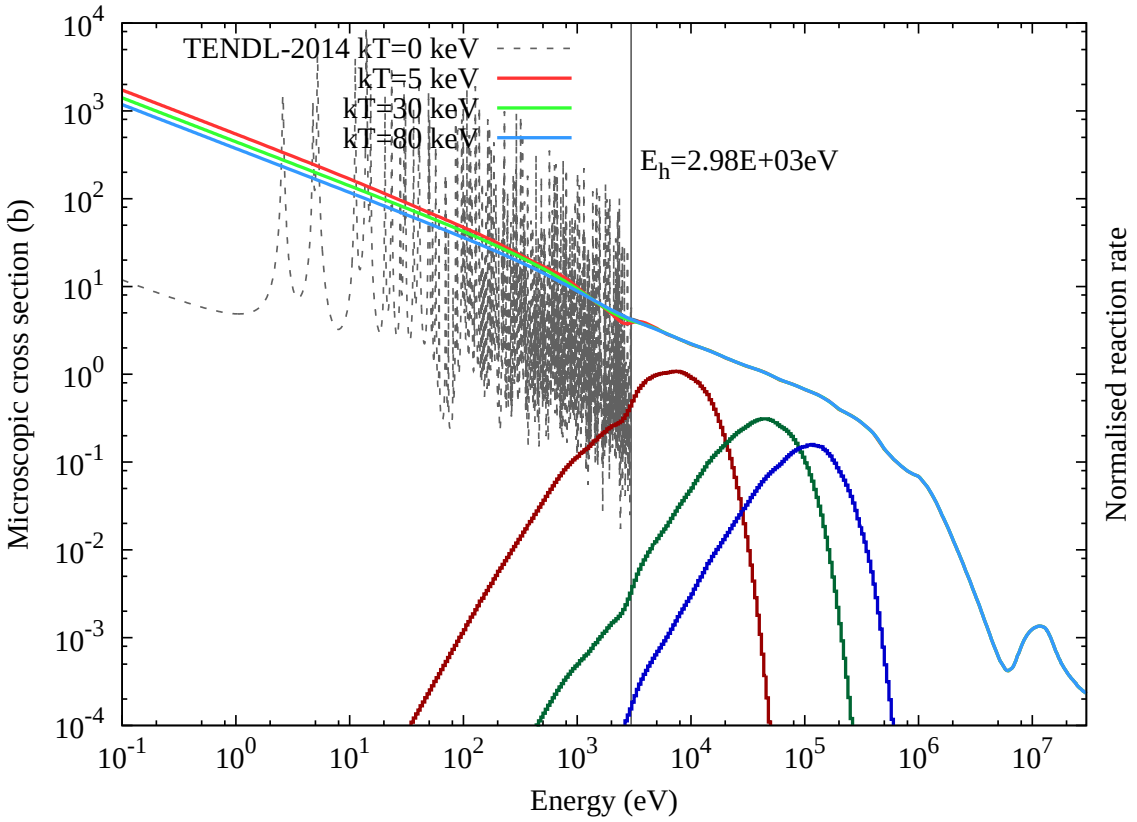


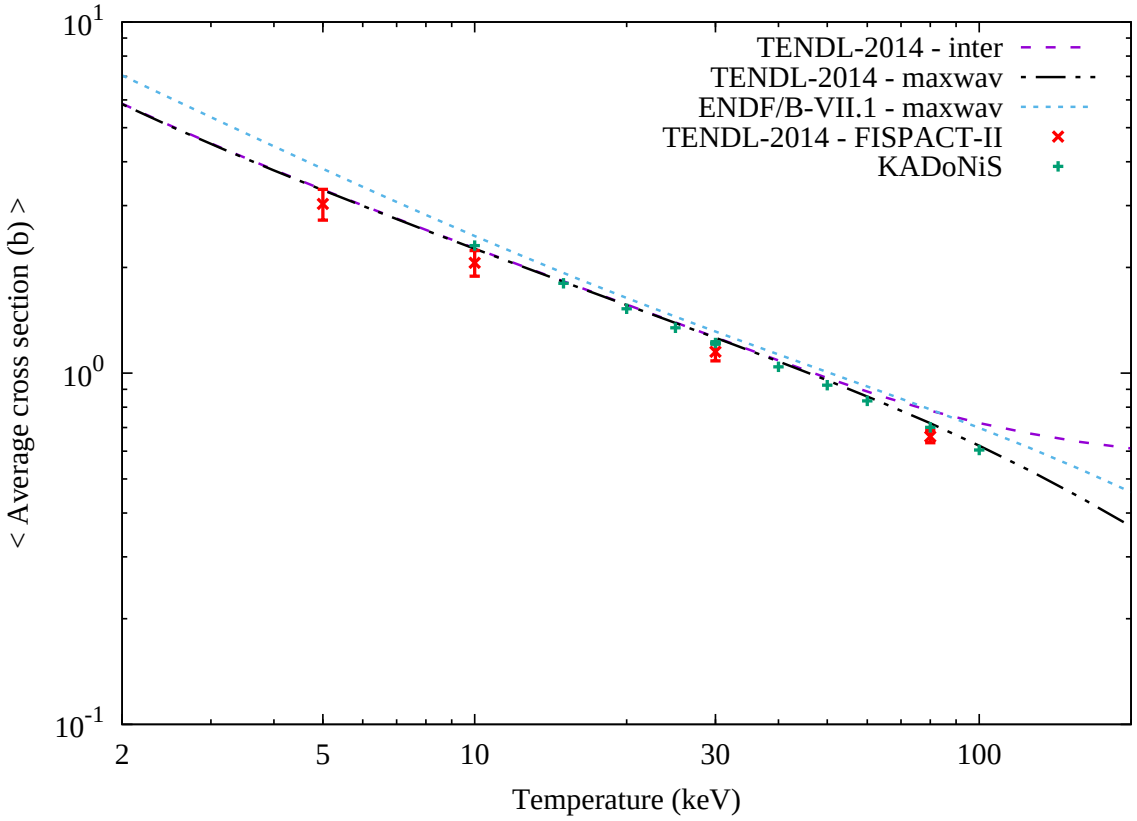
$^{176}Yb_{70}$ [Stable]



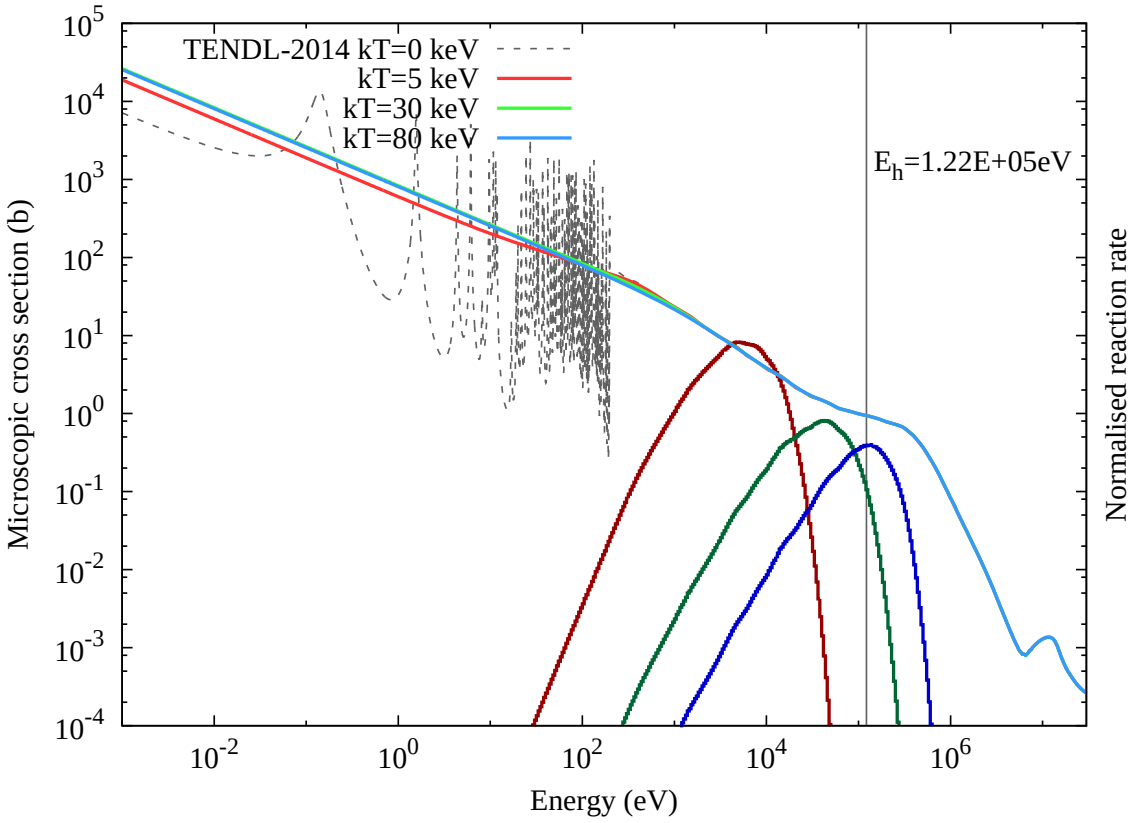


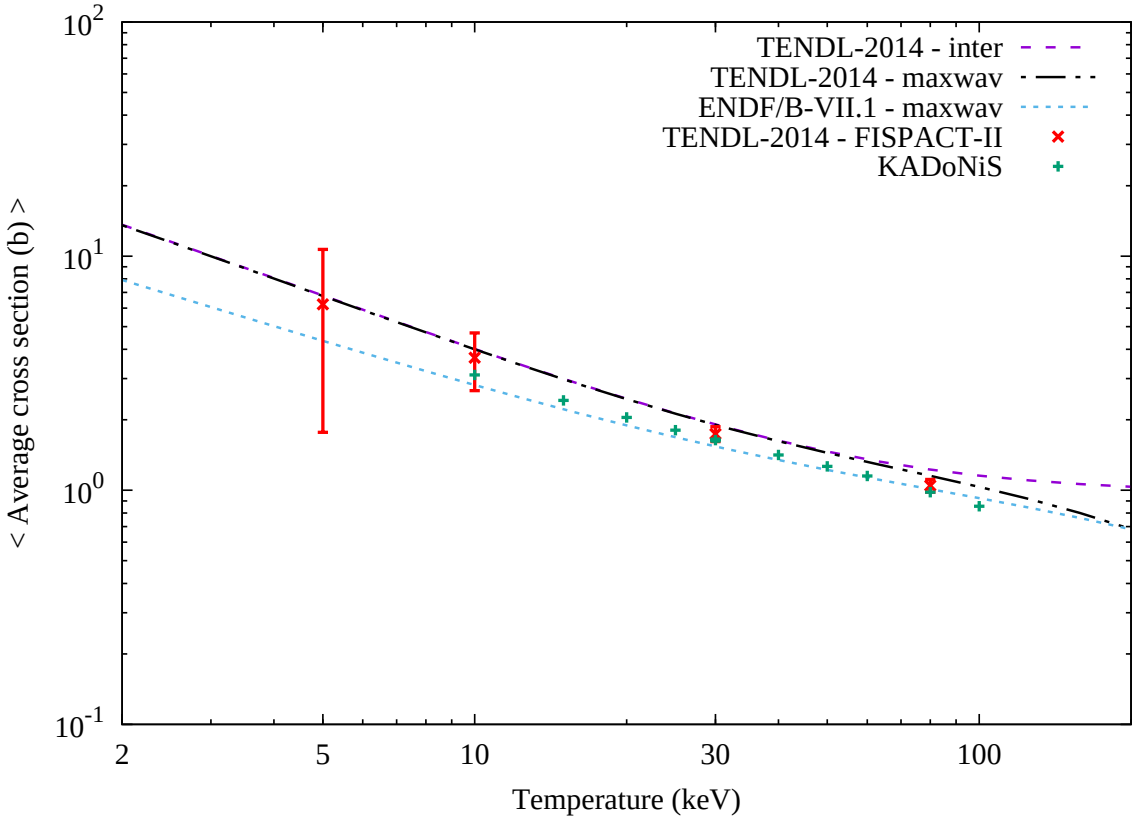
$^{175}Lu_{71}$ [Stable]



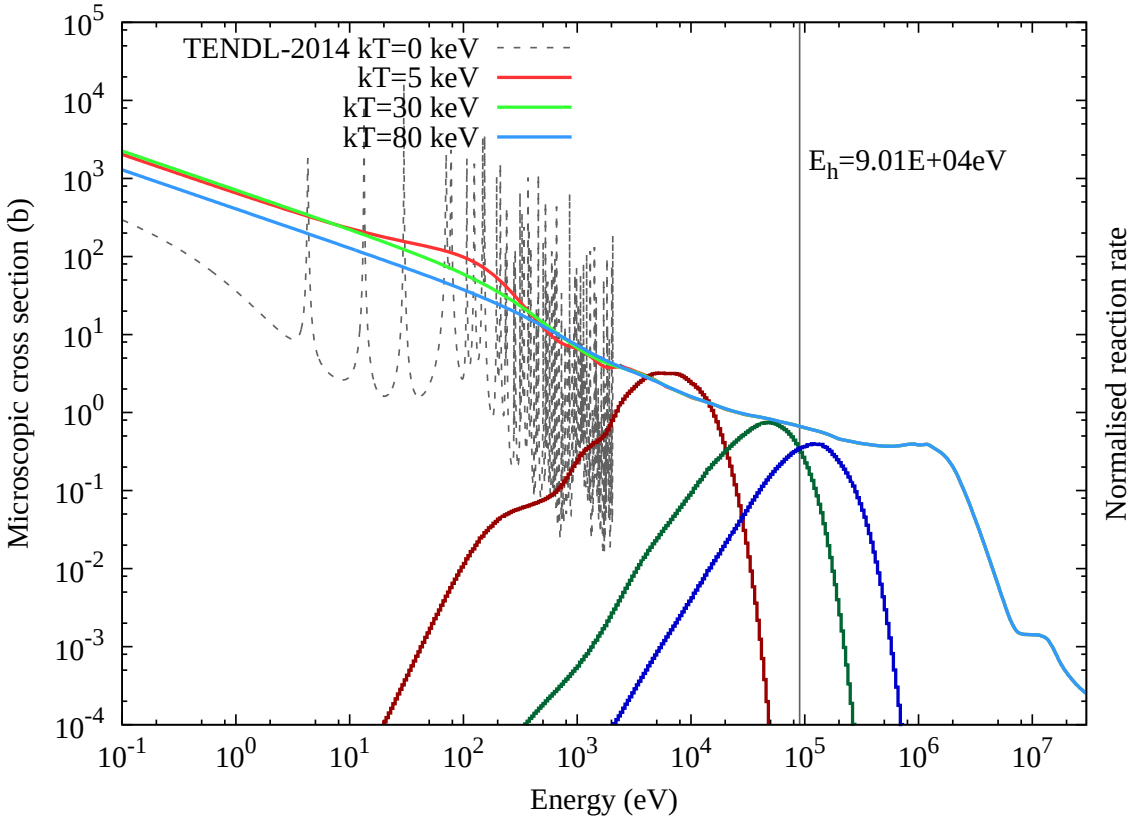


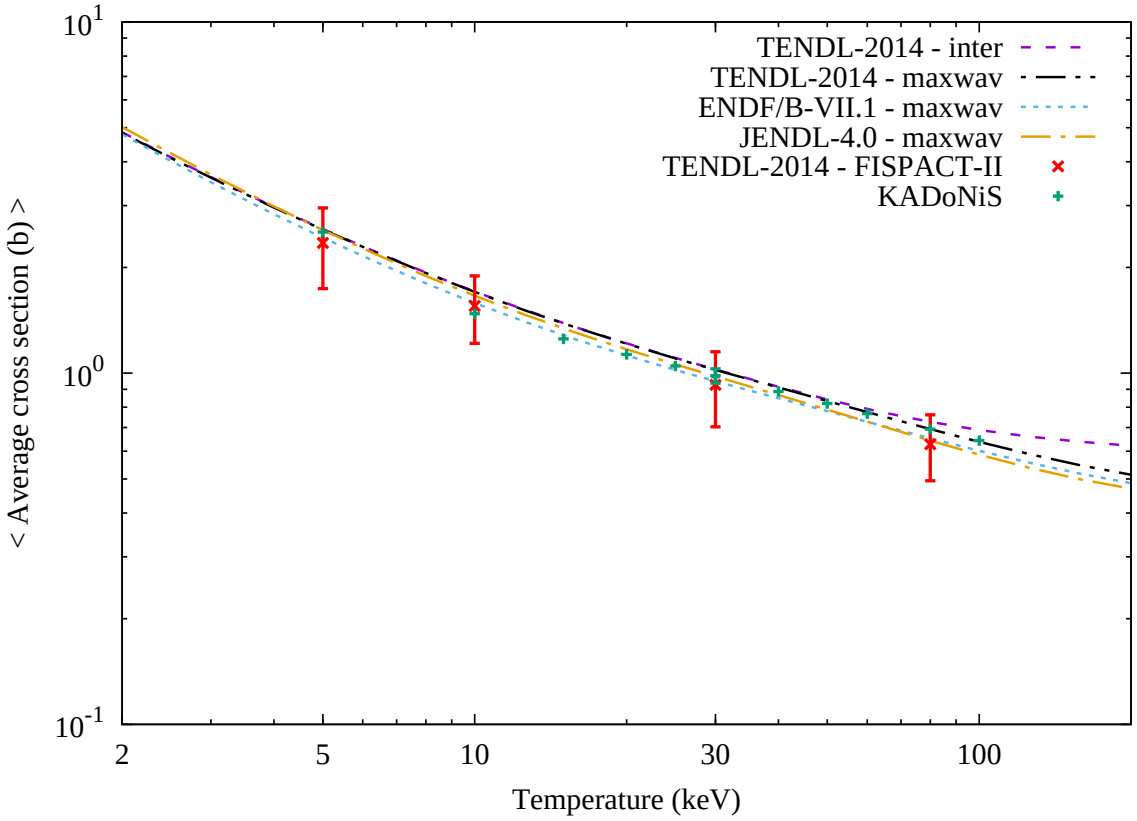
$^{176}Lu_{71}$ $[T_{1/2} = 4.00 \times 10^{10}$ years$]$



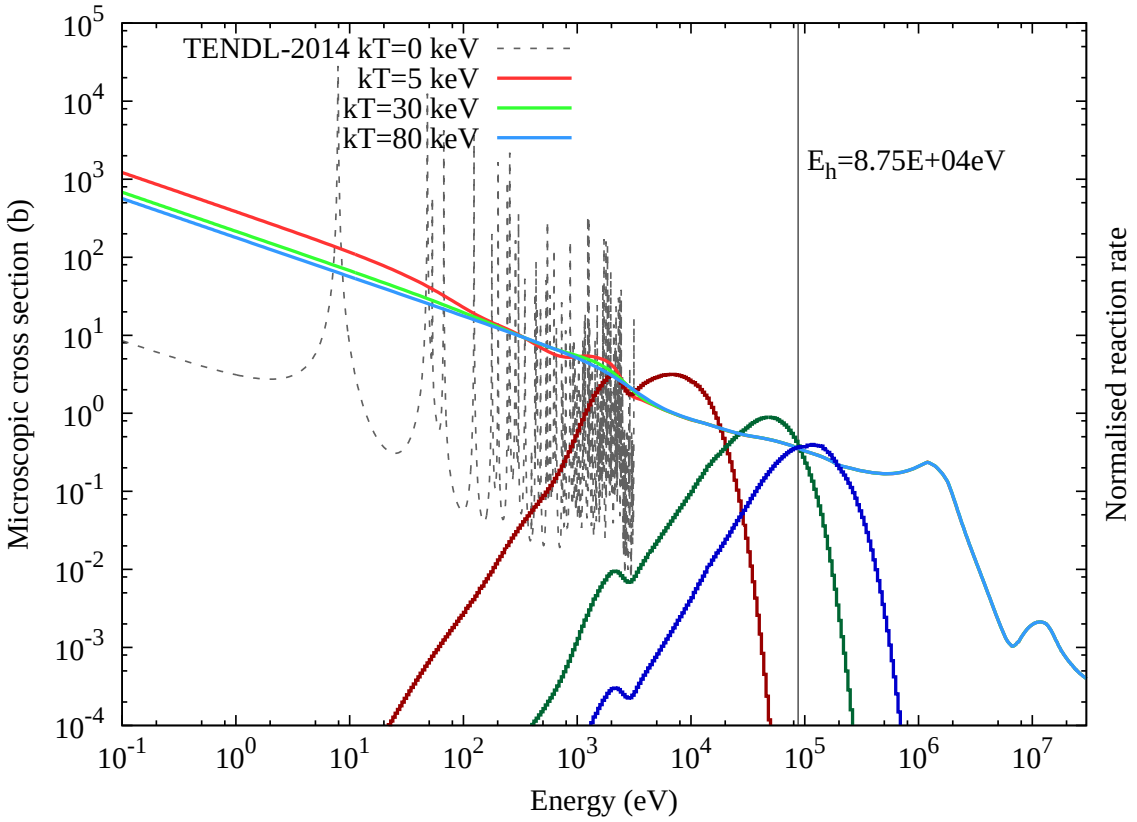


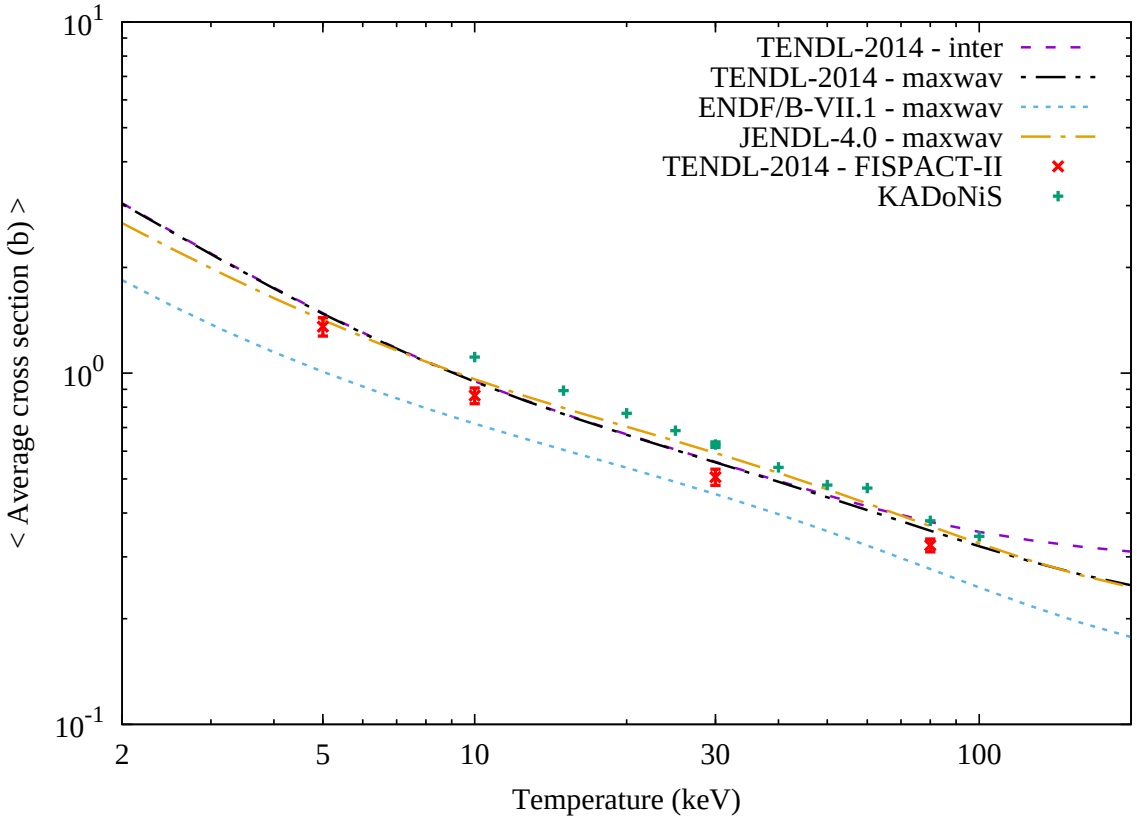
$^{174}Hf_{72}$ $[T_{1/2} = 2.00 \times 10^{15}$ years$]$



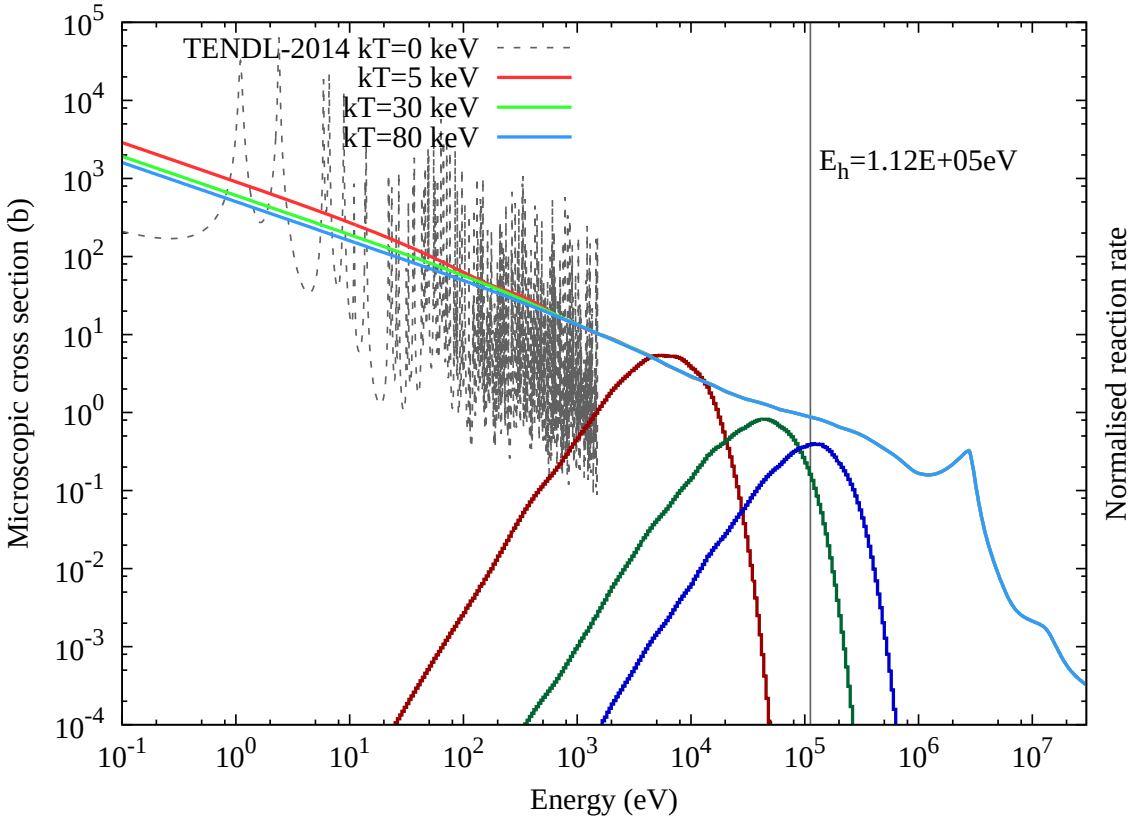


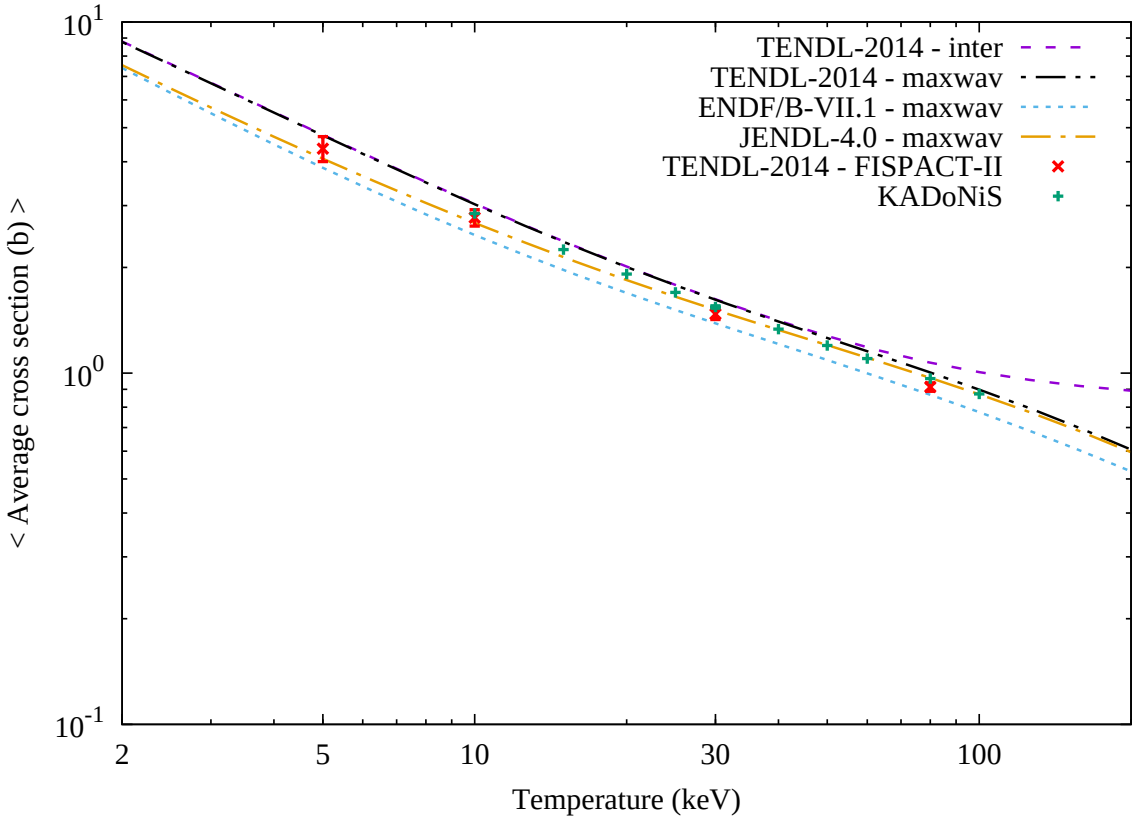
$^{176}Hf_{72}$ [Stable]



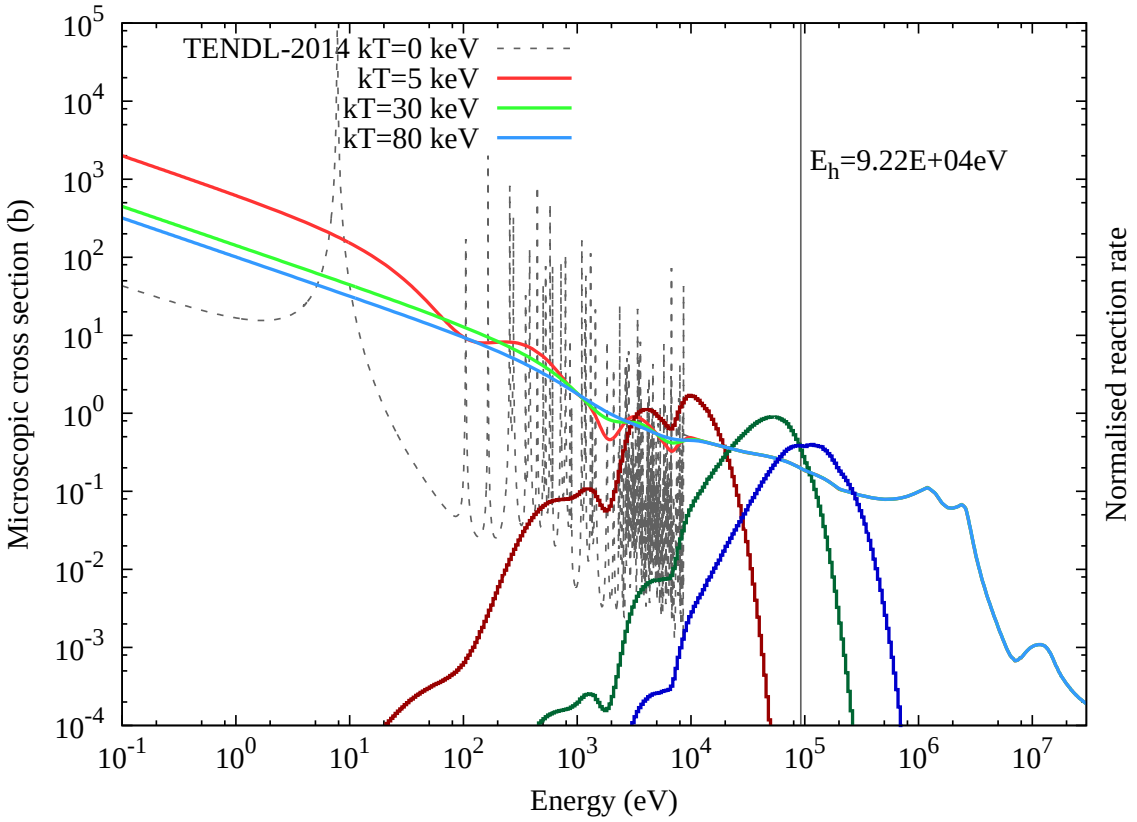


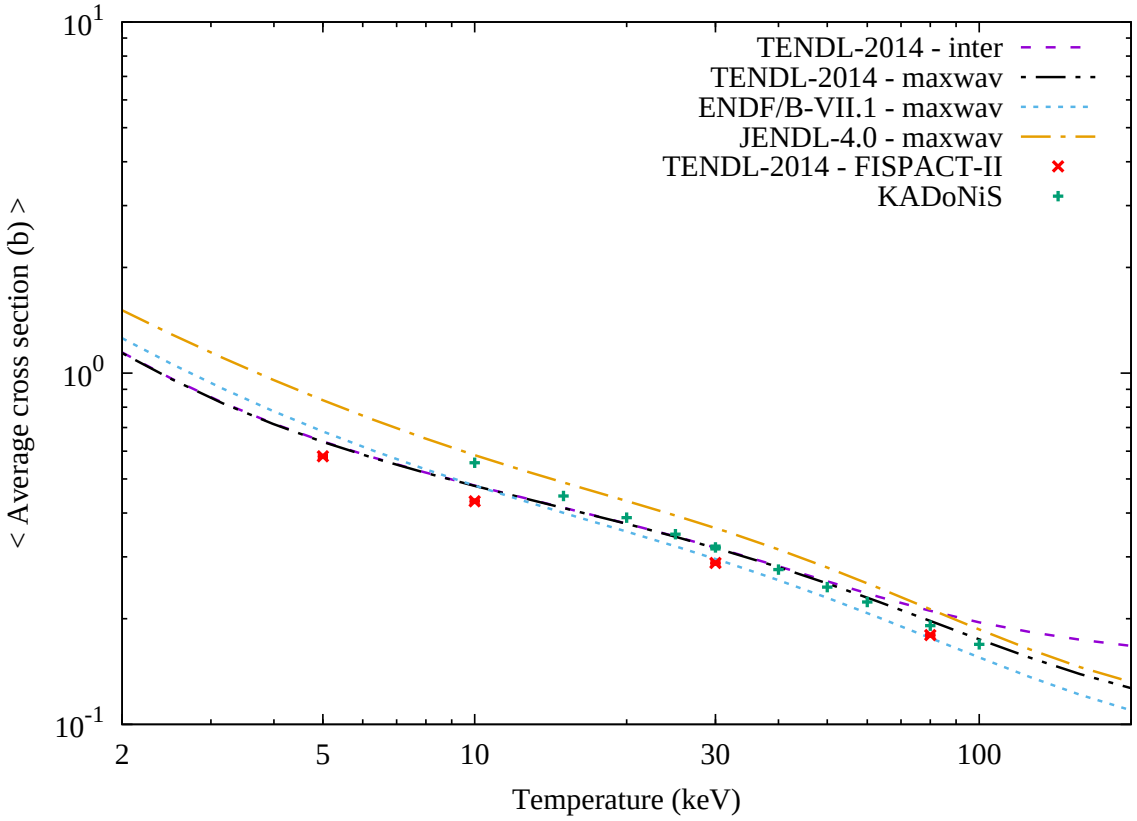
$^{177}Hf_{72}$ $[T_{1/2} = 51.40$ minutes$]$



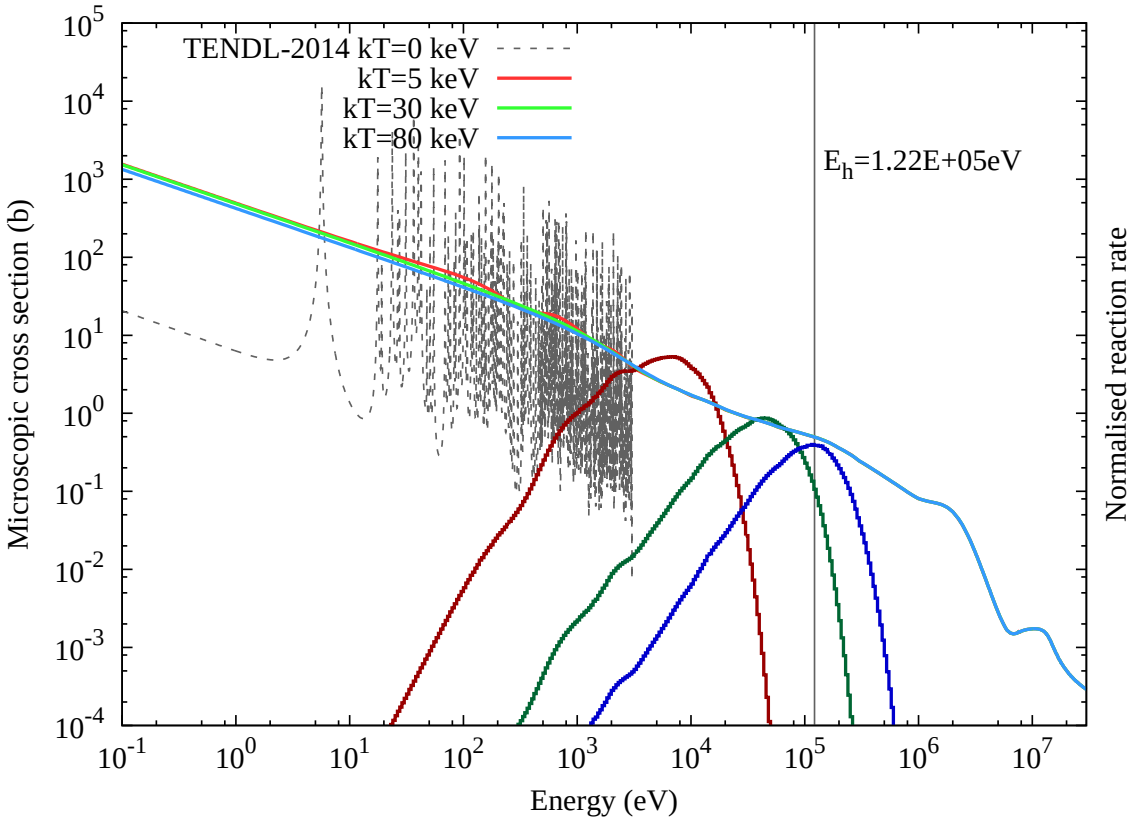


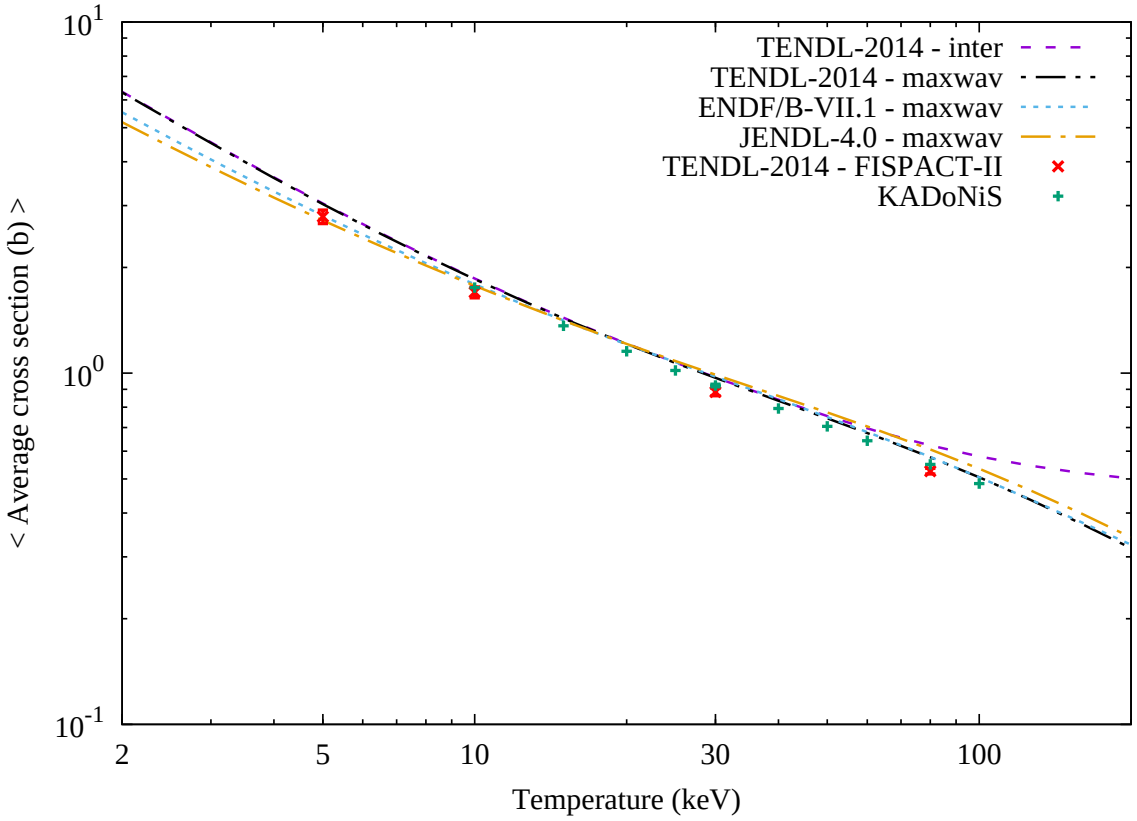
$^{178}Hf_{72}$ [Stable]



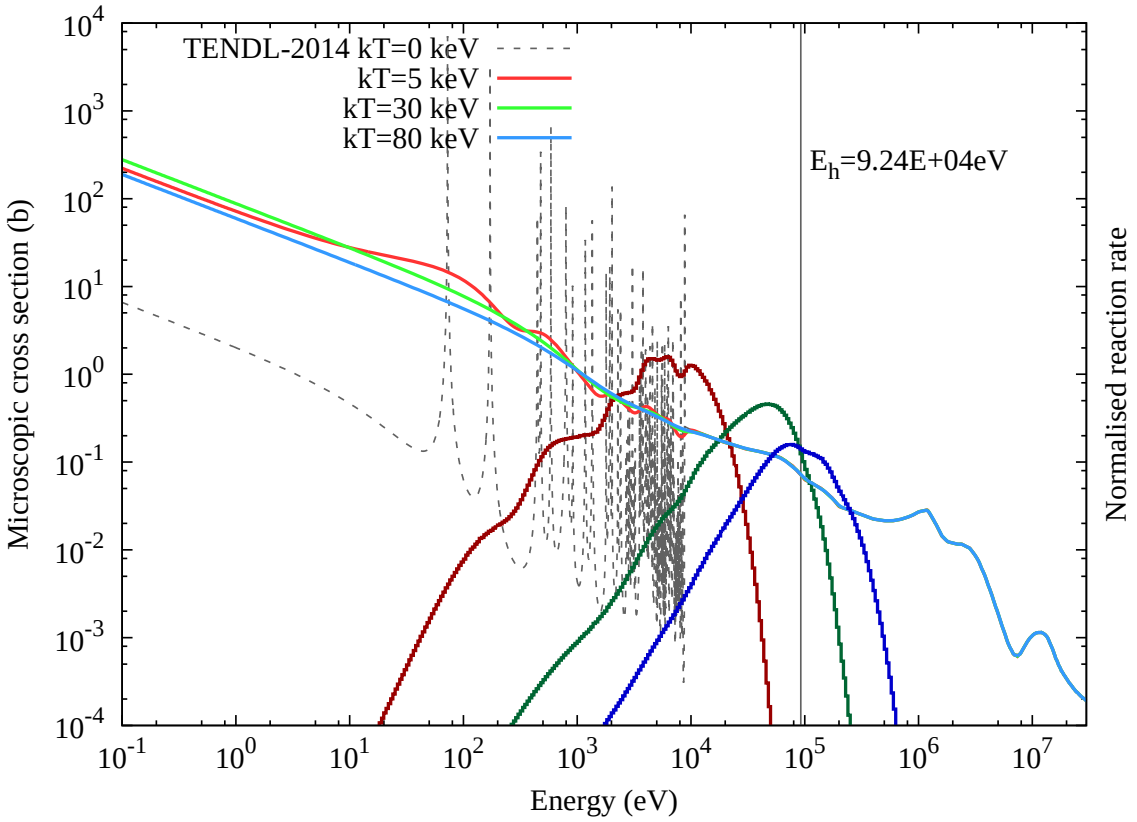


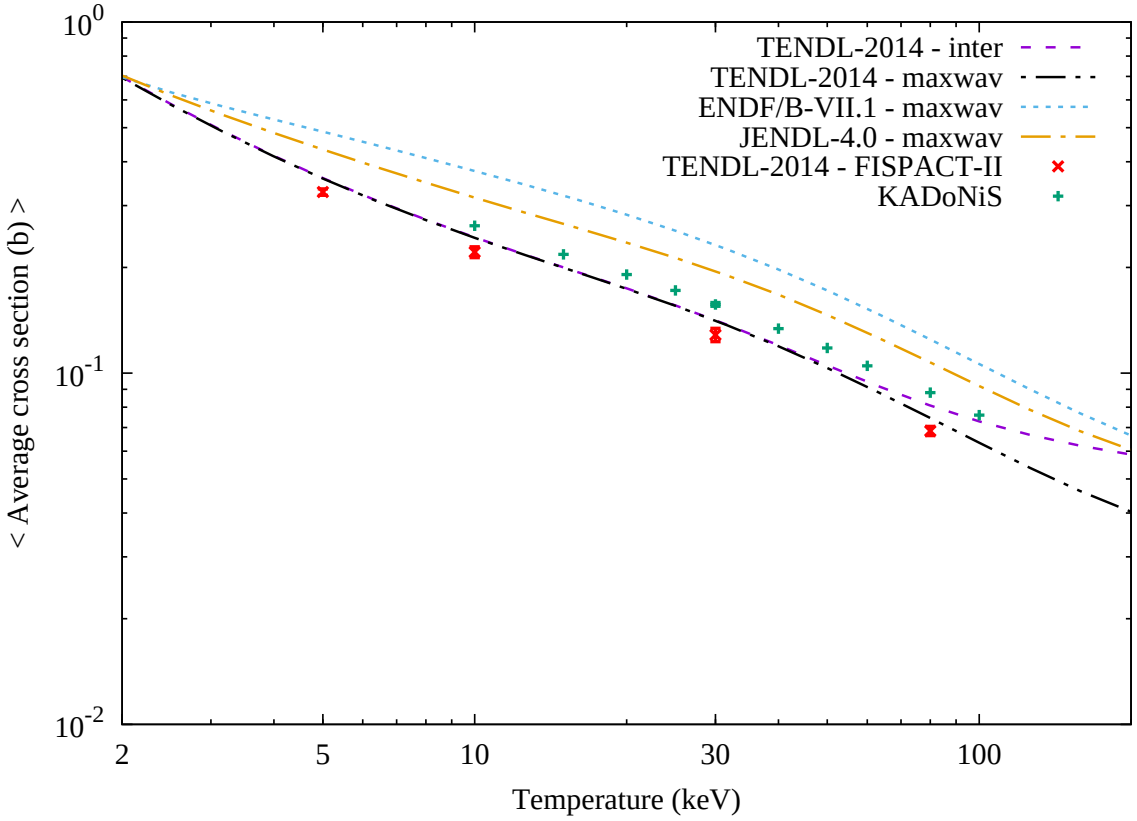
$^{179}Hf_{72}$ [Stable]



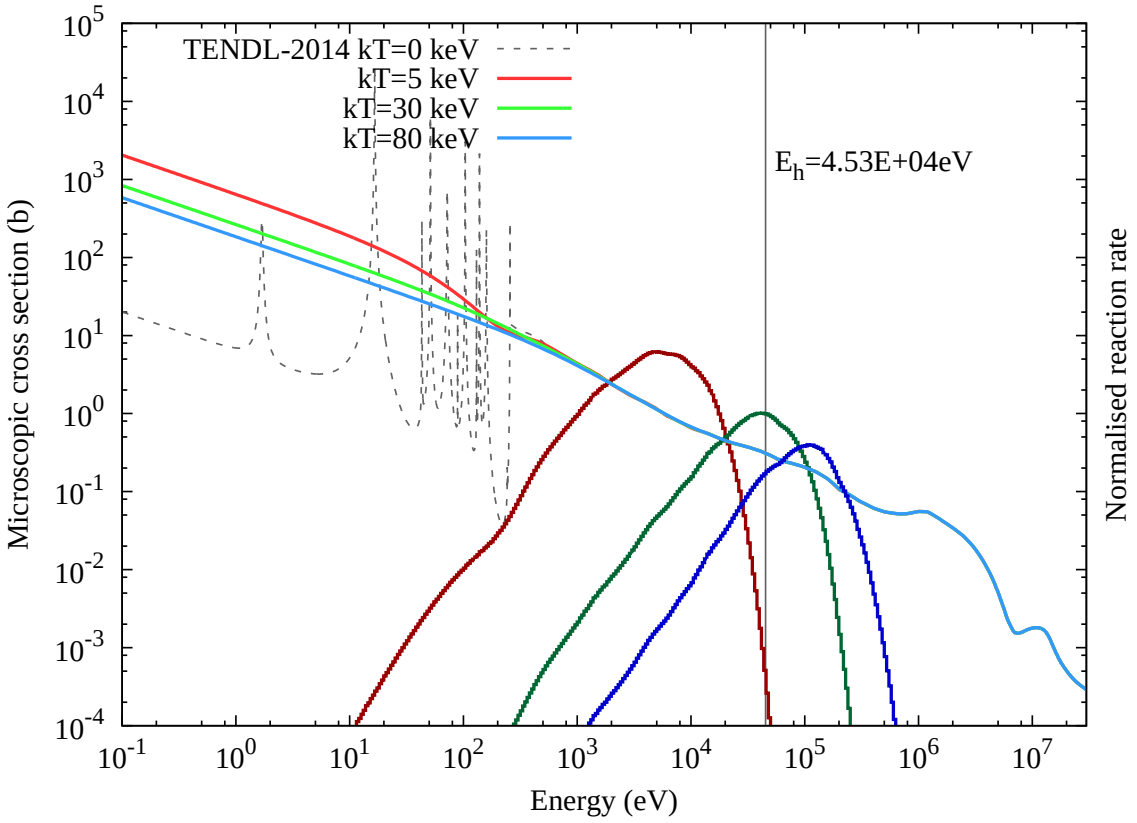


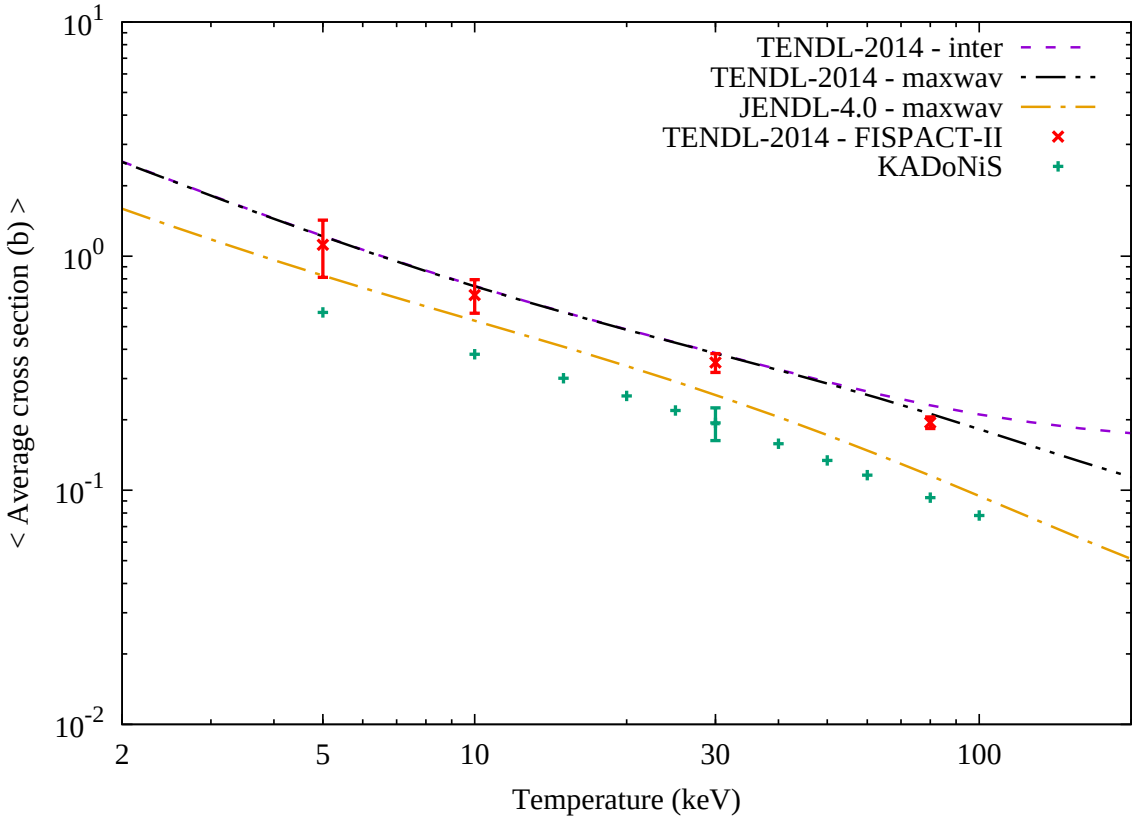
$^{180}Hf_{72}$ [Stable]



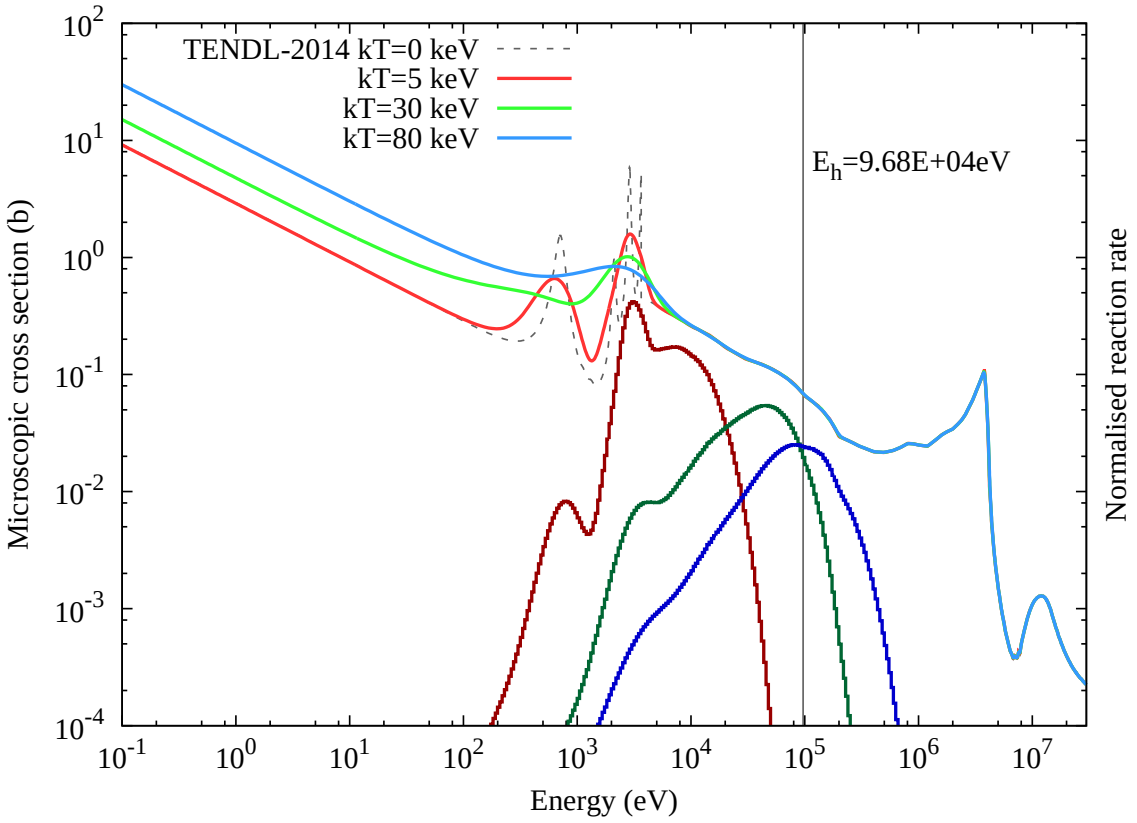


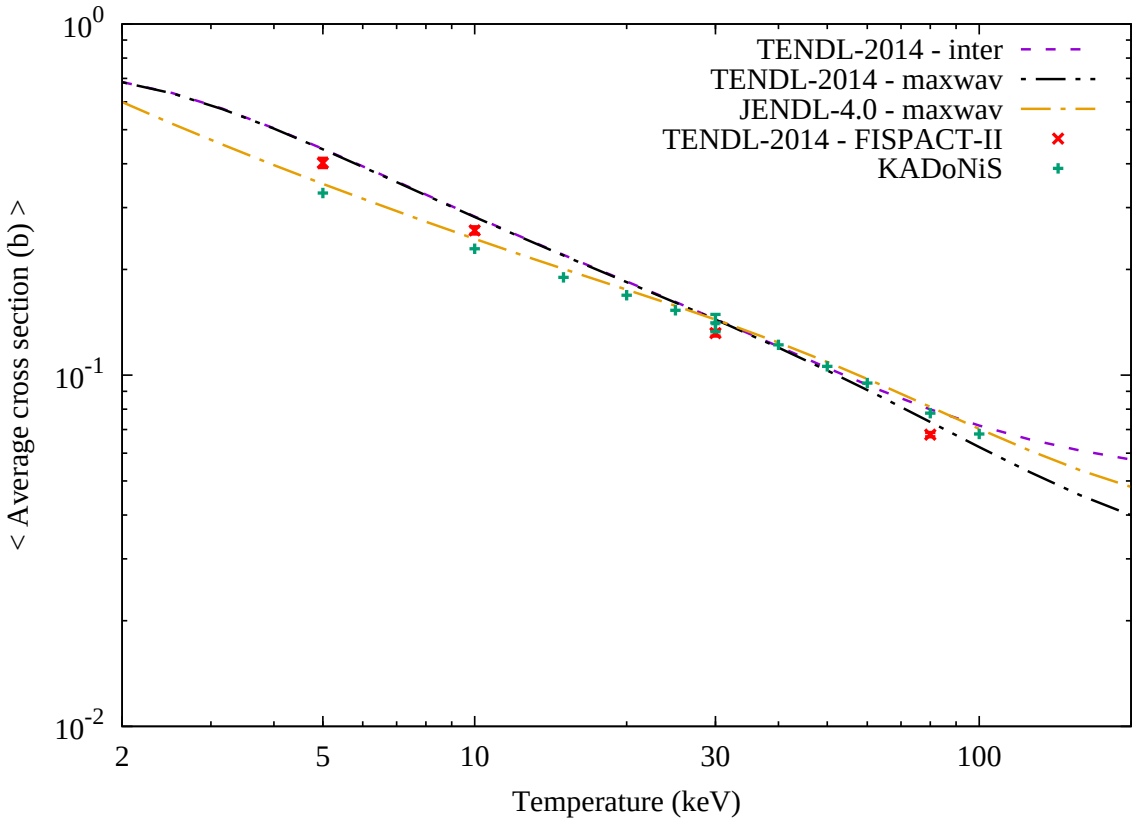
$^{181}Hf_{72}$ [$T_{1/2}$ = 42.38 days] (KADoNiS=SMC)



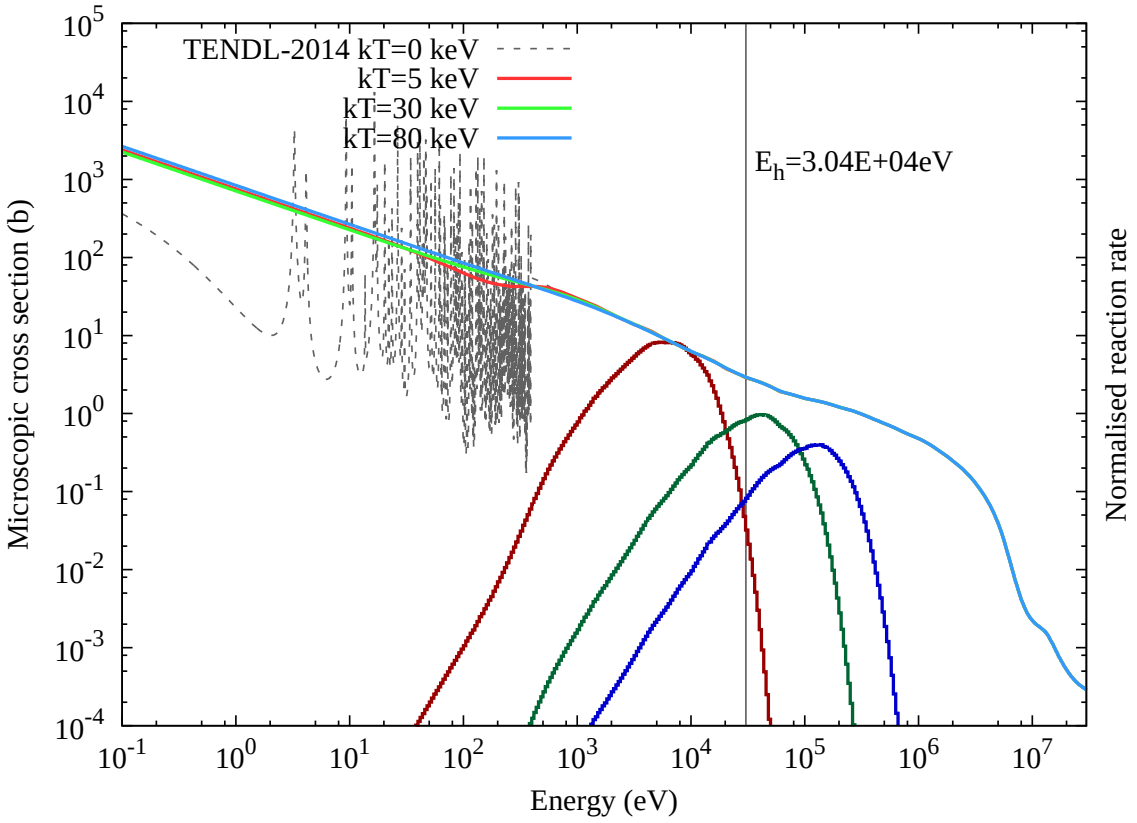


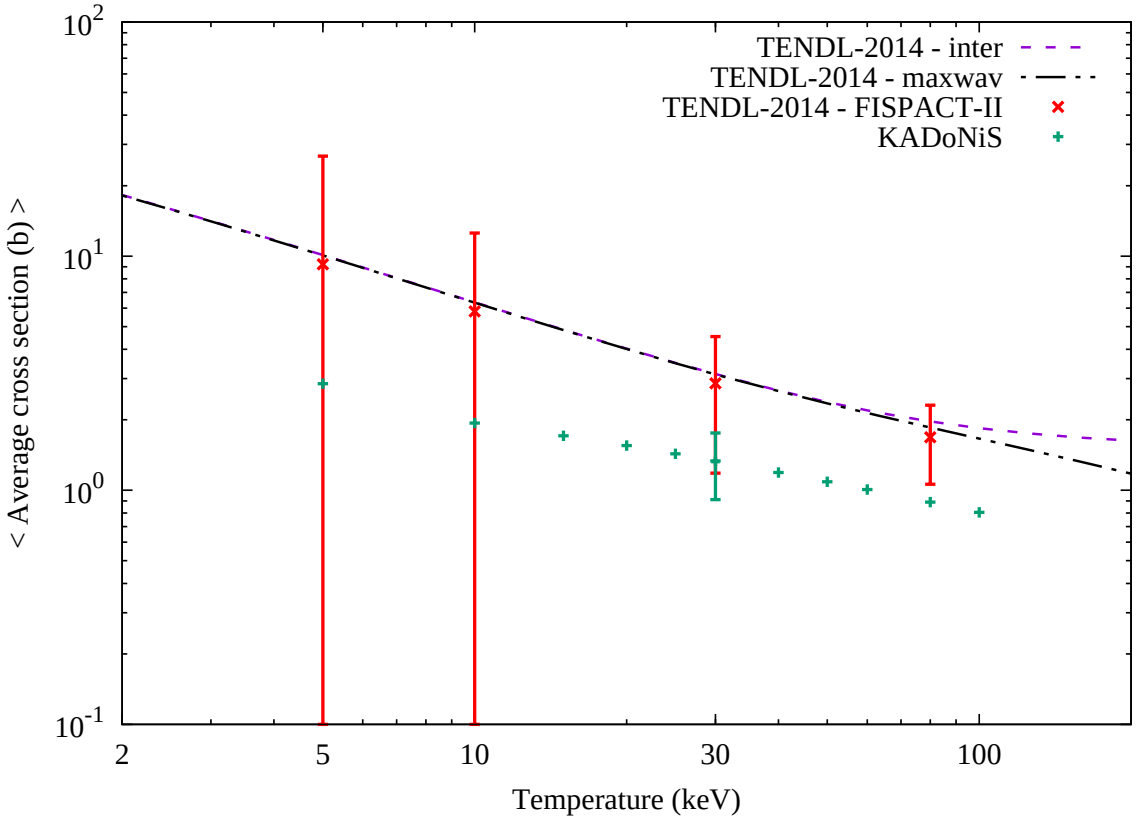
$^{182}Hf_{72}$ $[T_{1/2} = 9.00 \times 10^6$ years$]$



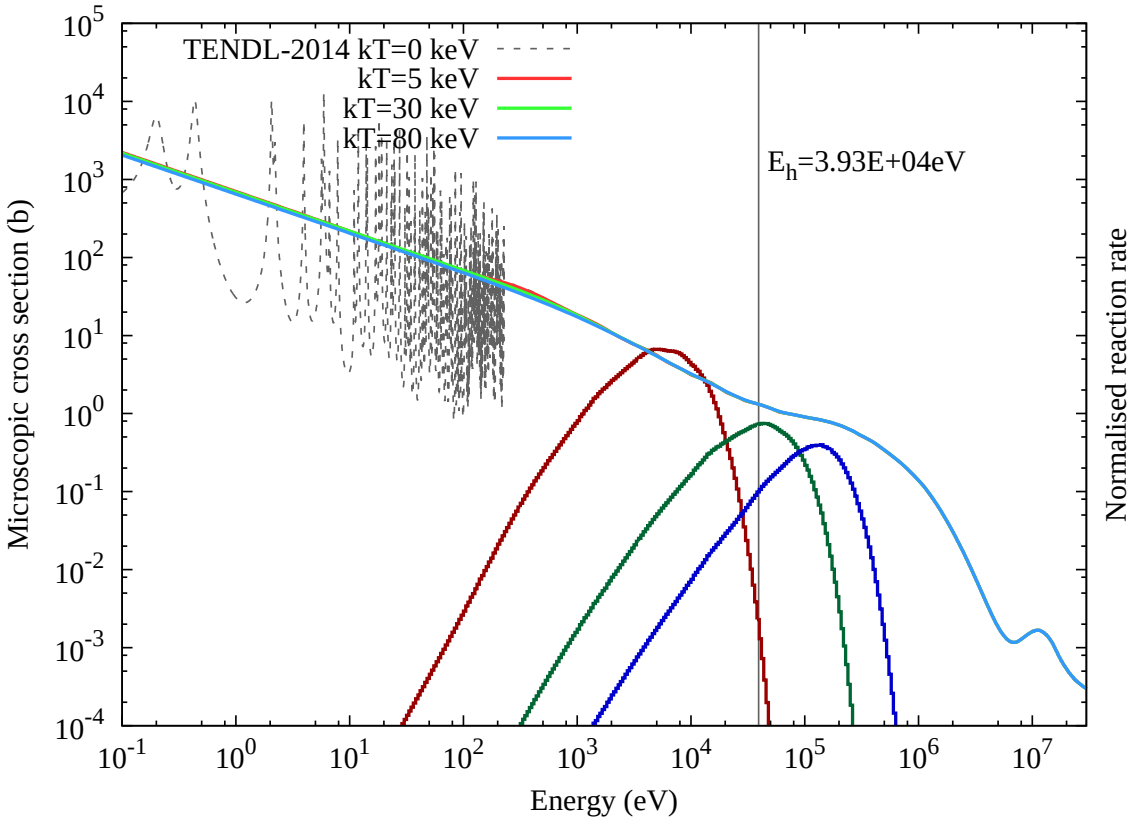


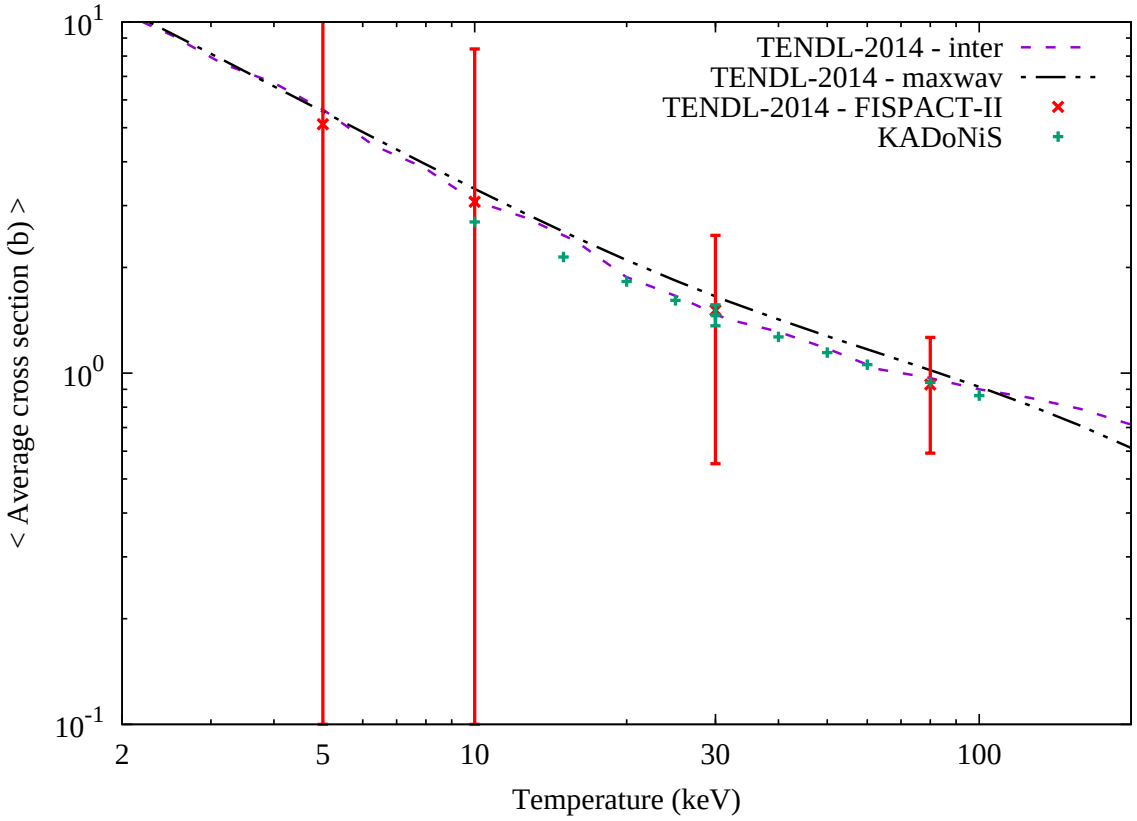
$^{179}Ta_{73}$ $[T_{1/2} = 1.61$ years$]$ (KADoNiS=SMC)



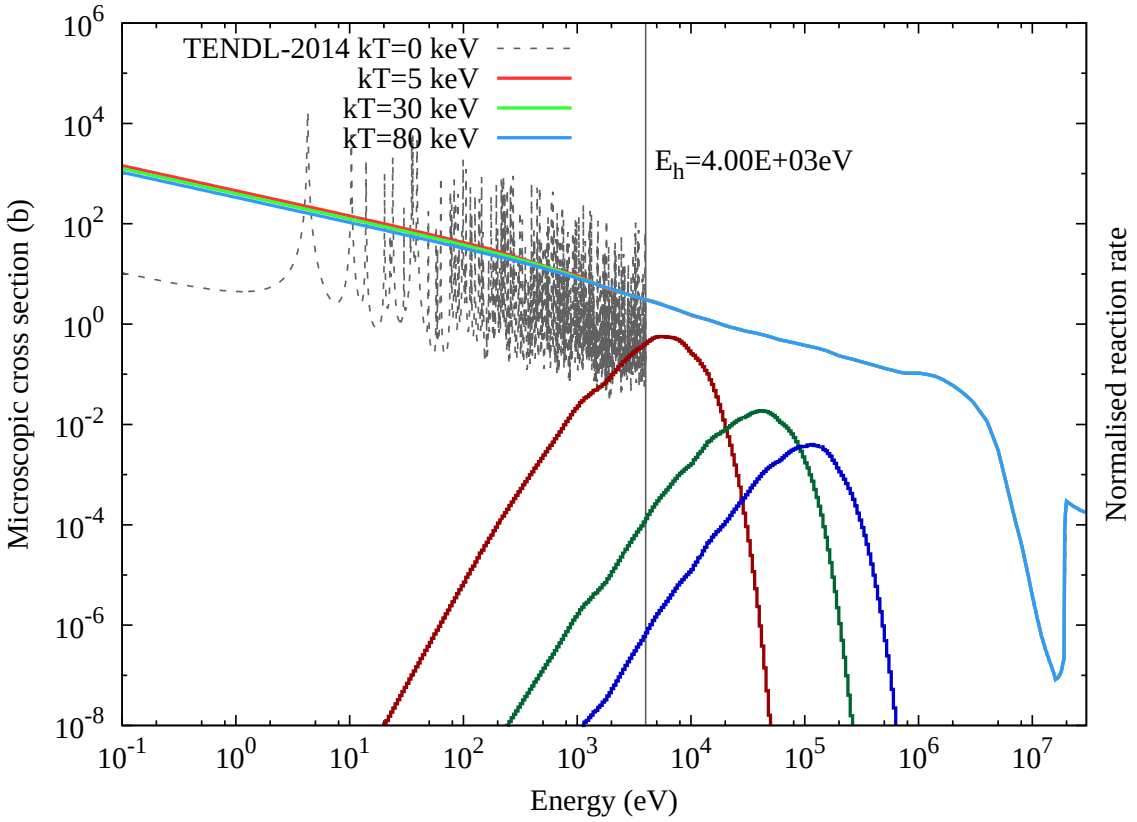


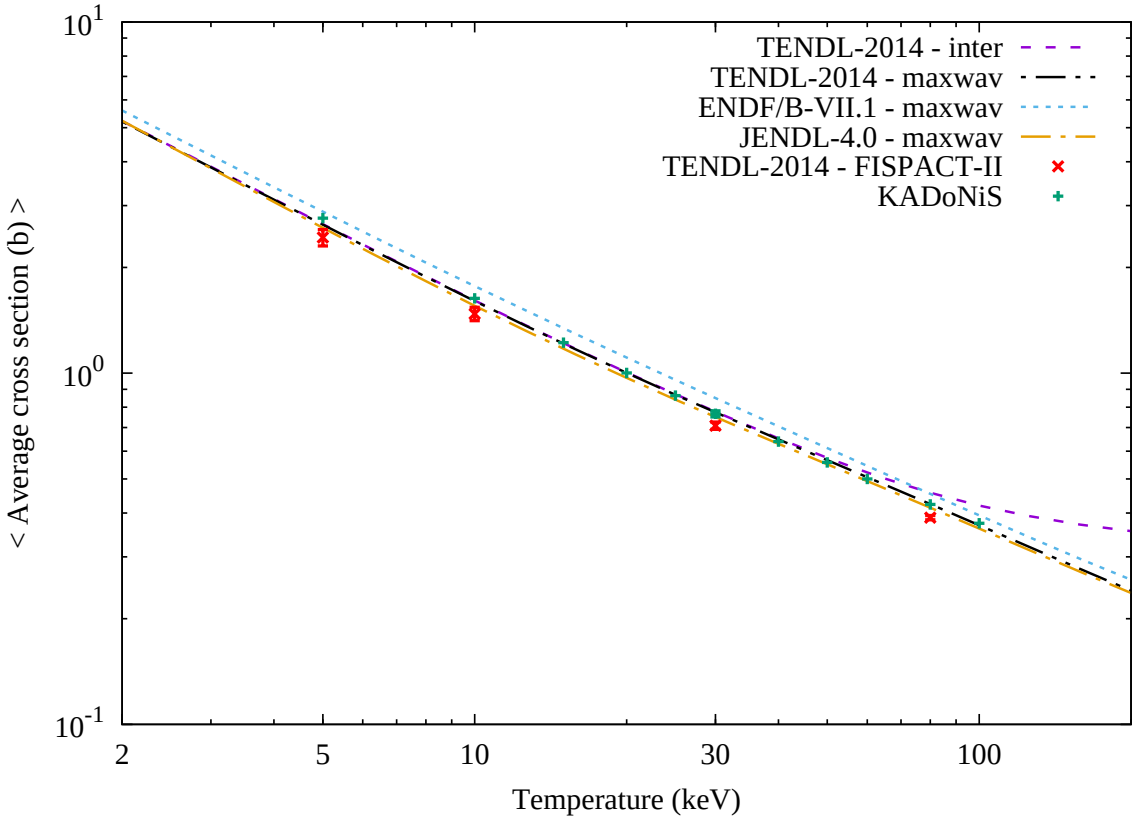
$^{180m}Ta_{73}$ $[T_{1/2} = 1.80 \times 10^{15}$ years$]$



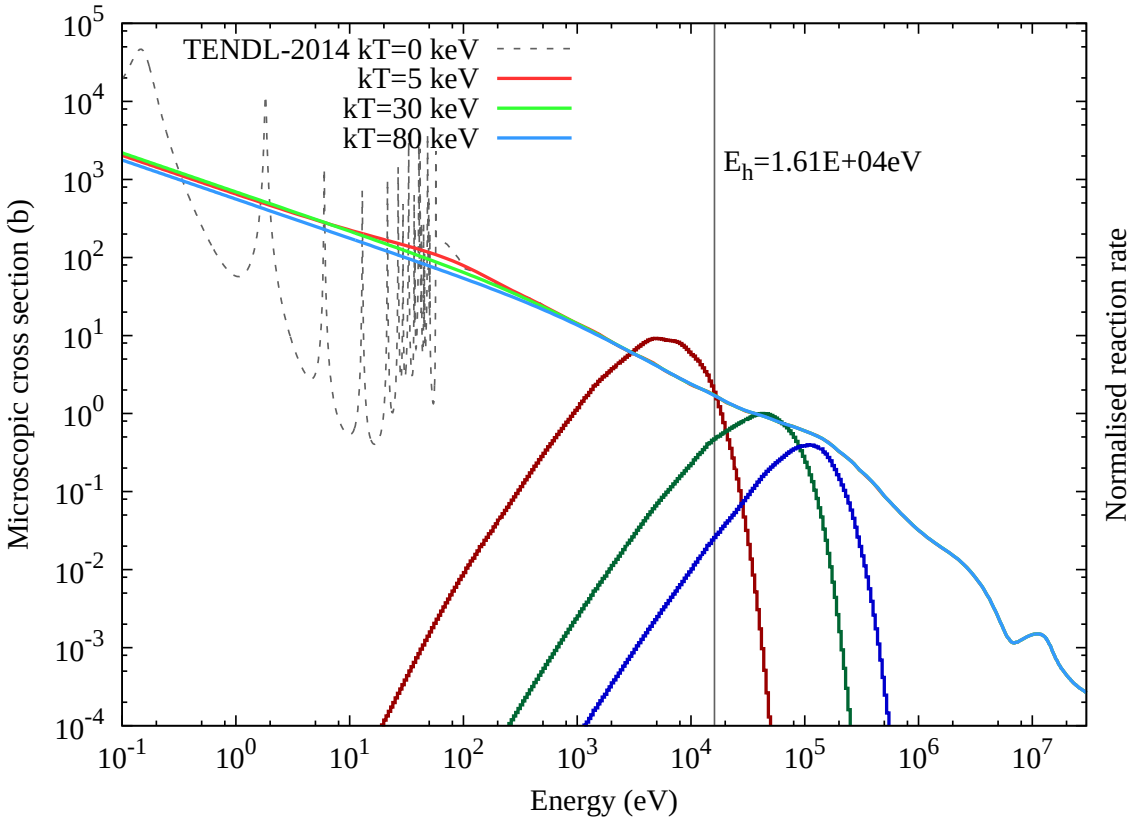


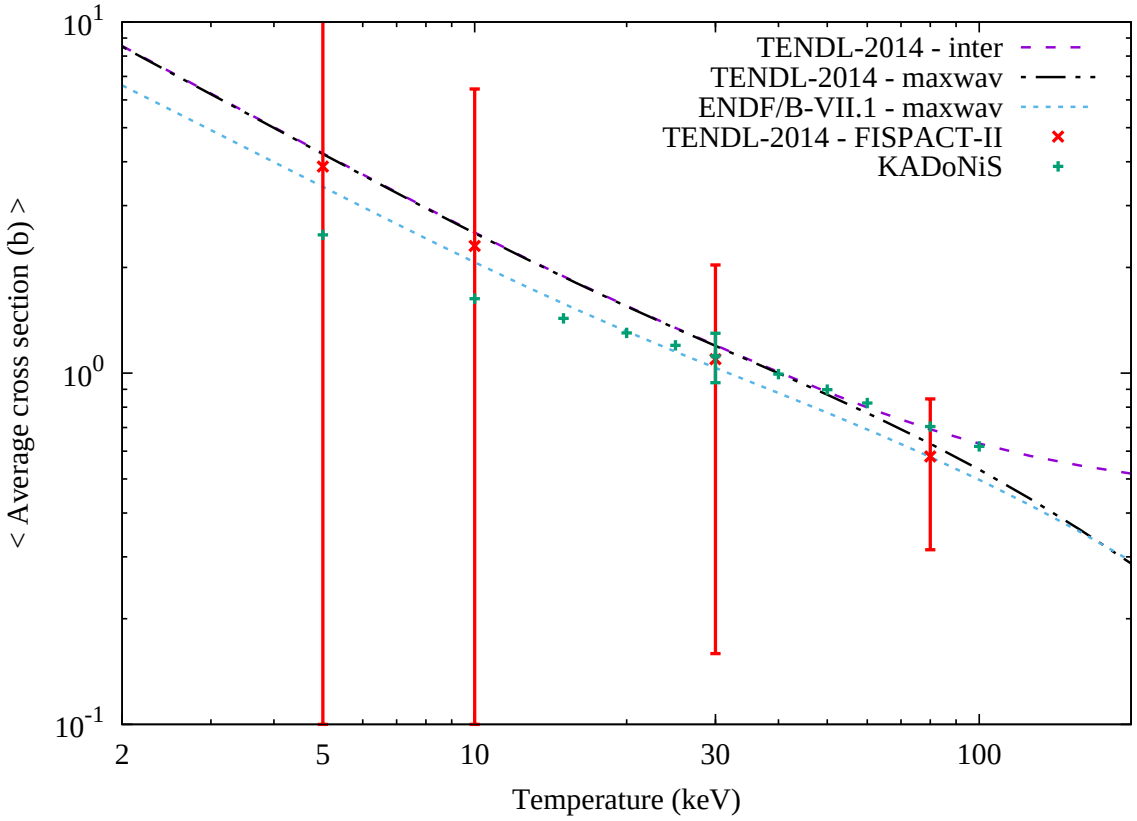
$^{181}Ta_{73}$ [Stable]



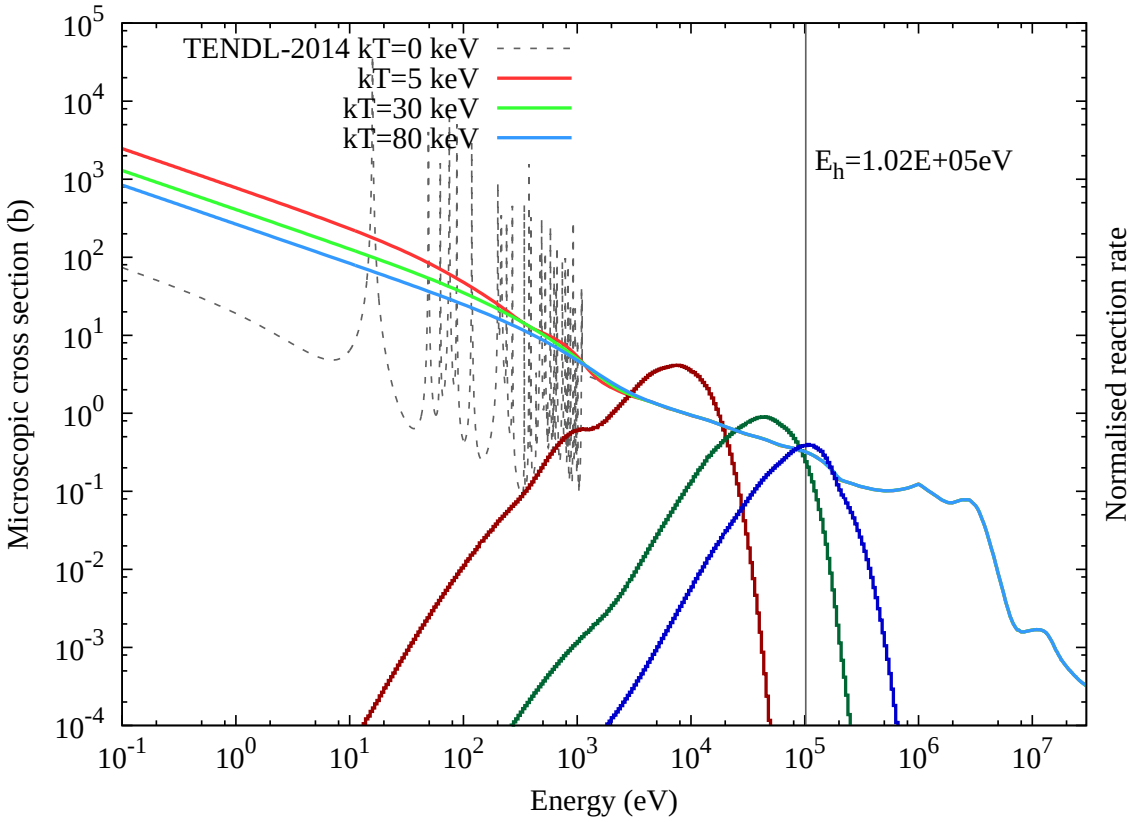


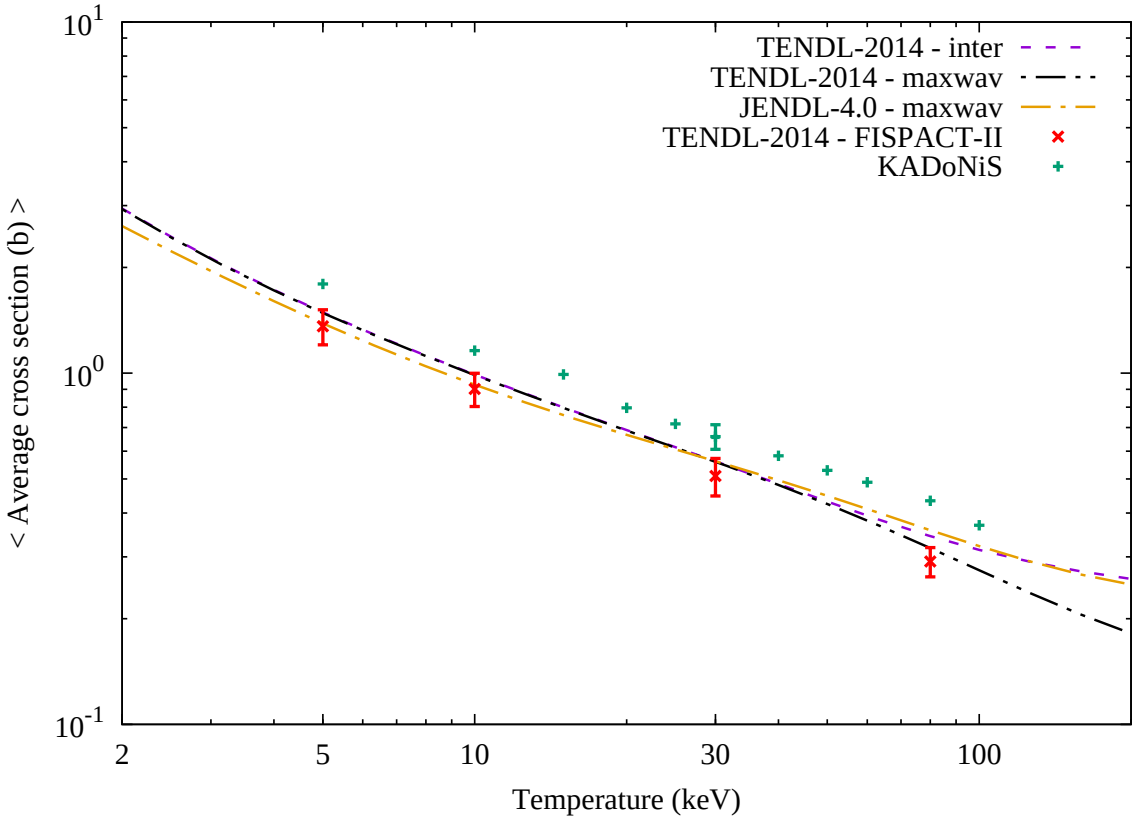
$^{182}Ta_{73}$ $[T_{1/2} = 114.70$ days$]$ (KADoNiS=SMC)



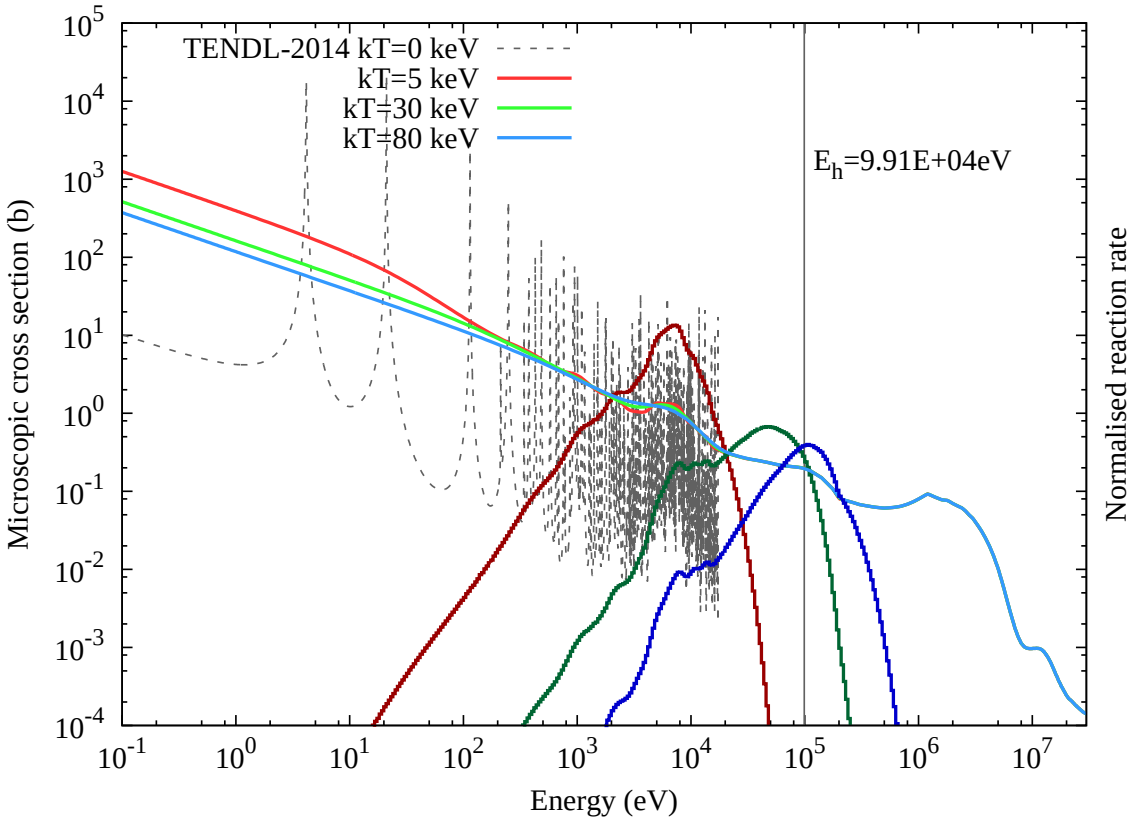


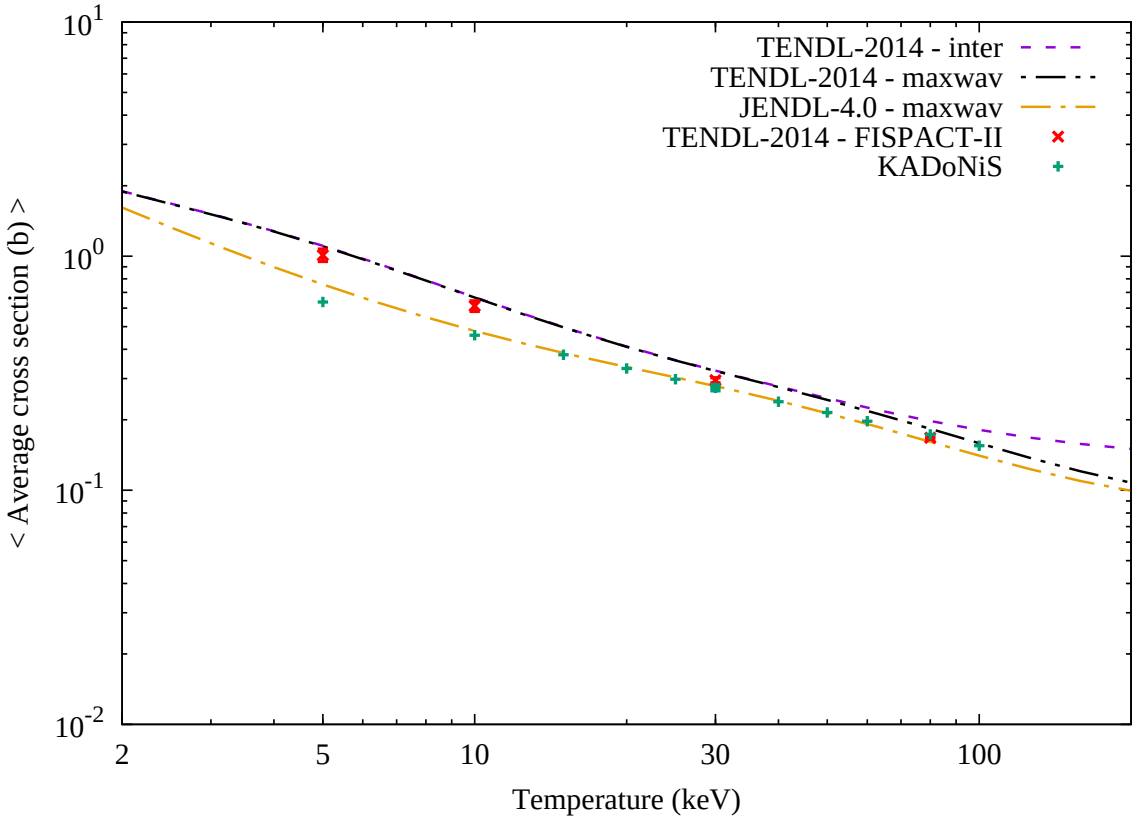
$^{180}W_{74}$ [Stable]



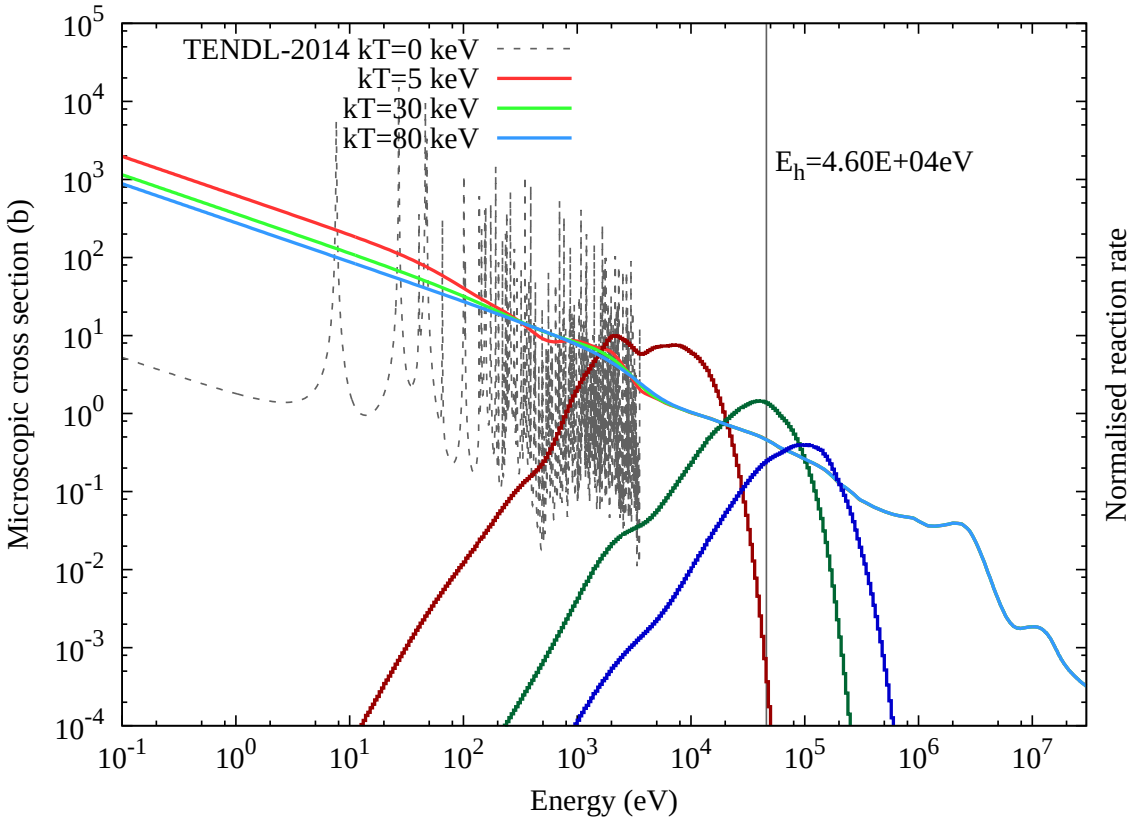


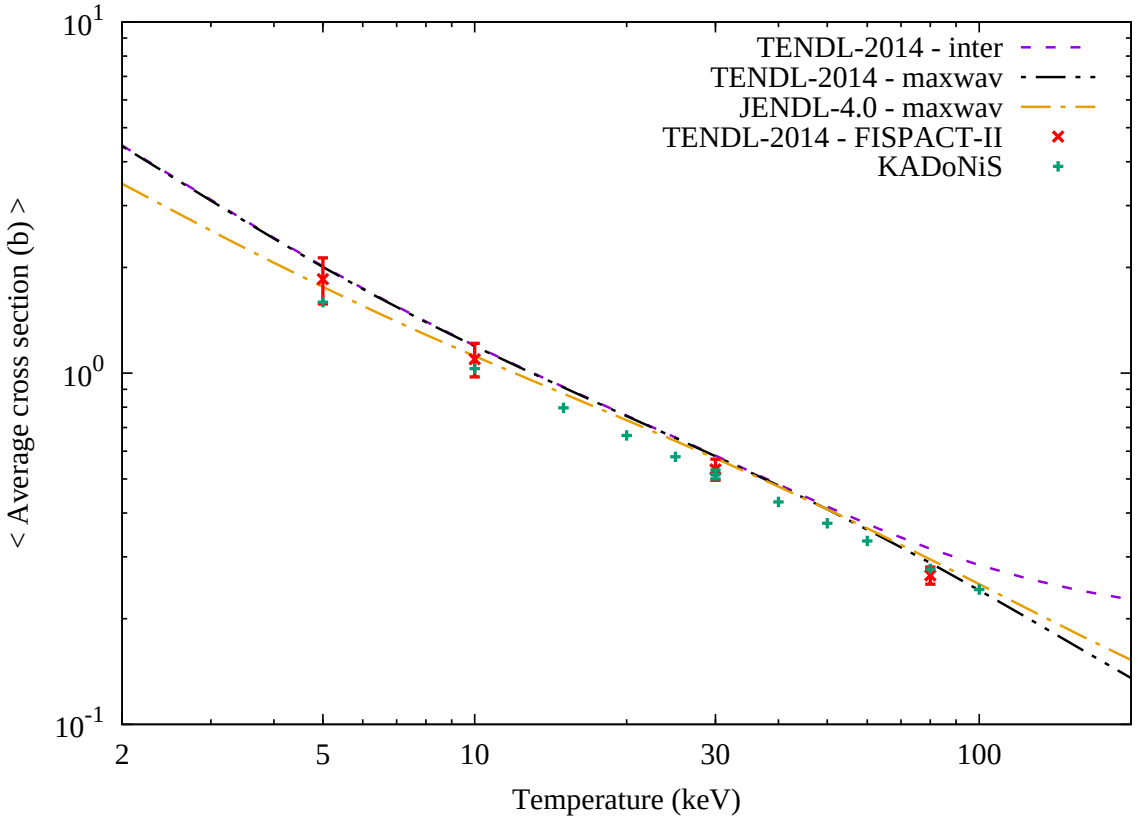
$^{182}W_{74}$ [Stable]



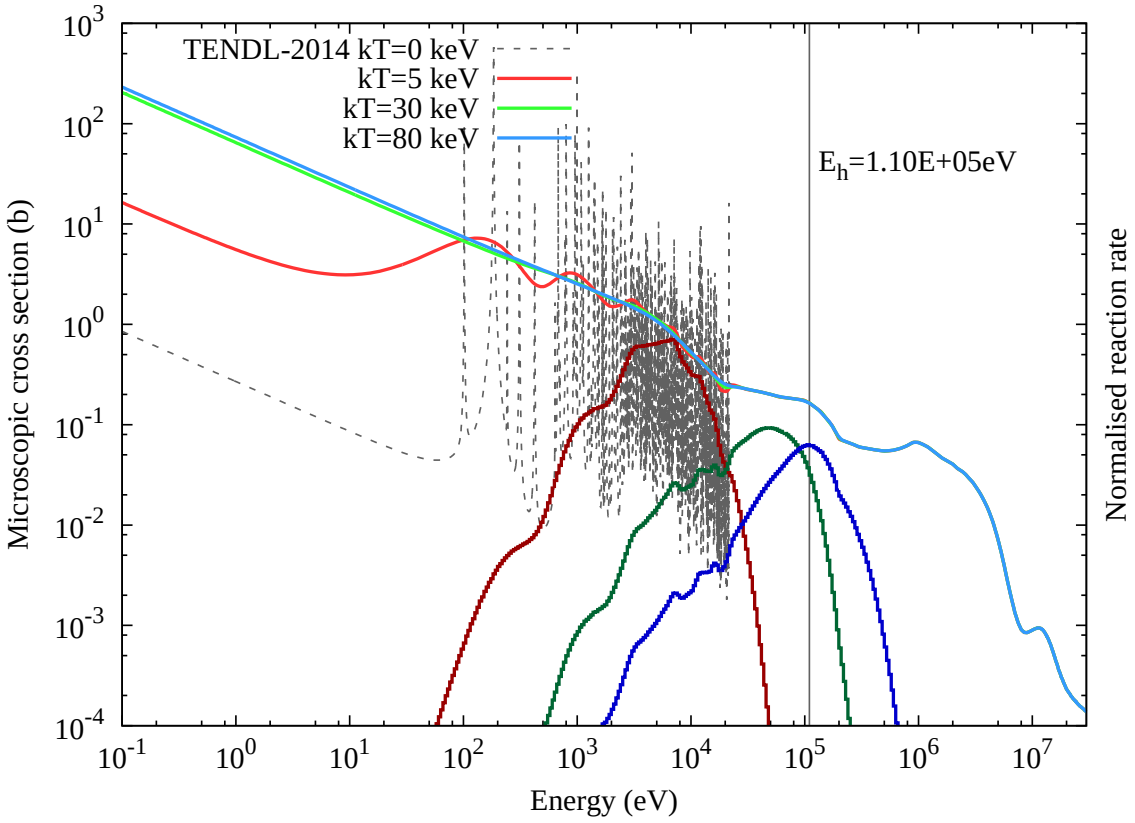


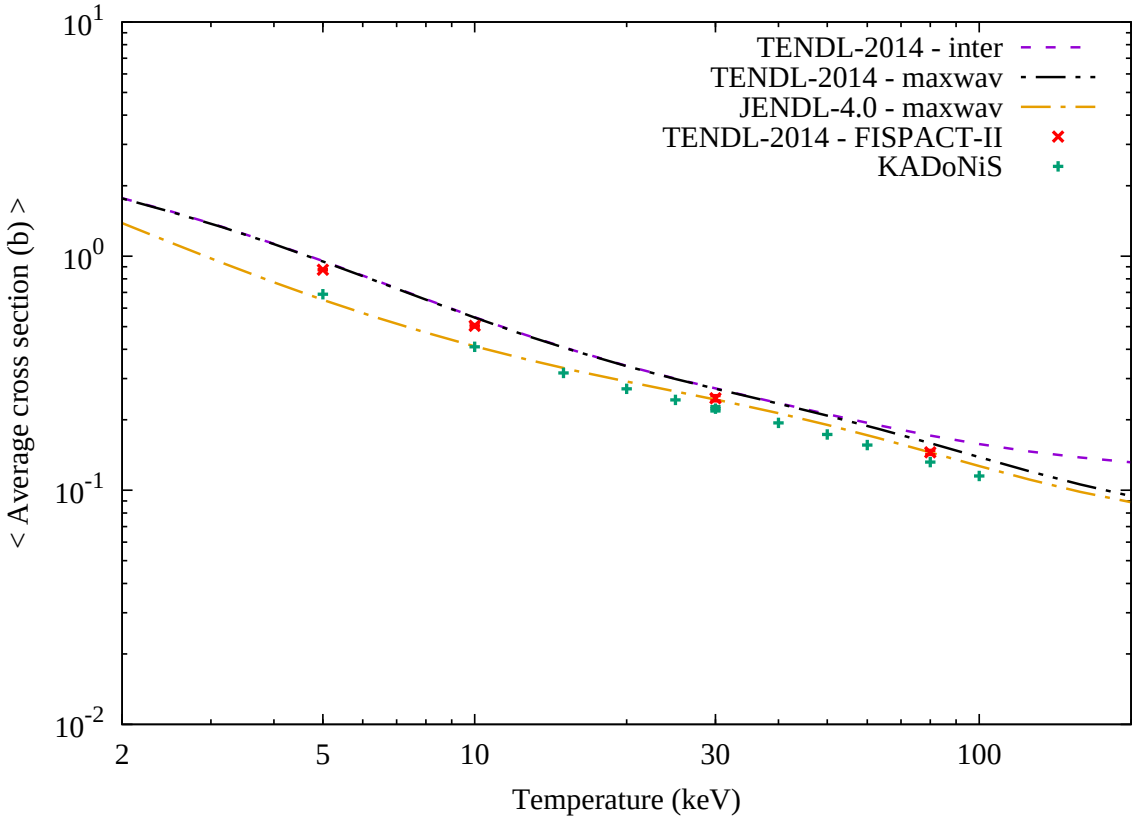
$^{183}W_{74}$ $[T_{1/2} = 1.10 \times 10^{17}$ years$]$



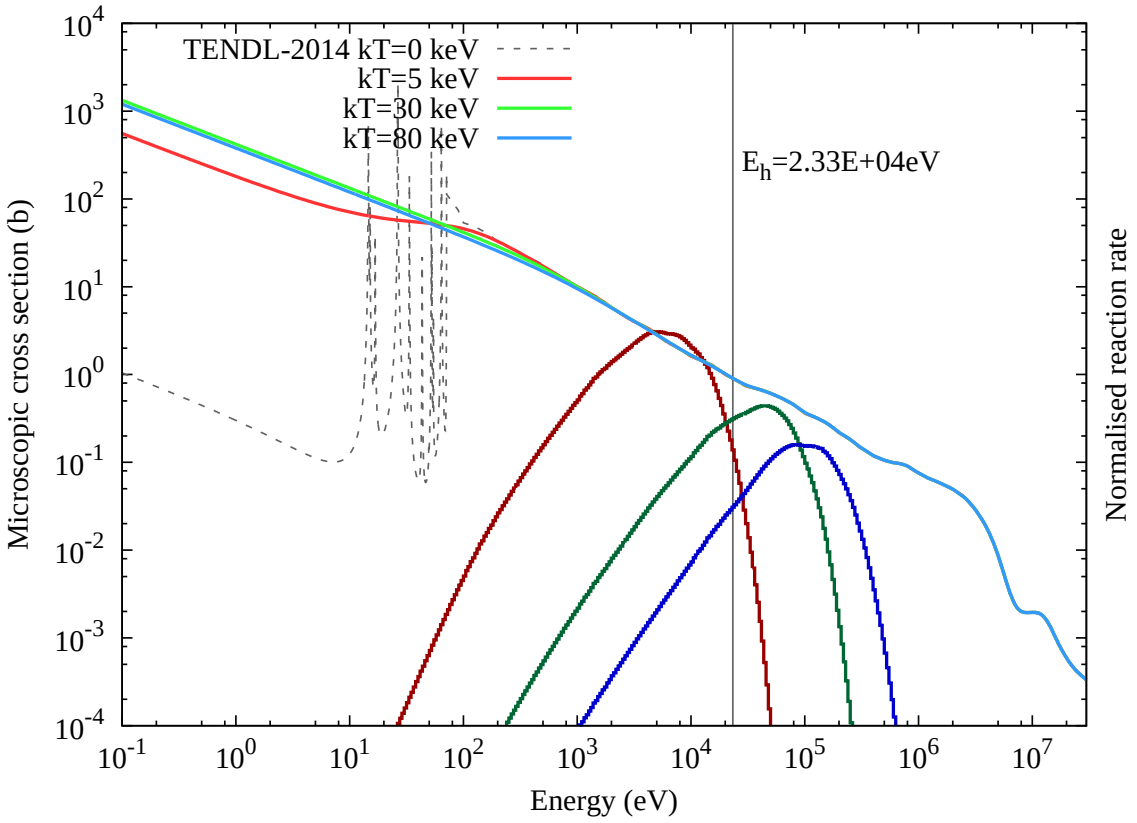


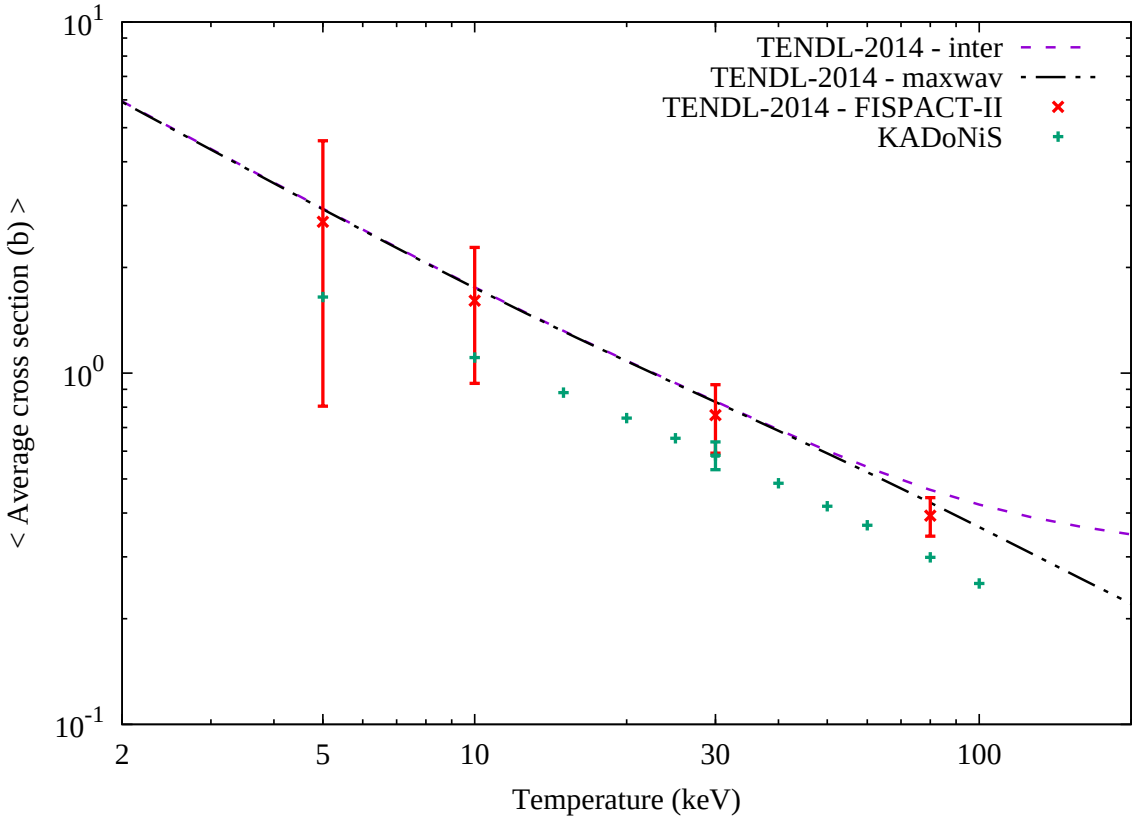
$^{184}W_{74}$ $[T_{1/2} = 4.00 \times 10^{17}$ years$]$



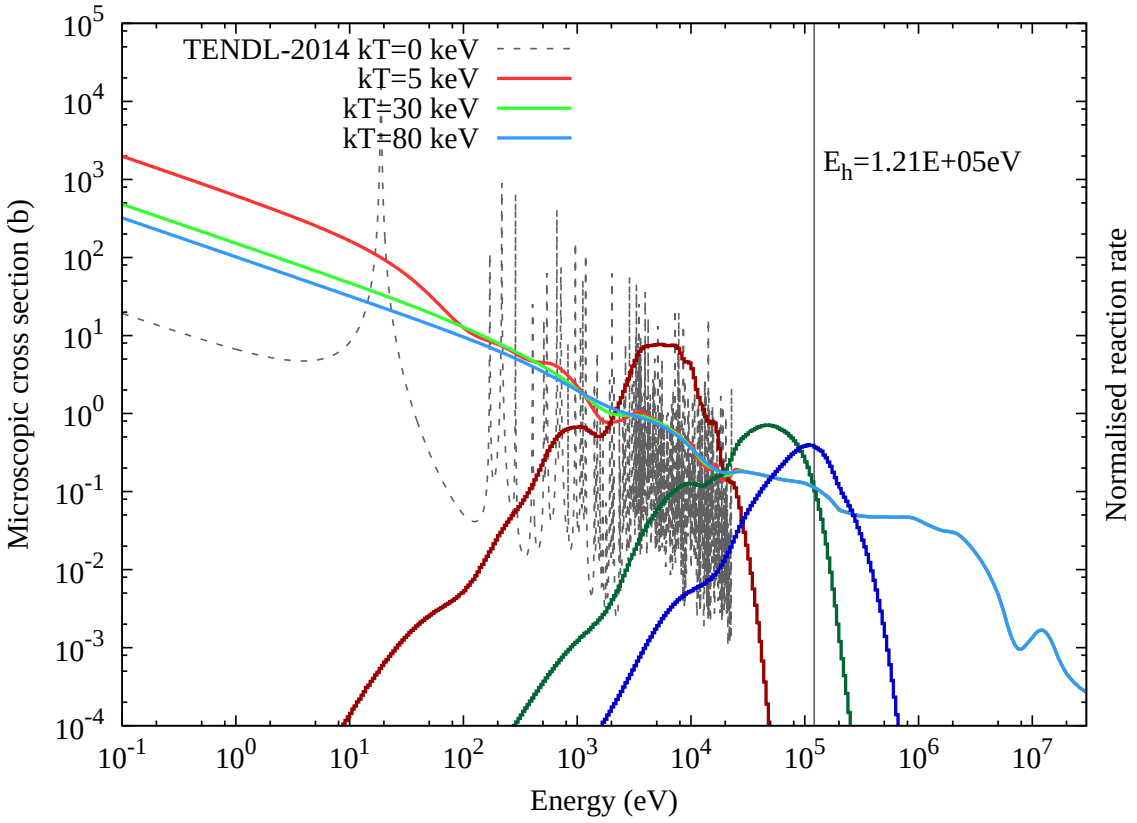


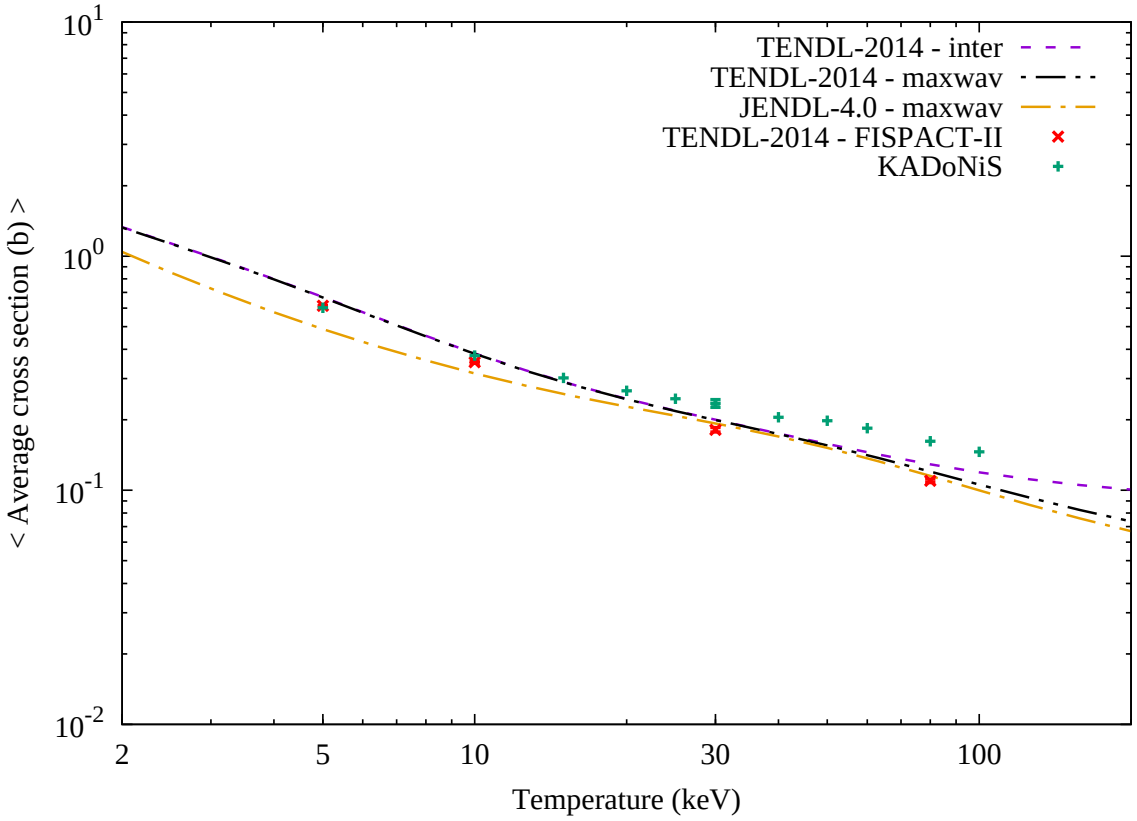
$^{185}W_{74}$ $[T_{1/2} = 75.10$ days$]$



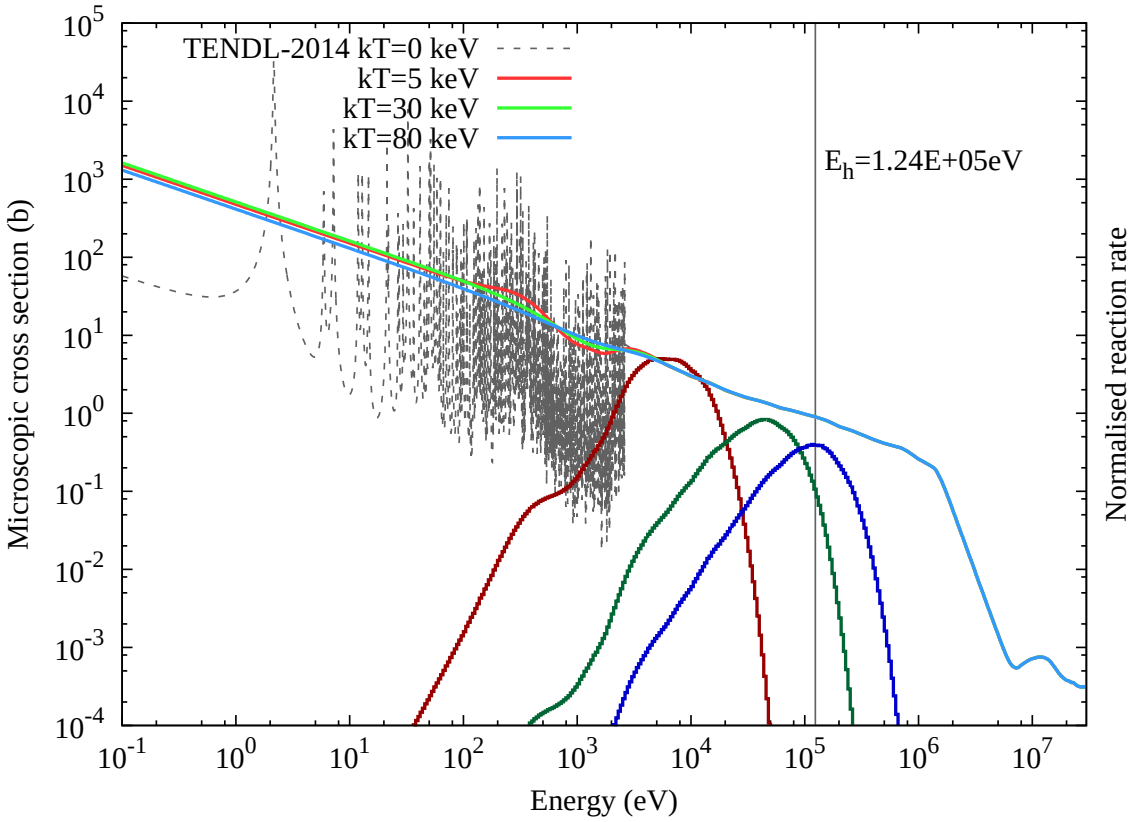


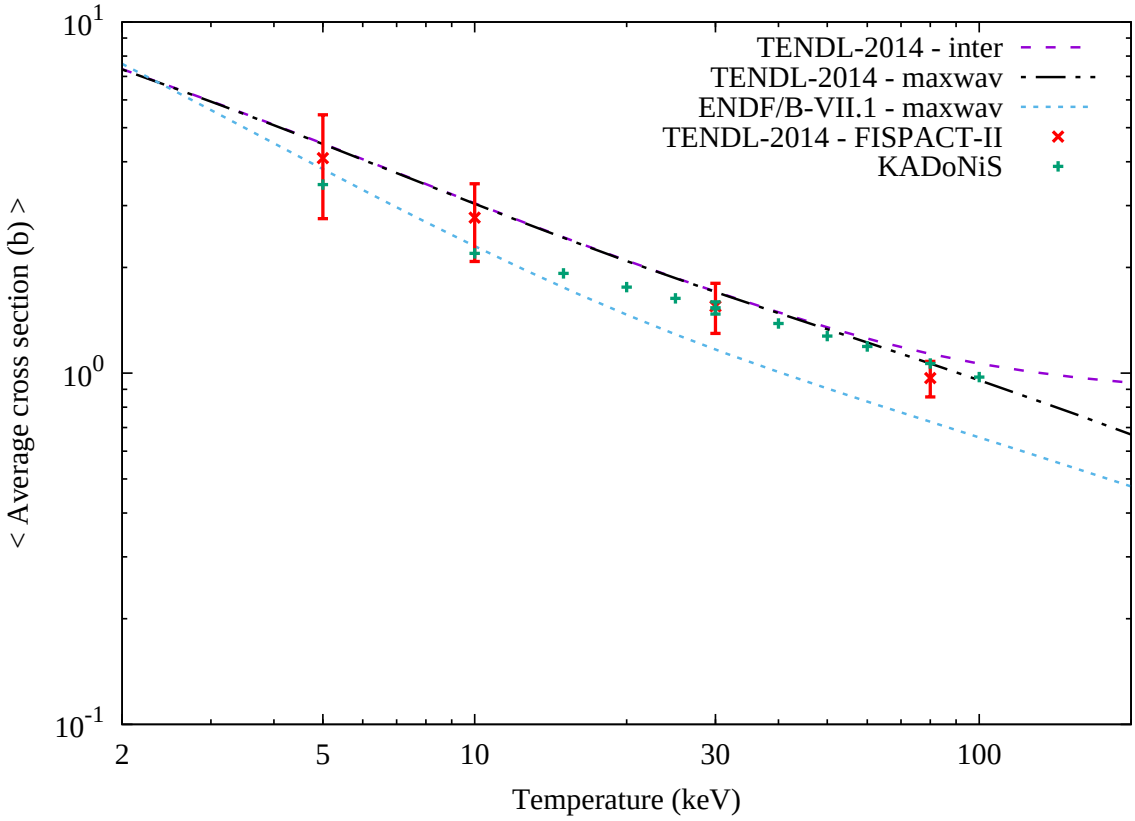
$^{186}W_{74}$ $[T_{1/2} = 5.90 \times 10^{17}$ years$]$



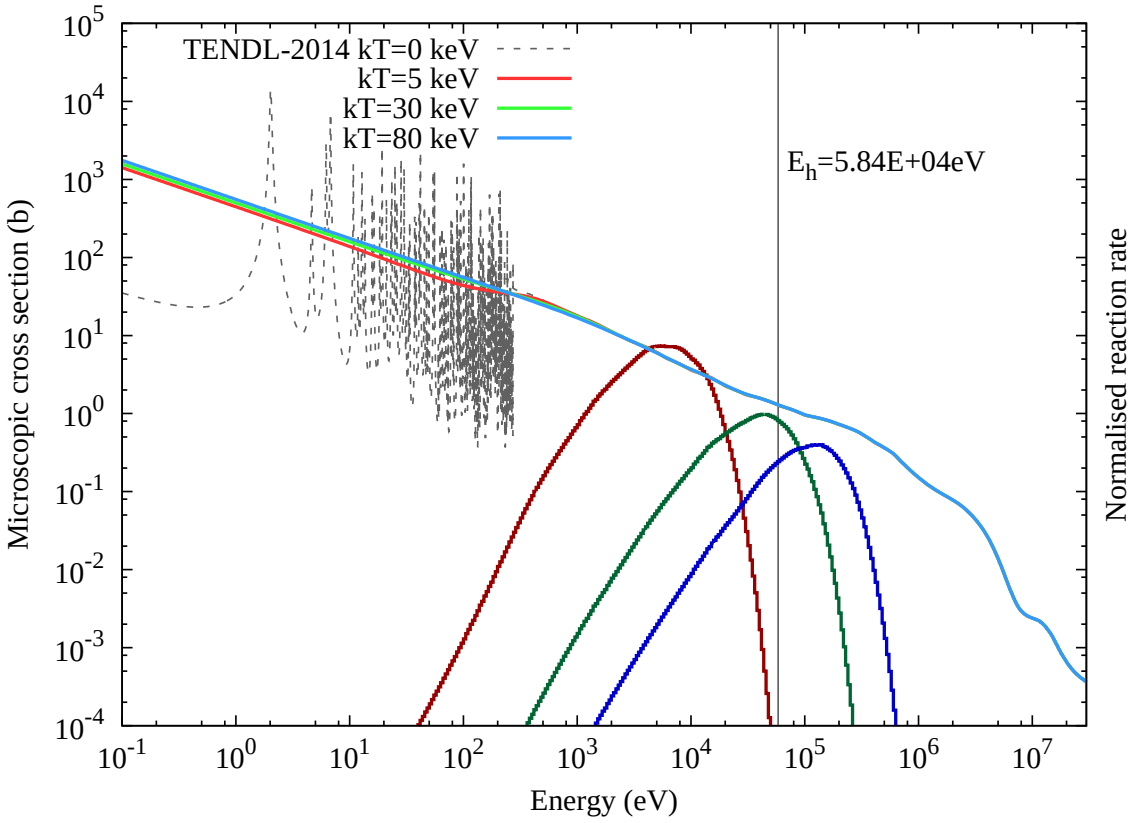


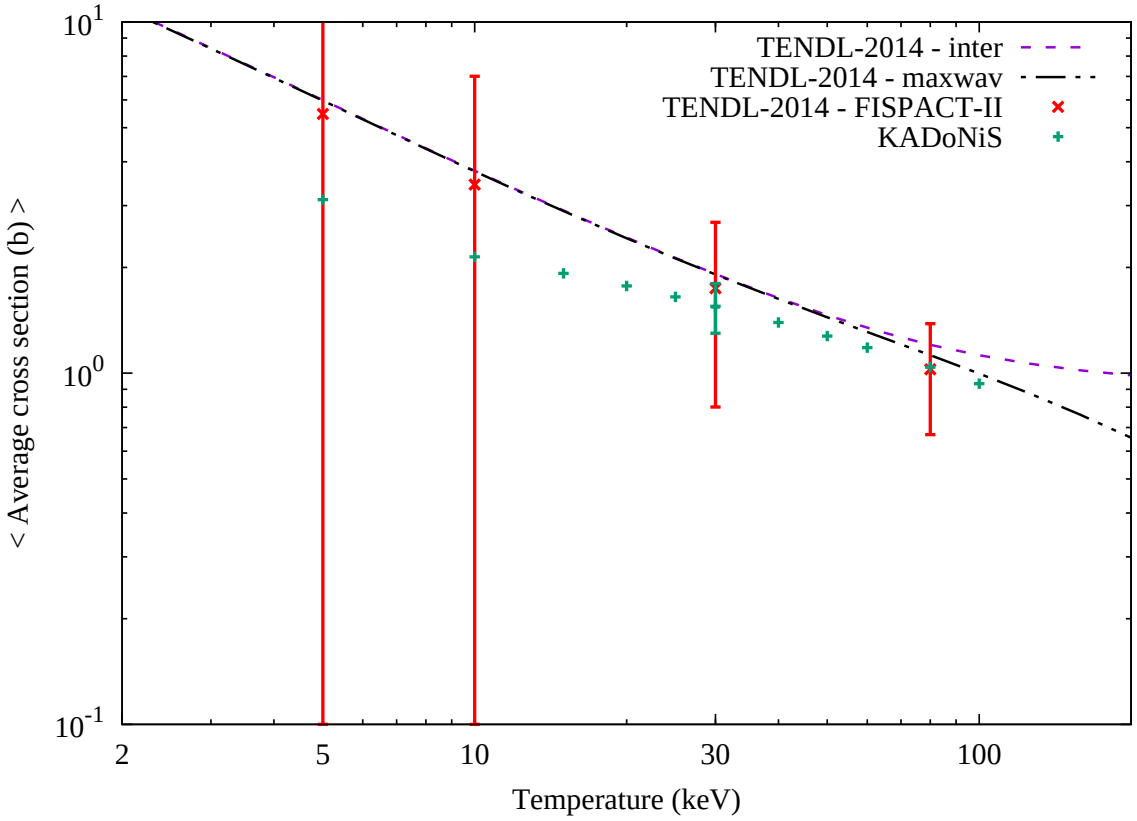
$^{185}Re_{75}$ [Stable]



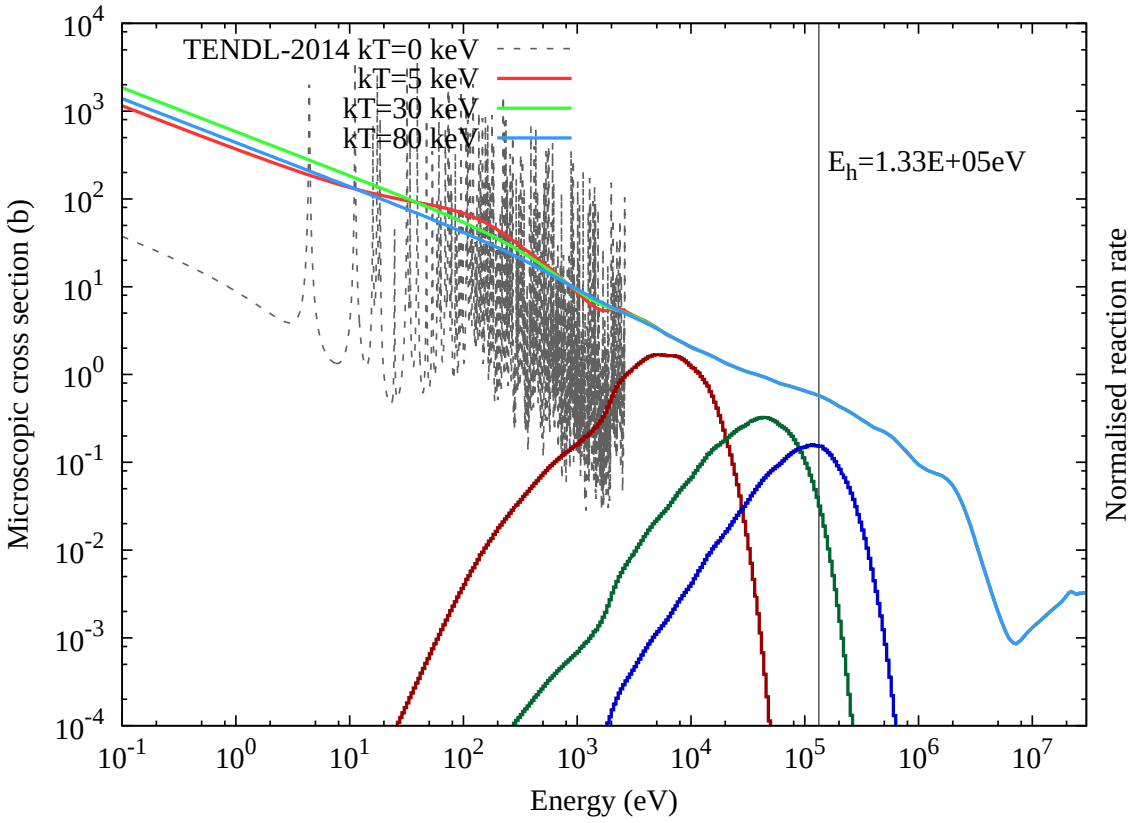


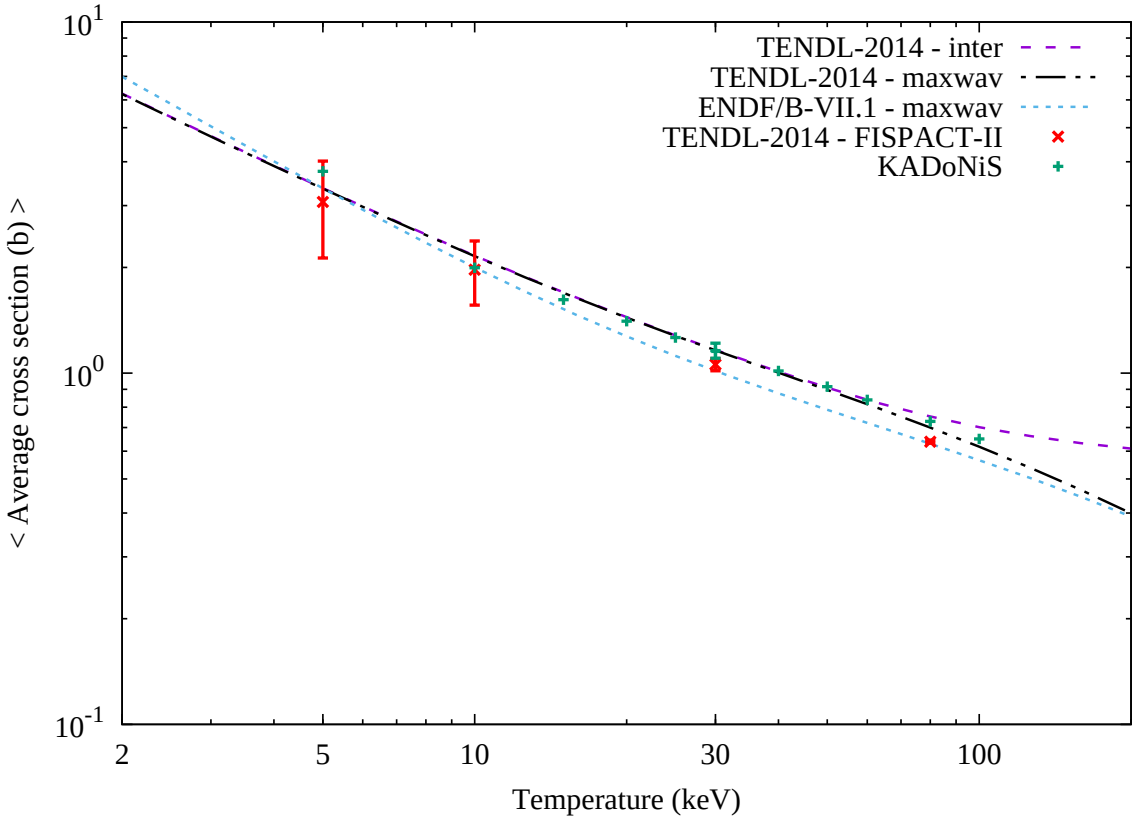
$^{186}Re_{75}$ $[T_{1/2} = 3.75 \text{ days}]$ (KADoNiS=SMC)



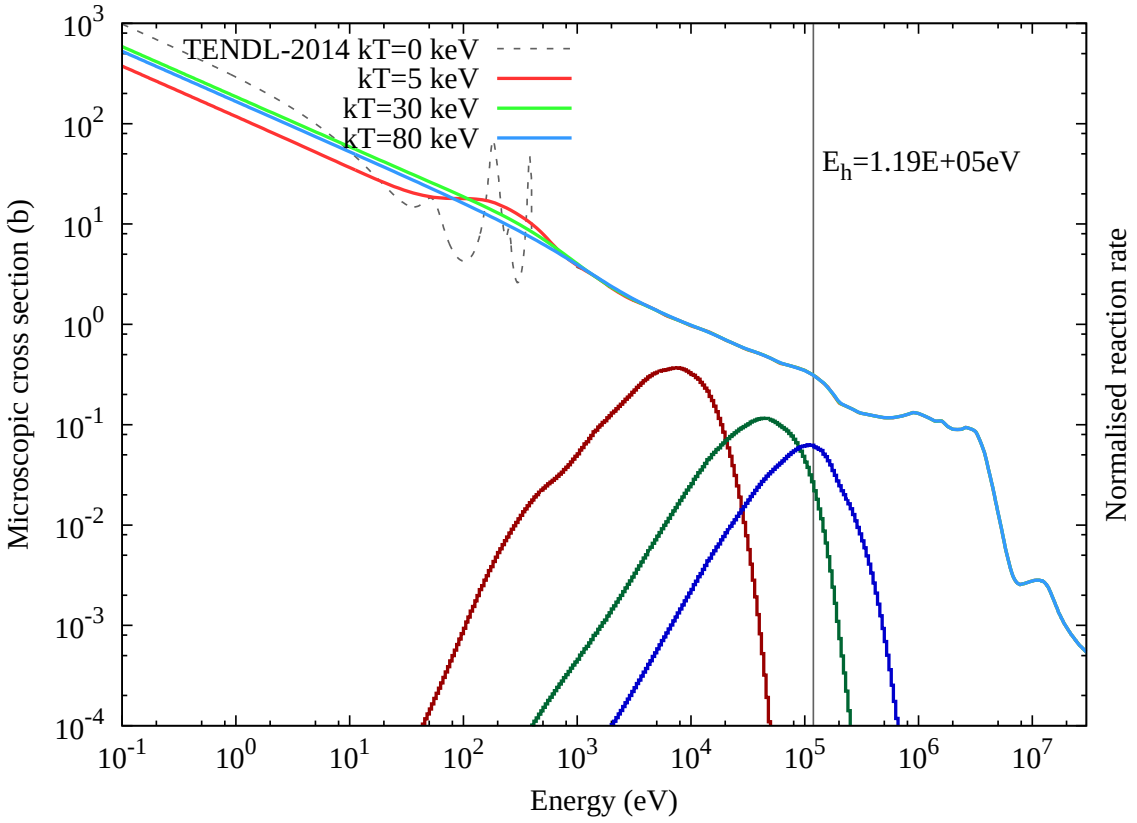


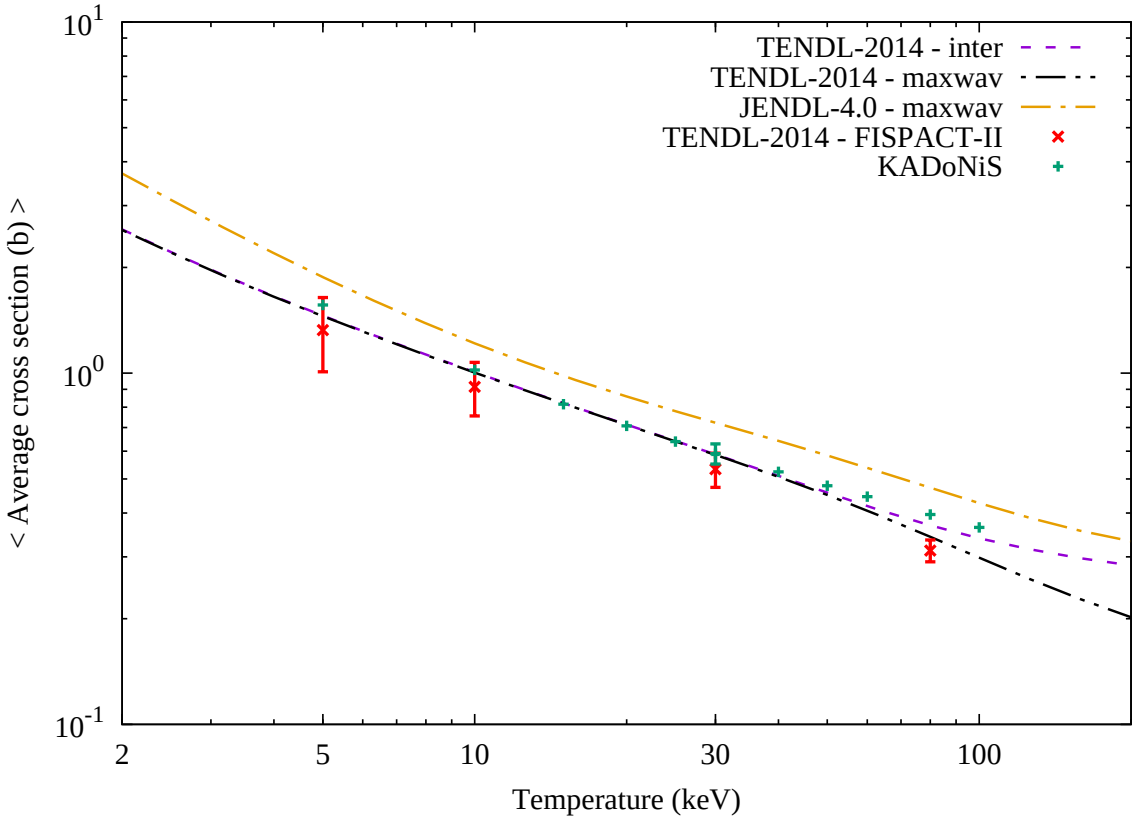
$^{187}Re_{75}$ $[T_{1/2} = 4.35 \times 10^{10}$ years$]$



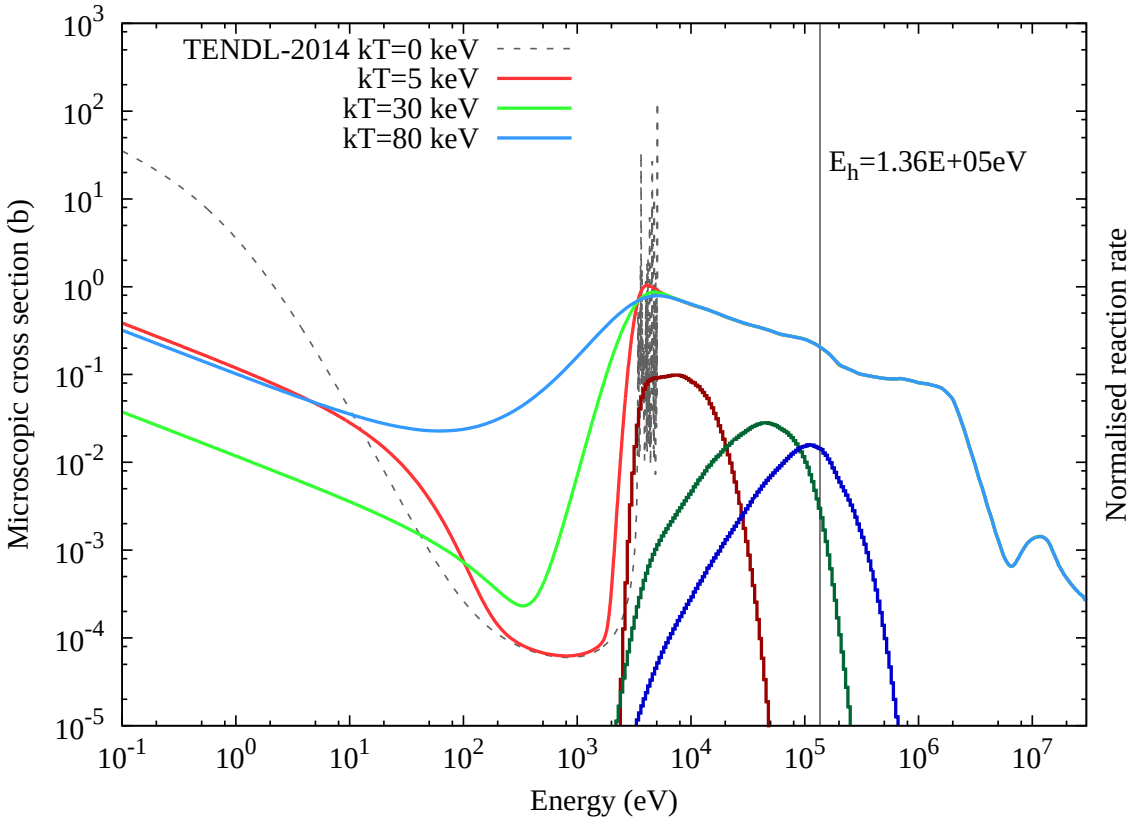


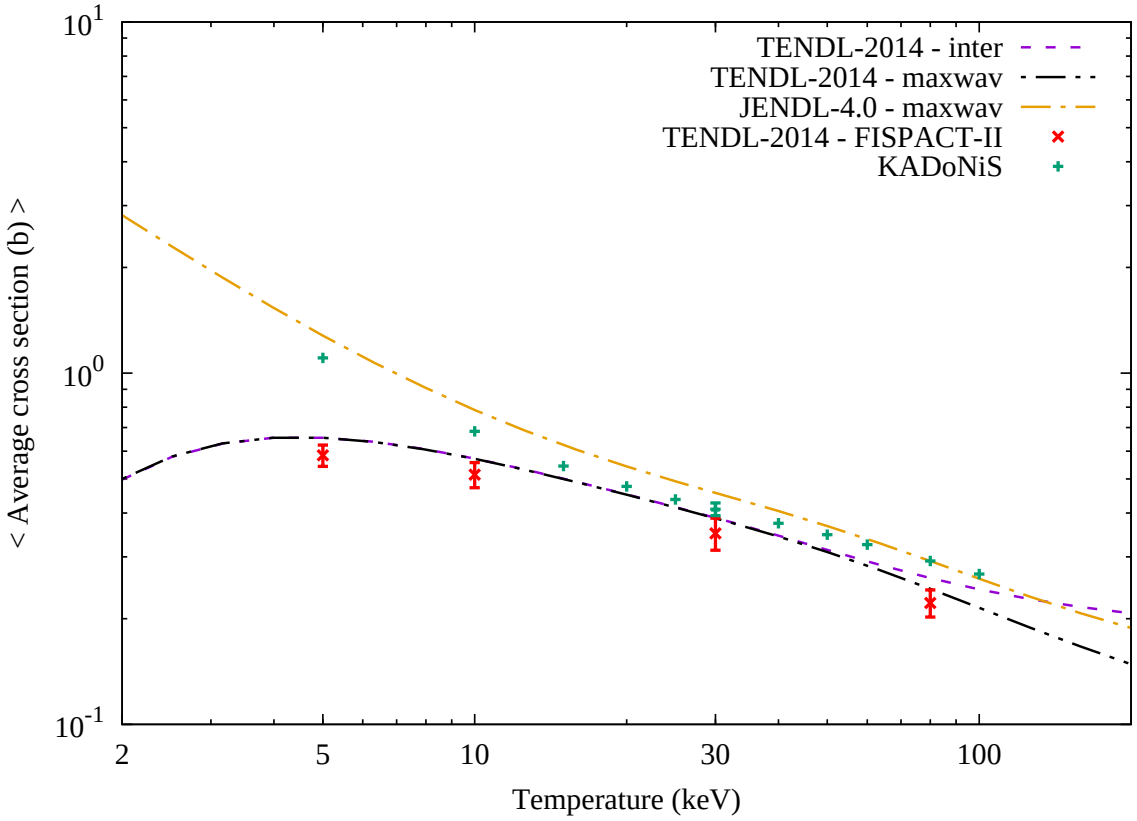
$^{184}Os_{76}$ $[T_{1/2} = 5.60 \times 10^{13}$ years$]$



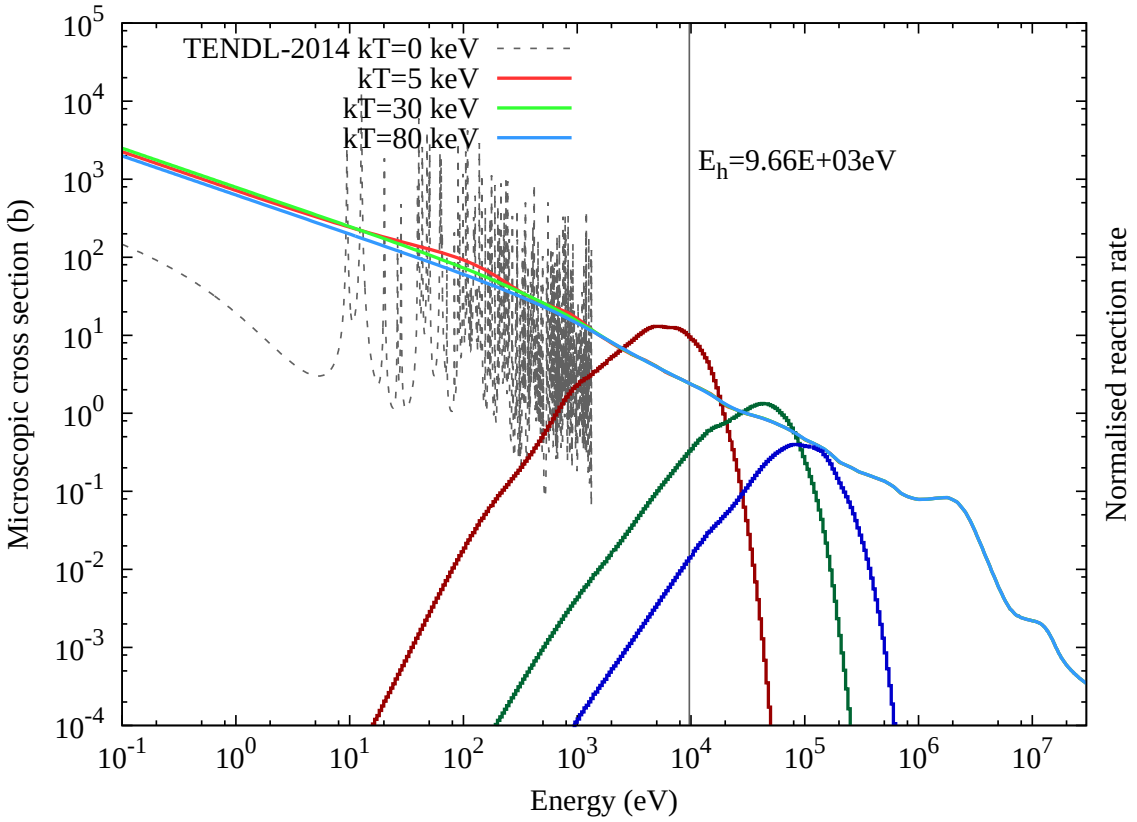


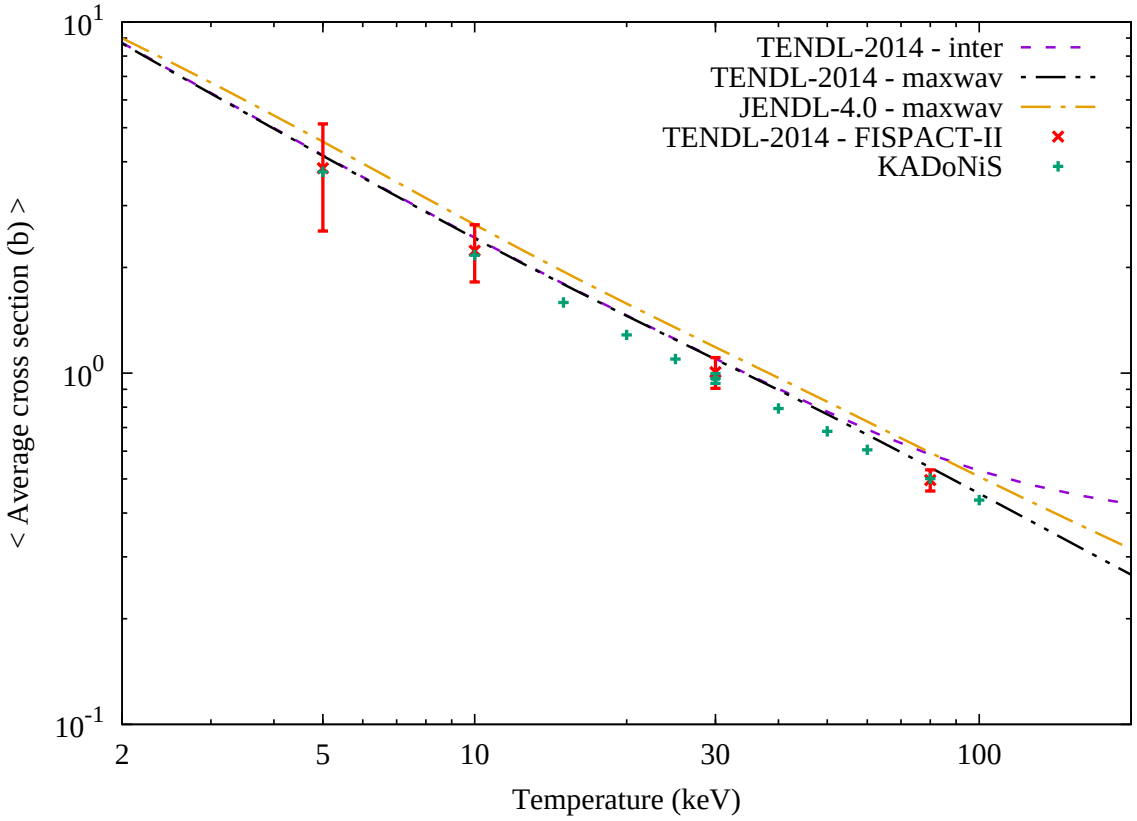
$^{186}Os_{76}$ $[T_{1/2} = 2.00 \times 10^{15}$ years$]$



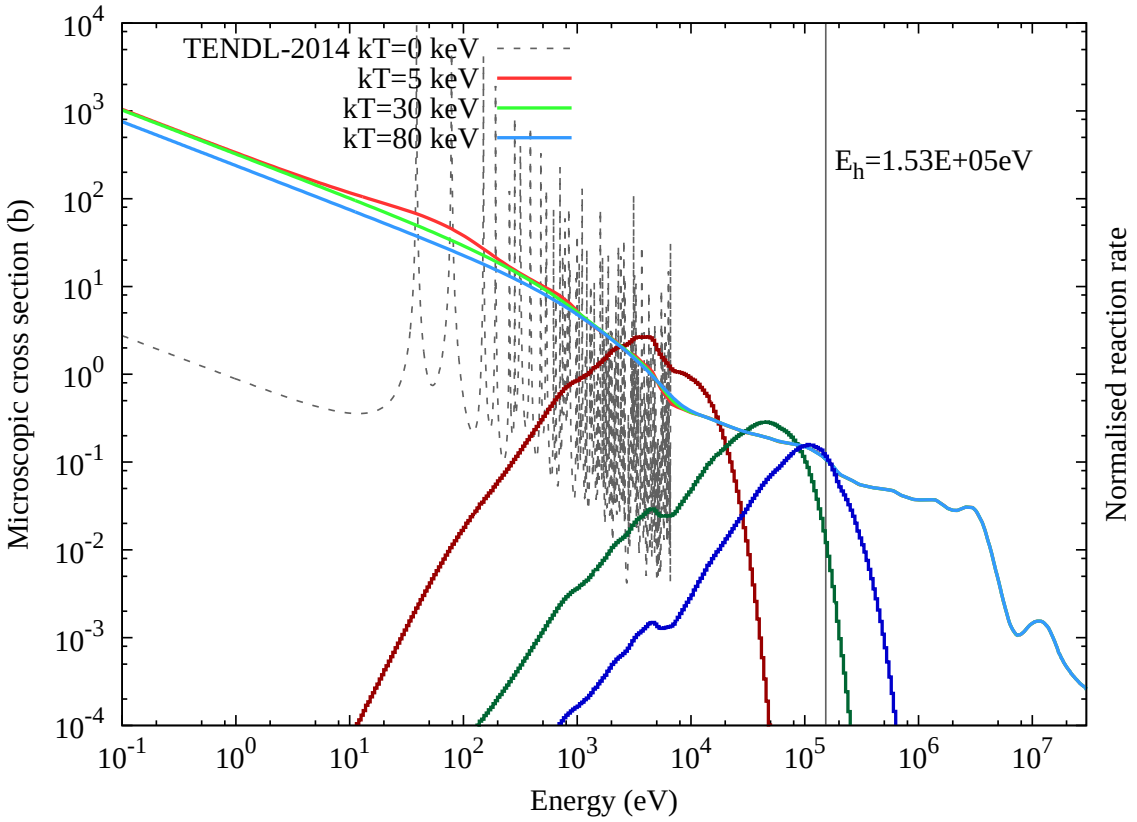


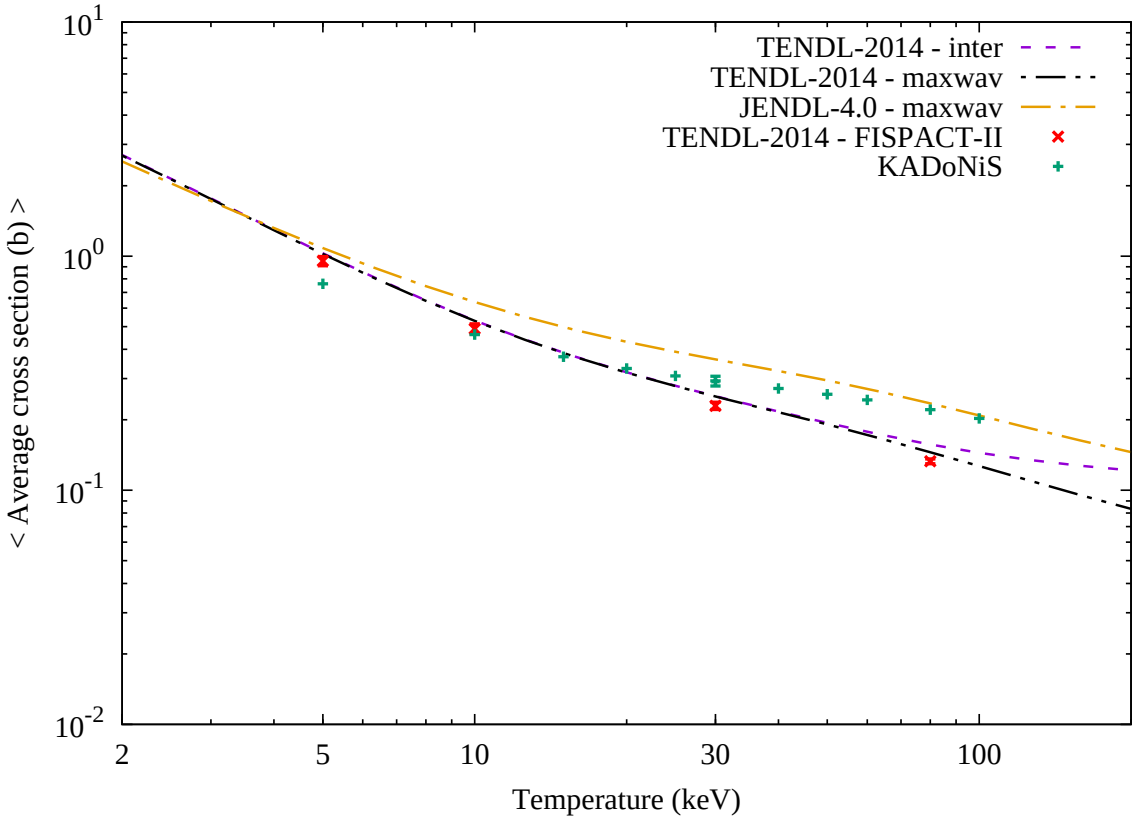
$^{187}Os_{76}$ [Stable]



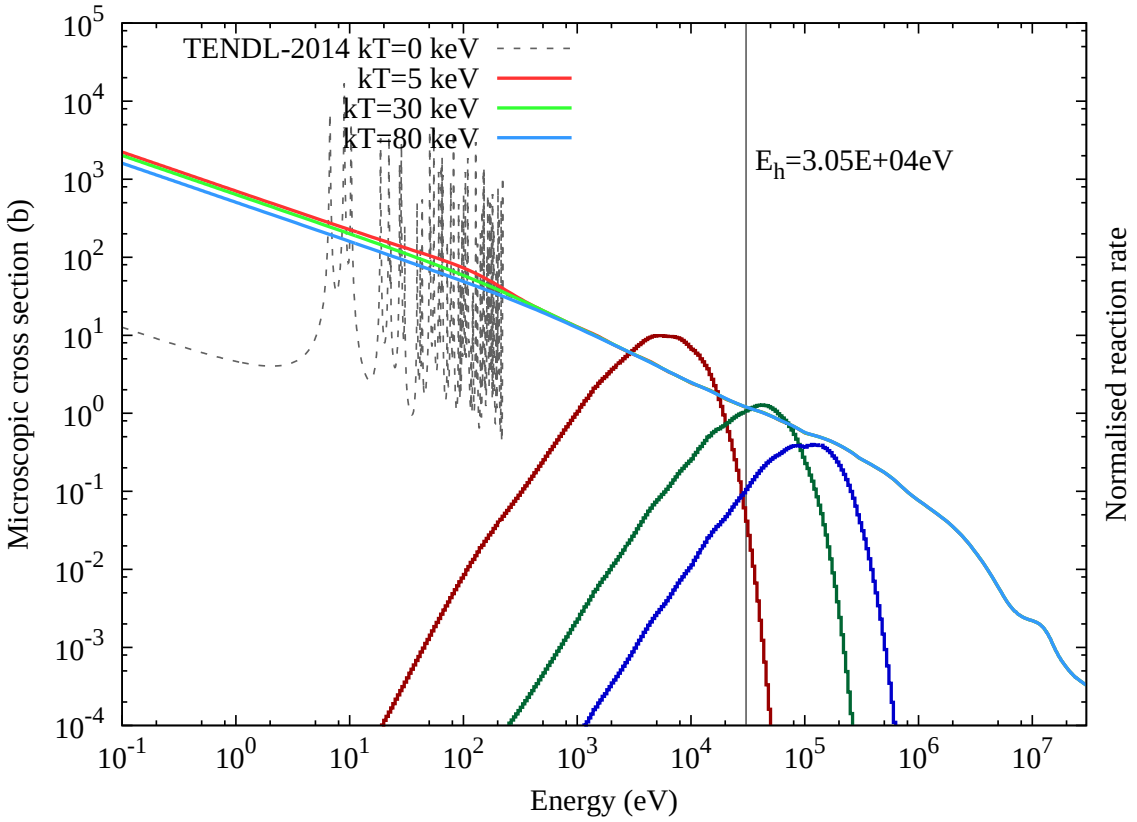


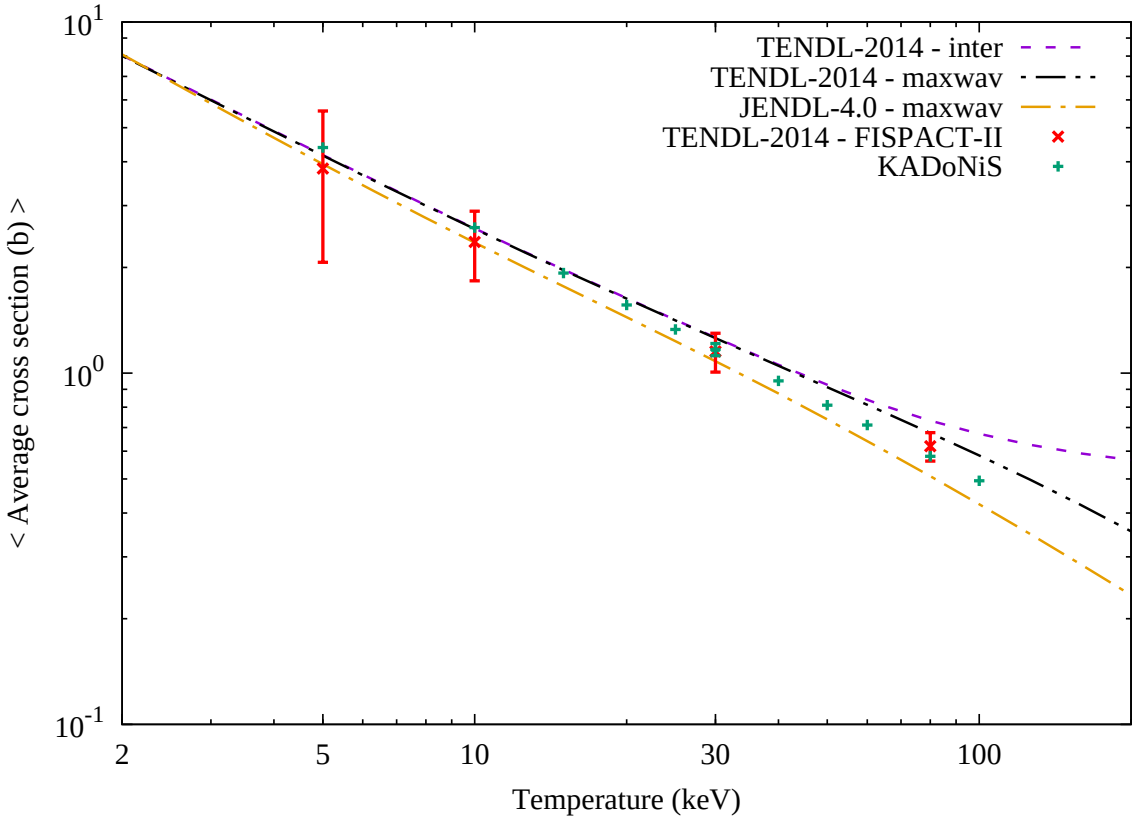
$^{188}Os_{76}$ [Stable]



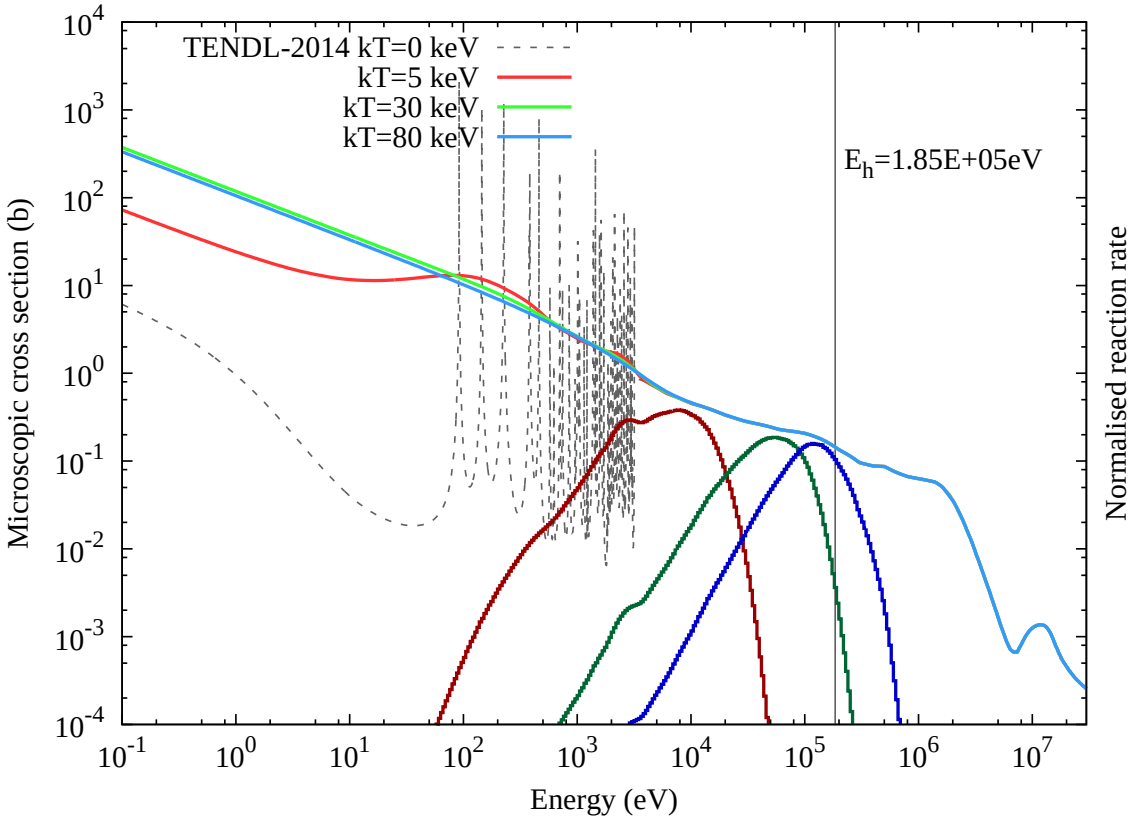


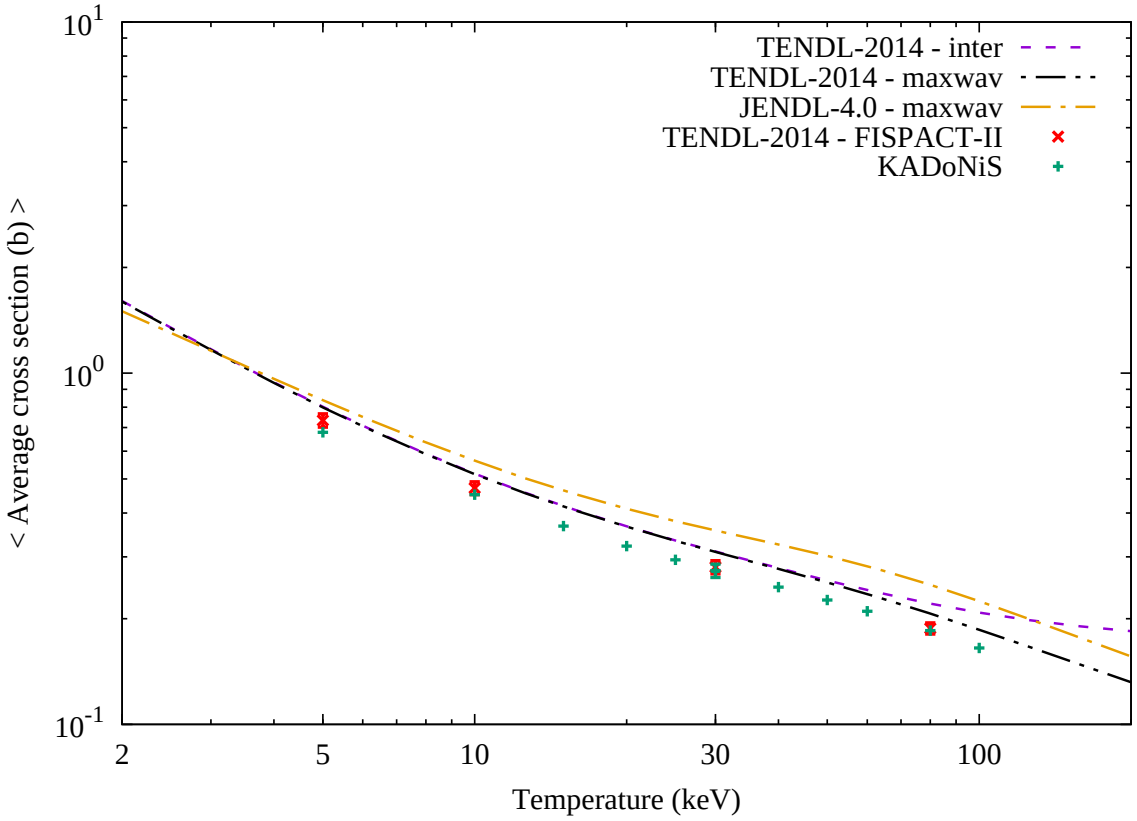
$^{189}Os_{76}$ [Stable]



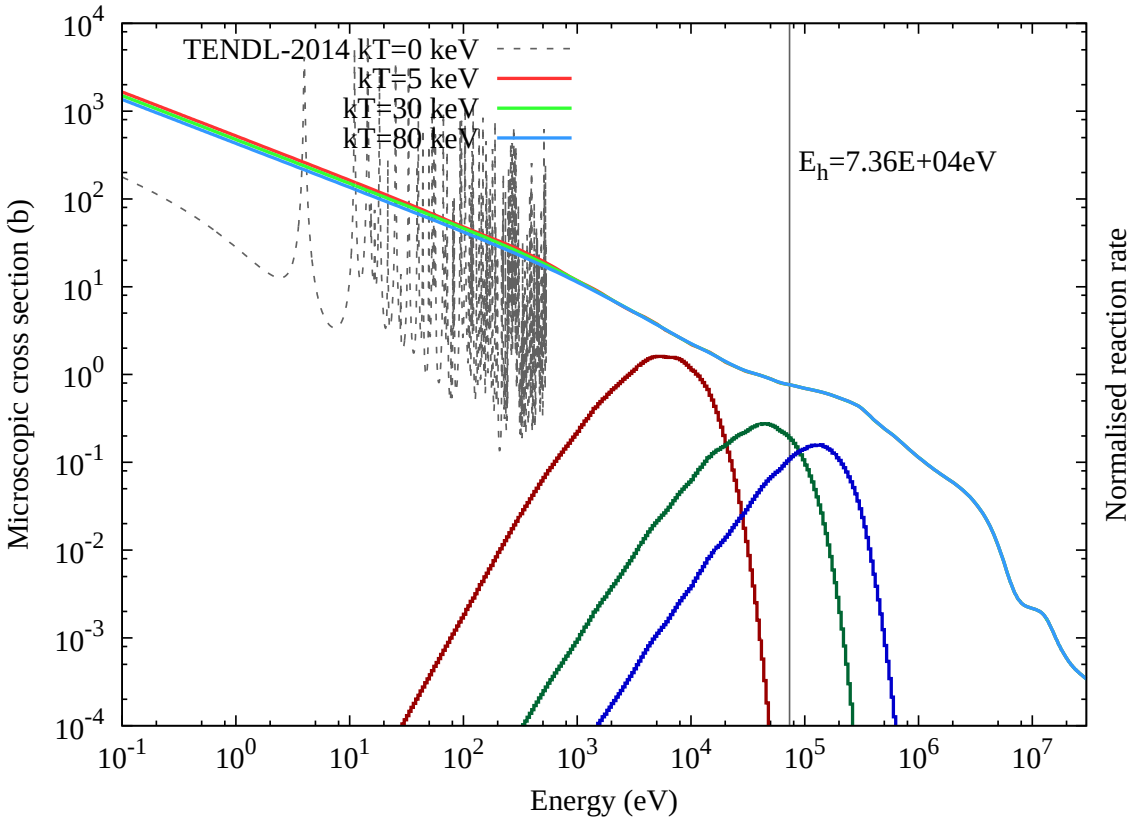


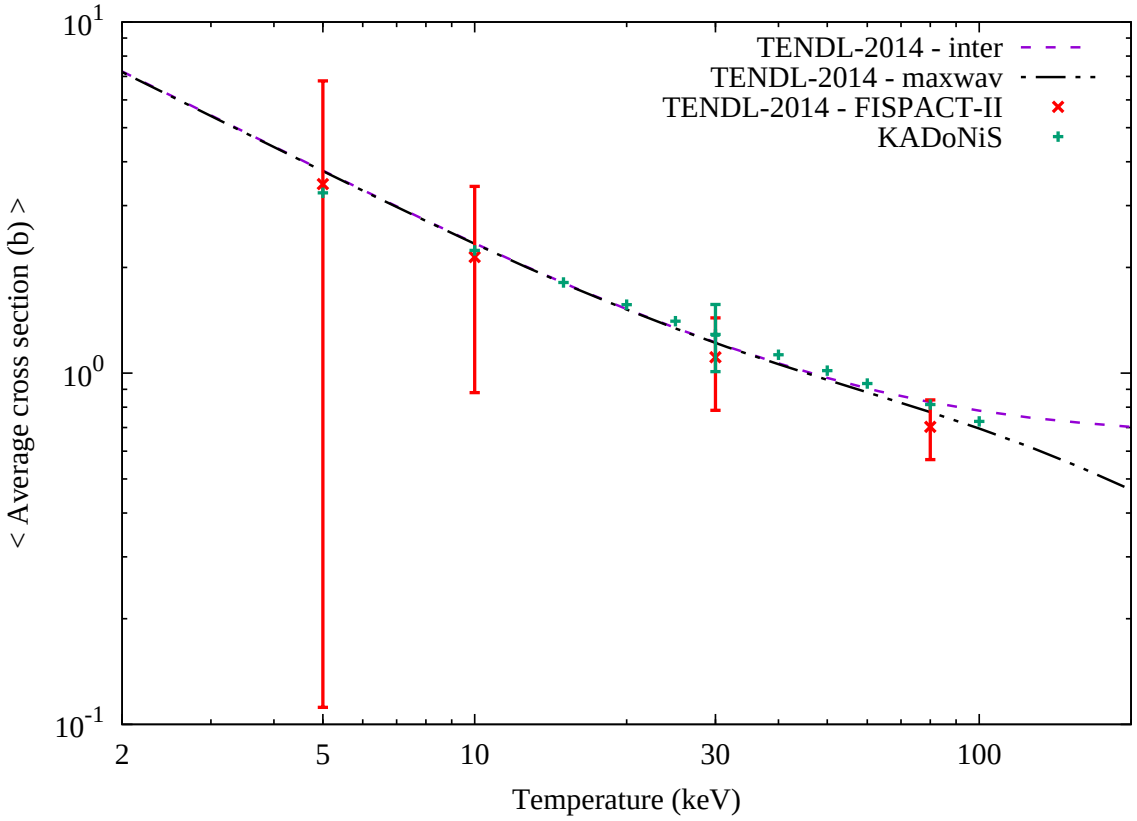
$^{190}Os_{76}$ [Stable]



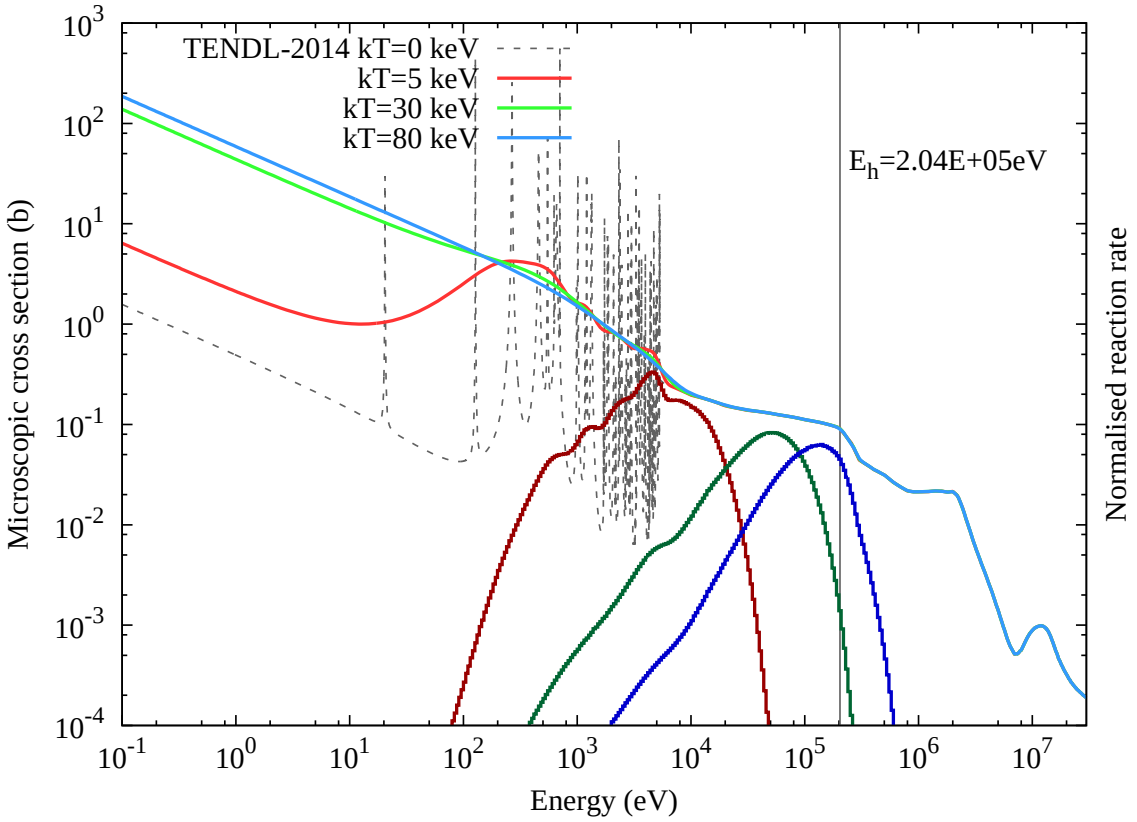


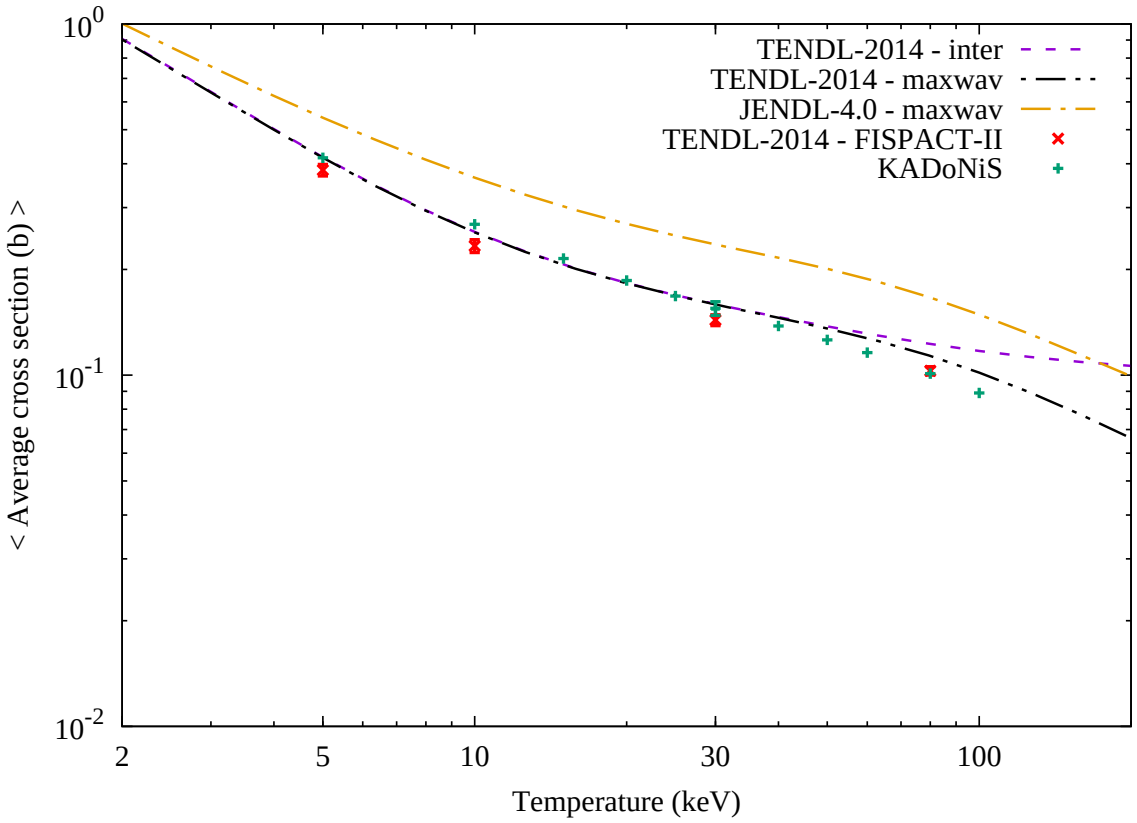
$^{191}Os_{76}$ $[T_{1/2} = 15.30 \text{ days}]$ (KADoNiS=SMC)



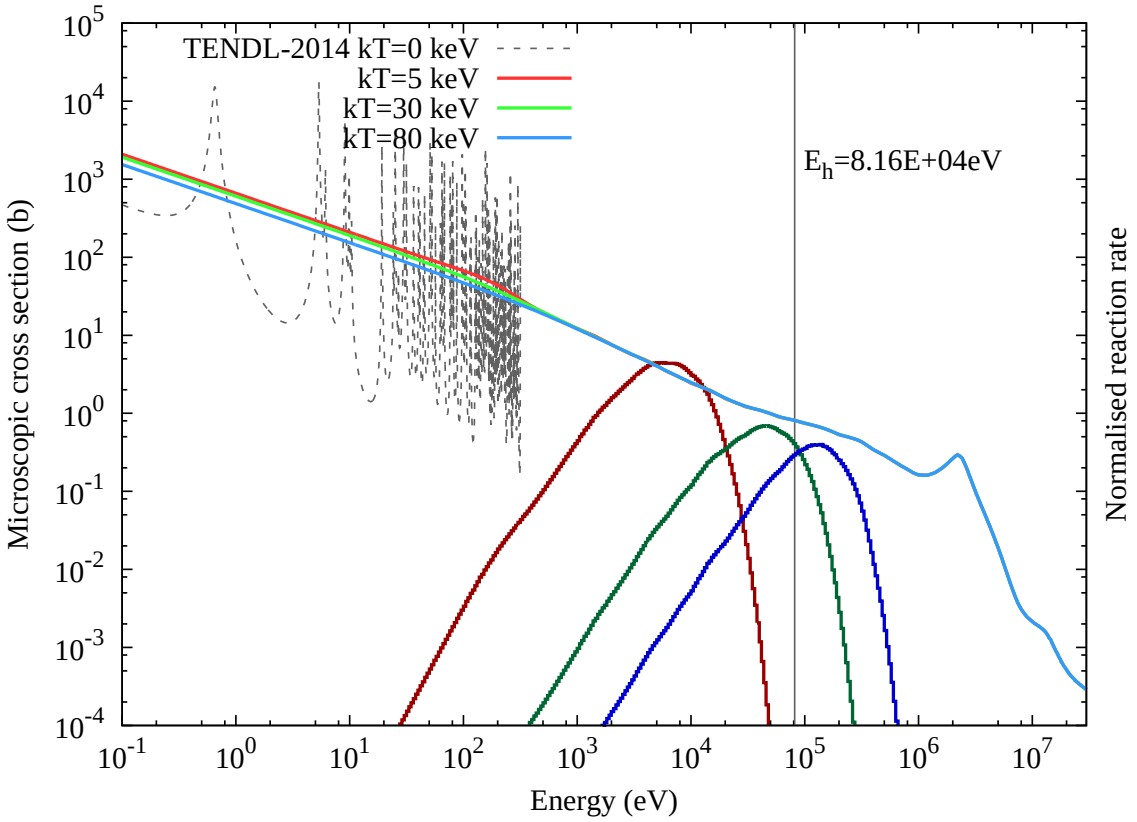


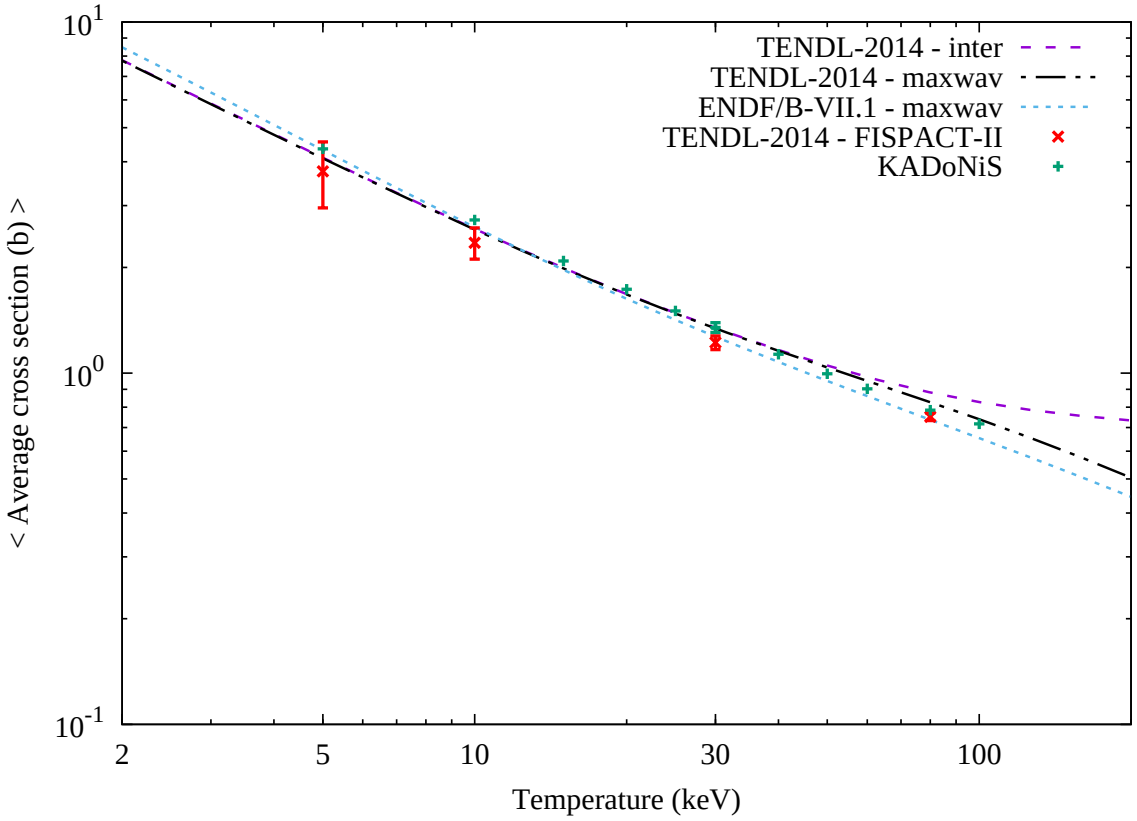
$^{192}Os_{76}$ [Stable]



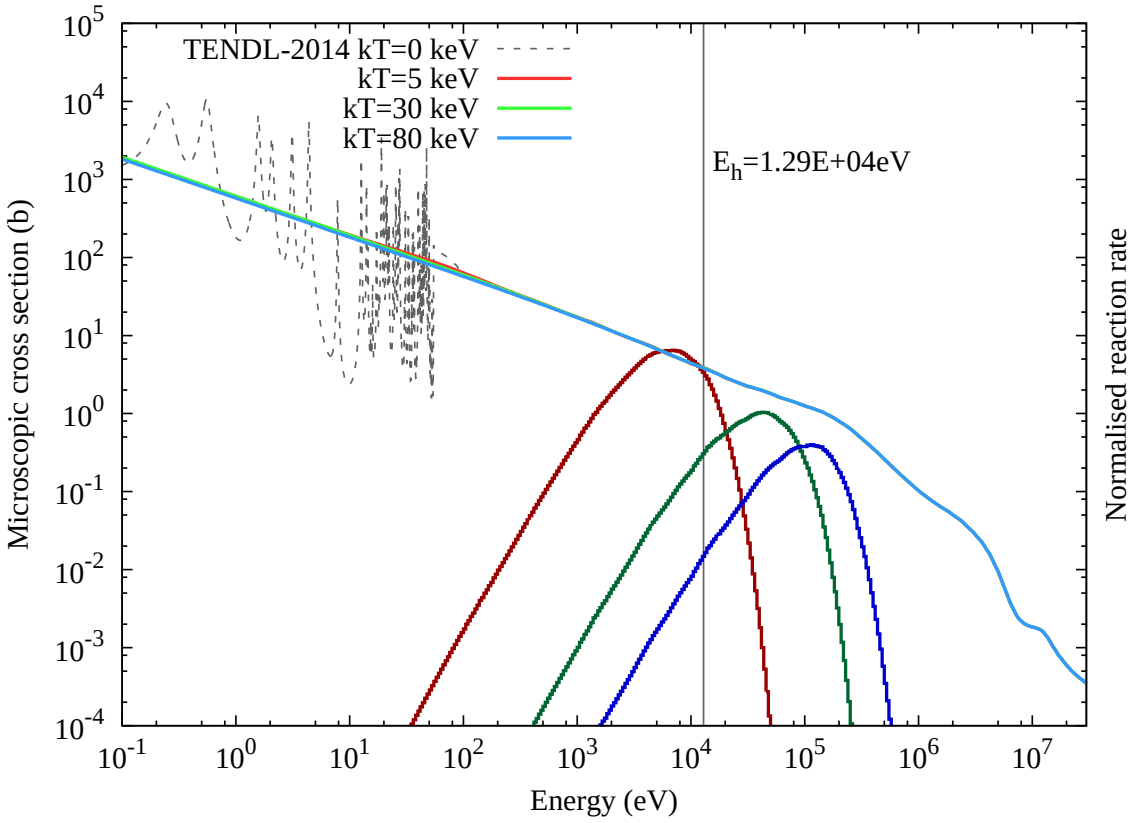


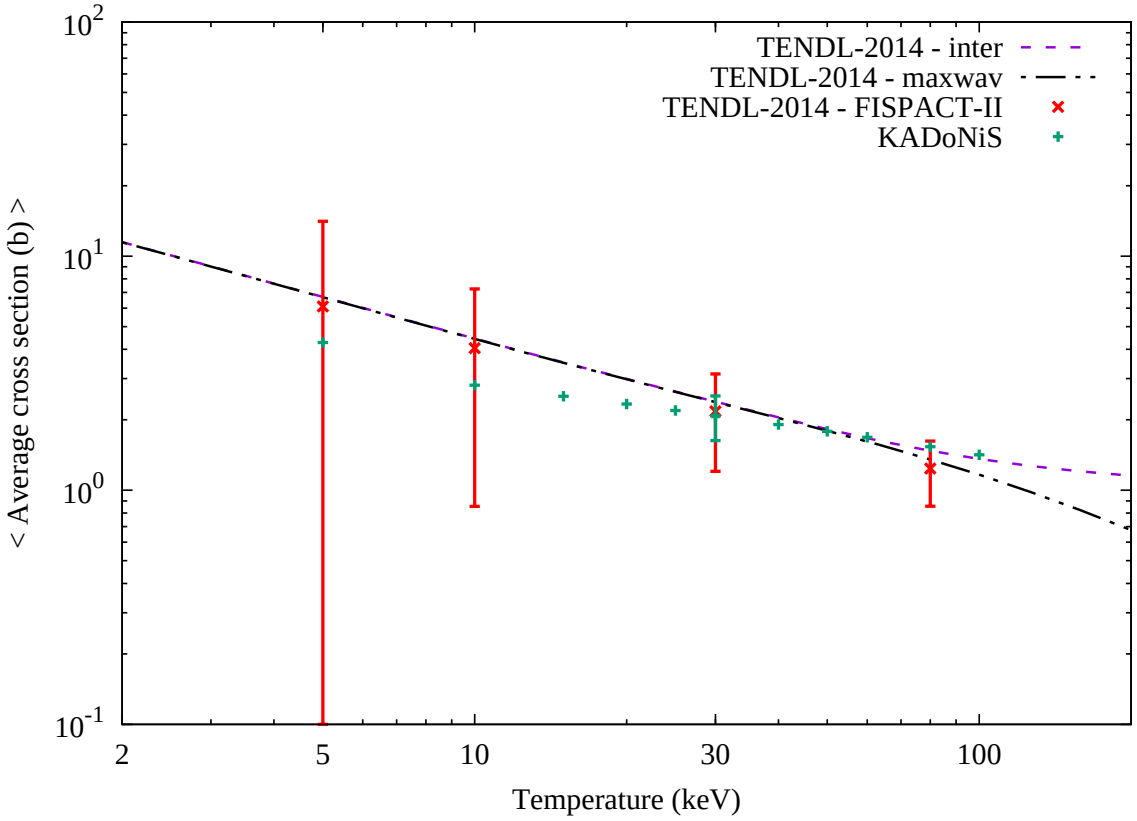
$^{191}Ir_{77}$ [Stable]



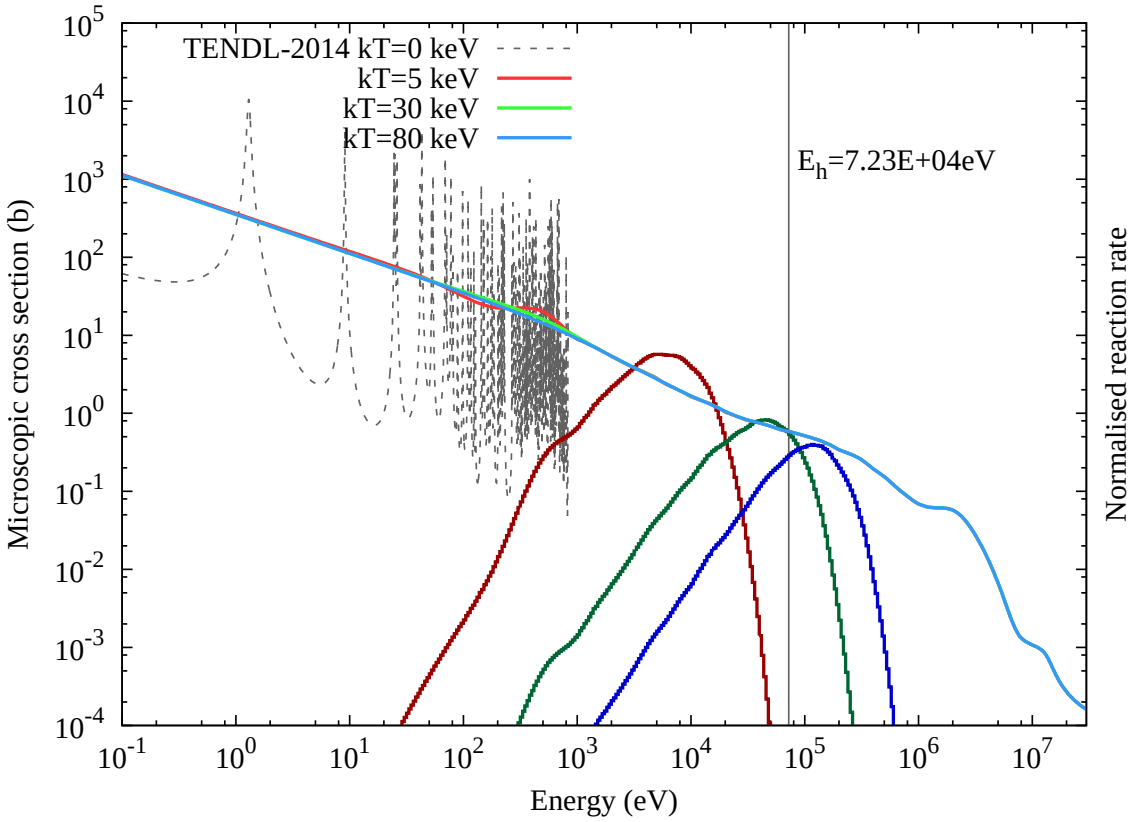


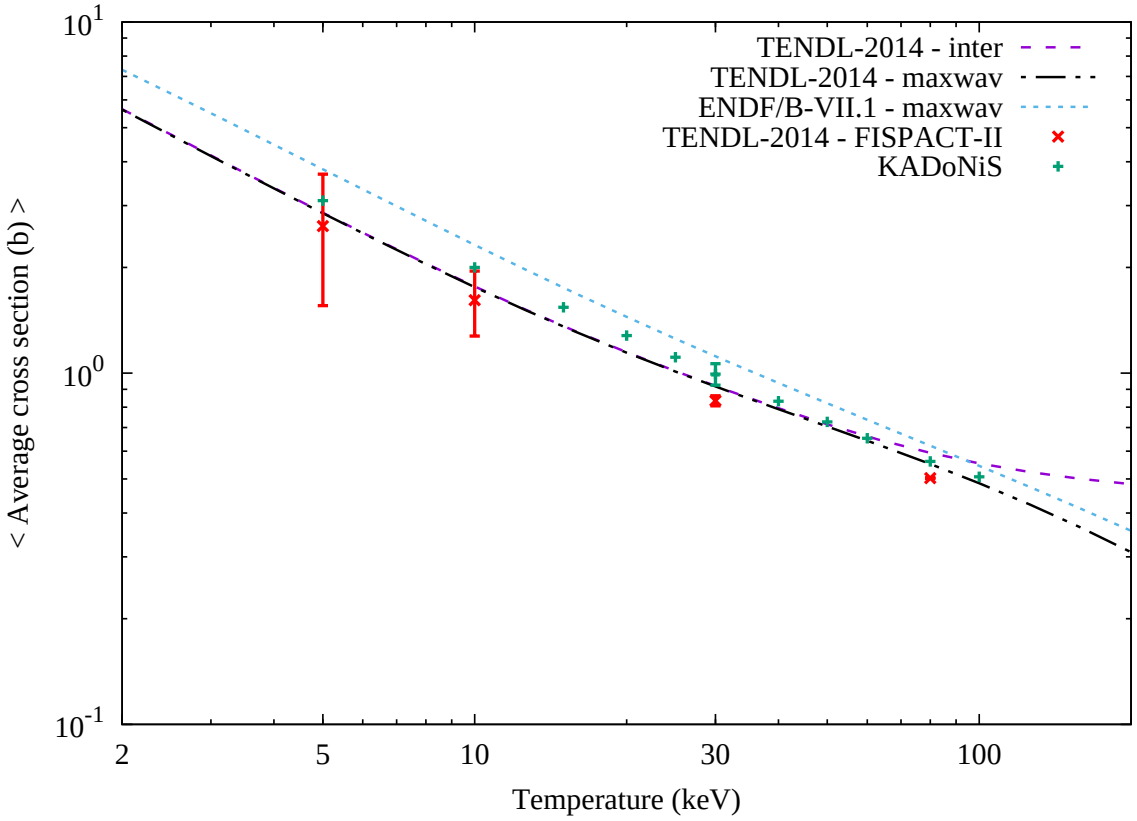
$^{192}Ir_{77}$ $[T_{1/2} = 73.82$ days$]$ (KADoNiS=SMC)



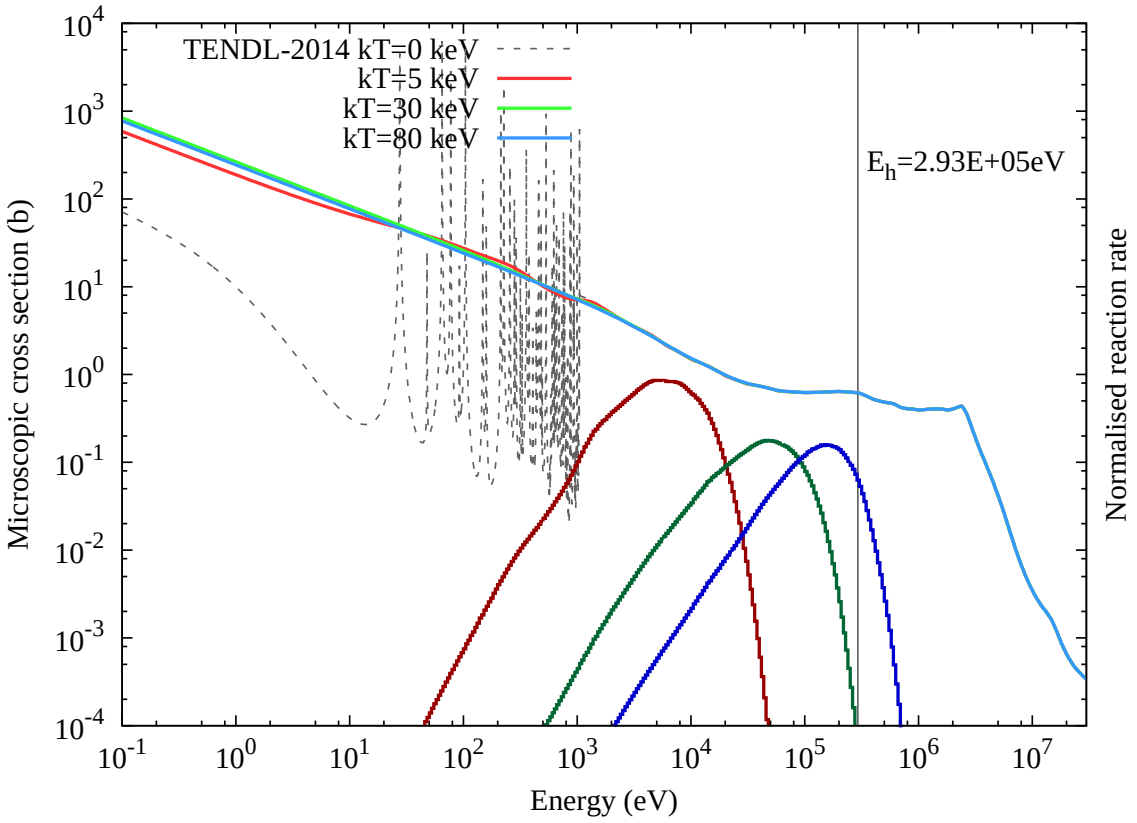


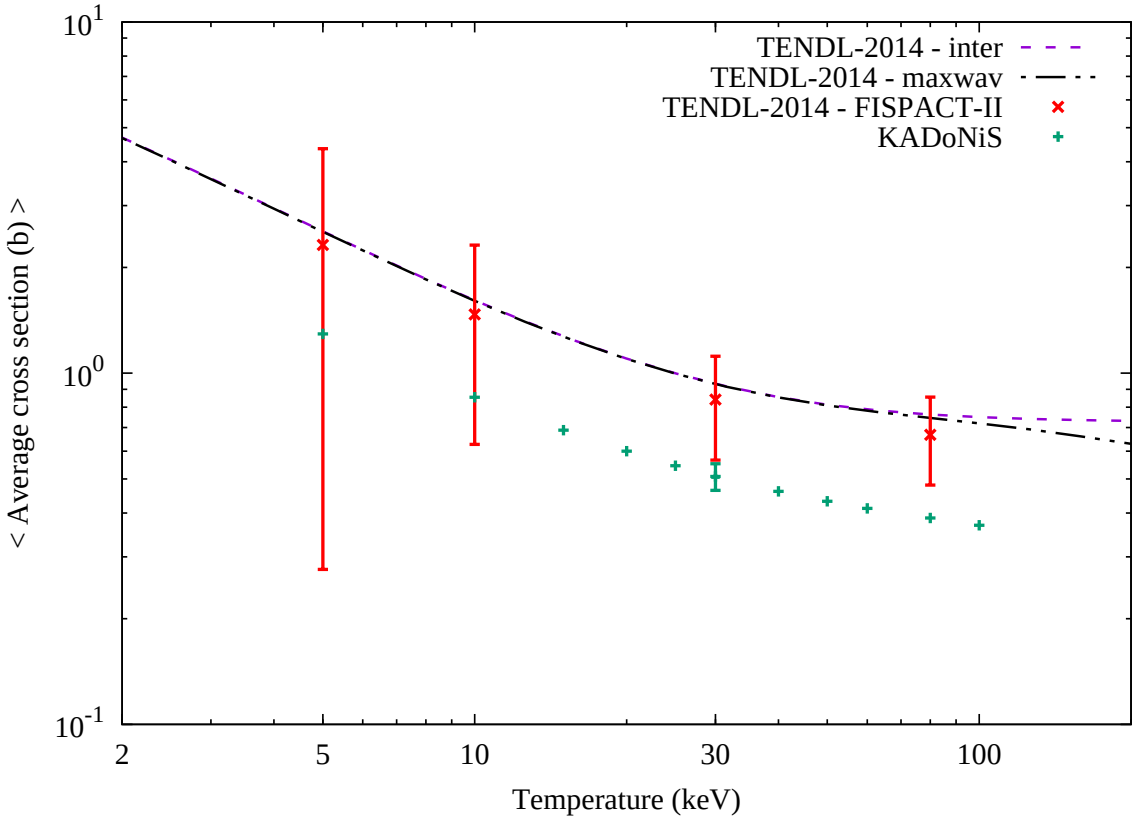
$^{193}Ir_{77}$ [Stable]



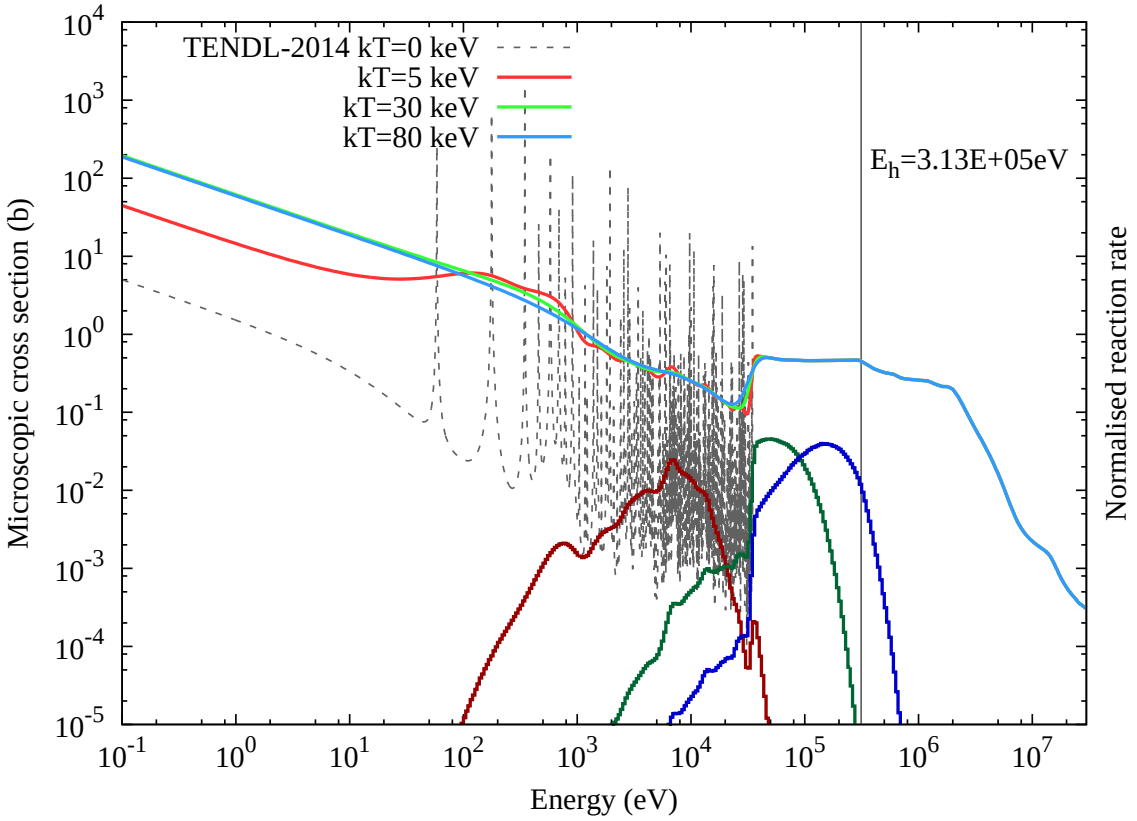


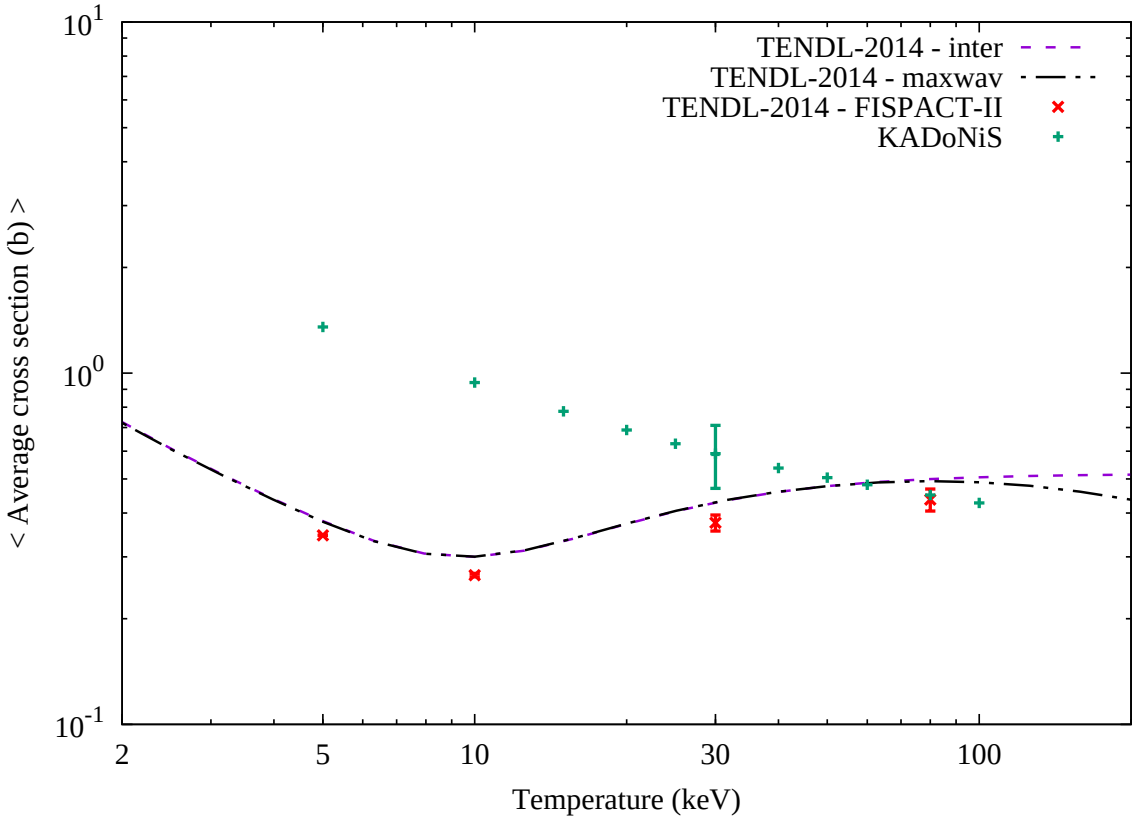
$^{190}Pt_{78}$ $[T_{1/2} = 6.50 \times 10^{11}$ years$]$



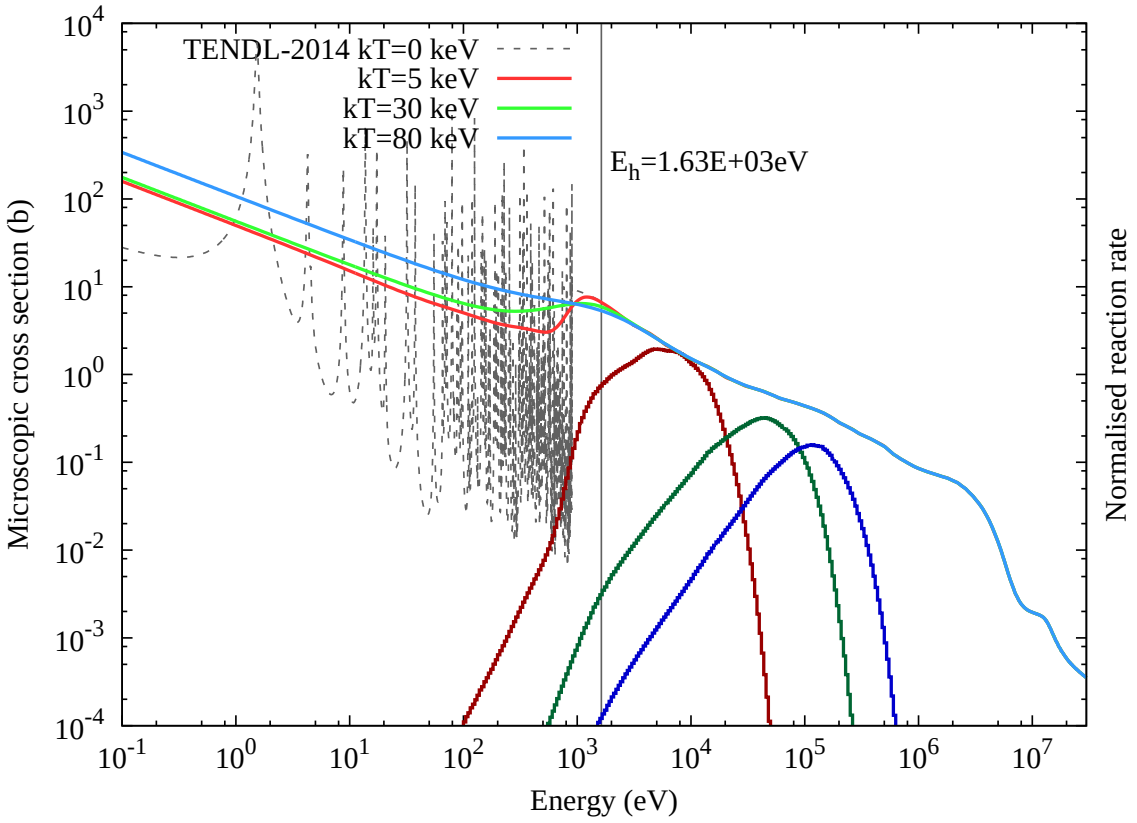


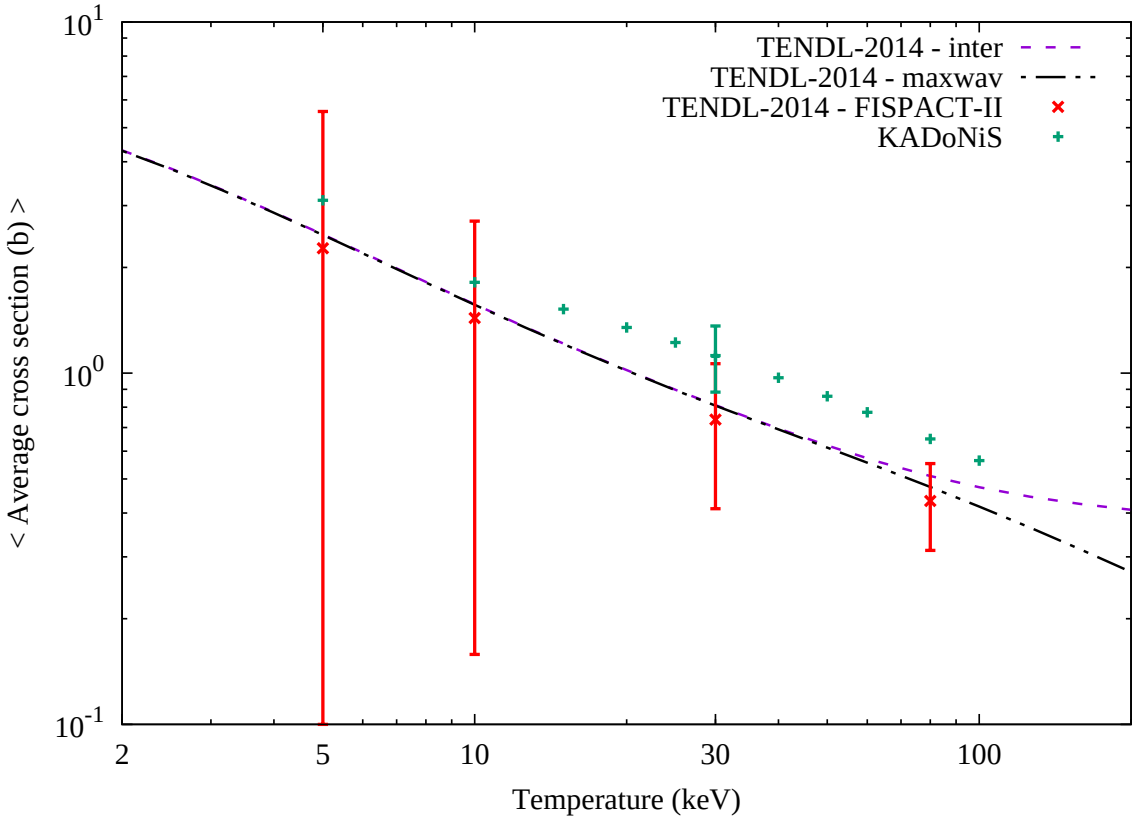
$^{192}Pt_{78}$ [Stable]



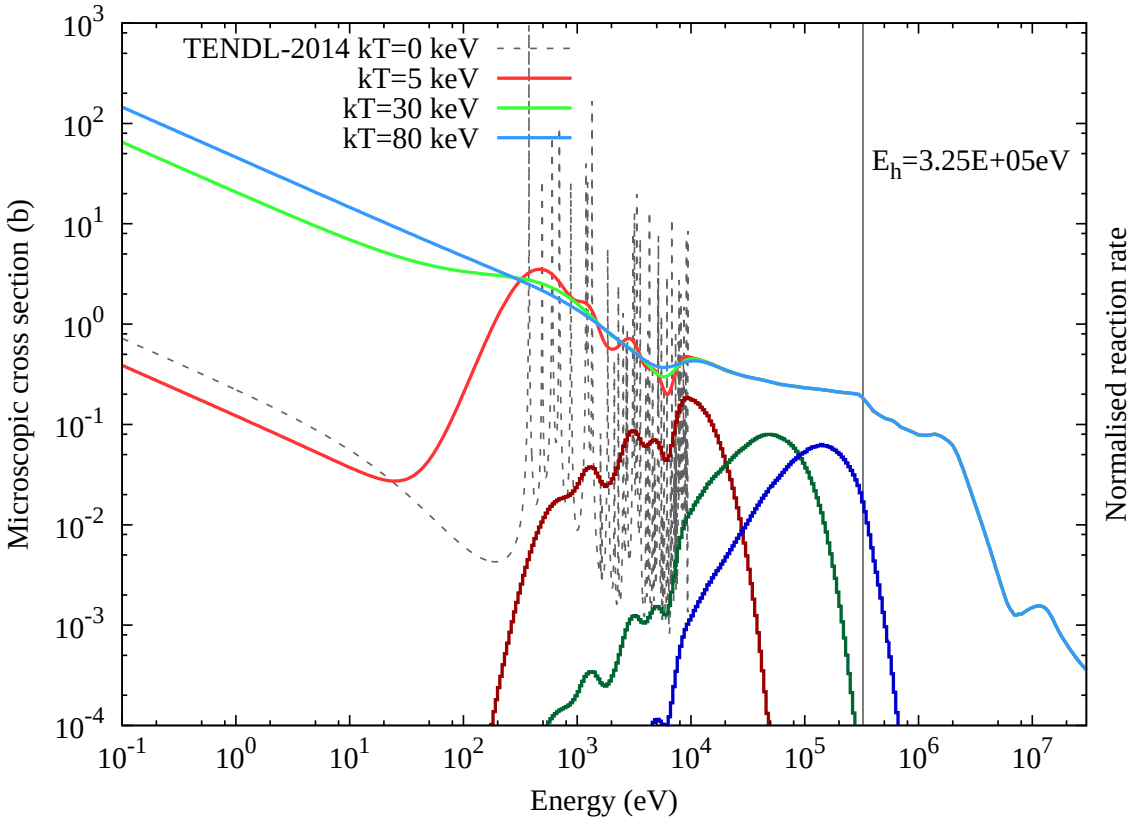


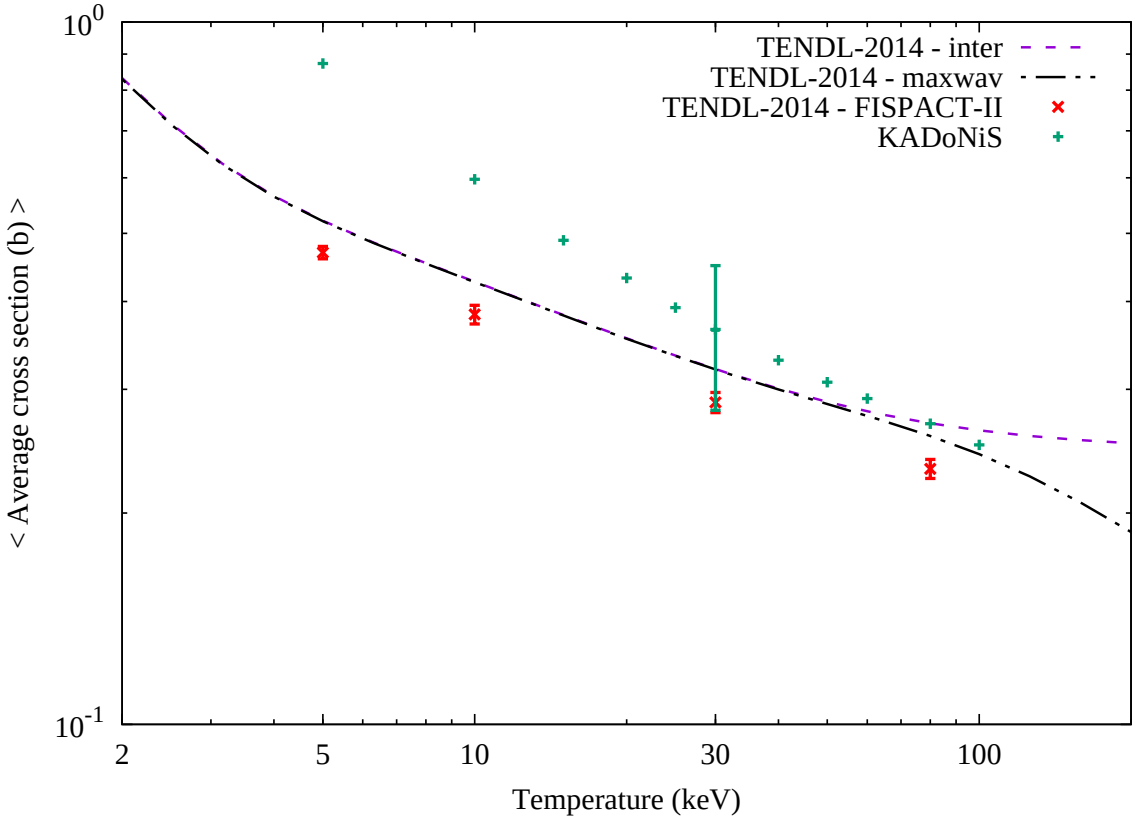
$^{193}Pt_{78}$ $[T_{1/2} = 50.00$ years$]$ (KADoNiS=SMC)



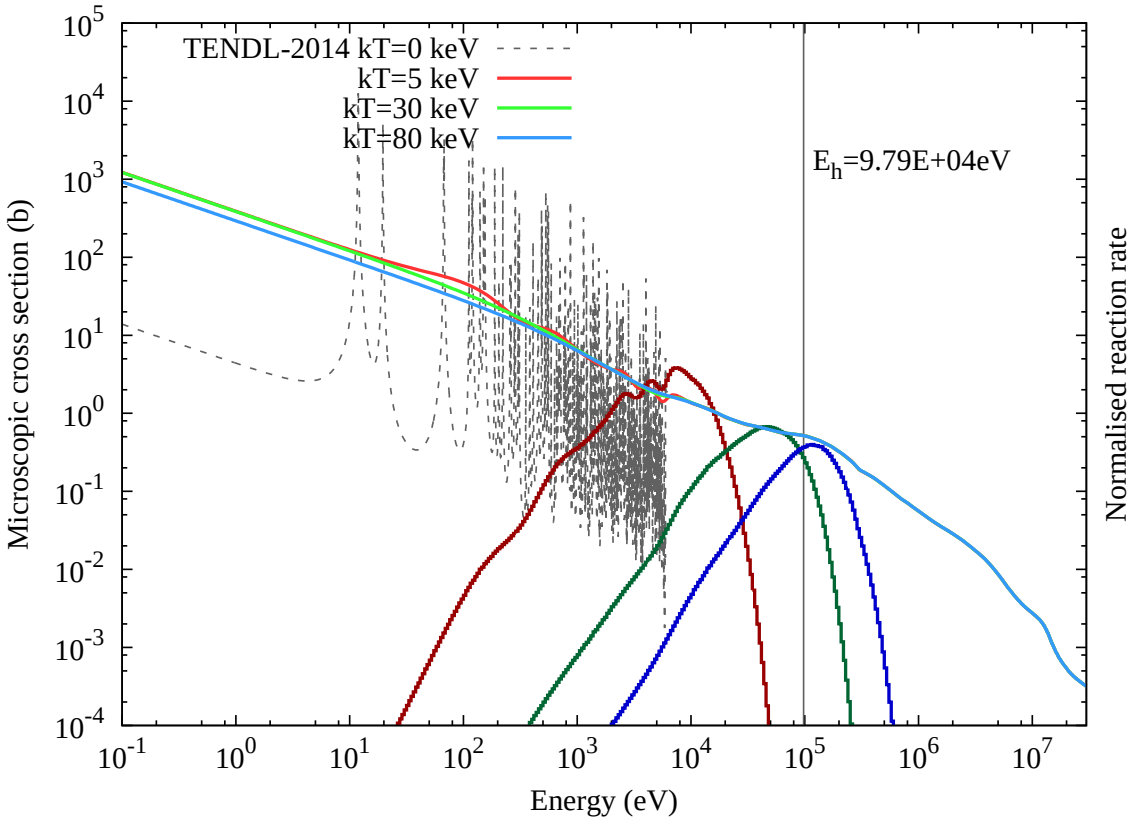


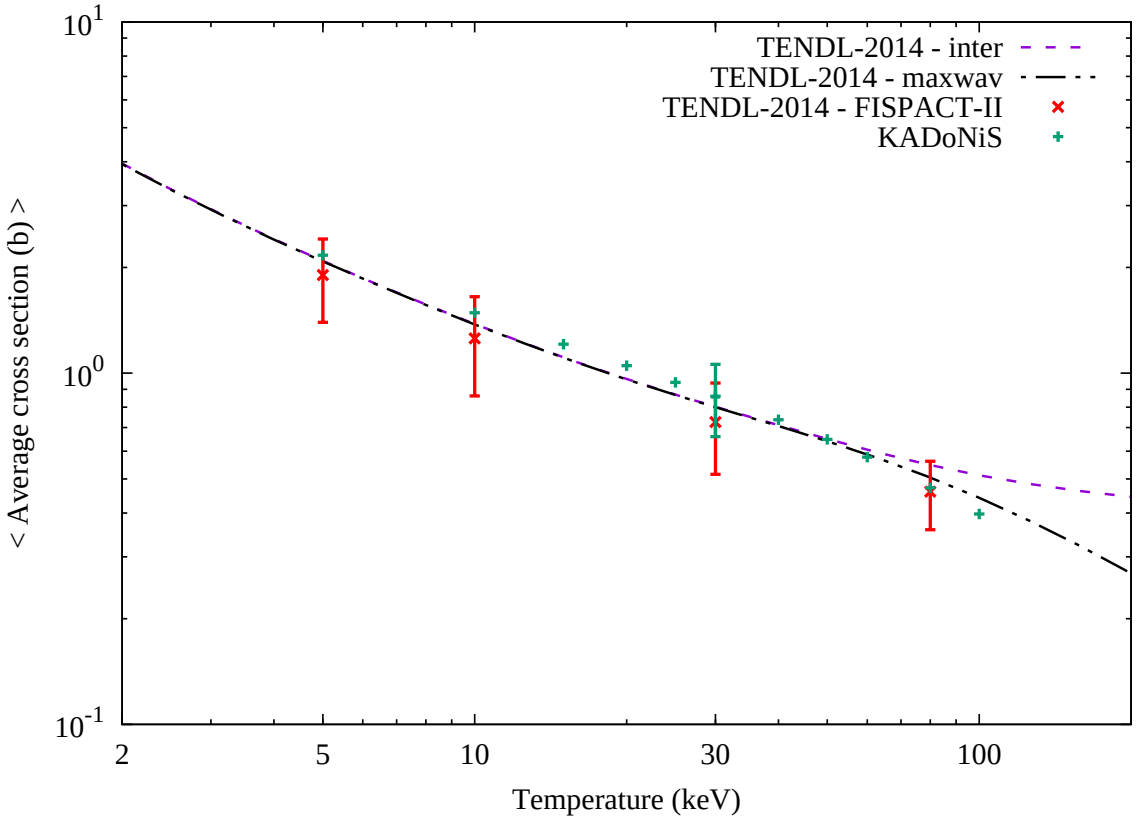
$^{194}Pt_{78}$ [Stable]



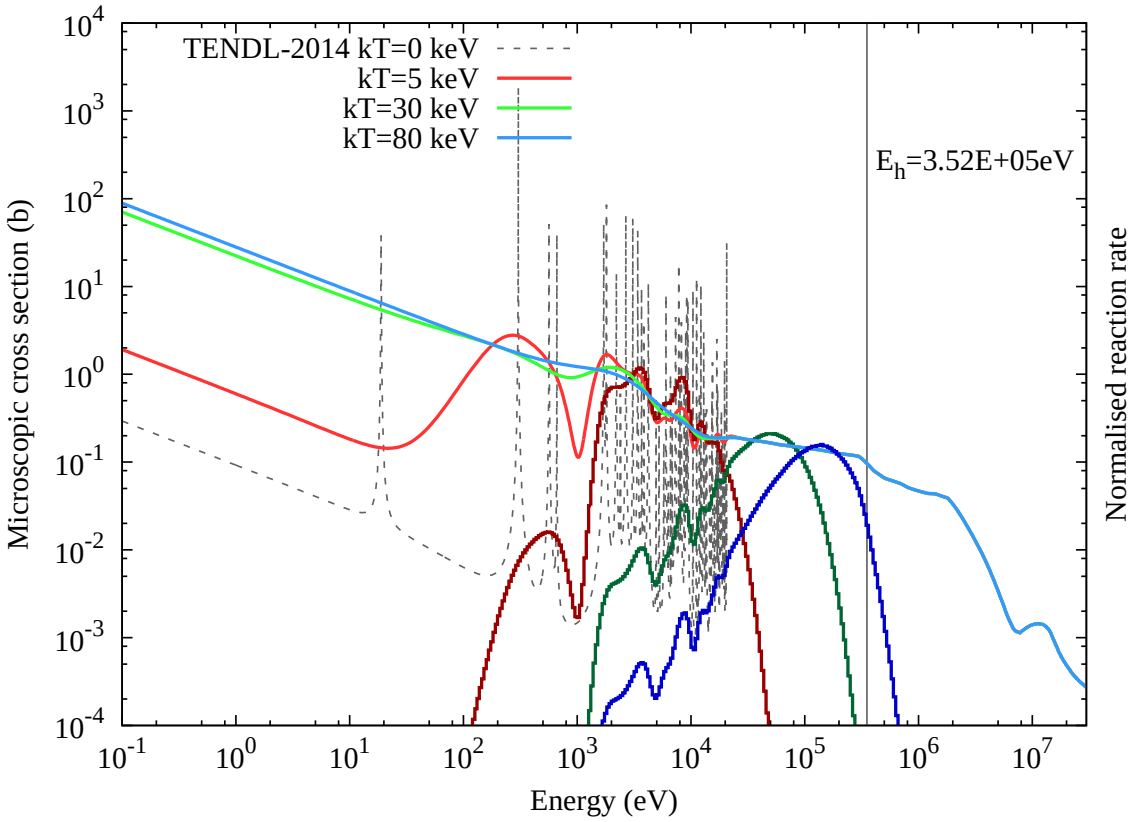


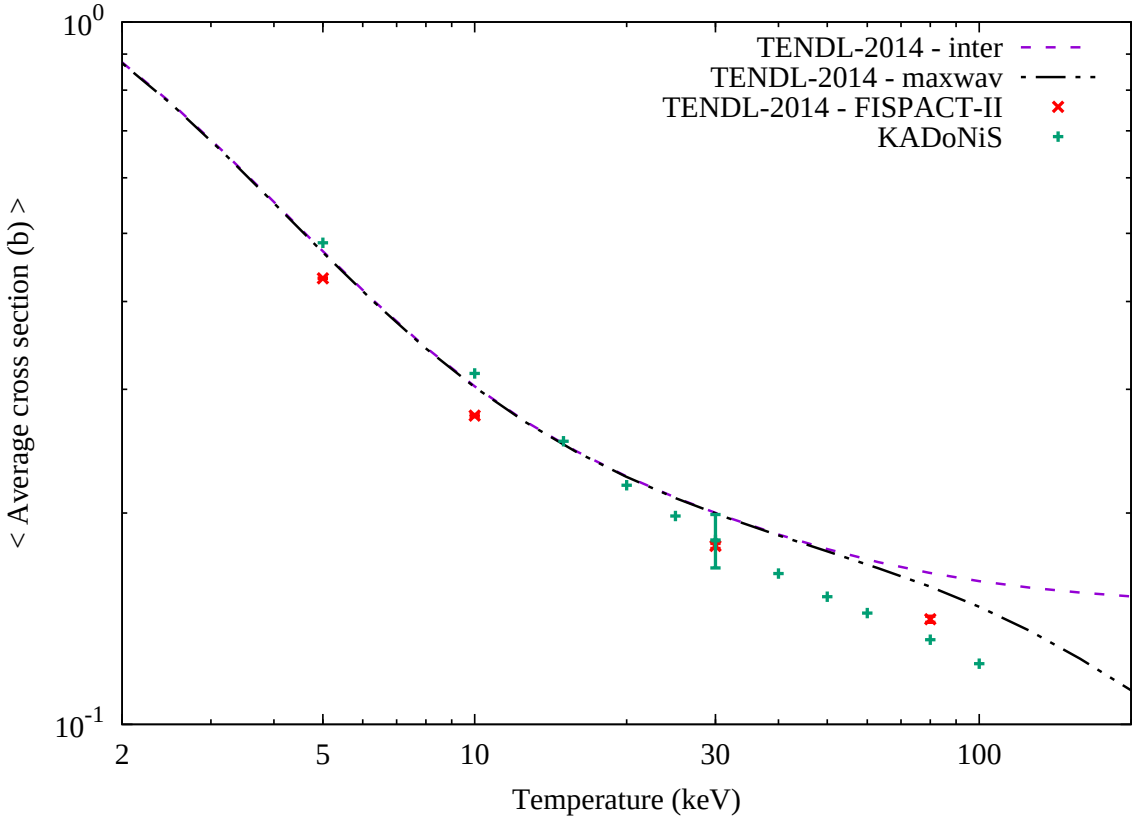
$^{195}Pt_{78}$ [Stable]



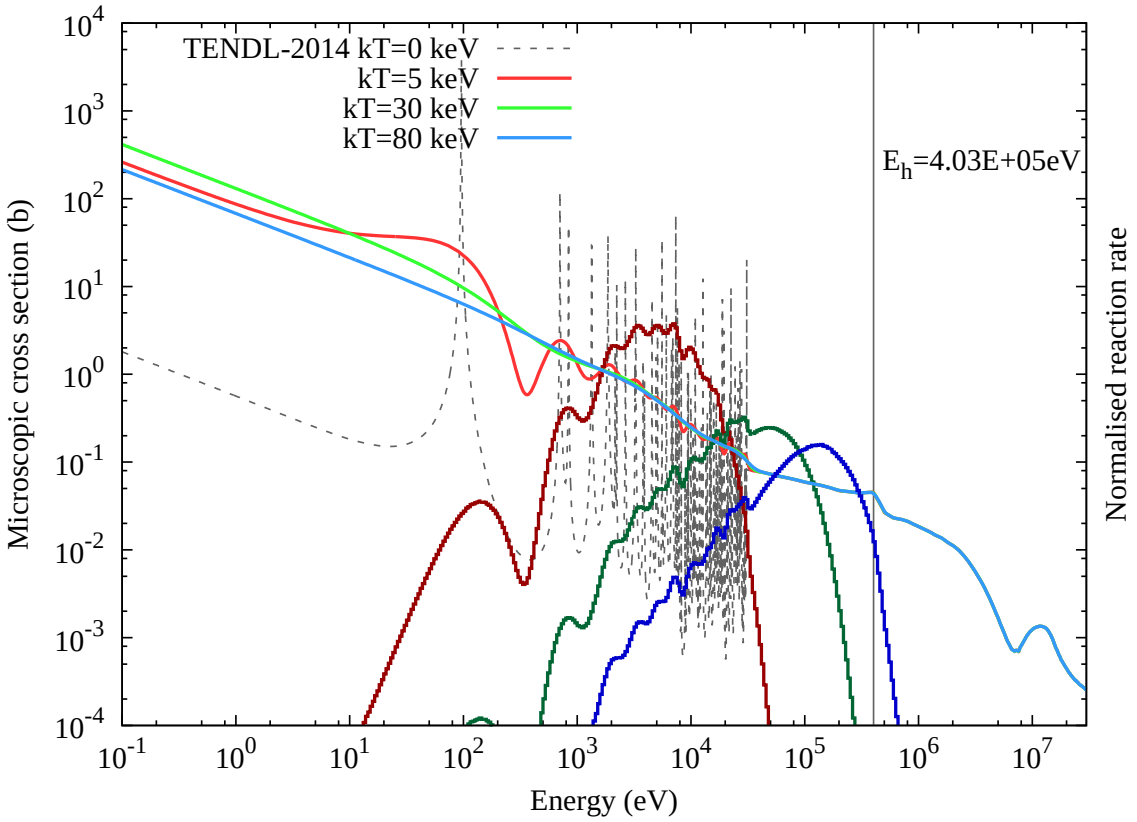


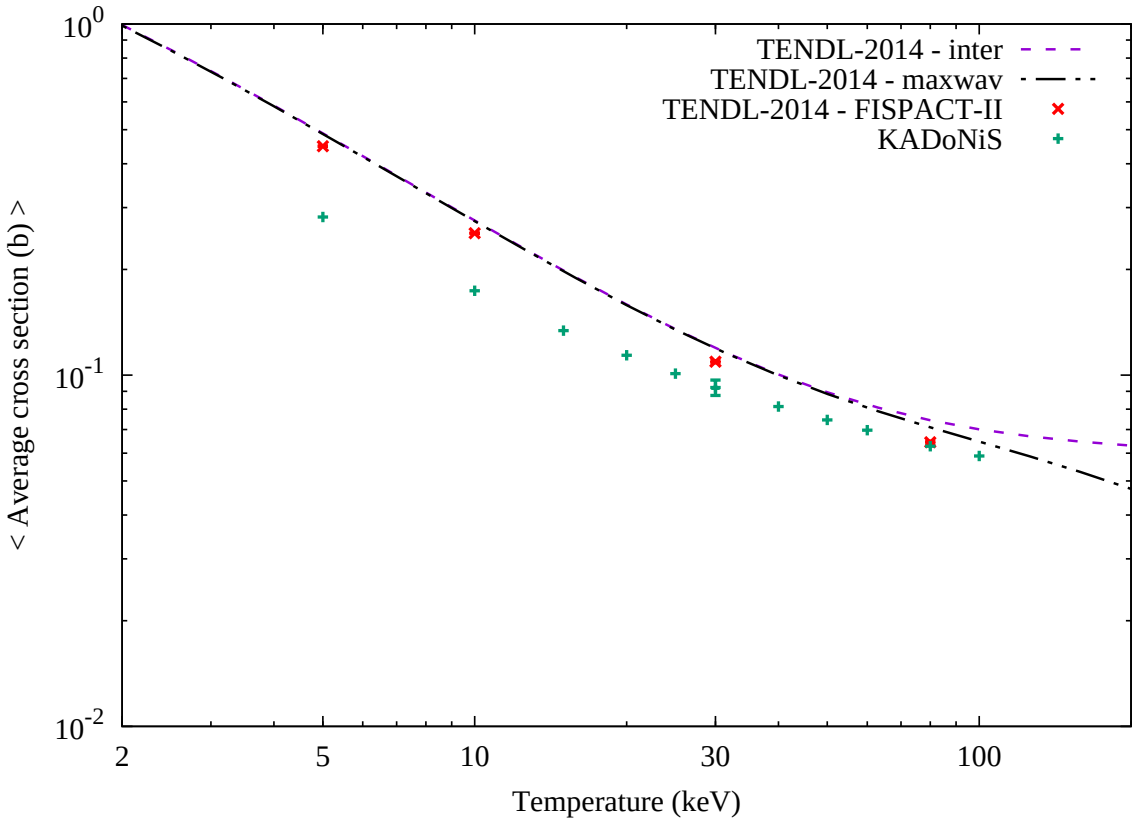
$^{196}Pt_{78}$ [Stable]



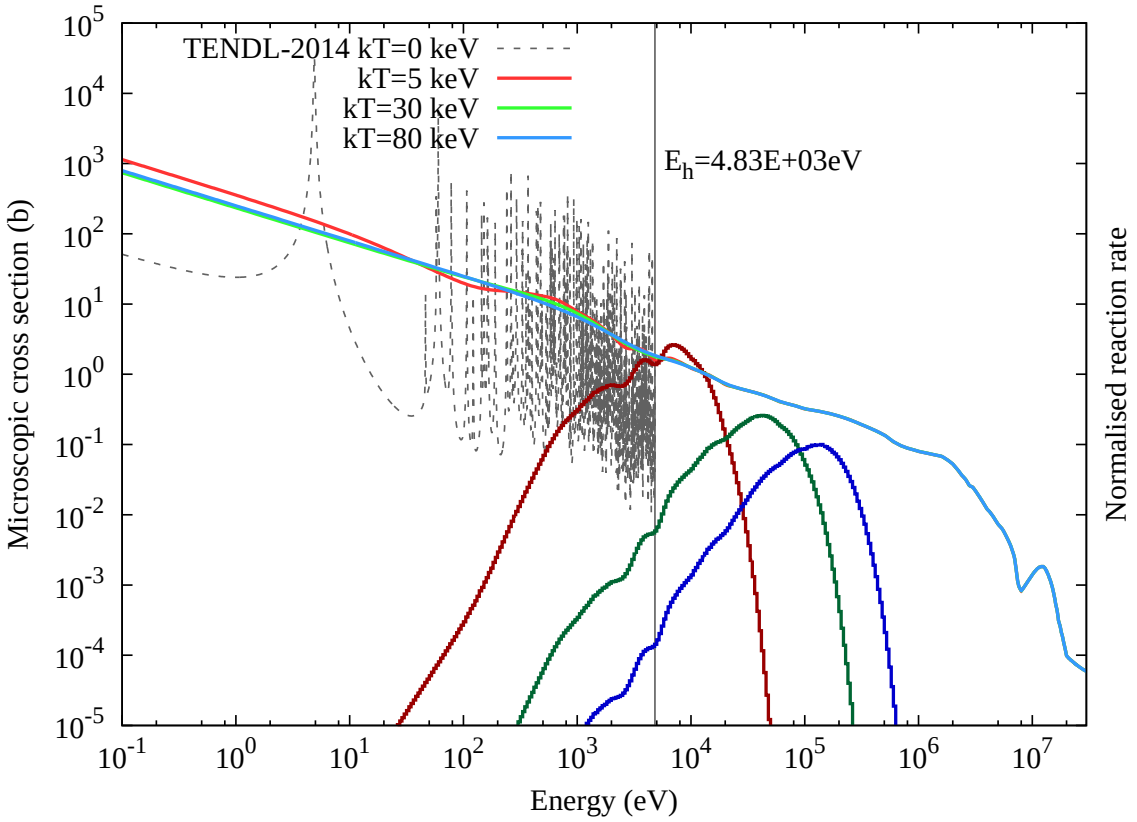


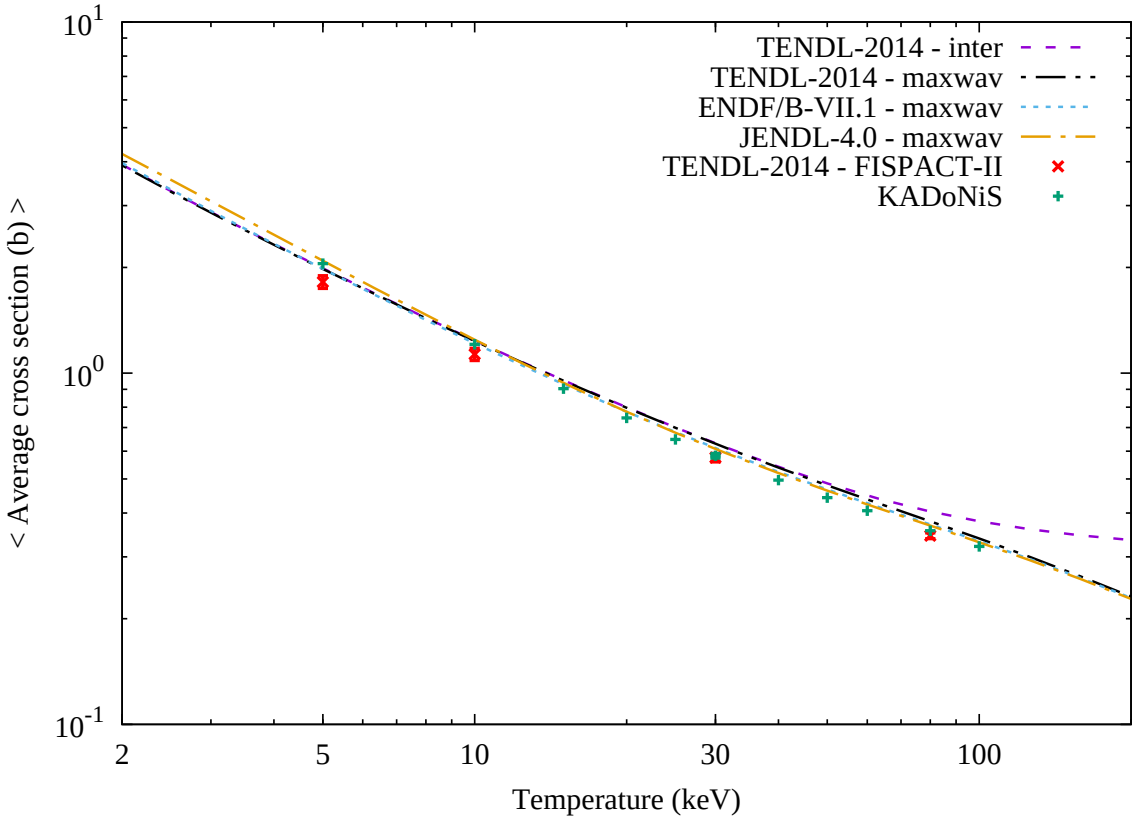
$^{198}Pt_{78}$ [Stable]



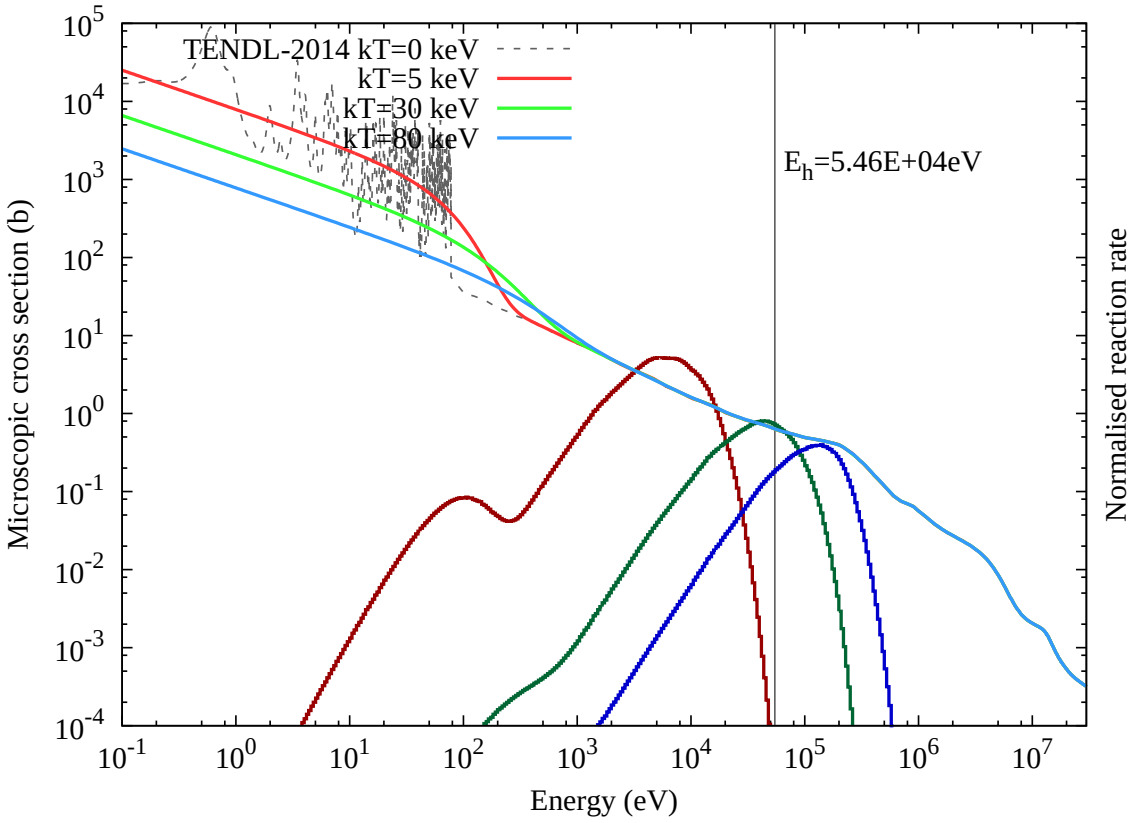


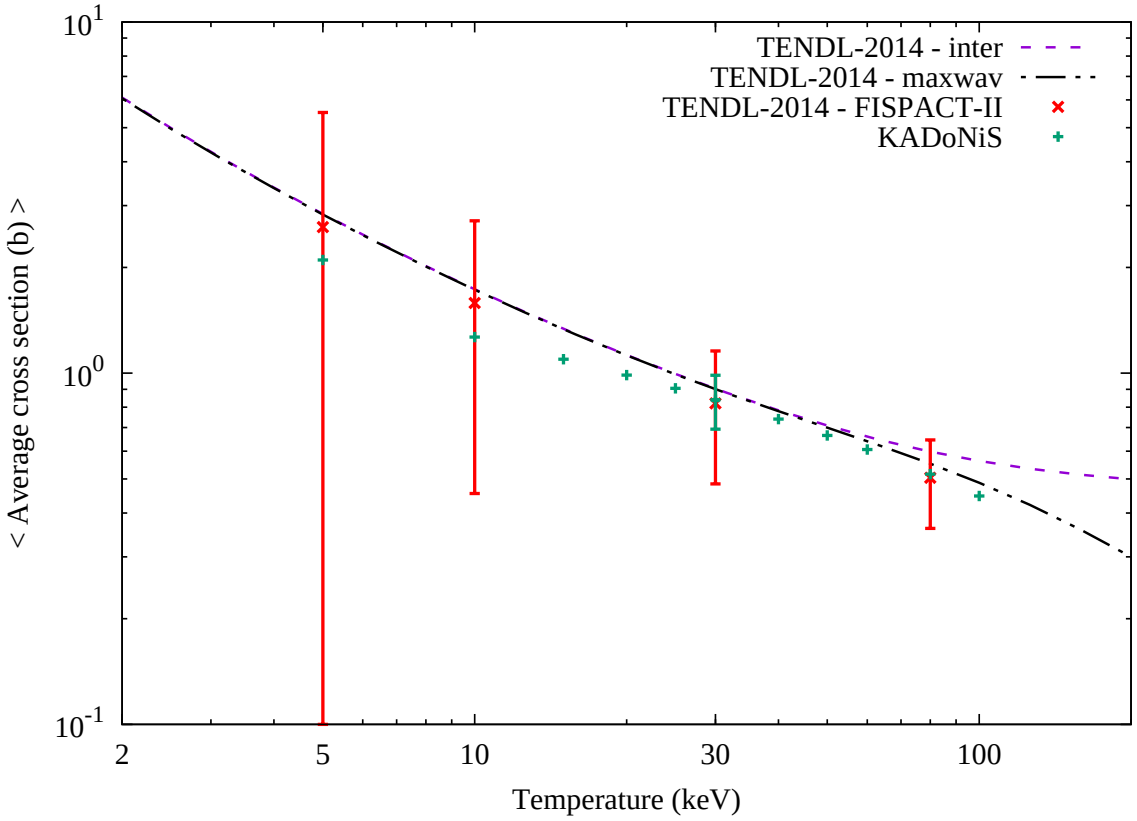
$^{197}Au_{79}$ [Stable]



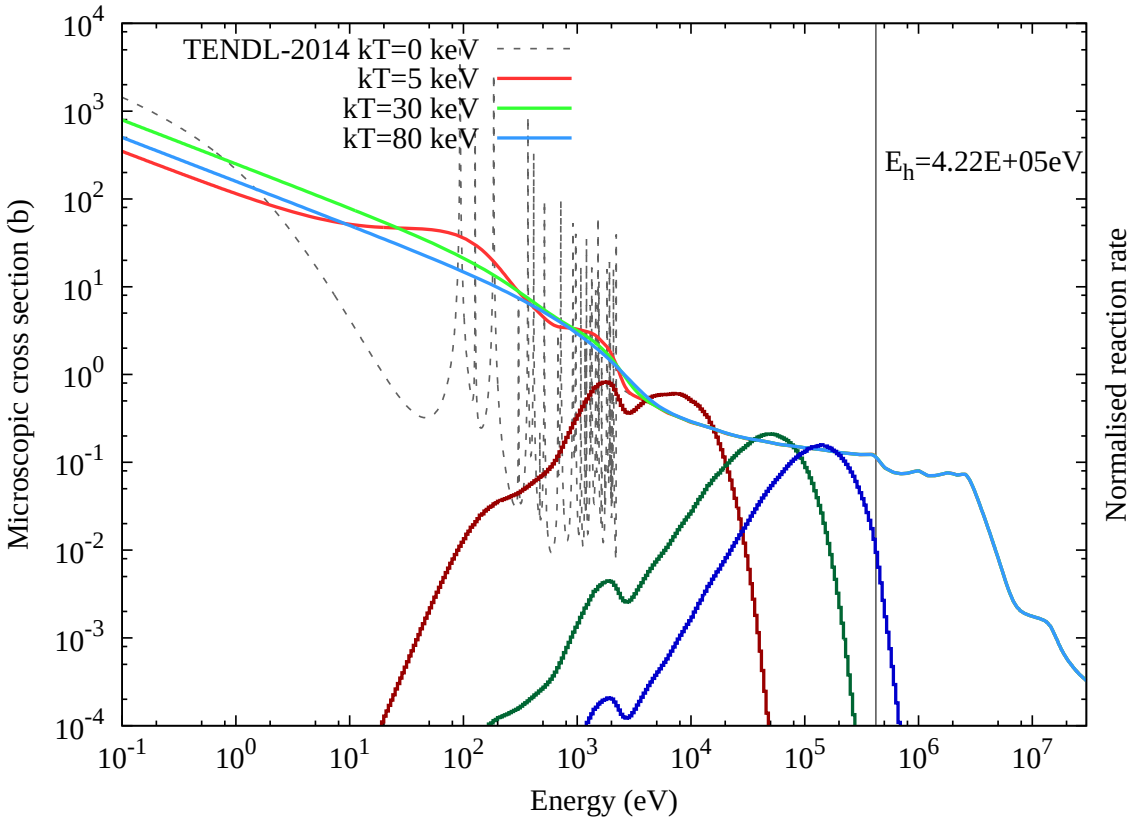


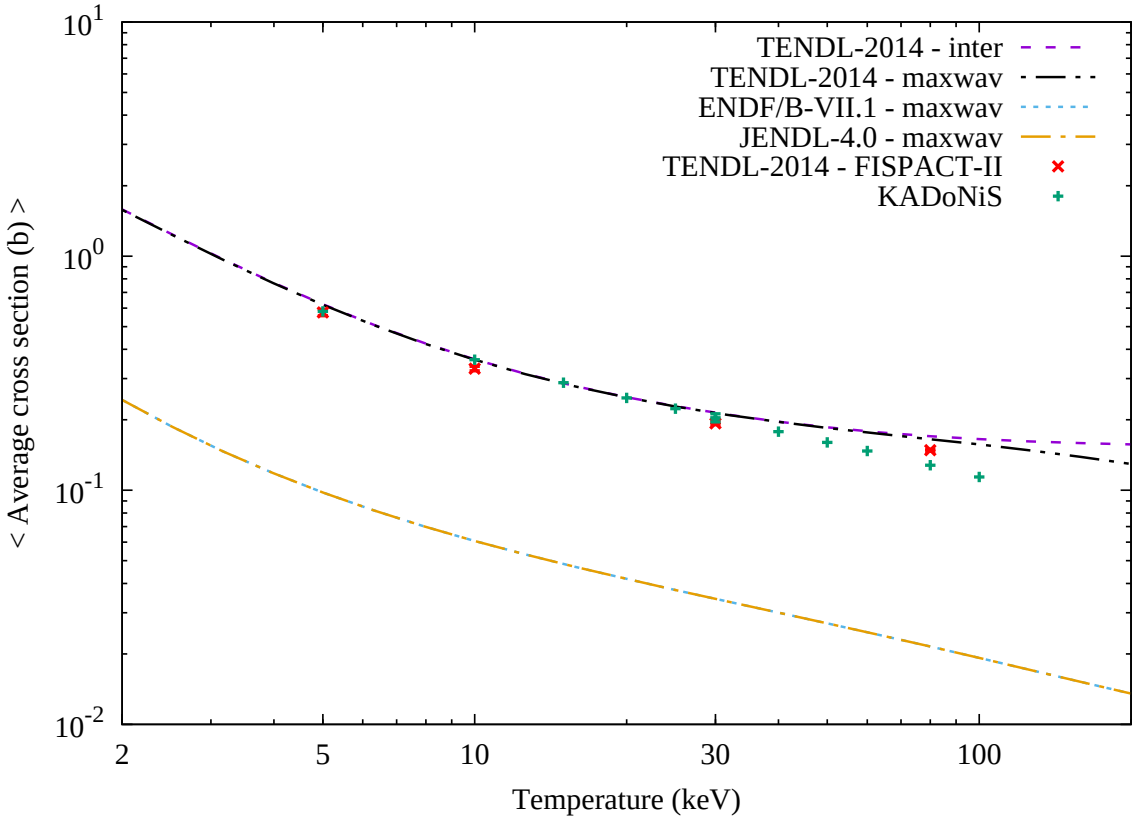
$^{198}Au_{79}$ $[T_{1/2} = 2.30$ days$]$ (KADoNiS=SMC)



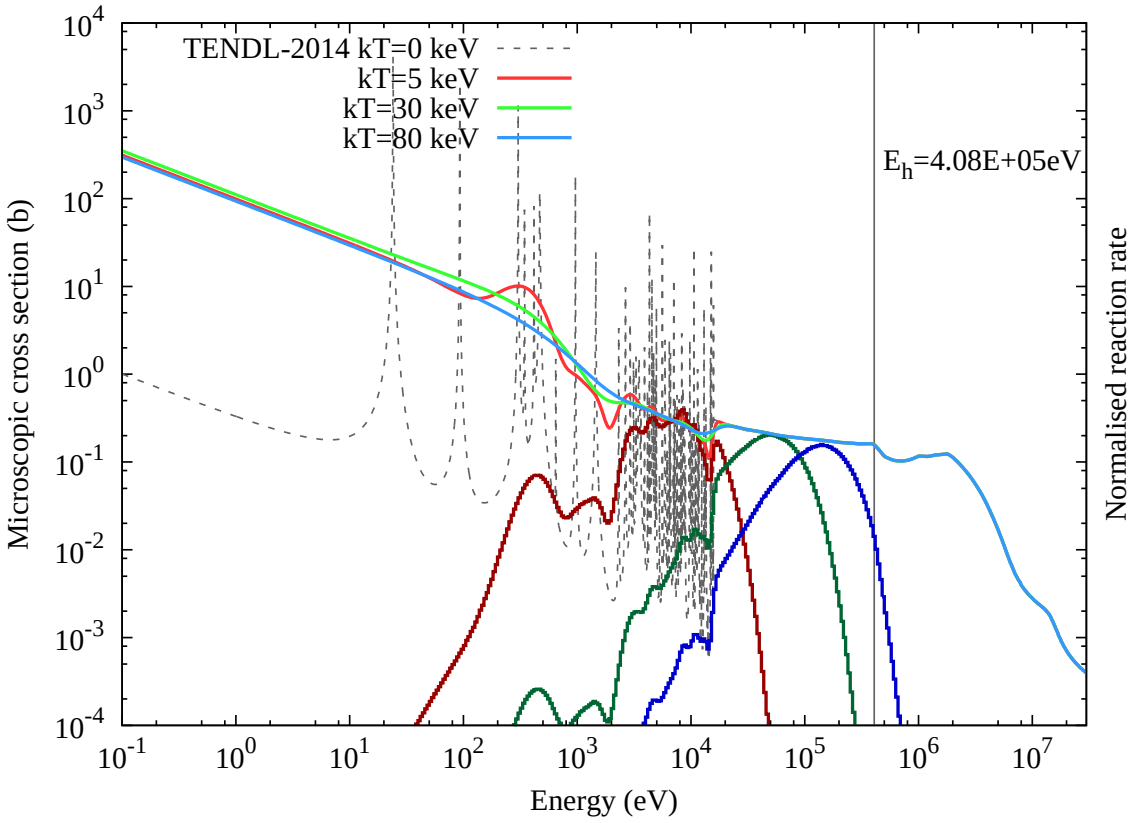


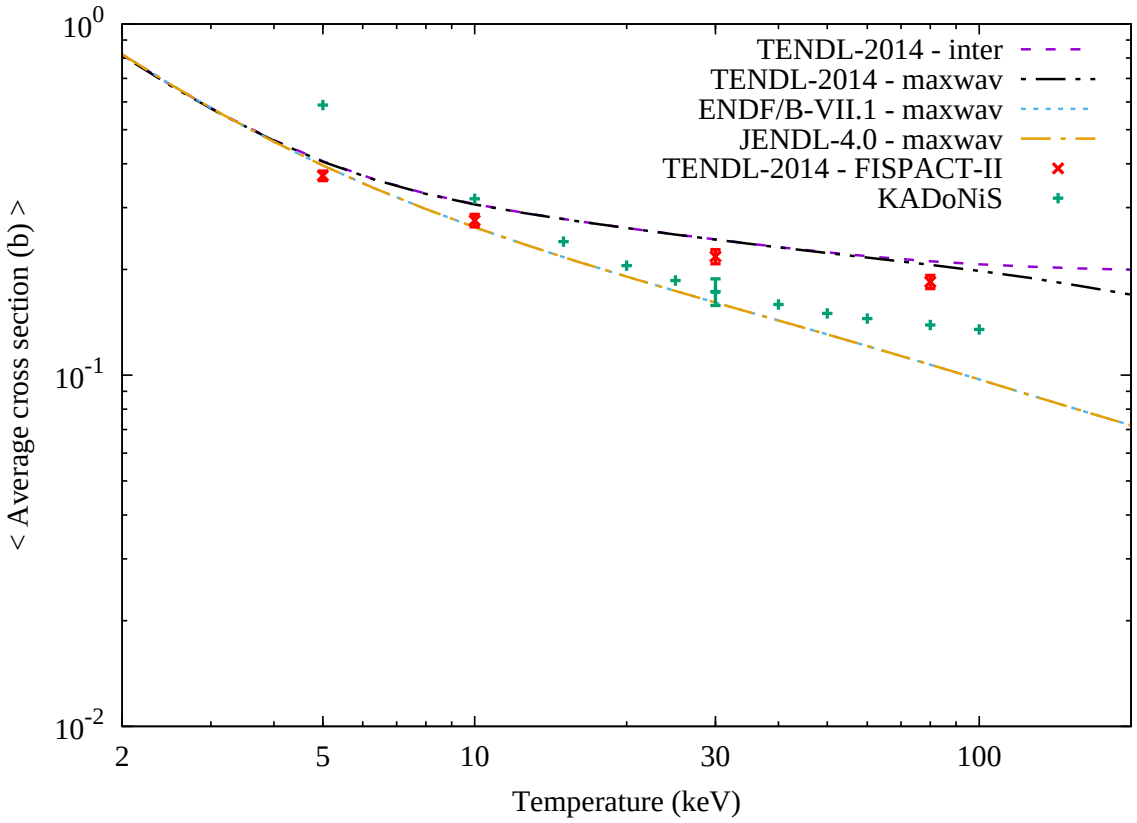
$^{196}Hg_{80}$ $[T_{1/2} = 2.50 \times 10^{18}$ years$]$



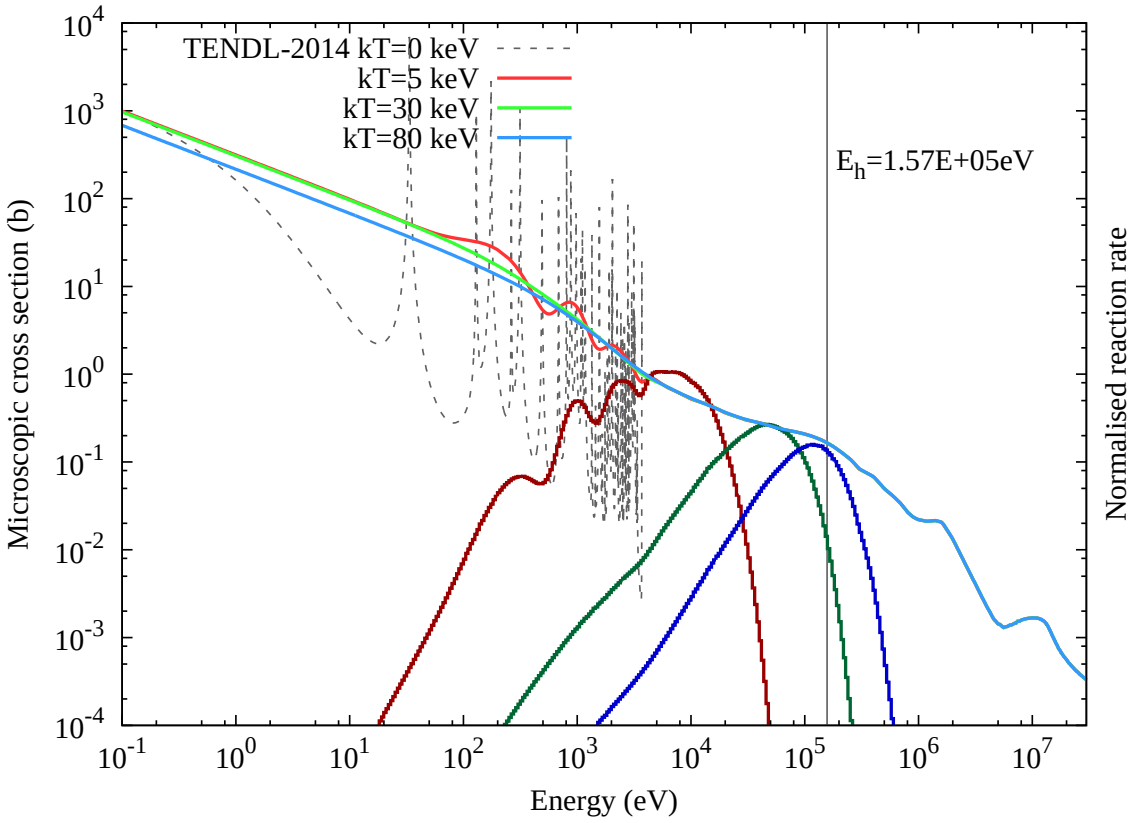


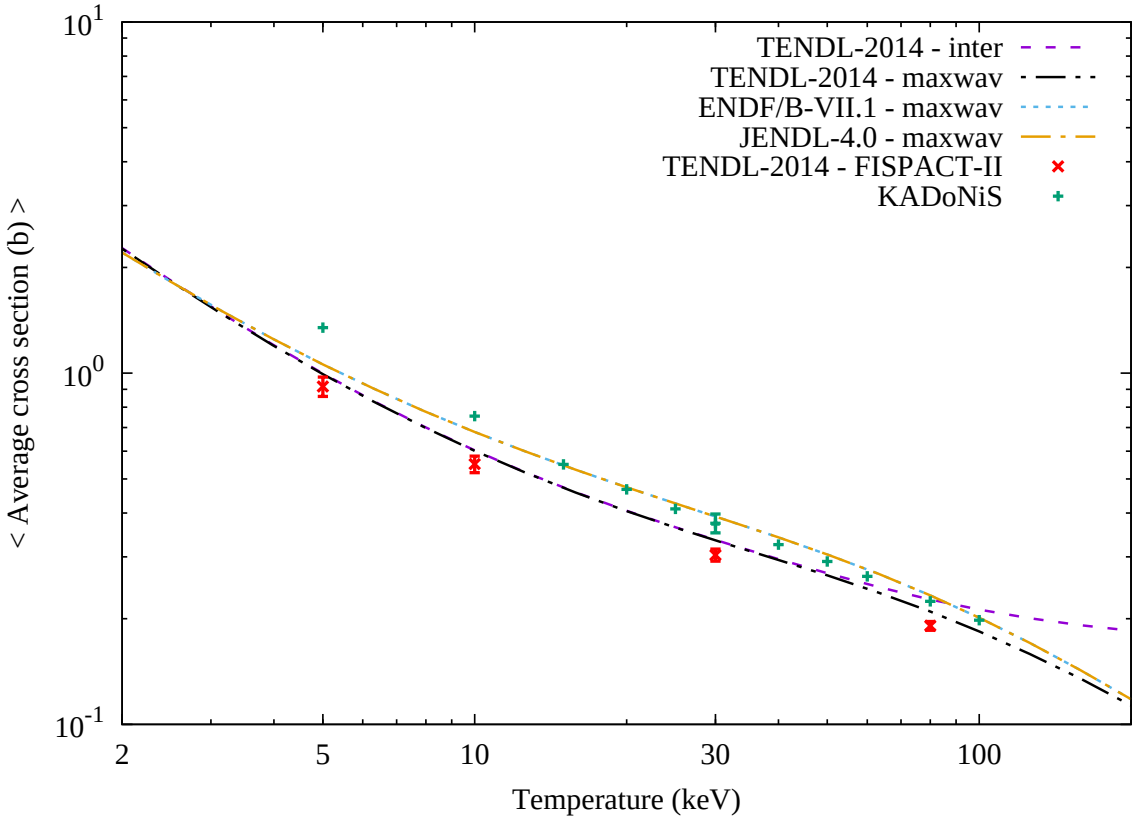
$^{198}Hg_{80}$ [Stable]



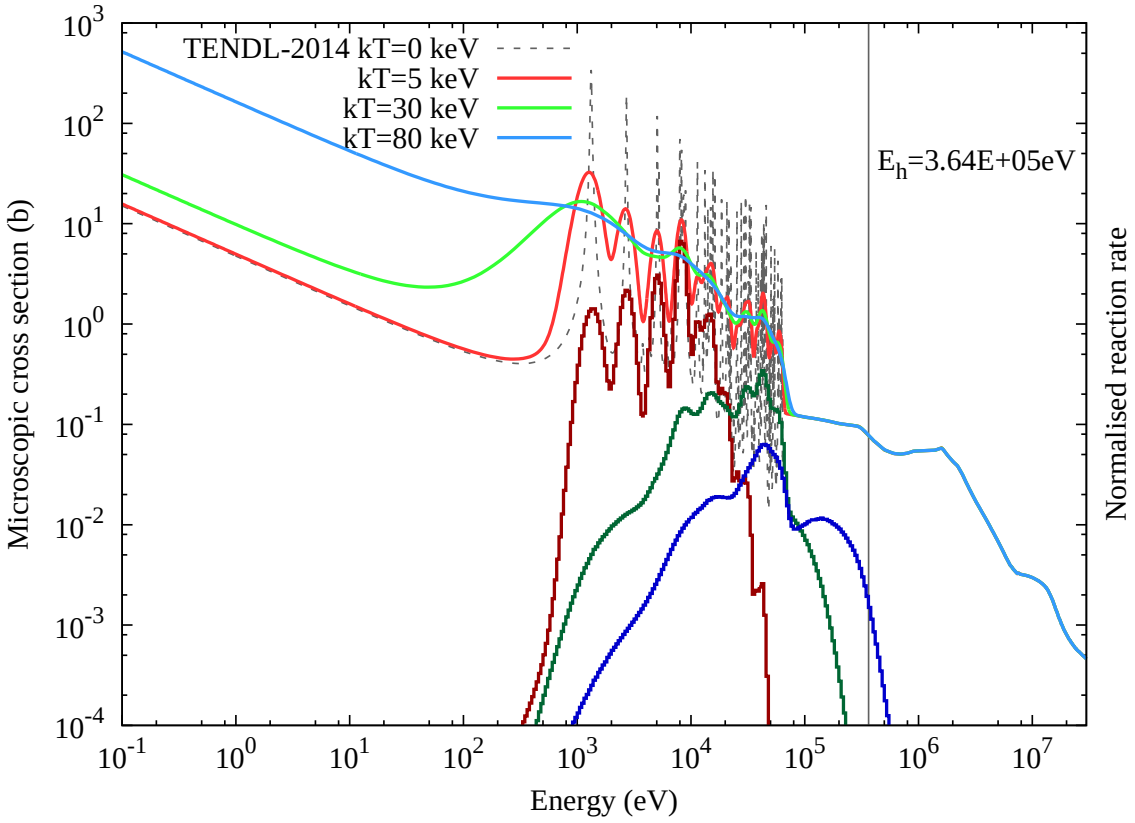


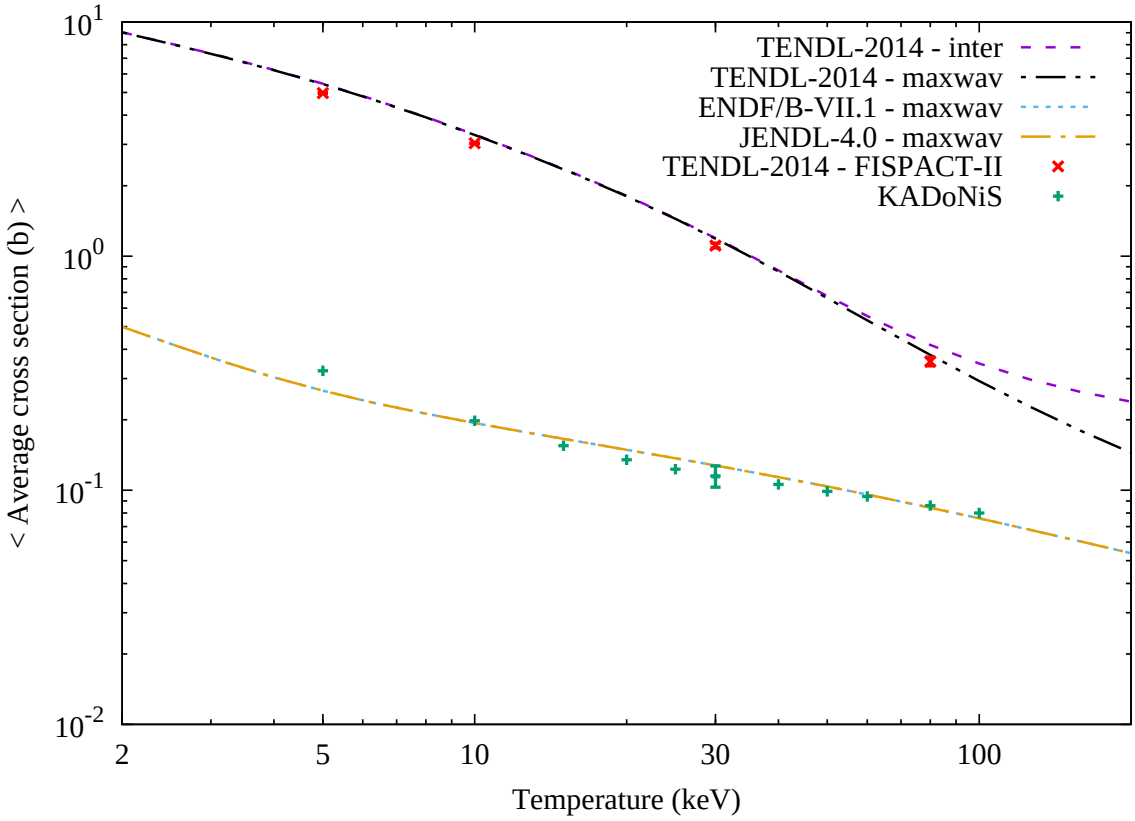
$^{199}Hg_{80}$ [Stable]



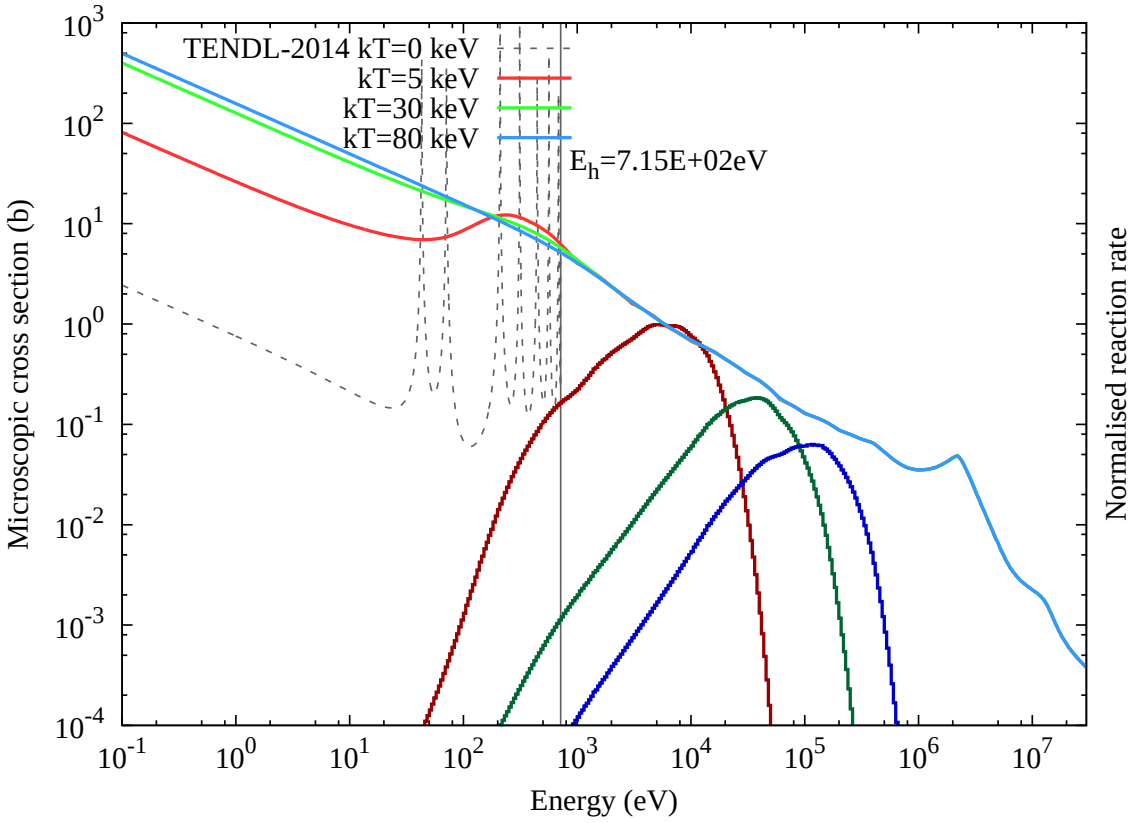


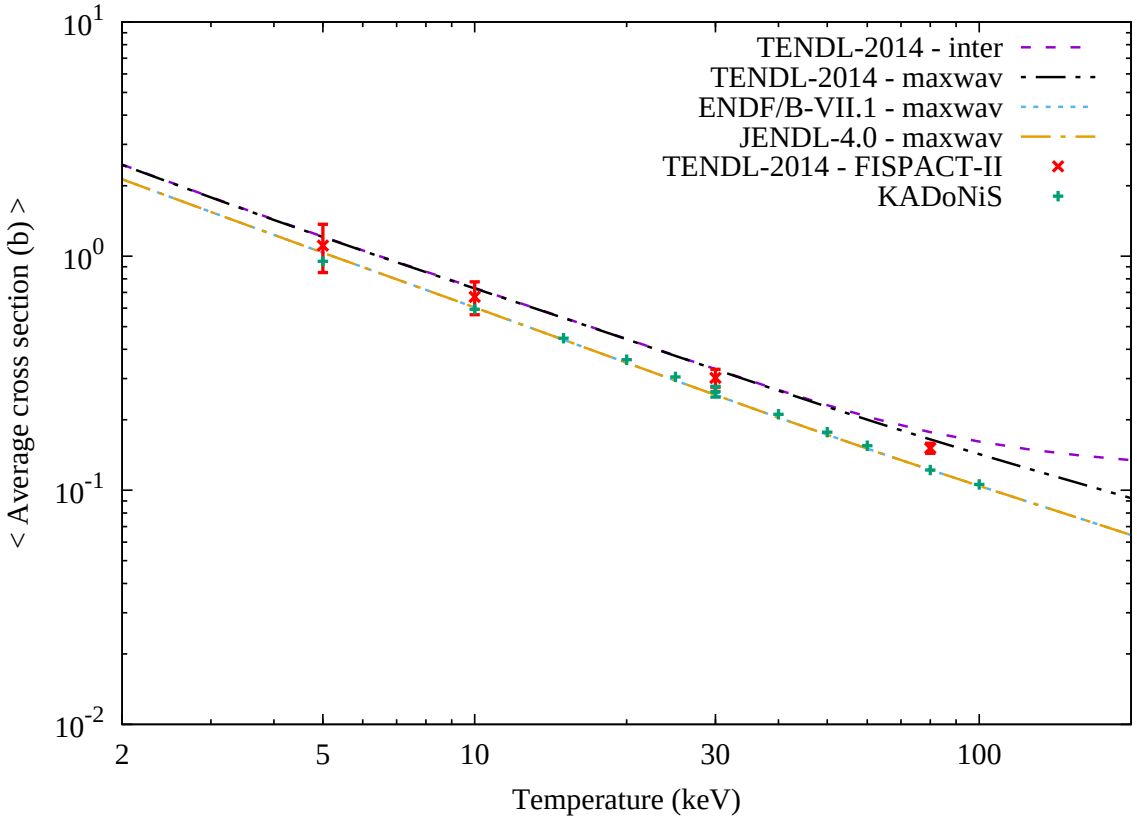
$^{200}Hg_{80}$ [Stable]



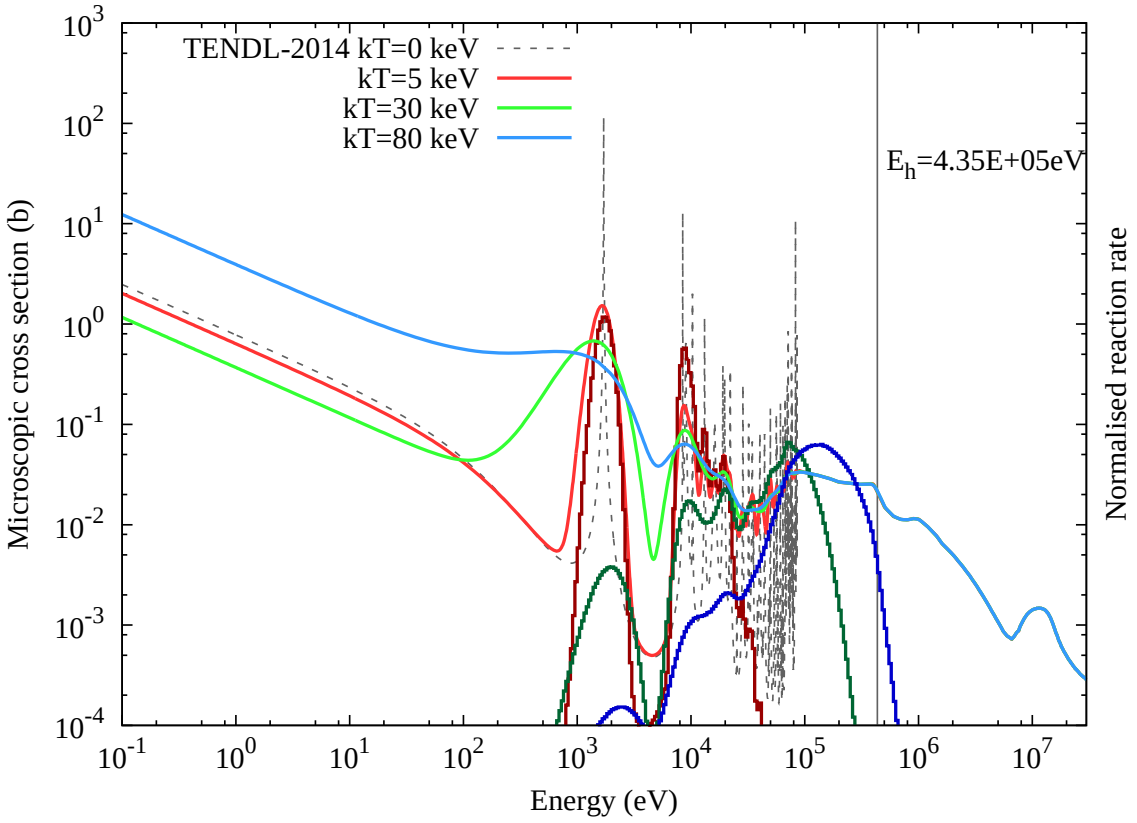


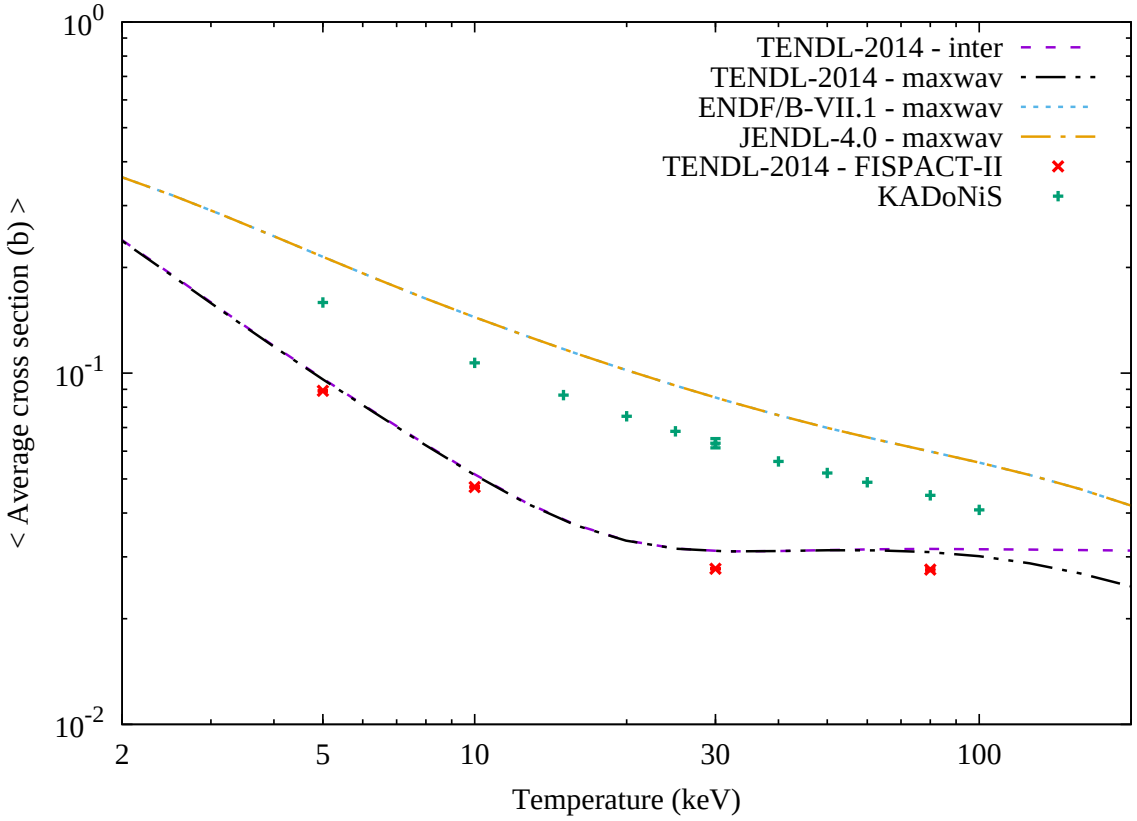
$^{201}Hg_{80}$ [Stable]



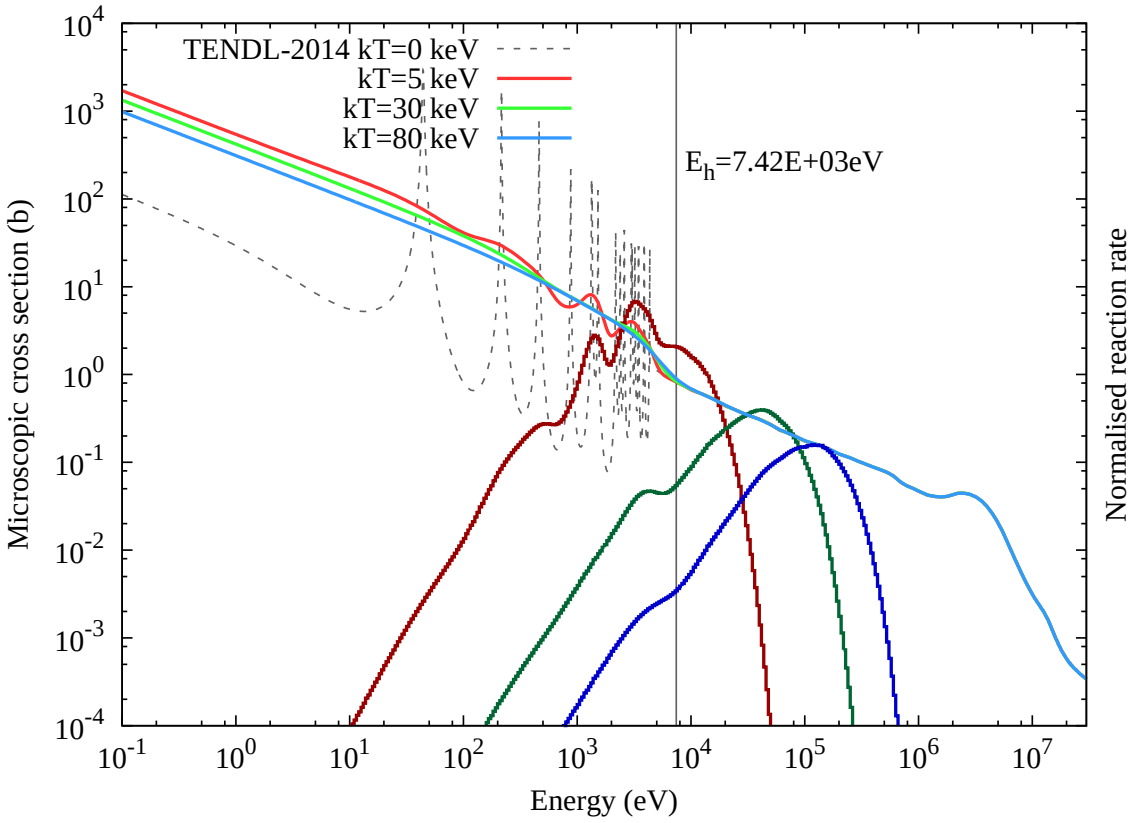


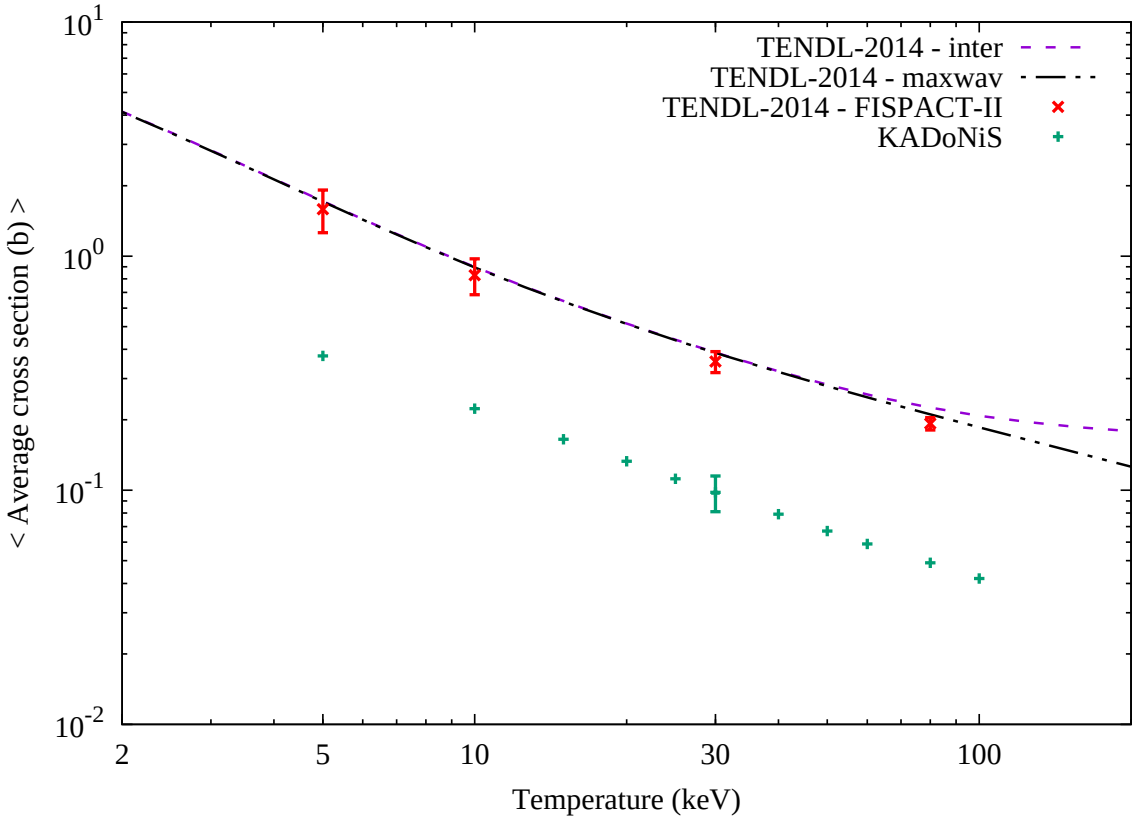
$^{202}Hg_{80}$ [Stable]



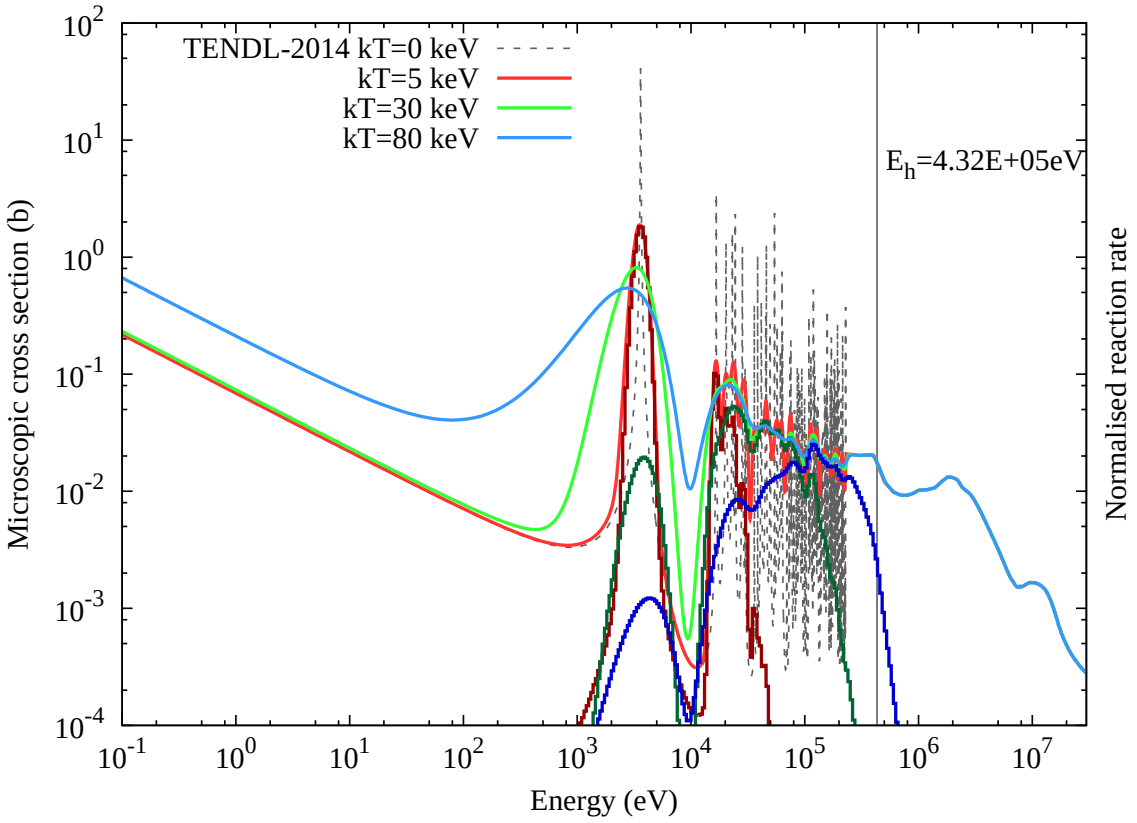


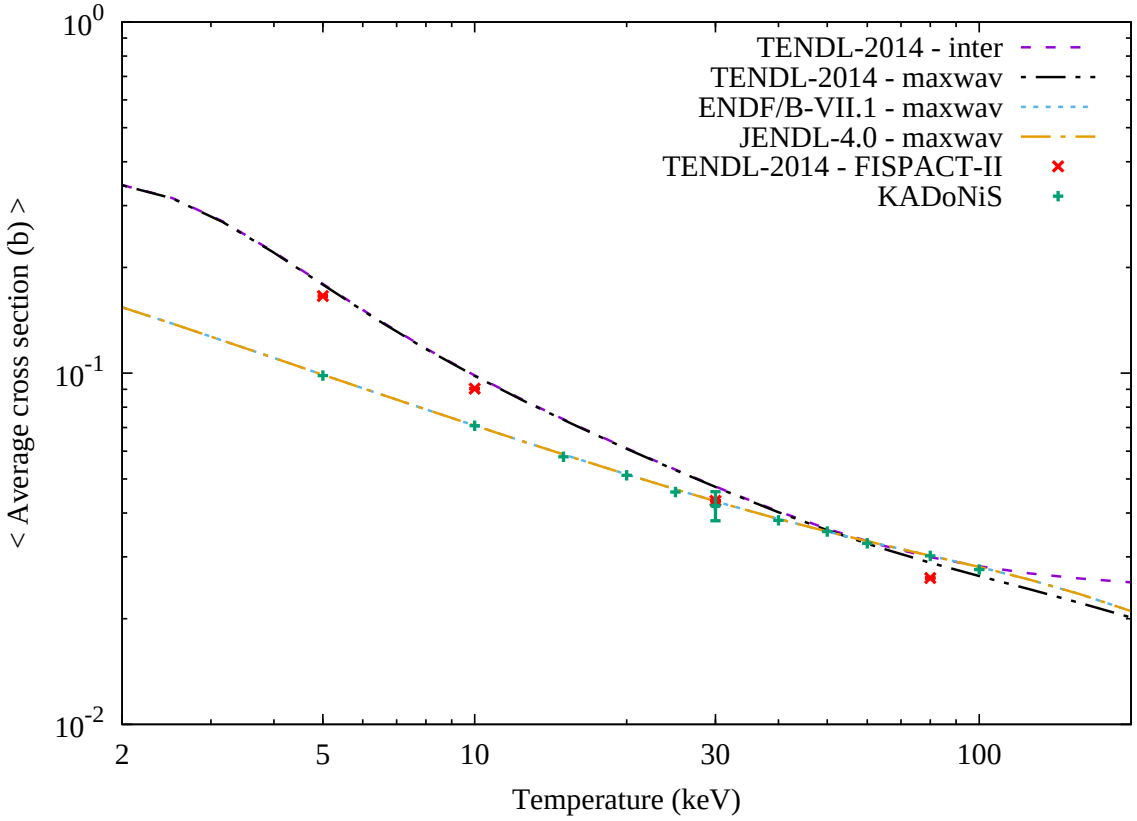
$^{203}Hg_{80}$ $[T_{1/2} = 46.60$ days$]$ (KADoNiS=SMC)



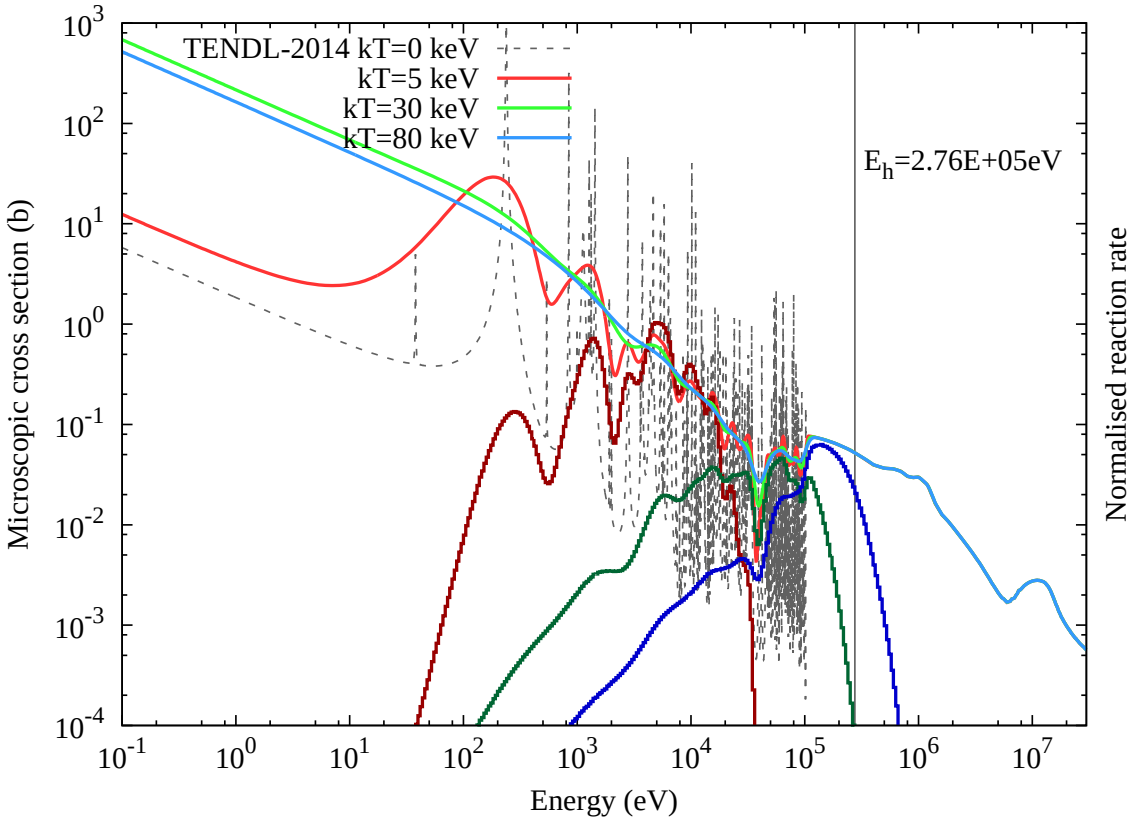


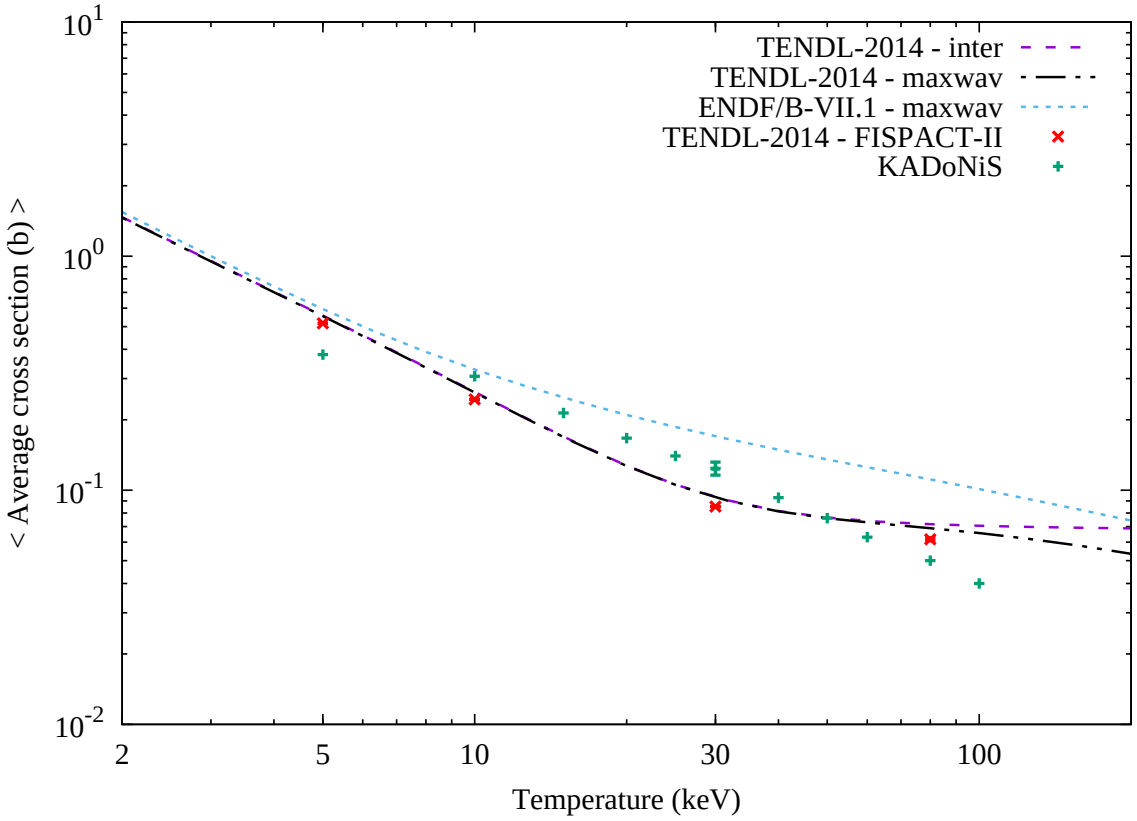
$^{204}Hg_{80}$ [Stable]



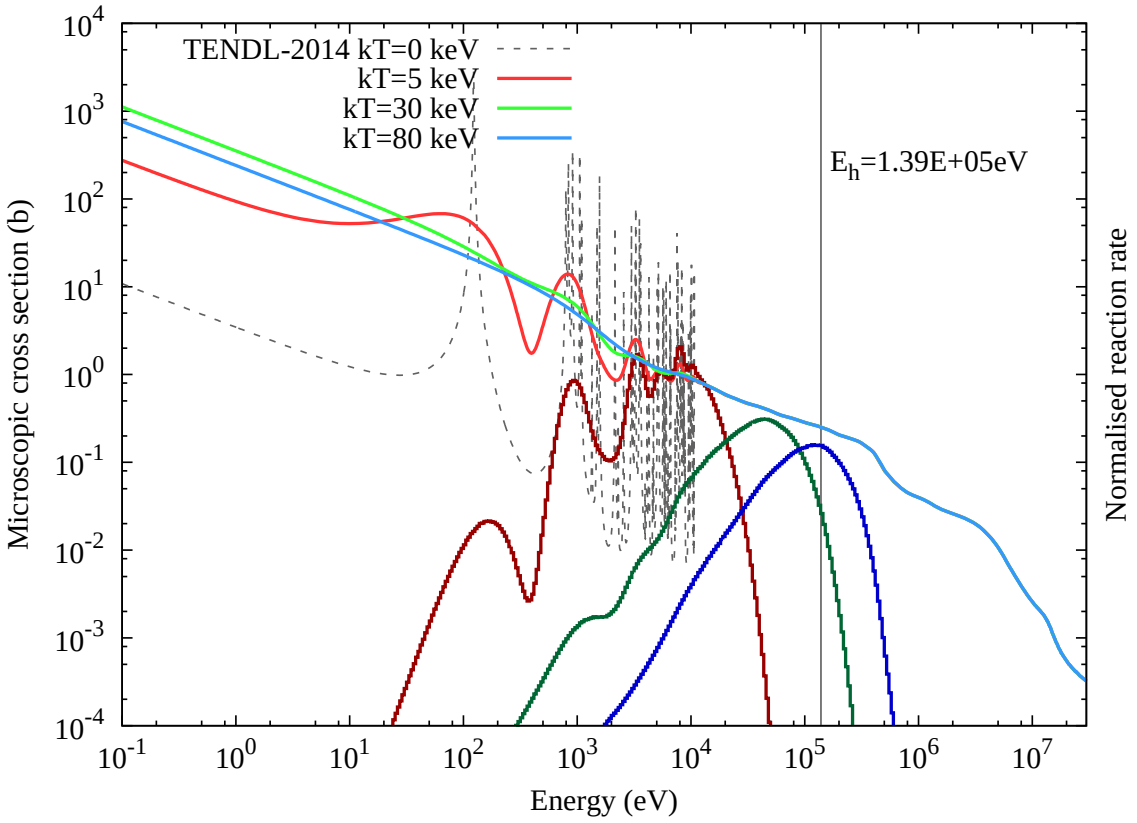


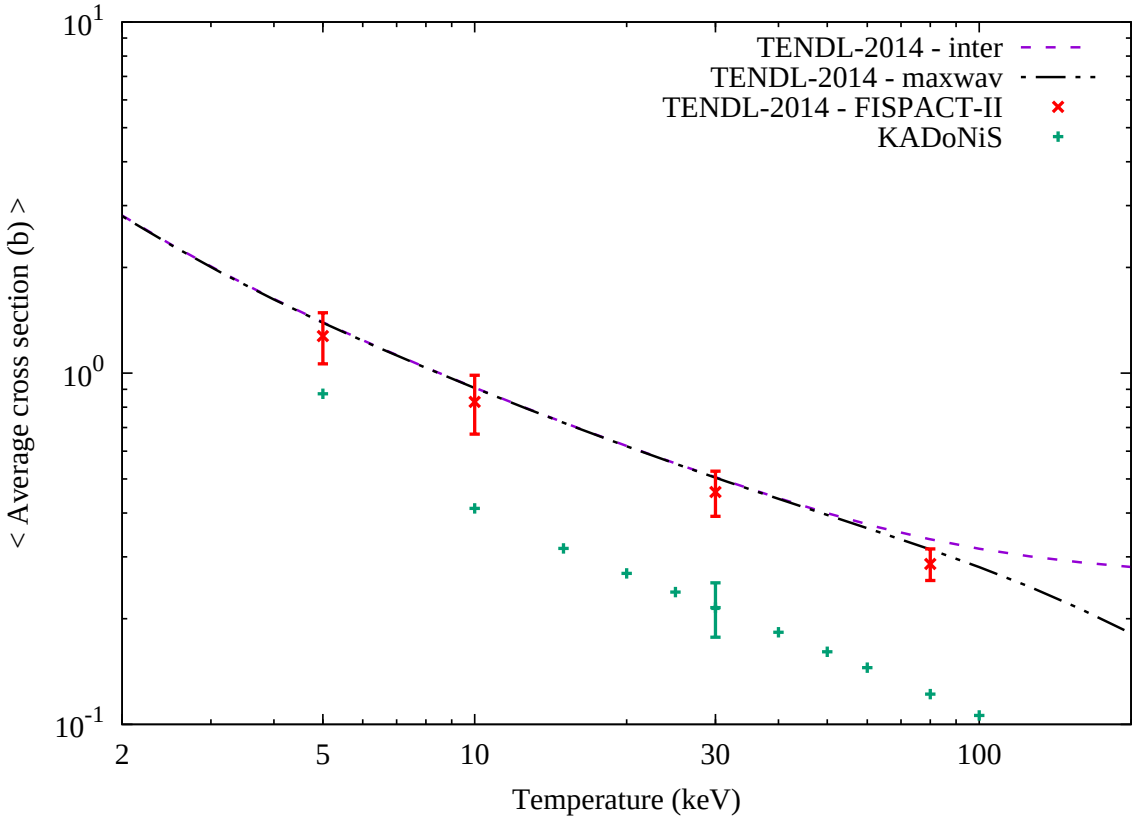
$^{203}Tl_{81}$ [Stable]



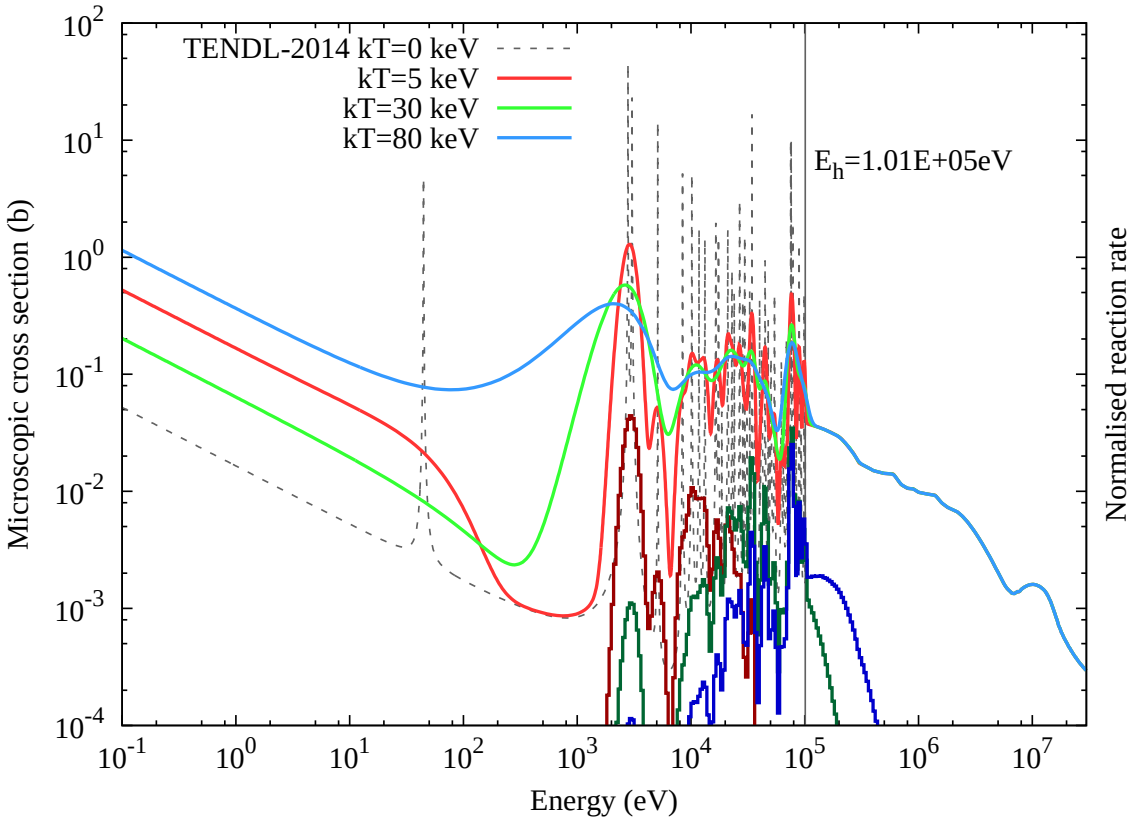


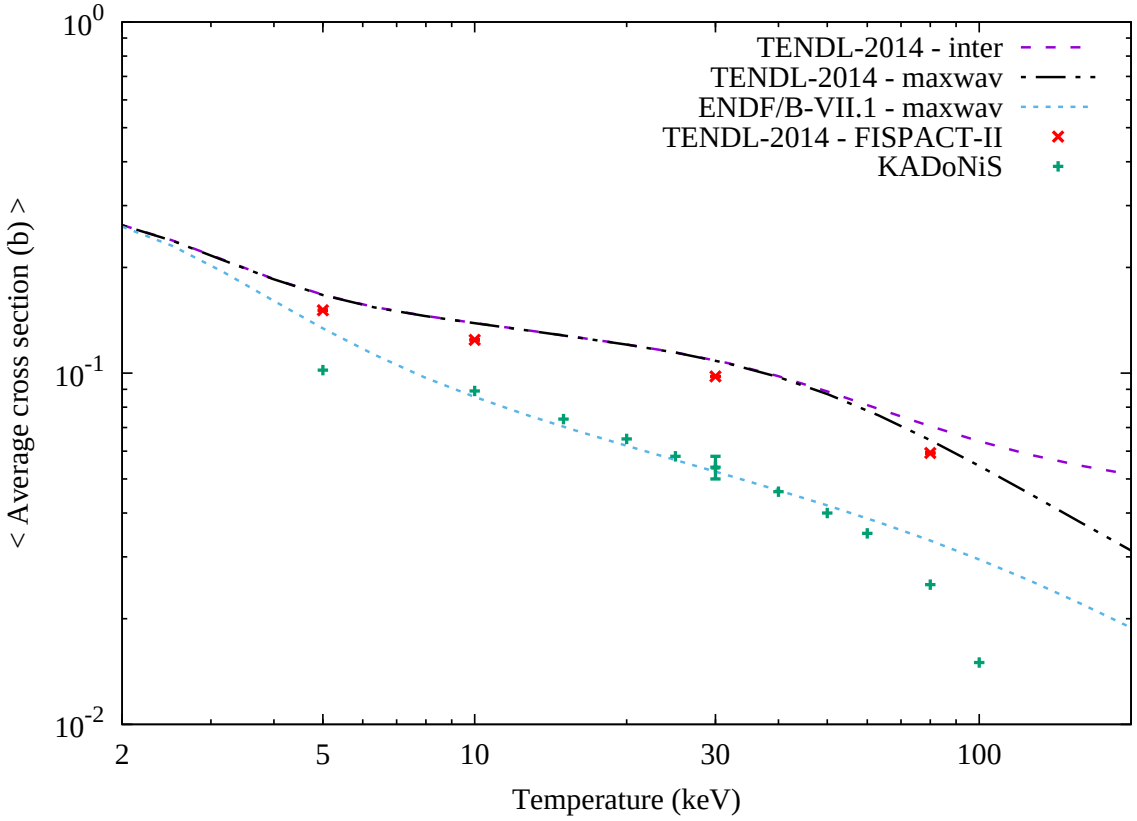
$^{204}Tl_{81}$ [$T_{1/2}$ = 3.79 years] (KADoNiS=SMC)



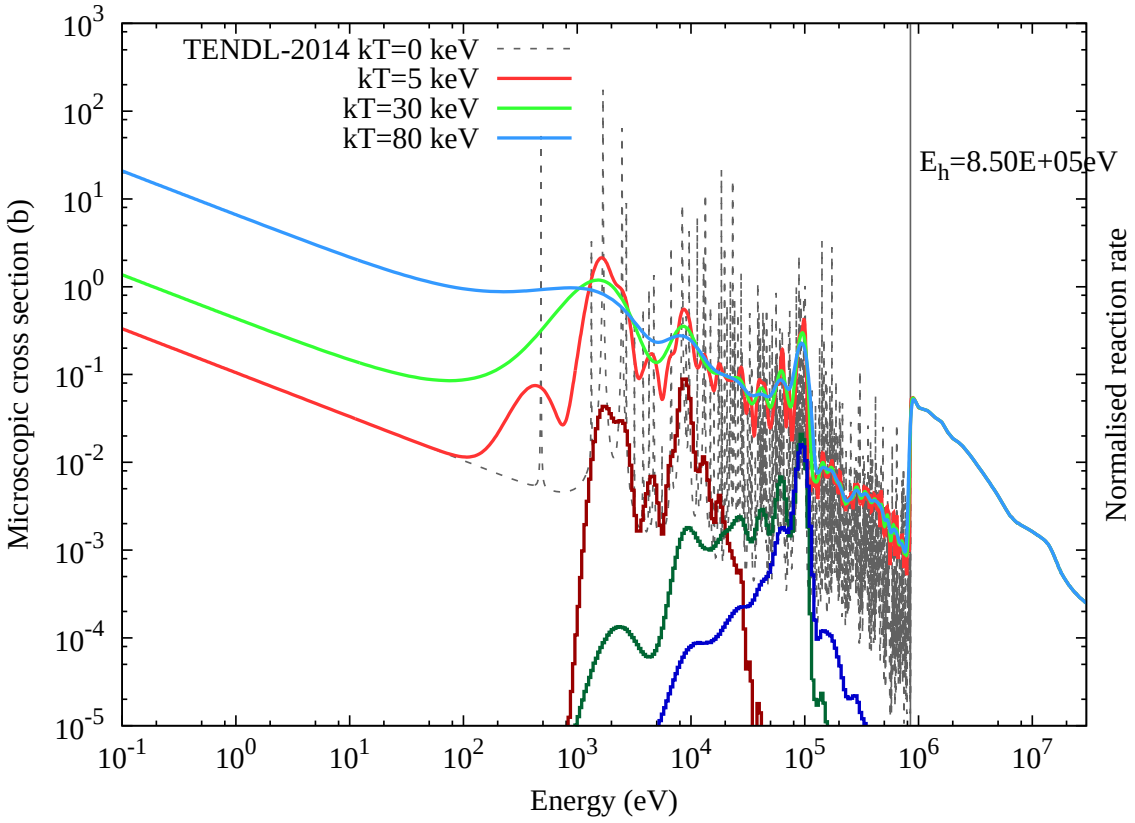


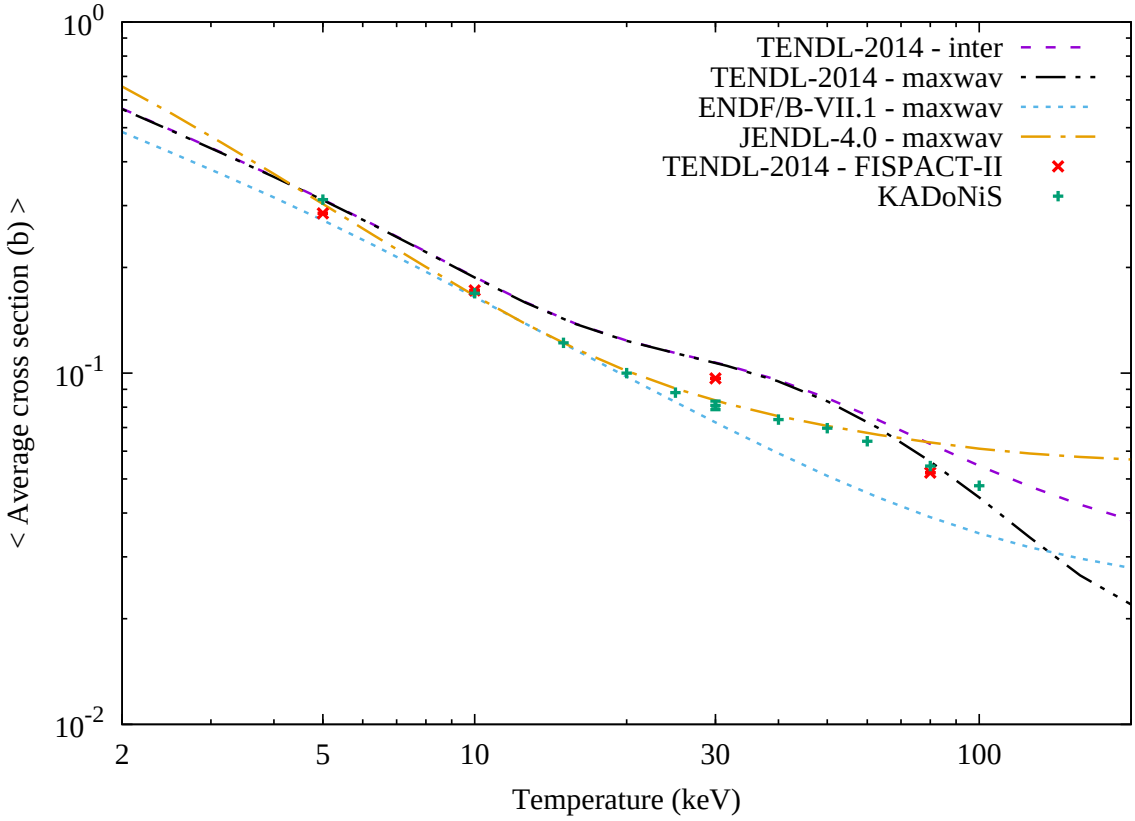
$^{205}Tl_{81}$ [Stable]



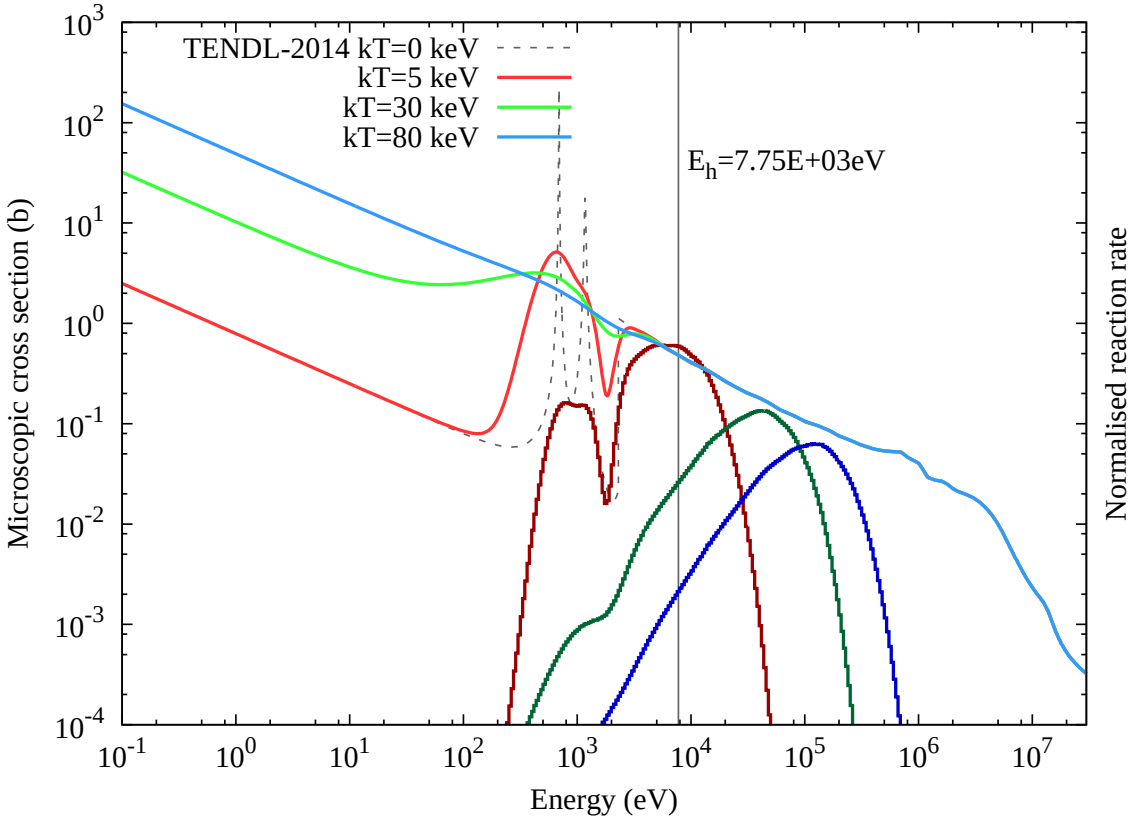


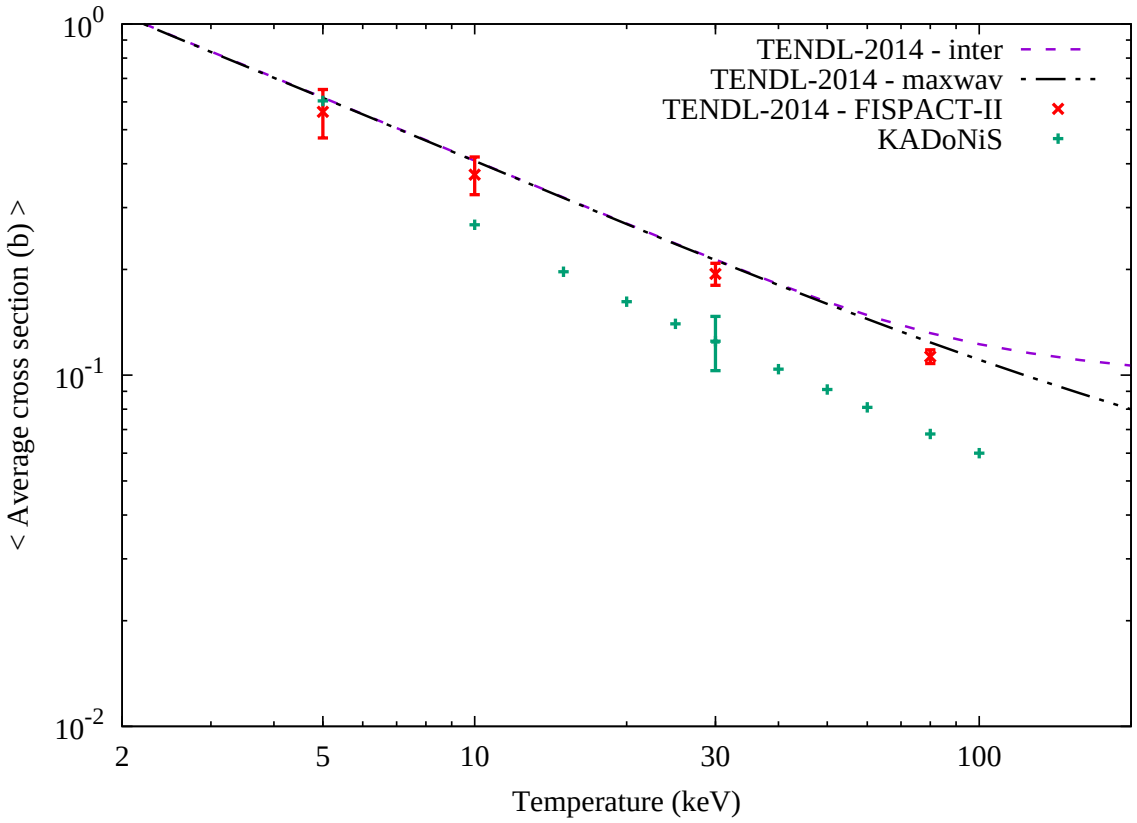
$^{204}Pb_{82}$ $[T_{1/2} = 1.40 \times 10^{17}$ years$]$



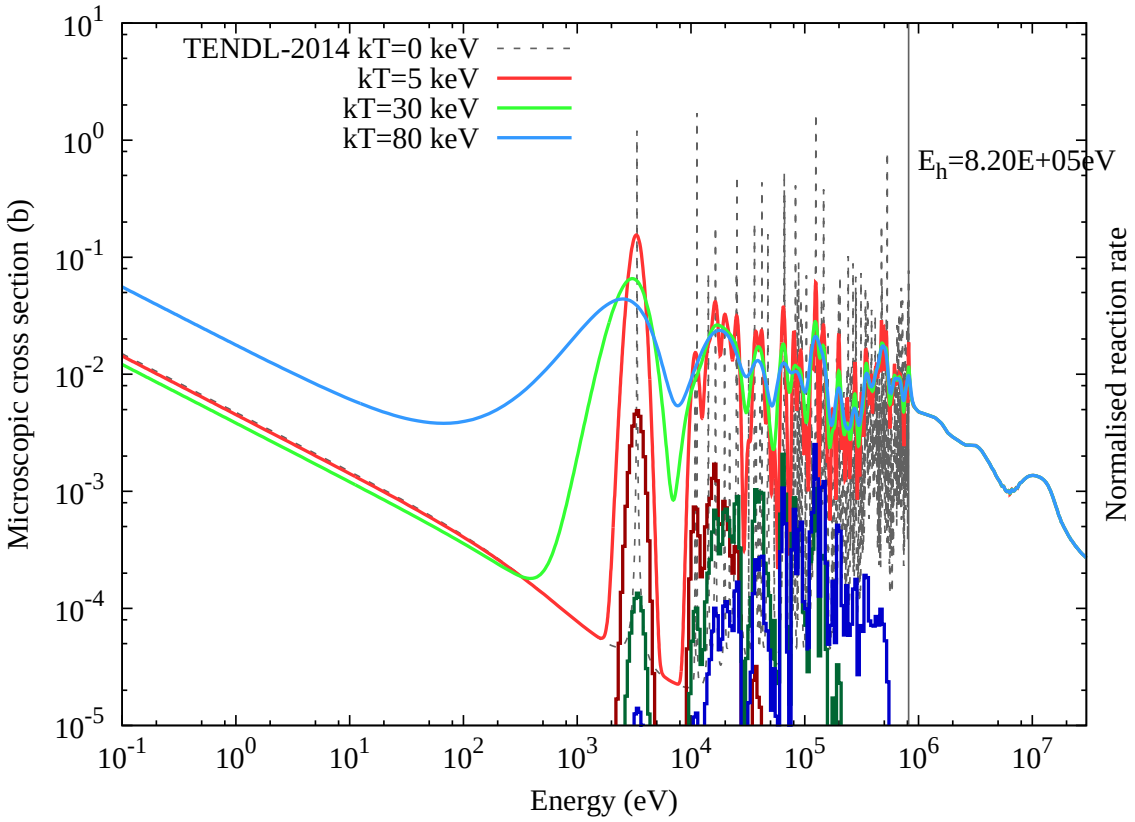


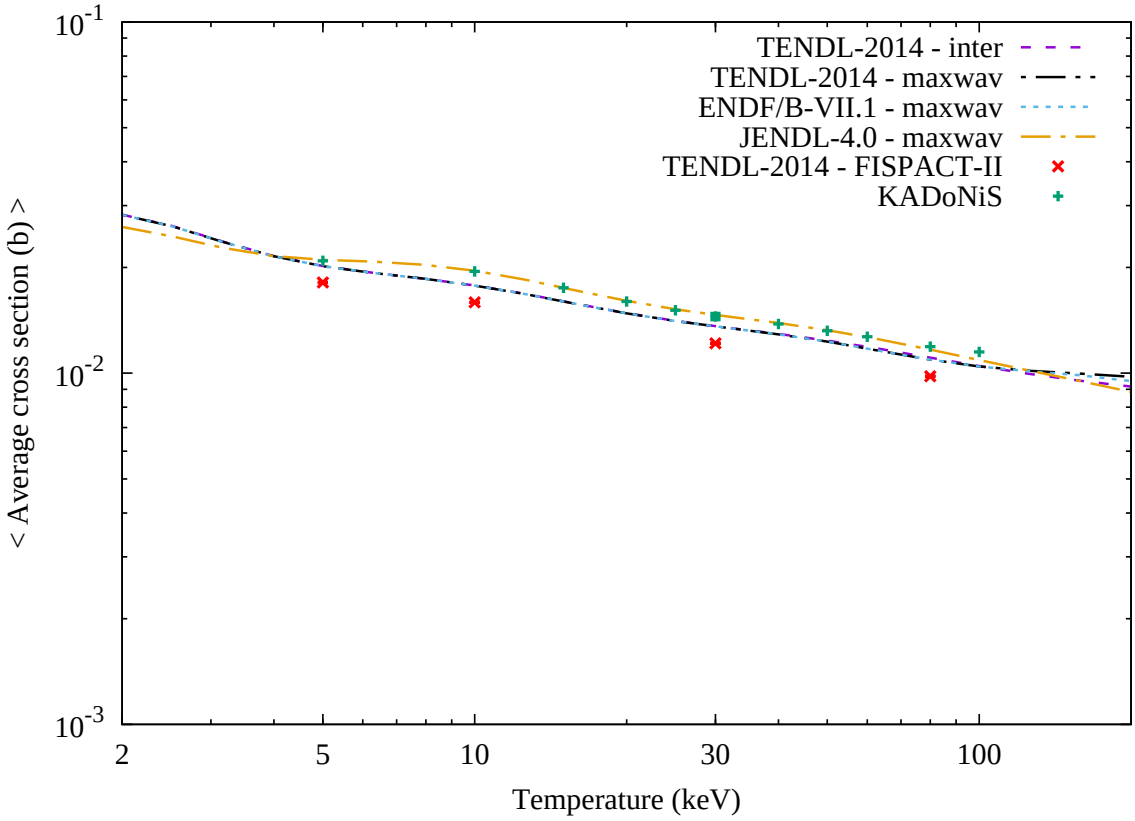
$^{205}Pb_{82}$ $[T_{1/2} = 1.53 \times 10^7$ years] (KADoNiS=SMC)



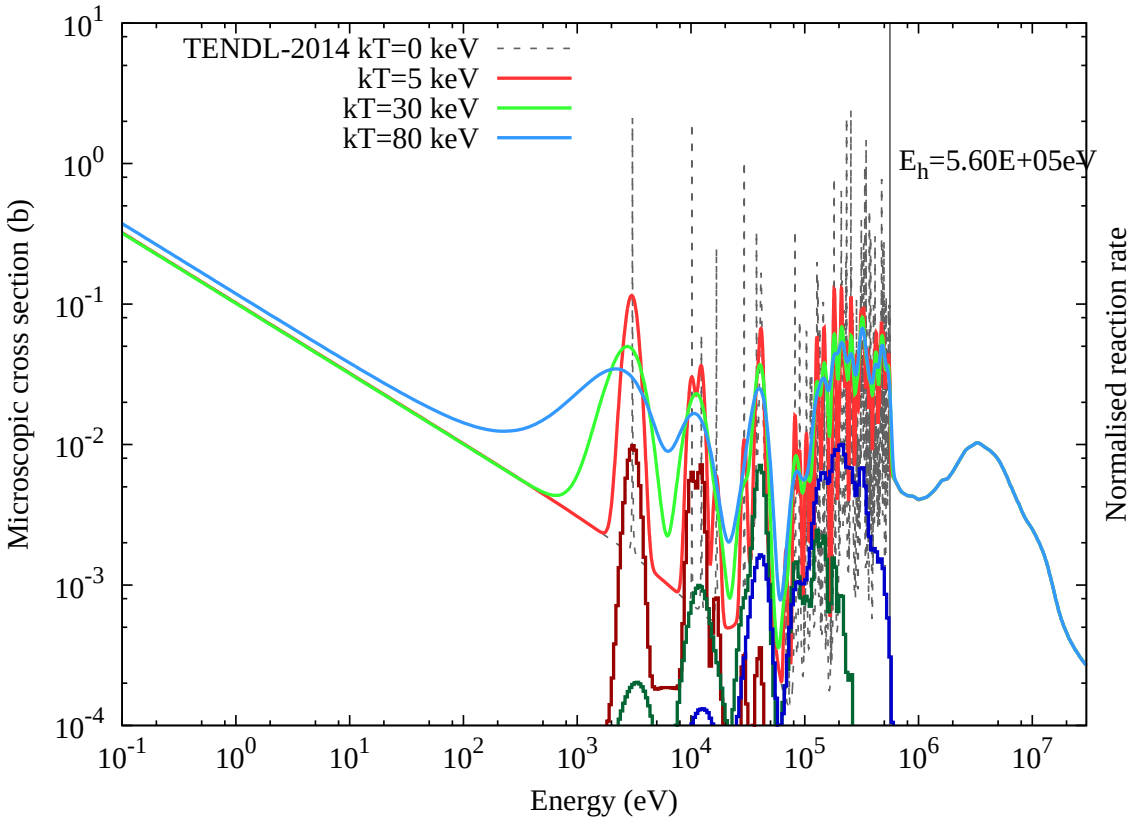


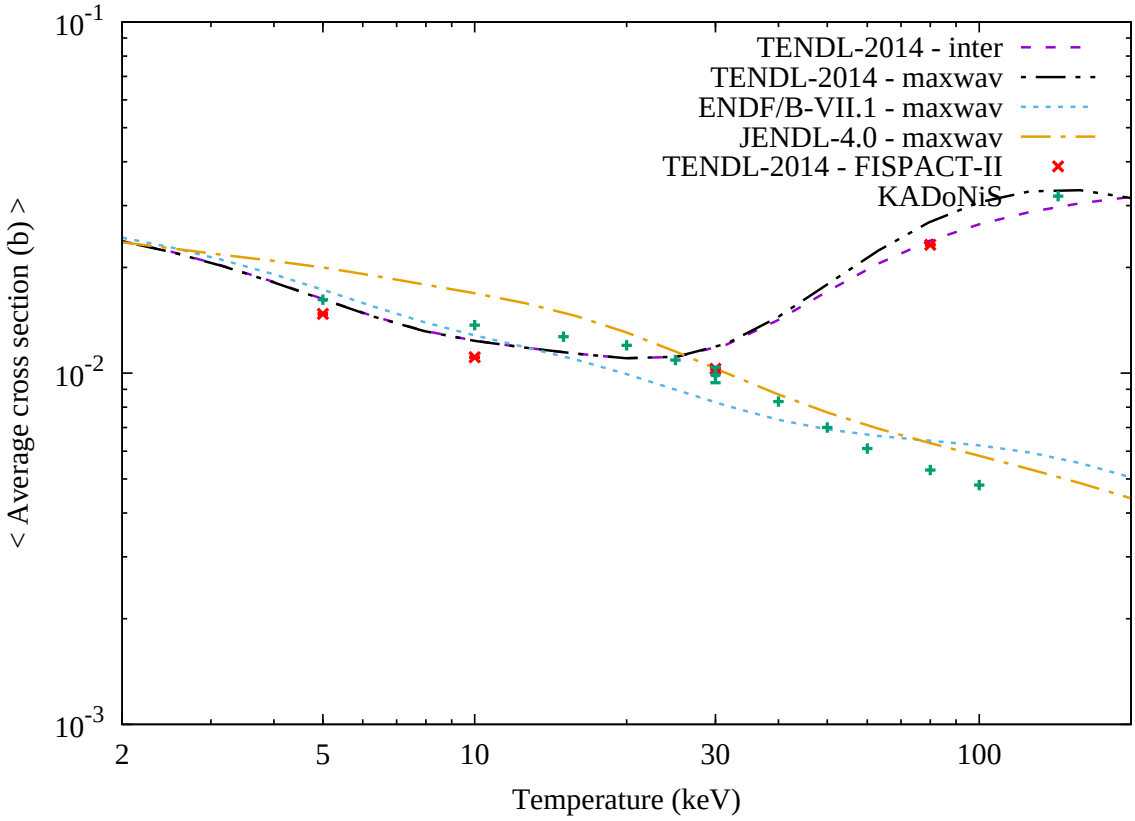
$^{206}Pb_{82}$ [Stable]



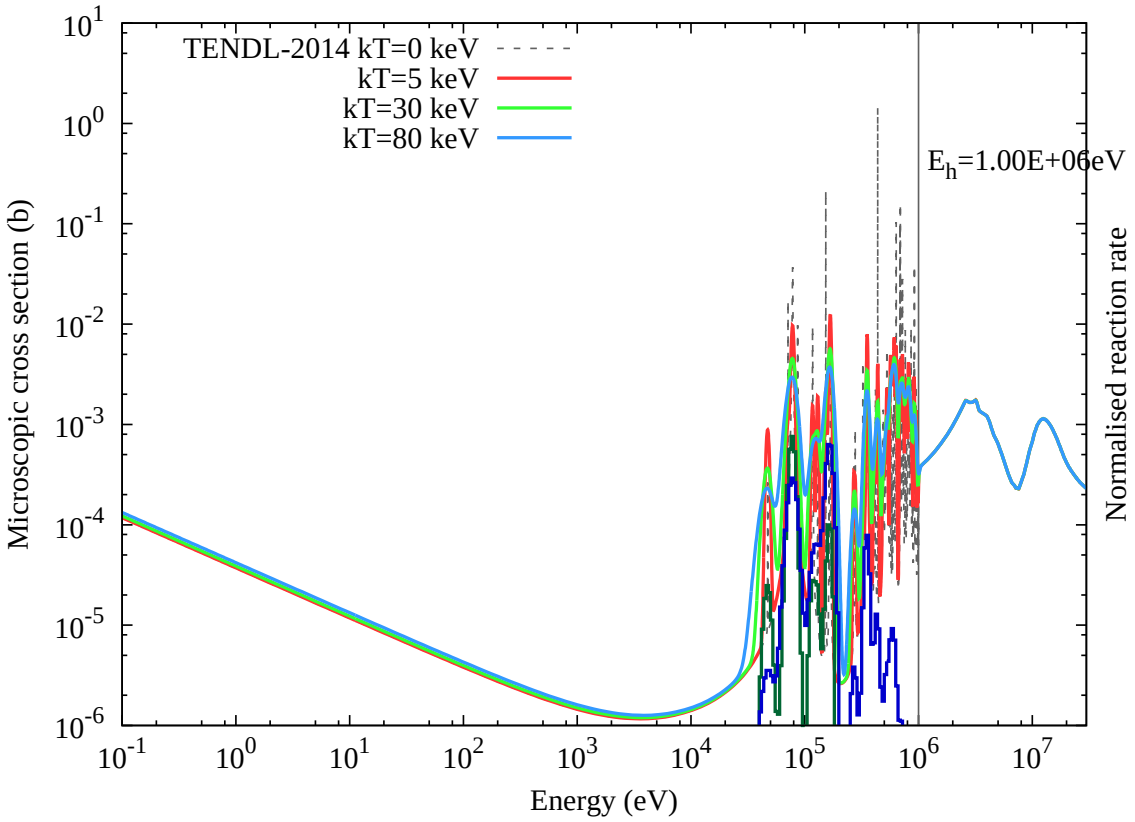


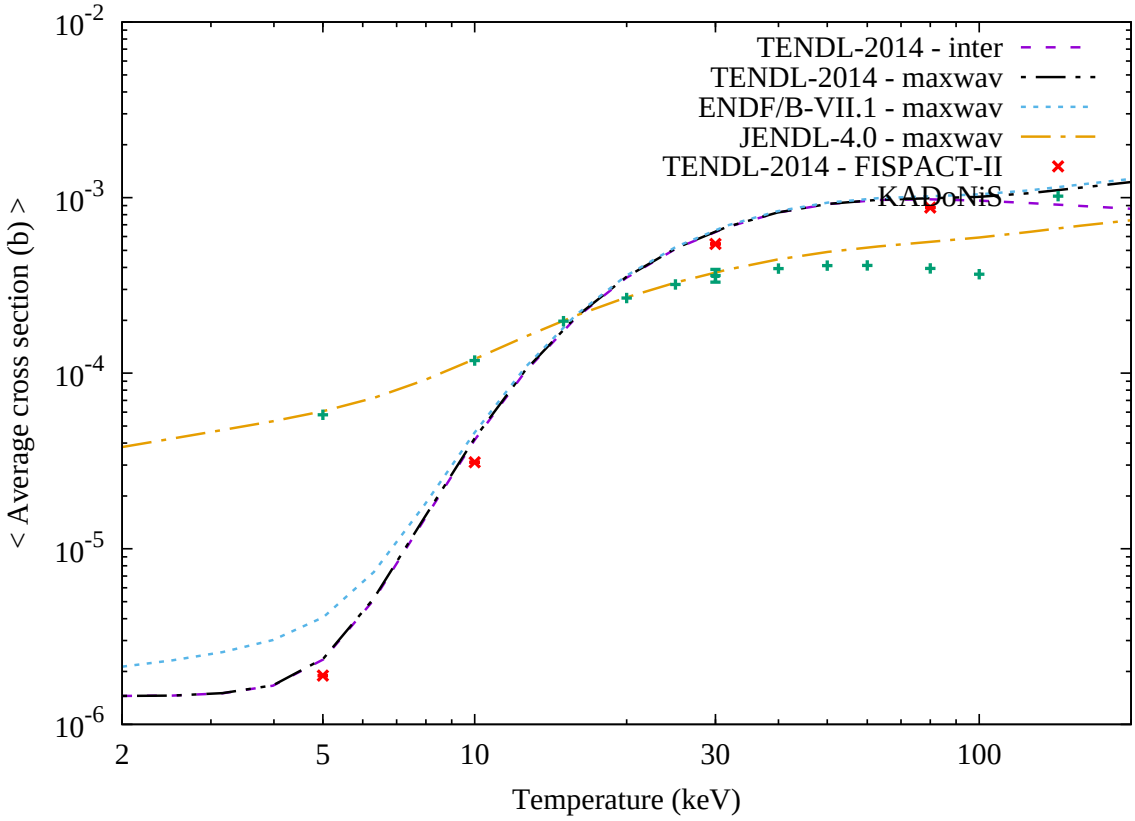
$^{207}Pb_{82}$ [Stable]



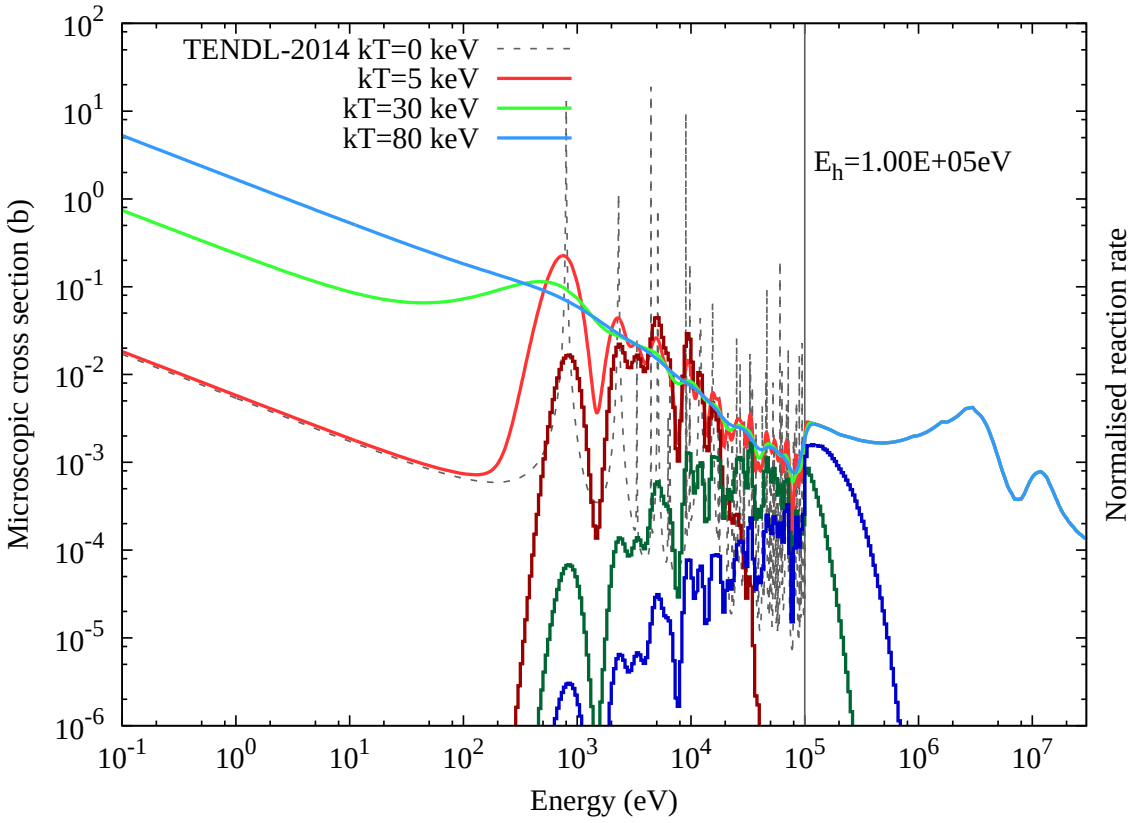


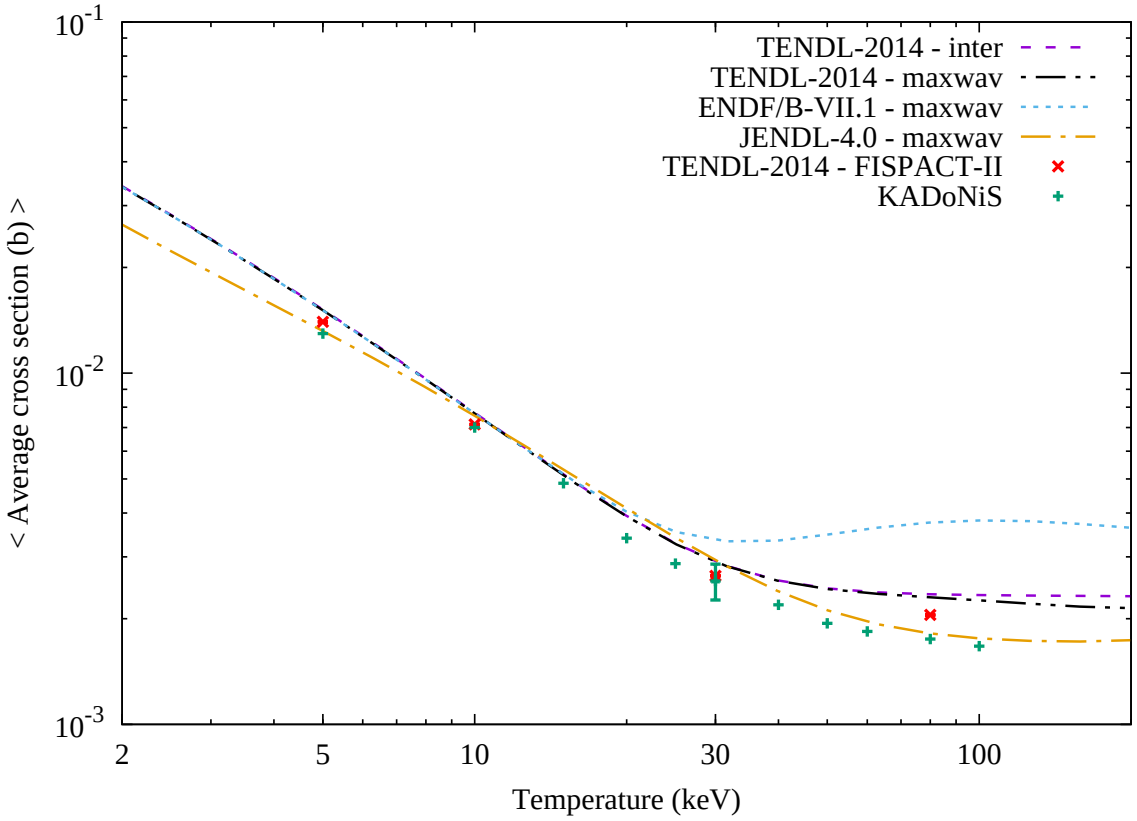
$^{208}Pb_{82}$ [Stable]



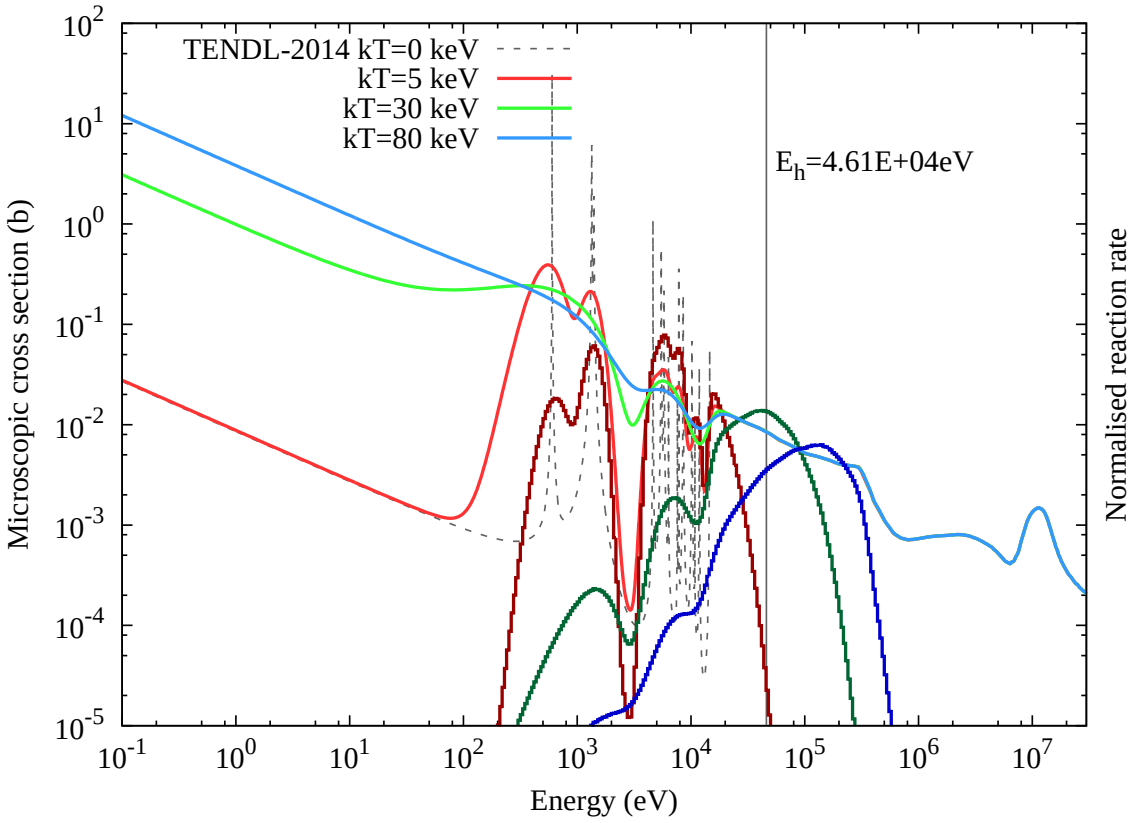


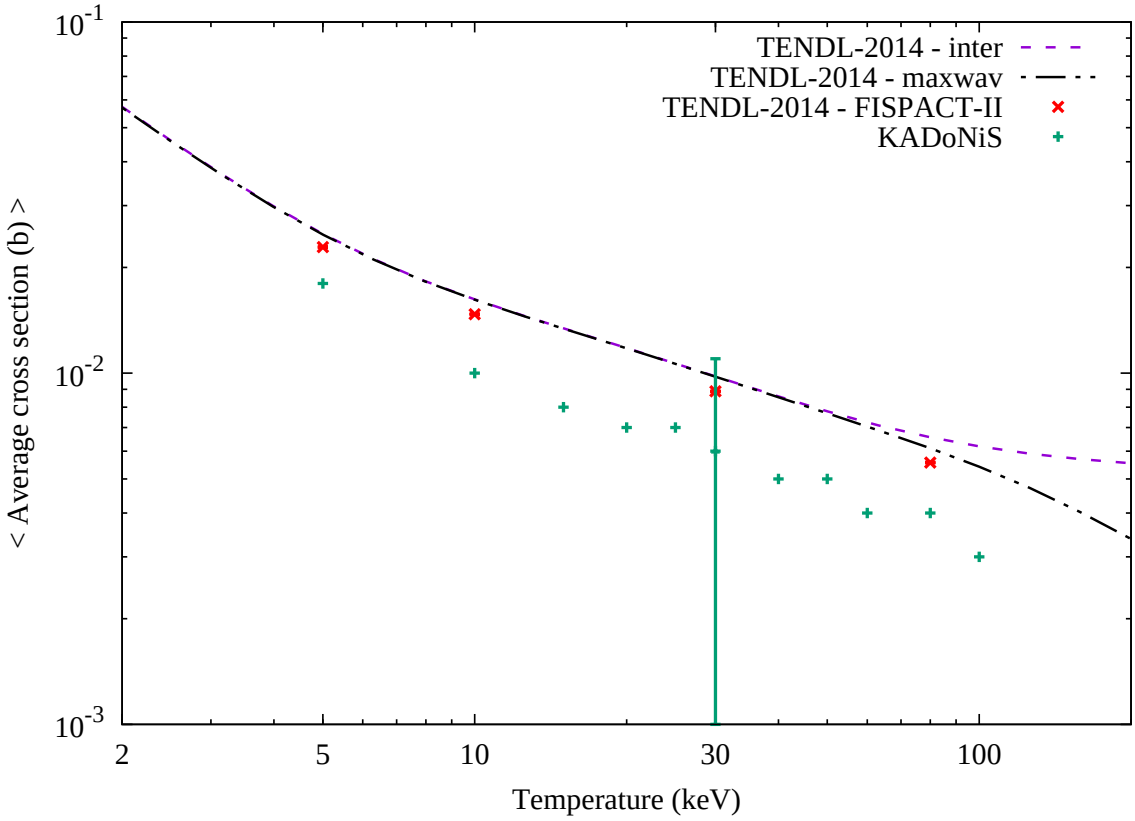
$^{209}Bi_{83}$ $[T_{1/2} = 1.90 \times 10^{19}$ years$]$





$^{210}Bi_{83}$ $[T_{1/2} = 5.01$ days$]$ (KADoNiS=SMC)





6 Discussion

The temperature dependent Maxwellian-averaged cross section (MACS) data assembled for stellar nucleosynthesis offers a wealth of experimental information which can be used to probe microscopic cross section data up to a few hundred keV. For the well-known nuclides where considerable efforts have been made to characterise the resolved resonance range over these energies, all nuclear data libraries generally agree with each other and the experiments. For nuclides which do not benefit from continuous resolved resonances over several hundred keV, results are more scattered. The multiple methods employed to treat resolved and unresolved resonance ranges, particularly with gross average parameters in the latter, produce variation in Doppler broadened data which demonstrates a serious weakness. Statistically resolved parameters are required to account for the full broadening effects, taking into account remaining structure which would otherwise be lost. An attempt to address this issue has been made with the high-fidelity resonance (HFR) method within TENDL-2014, which generates statistically sampled resonances married with optical model parameters taken from TALYS. For many nuclides within KADoNiS, this allows considerable improvement in the agreement with KADoNiS SMC and experiment, for example with ^{85}Kr and ^{74}Ge as shown in Figures 9 (TENDL-2014 C/C=0.92, see page 129) and 10 (TENDL-2014 C/E=0.96, see page 110).

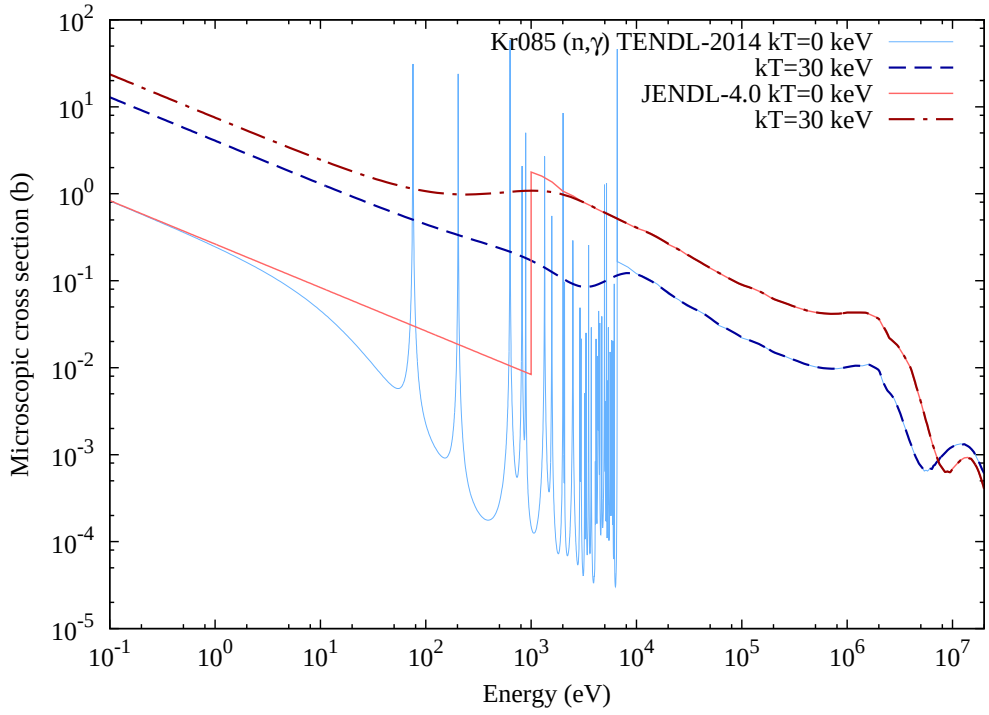


Figure 9: TENDL-2014 and JENDL-4.0 microscopic cross sections for Kr85, showing the 0K and 30 keV broadened data.

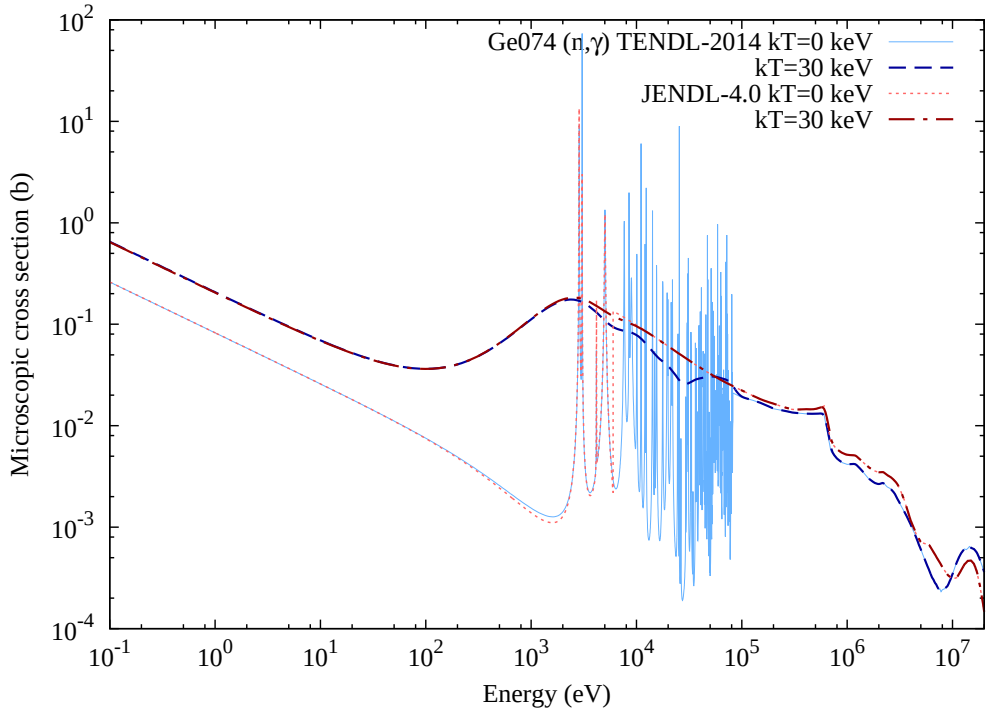


Figure 10: TENDL-2014 and JENDL-4.0 microscopic cross sections for Ge74, showing the 0K and 30 keV broadened data.

For these isotopes the average parameters including; scattering radius r, average level spacing D, average reduced neutron width Γ_{n_0} and average radiation width Γ_γ are taken directly from TALYS with with the Koning-Delaroche optical model potential [23] and the level density from [24]. The resolved resonances are based on the TALYS unresolved resonance range extended to eV, adjusted to systematics from Kopecky and Nierop [25, 26]. CALENDF is then used to produce a set of statistical resonances, consistent with the average parameters from TALYS. This energy limit can be arbitrarily chosen, but in practice it can result in many millions of resonances and must be chosen thoughtfully with application demands in mind.

In cases where limited information is available for the reconstruction of unresolved resonance ranges or where a choice of resonance parameters may be questionable, MACS may prove invaluable. Analysis of the collapsed cross sections and their energy dependent contributions alongside the differential data provides another tool for evaluation. This will be particularly useful for future TENDL releases, informing TARES parameter selection and the specific processes for HFR parameter selection from TALYS. While the HFR methodology produces a surfeit of data, for various applications such as stellar nucleosynthesis this data is required for accurate calculations and should be applied fully over an appropriate energy range, which for astrophysical MACS must be at least 150 keV.

The resonance parameters chosen by different libraries, such as ENDF/B-VII.1 and JENDL-4.0 are not unique and the capability of TARES to intelligently select from the various databases should be strengthened to address the occasional superiority of legacy library results. As noted earlier and as demonstrated in Figure 8, JENDL-4.0 in particular takes advantage of astrophysical MACS measurements in its evaluation process, yielding a strongly peaked C/E distribution around 1 – for those nuclides with n-incident files. Some nuclides which may deserve investigation, taking data from the following libraries, are (those in red are based on comparisons with statistical model KADoNiS):

JENDL-4.0: ^{58}**Ni,** ^{65}**Zn,** ^{70}**Ge,** ^{76}**Se,** ^{84}**Sr,** ^{104}**Ru,** ^{112,114,118}**Sn,** ^{123,124,128}**Te,** ^{140}**Ce,** ^{146}**Nd,** ^{144,153}**Sm,** ^{160}**Tb,** ^{186}**Os,** ^{198,200,202,204}**Hg,** ^{204,207,208}**Pb**

ENDF/B-VII.1: ^{67,71}**Ga,** ^{82}**Se,** ^{103}**Rh,** ^{156,158}**Dy,** ^{205}**Tl**

Along side earlier attempts to shed more lights on the unresolved range its physics and processing features [27] this study demonstrates the importance that this energy range has for the simulation of many astrophysical reaction rates. This is a salient feature for astrophysics when even the most sophisticated Hauser-Feshbach model will not be able to represent the impact resonances can have even at those temperatures.

Appendix

A Summary of 5, 30 and 80 keV MACS

A few temperatures were selected which cover the range of KADoNiS values in order to provide more specific information. The 5, 30 and 80 keV MACS from KADoNiS are presented against the TENDL-2014, ENDF/B-VII.1 and JENDL-4.0u collapsed cross sections using 0K pointwise files and the `maxwav` code in Table 1. The calculated value from TENDL-2014 is shown alongside C/E values for all libraries. Uncertainties are only available for 30 keV files in the KADoNiS v0.3 database and all calculation-derived cross sections within KADoNiS are indicated in red and with (SMC).

Note that some nuclides have 30 keV measurements but no 5 and/or 80 keV data (to prevent mixing of experimental and theoretical results), which is indicated by a dashed entry, but values from TENDL-2014 are kept for reference. Whenever files are absent from ENDF/B-VII.1 or JENDL-4.0, the entries in the table are replaced by a red dash. The astrophysical reaction rate is also provided for TENDL-2014.

Table 1: Comparison of KADoNiS 5, 30 and 80 keV MACS against collapsed nuclear data values. Only 30 keV uncertainties are provided and all statistical model calculations are indicated in red with (SMC).

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
H1							
5keV	8.70E-04		4.87E-04	4.07E+04	0.56	0.56	0.56
30keV	2.54E-04	7.9	1.52E-04	3.12E+04	0.60	0.60	0.60
80keV	1.62E-04		4.87E-04	2.55E+04	0.47	0.47	0.47
H2							
5keV	3.60E-06		1.29E-06	9.38E+01	0.36	0.36	0.50
30keV	3.00E-06	6.7	2.00E-06	3.55E+02	0.67	0.67	0.79
80keV	3.40E-06		1.29E-06	9.19E+02	0.93	0.93	1.00
He3							
5keV	—		8.72E-06	5.96E+02	—	—	—
30keV	7.60E-06	7.9	2.13E-05	3.56E+03	2.80	2.80	2.16
80keV	—		3.52E-05	9.61E+03	—	—	—
Li7							
5keV	1.02E-04		1.16E-04	7.31E+03	1.13	1.13	0.94
30keV	4.20E-05	7.1	4.64E-05	7.19E+03	1.11	1.11	0.93
80keV	3.10E-05		1.16E-04	7.88E+03	1.01	1.01	0.77
Be9							
5keV	1.66E-05		2.18E-05	1.36E+03	1.31	1.31	1.09

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
30keV	1.02E-05	15.7	9.29E-06	1.42E+03	0.91	0.91	0.72
80keV	9.90E-06		2.18E-05	1.50E+03	0.61	0.61	0.46
C12							
5keV	1.26E-05		1.37E-05	8.43E+02	1.09	1.09	1.09
30keV	1.54E-05	6.5	1.62E-05	2.45E+03	1.05	1.05	1.05
80keV	2.20E-05		1.37E-05	5.14E+03	0.95	0.95	0.95
C13							
5keV	7.30E-06		3.01E-06	1.85E+02	0.41	—	—
30keV	2.10E-05	19.0	1.40E-05	2.11E+03	0.67	—	—
80keV	5.00E-05		3.01E-06	8.37E+03	0.68	—	—
C14							
5keV	3.62E-06		7.32E-09	4.48E-01	0.00	—	—
30keV	8.48E-06	6.7	1.49E-08	2.23E+00	0.00	—	—
80keV	1.27E-05		7.32E-09	6.36E+00	0.00	—	—
N14							
5keV	1.83E-04		1.63E-04	9.99E+03	0.89	0.89	0.89
30keV	4.10E-05	146.3	6.68E-05	1.00E+04	1.63	1.63	1.64
80keV	1.90E-05		1.63E-04	1.04E+04	2.23	2.23	2.47
N15							
5keV	2.50E-06		3.47E-06	2.12E+02	1.39	1.39	1.27
30keV	5.80E-06	10.3	9.20E-06	1.38E+03	1.59	1.59	1.25
80keV	8.70E-06		3.47E-06	3.26E+03	1.53	1.53	1.26
O16							
5keV	1.60E-05		1.31E-05	7.98E+02	0.82	0.82	0.82
30keV	3.80E-05	10.5	3.16E-05	4.72E+03	0.83	0.83	0.83
80keV	6.20E-05		1.31E-05	1.78E+04	1.18	1.18	1.18
O18							
5keV	3.70E-06		1.70E-05	1.03E+03	4.60	—	—
30keV	8.90E-06	9.0	4.89E-04	7.28E+04	54.92	—	—
80keV	2.23E-05		1.70E-05	8.24E+04	15.20	—	—
F19							
5keV	1.20E-03		1.62E-03	9.84E+04	1.35	1.35	1.59
30keV	3.20E-03	3.1	4.36E-03	6.48E+05	1.36	1.36	1.79
80keV	1.20E-03		1.62E-03	4.01E+05	1.38	1.38	1.99
Ne20							
5keV	8.80E-05		7.39E-05	4.48E+03	0.84	—	—
30keV	1.19E-04	9.2	1.19E-04	1.76E+04	1.00	—	—
80keV	2.72E-04		7.39E-05	6.35E+04	0.96	—	—
Ne21							
5keV	—		1.70E-02	1.03E+06	—	—	—
30keV	1.50E-03	60.0	1.71E-03	2.53E+05	1.14	—	—
80keV	—		6.61E-04	1.60E+05	—	—	—

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
Ne22							
5keV	1.33E-04		4.61E-04	2.79E+04	3.47	—	—
30keV	5.80E-05	6.9	8.34E-05	1.24E+04	1.44	—	—
80keV	8.50E-05		4.61E-04	4.27E+03	0.21	—	—
Na23							
5keV	1.40E-02		1.36E-02	8.20E+05	0.97	0.99	0.95
30keV	2.10E-03	9.5	2.00E-03	2.95E+05	0.95	0.87	0.83
80keV	1.30E-03		1.36E-02	3.38E+05	1.08	0.84	0.68
Mg24							
5keV	1.10E-04		1.70E-04	1.03E+04	1.55	1.50	1.50
30keV	3.30E-03	12.1	3.90E-03	5.76E+05	1.18	1.15	1.15
80keV	2.70E-03		1.70E-04	7.06E+05	1.08	1.05	1.05
Mg25							
5keV	4.80E-03		3.33E-03	2.01E+05	0.69	0.47	0.47
30keV	6.40E-03	6.2	5.86E-03	8.65E+05	0.91	0.82	0.82
80keV	4.40E-03		3.33E-03	9.48E+05	0.89	0.70	0.70
Mg26							
5keV	1.03E-04		7.53E-05	4.54E+03	0.73	0.63	0.63
30keV	1.26E-04	7.1	9.74E-05	1.44E+04	0.77	0.69	0.69
80keV	2.26E-04		7.53E-05	1.12E+05	2.06	2.05	2.05
Al26 (SMC)							
5keV	1.00E-02		1.25E-02	7.51E+05	1.25	—	—
30keV	3.70E-03	0.0	3.12E-03	4.60E+05	0.84	—	—
80keV	1.90E-03		1.25E-02	2.76E+05	0.60	—	—
Al27							
5keV	1.12E-02		9.44E-03	5.69E+05	0.84	0.84	0.98
30keV	3.74E-03	8.0	3.30E-03	4.87E+05	0.88	0.88	0.89
80keV	2.50E-03		9.44E-03	4.50E+05	0.75	0.75	0.89
Si28							
5keV	1.40E-04		2.66E-04	1.60E+04	1.90	2.99	2.99
30keV	1.42E-03	9.2	5.80E-03	8.56E+05	4.09	2.54	2.54
80keV	1.08E-03		2.66E-04	7.11E+05	2.73	2.19	2.19
Si29							
5keV	8.58E-03		7.83E-03	4.71E+05	0.91	1.26	1.26
30keV	6.58E-03	10.0	6.44E-03	9.49E+05	0.98	1.18	1.18
80keV	1.92E-03		7.83E-03	5.10E+05	1.10	1.19	1.19
Si30							
5keV	3.47E-02		1.05E-02	6.29E+05	0.30	2.63	2.63
30keV	1.82E-03	18.1	1.81E-03	2.66E+05	0.99	2.44	2.44
80keV	3.60E-04		1.05E-02	2.35E+05	2.72	3.42	3.42
P31							
5keV	8.00E-04		7.10E-04	4.27E+04	0.89	10.60	0.50
30keV	1.74E-03	5.2	2.10E-03	3.08E+05	1.20	4.14	0.94

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	1.90E-03		7.10E-04	5.08E+05	1.11	2.80	0.93
S32							
5keV	1.30E-03		1.11E-03	6.66E+04	0.85	1.00	1.00
30keV	4.10E-03	4.9	5.81E-03	8.55E+05	1.42	1.38	1.38
80keV	3.30E-03		1.11E-03	8.68E+05	1.09	1.14	1.14
S33							
5keV	6.30E-03		7.53E-03	4.52E+05	1.19	0.63	0.63
30keV	7.40E-03	20.3	6.33E-03	9.31E+05	0.86	0.31	0.31
80keV	3.90E-03		7.53E-03	4.58E+05	0.49	0.21	0.21
S34							
5keV	3.67E-04		1.47E-05	8.84E+02	0.04	0.58	0.58
30keV	2.26E-04	4.4	3.13E-04	4.60E+04	1.38	1.03	1.03
80keV	2.69E-04		1.47E-05	2.10E+05	3.26	1.67	1.67
S36							
5keV	4.20E-04		3.50E-04	2.10E+04	0.83	3.10	3.10
30keV	1.71E-04	8.2	7.60E-04	1.12E+05	4.45	3.70	3.70
80keV	1.10E-04		3.50E-04	1.31E+05	4.97	3.84	3.84
Cl35							
5keV	2.52E-02		2.56E-02	1.54E+06	1.02	0.84	1.03
30keV	9.70E-03	2.2	9.24E-03	1.36E+06	0.95	0.78	0.88
80keV	4.60E-03		2.56E-02	1.07E+06	0.97	0.71	0.86
Cl36 (SMC)							
5keV	3.90E-02		5.57E-02	3.34E+06	1.43	—	—
30keV	1.20E-02	8.3	6.13E-03	9.01E+05	0.51	—	—
80keV	6.00E-03		5.57E-02	7.84E+05	0.54	—	—
Cl37							
5keV	6.85E-03		6.43E-03	3.86E+05	0.94	0.80	1.11
30keV	2.12E-03	3.3	3.44E-03	5.05E+05	1.62	0.96	1.16
80keV	7.90E-04		6.43E-03	4.70E+05	2.48	1.52	1.46
Ar36 (SMC)							
5keV	2.37E-02		4.28E-02	2.57E+06	1.81	0.30	—
30keV	9.00E-03	16.7	8.70E-03	1.28E+06	0.97	0.98	—
80keV	4.90E-03		4.28E-02	1.03E+06	0.88	1.28	—
Ar38 (SMC)							
5keV	1.06E-02		5.68E-03	3.40E+05	0.54	0.05	—
30keV	3.00E-03	10.0	2.21E-03	3.25E+05	0.74	0.05	—
80keV	1.80E-03		5.68E-03	2.46E+05	0.57	0.33	—
Ar39 (SMC)							
5keV	3.50E-02		2.17E+00	1.30E+08	61.95	—	—
30keV	8.00E-03	25.0	1.50E+00	2.20E+08	187.60	—	—
80keV	3.80E-03		2.17E+00	9.93E+07	109.08	—	—
Ar40							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	3.34E-03		2.07E-03	1.24E+05	0.62	0.56	0.56
30keV	2.55E-03	3.9	2.37E-03	3.47E+05	0.93	0.88	0.88
80keV	1.85E-03		2.07E-03	5.85E+05	1.32	1.32	1.32
K39							
5keV	2.42E-02		1.89E-02	1.13E+06	0.78	0.94	2.36
30keV	1.18E-02	3.4	1.03E-02	1.51E+06	0.87	0.90	1.57
80keV	6.10E-03		1.89E-02	1.36E+06	0.93	0.88	1.34
K40 (SMC)							
5keV	1.30E-01		1.17E-01	7.03E+06	0.90	0.47	0.47
30keV	3.10E-02	22.6	3.07E-02	4.50E+06	0.99	0.63	0.63
80keV	1.30E-02		1.17E-01	3.29E+06	1.06	0.69	0.69
K41							
5keV	8.80E-02		7.64E-02	4.57E+06	0.87	0.88	1.83
30keV	2.20E-02	3.2	1.99E-02	2.91E+06	0.90	0.92	1.43
80keV	1.35E-02		7.64E-02	2.54E+06	0.79	0.80	1.19
Ca40							
5keV	1.20E-02		1.06E-02	6.34E+05	0.88	0.90	0.90
30keV	5.73E-03	5.9	5.46E-03	8.01E+05	0.95	0.90	0.90
80keV	3.91E-03		1.06E-02	1.21E+06	1.29	0.90	0.90
Ca41 (SMC)							
5keV	1.11E-01		1.62E-01	9.72E+06	1.46	—	—
30keV	3.00E-02	23.3	3.67E-02	5.38E+06	1.22	—	—
80keV	1.50E-02		1.62E-01	3.96E+06	1.10	—	—
Ca42							
5keV	3.03E-02		2.92E-02	1.75E+06	0.96	0.96	0.96
30keV	1.56E-02	12.8	1.31E-02	1.93E+06	0.84	0.79	0.79
80keV	9.40E-03		2.92E-02	2.23E+06	0.99	0.67	0.69
Ca43							
5keV	2.30E-01		2.09E-01	1.25E+07	0.91	0.67	0.98
30keV	5.10E-02	11.8	4.99E-02	7.32E+06	0.98	0.69	0.74
80keV	2.37E-02		2.09E-01	6.59E+06	1.16	0.70	0.86
Ca44							
5keV	9.90E-03		9.34E-03	5.59E+05	0.94	0.98	0.98
30keV	9.40E-03	13.8	7.63E-03	1.12E+06	0.81	0.82	0.82
80keV	5.00E-03		9.34E-03	1.22E+06	1.02	0.78	0.78
Ca45 (SMC)							
5keV	7.10E-02		2.67E-02	1.60E+06	0.38	—	—
30keV	1.75E-02	20.0	1.72E-02	2.52E+06	0.98	—	—
80keV	8.10E-03		2.67E-02	2.16E+06	1.12	—	—
Ca46							
5keV	7.20E-03		1.24E-01	7.42E+06	17.23	0.37	1.03
30keV	5.30E-03	9.4	6.17E-03	9.04E+05	1.16	0.35	0.49

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	2.40E-03		1.24E-01	3.07E+05	0.53	0.51	0.64
Ca48							
5keV	2.13E-03		2.99E-03	1.78E+05	1.40	0.48	0.48
30keV	8.70E-04	10.3	8.60E-04	1.26E+05	0.99	0.12	0.12
80keV	5.30E-04		2.99E-03	4.70E+04	0.37	0.12	0.12
Sc45							
5keV	2.26E-01		1.85E-01	1.11E+07	0.82	0.84	0.82
30keV	6.90E-02	7.2	6.45E-02	9.44E+06	0.93	0.99	0.95
80keV	3.10E-02		1.85E-01	7.69E+06	1.04	1.15	1.11
Ti46							
5keV	2.99E-02		2.86E-02	1.71E+06	0.96	0.93	0.93
30keV	2.68E-02	11.9	2.60E-02	3.81E+06	0.97	0.95	0.95
80keV	1.73E-02		2.86E-02	4.01E+06	0.97	0.90	0.90
Ti47							
5keV	2.13E-01		2.19E-01	1.31E+07	1.03	0.86	0.86
30keV	6.44E-02	12.0	5.82E-02	8.52E+06	0.90	0.76	0.65
80keV	3.08E-02		2.19E-01	6.41E+06	0.87	0.97	0.70
Ti48							
5keV	4.26E-02		4.95E-02	2.96E+06	1.16	1.16	1.21
30keV	3.18E-02	16.0	2.65E-02	3.88E+06	0.83	0.83	0.88
80keV	1.29E-02		4.95E-02	2.59E+06	0.84	0.83	0.86
Ti49							
5keV	5.21E-02		4.27E-02	2.55E+06	0.82	0.77	0.77
30keV	2.21E-02	9.5	1.32E-02	1.93E+06	0.60	0.72	0.72
80keV	1.19E-02		4.27E-02	1.14E+06	0.40	0.54	0.52
Ti50							
5keV	2.00E-03		2.35E-03	1.40E+05	1.17	0.62	0.62
30keV	3.60E-03	11.1	3.43E-03	5.02E+05	0.95	0.85	0.85
80keV	2.40E-03		2.35E-03	5.57E+05	0.97	0.88	0.88
V50 (SMC)							
5keV	2.33E-01		3.84E-01	2.29E+07	1.65	0.60	0.60
30keV	5.00E-02	18.0	4.28E-02	6.27E+06	0.86	0.43	0.43
80keV	2.60E-02		3.84E-01	3.02E+06	0.49	0.38	0.38
V51							
5keV	2.26E-01		1.33E-01	7.96E+06	0.59	0.59	0.59
30keV	3.80E-02	10.5	3.17E-02	4.63E+06	0.83	0.84	0.84
80keV	1.80E-02		1.33E-01	3.40E+06	0.79	0.79	0.78
Cr50							
5keV	2.29E-01		1.90E-01	1.14E+07	0.83	0.83	0.83
30keV	4.90E-02	26.5	3.82E-02	5.60E+06	0.78	0.78	0.75
80keV	2.30E-02		1.90E-01	4.99E+06	0.91	0.91	0.71
Cr51 (SMC)							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	4.38E-01		4.04E-01	2.41E+07	0.92	—	—
30keV	8.70E-02	18.4	8.29E-02	1.21E+07	0.95	—	—
80keV	4.60E-02		4.04E-01	1.07E+07	0.97	—	—
Cr52							
5keV	1.03E-02		1.09E-02	6.53E+05	1.06	0.95	0.95
30keV	8.80E-03	26.1	9.06E-03	1.33E+06	1.03	0.91	0.91
80keV	7.10E-03		1.09E-02	1.88E+06	1.11	0.88	0.88
Cr53							
5keV	3.50E-01		2.34E-01	1.40E+07	0.67	0.48	0.48
30keV	5.80E-02	17.2	4.15E-02	6.06E+06	0.71	0.45	0.45
80keV	2.70E-02		2.34E-01	4.10E+06	0.64	0.39	0.40
Cr54							
5keV	1.60E-02		7.66E-03	4.57E+05	0.48	0.48	0.57
30keV	6.70E-03	23.9	4.78E-03	6.99E+05	0.71	0.71	0.70
80keV	4.50E-03		7.66E-03	1.27E+06	1.18	1.18	0.74
Mn55							
5keV	2.51E-01		1.83E-01	1.09E+07	0.73	0.73	0.73
30keV	3.96E-02	7.6	3.28E-02	4.80E+06	0.83	0.83	0.82
80keV	1.90E-02		1.83E-01	3.76E+06	0.83	0.83	0.80
Fe54							
5keV	1.19E-01		8.87E-02	5.30E+06	0.75	0.75	0.75
30keV	2.96E-02	4.4	2.16E-02	3.16E+06	0.73	0.73	0.73
80keV	1.74E-02		8.87E-02	3.58E+06	0.86	0.86	0.86
Fe55 (SMC)							
5keV	3.67E-01		3.07E-01	1.83E+07	0.84	—	—
30keV	7.50E-02	16.0	8.47E-02	1.24E+07	1.13	—	—
80keV	4.00E-02		3.07E-01	1.00E+07	1.05	—	—
Fe56							
5keV	1.18E-02		1.10E-02	6.57E+05	0.93	0.93	0.93
30keV	1.17E-02	4.3	1.18E-02	1.73E+06	1.01	0.98	1.01
80keV	8.63E-03		1.10E-02	2.23E+06	1.08	1.09	1.08
Fe57							
5keV	1.24E-01		1.70E-01	1.02E+07	1.37	1.13	0.84
30keV	4.00E-02	10.0	6.05E-02	8.85E+06	1.51	0.71	0.76
80keV	1.90E-02		1.70E-01	5.49E+06	1.21	0.56	0.55
Fe58							
5keV	3.01E-02		4.28E-02	2.55E+06	1.42	1.63	1.42
30keV	1.35E-02	5.2	1.40E-02	2.05E+06	1.04	1.46	1.04
80keV	9.60E-03		4.28E-02	1.89E+06	0.83	1.15	0.82
Fe60 (SMC)							
5keV	—		7.78E-03	4.64E+05	—	—	—
30keV	5.15E-03	27.4	6.09E-03	8.90E+05	1.18	—	—

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	3.00E-03		7.78E-03	7.97E+05	1.11	—	—
Co59							
5keV	1.15E-01		1.54E-01	9.18E+06	1.34	1.41	1.50
30keV	3.96E-02	6.8	4.06E-02	5.93E+06	1.03	0.87	0.99
80keV	1.25E-02		1.54E-01	5.21E+06	1.75	1.54	1.64
Ni58							
5keV	3.83E-02		3.87E-02	2.31E+06	1.01	1.01	1.05
30keV	3.87E-02	3.9	3.39E-02	4.95E+06	0.87	0.87	1.03
80keV	2.70E-02		3.87E-02	5.17E+06	0.80	0.80	1.03
Ni59 (SMC)							
5keV	4.05E-01		3.59E-01	2.14E+07	0.89	0.92	0.84
30keV	8.70E-02	16.1	6.51E-02	9.51E+06	0.75	0.80	0.52
80keV	4.60E-02		3.59E-01	9.70E+06	0.88	0.70	0.41
Ni60							
5keV	6.96E-02		6.37E-02	3.80E+06	0.92	0.92	0.88
30keV	2.99E-02	2.3	2.67E-02	3.91E+06	0.89	0.89	0.93
80keV	1.67E-02		6.37E-02	3.62E+06	0.91	0.91	1.00
Ni61							
5keV	2.65E-01		3.64E-01	2.17E+07	1.37	1.35	1.35
30keV	8.20E-02	9.8	9.90E-02	1.45E+07	1.21	1.10	1.17
80keV	4.20E-02		3.64E-01	9.20E+06	0.92	0.90	0.93
Ni62							
5keV	1.90E-01		1.64E-01	9.79E+06	0.86	0.99	0.86
30keV	2.23E-02	7.2	1.92E-02	2.81E+06	0.86	1.07	0.86
80keV	1.03E-02		1.64E-01	2.13E+06	0.87	0.81	0.87
Ni63 (SMC)							
5keV	1.12E-01		1.96E-01	1.17E+07	1.75	—	—
30keV	3.10E-02	19.4	3.04E-02	4.44E+06	0.98	—	—
80keV	1.30E-02		1.96E-01	3.06E+06	0.99	—	—
Ni64							
5keV	1.18E-02		6.68E-02	3.98E+06	5.66	6.53	6.53
30keV	8.00E-03	8.8	1.44E-02	2.10E+06	1.80	2.51	2.51
80keV	5.10E-03		6.68E-02	1.07E+06	0.88	1.32	1.34
Cu63							
5keV	1.98E-01		2.81E-01	1.67E+07	1.42	1.43	1.43
30keV	5.57E-02	3.9	9.16E-02	1.34E+07	1.65	1.28	1.37
80keV	3.90E-02		2.81E-01	1.39E+07	1.50	0.99	1.09
Cu65							
5keV	1.11E-01		1.20E-01	7.18E+06	1.08	1.08	1.09
30keV	2.98E-02	4.4	3.84E-02	5.61E+06	1.29	1.31	1.25
80keV	1.96E-02		1.20E-01	5.08E+06	1.09	1.18	1.06
Zn64							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	1.39E-01		1.94E-01	1.16E+07	1.40	1.39	1.39
30keV	5.90E-02	8.5	6.00E-02	8.77E+06	1.02	1.03	1.03
80keV	4.00E-02		1.94E-01	7.30E+06	0.77	0.91	0.91
Zn65 (SMC)							
5keV	5.12E-01		3.18E+00	1.90E+08	6.22	1.07	1.07
30keV	1.62E-01	16.7	3.23E-01	4.71E+07	1.99	1.03	1.03
80keV	8.70E-02		3.18E+00	2.57E+07	1.24	1.06	1.06
Zn66							
5keV	8.40E-02		8.61E-02	5.13E+06	1.03	1.02	1.02
30keV	3.50E-02	8.6	3.60E-02	5.25E+06	1.03	1.04	1.04
80keV	2.50E-02		8.61E-02	4.73E+06	0.79	0.98	0.98
Zn67							
5keV	5.03E-01		5.96E-01	3.55E+07	1.19	1.10	1.10
30keV	1.53E-01	9.8	1.11E-01	1.62E+07	0.72	0.76	0.76
80keV	8.20E-02		5.96E-01	1.01E+07	0.51	0.83	0.83
Zn68							
5keV	9.30E-02		7.12E-02	4.24E+06	0.77	0.67	0.67
30keV	1.92E-02	12.5	2.10E-02	3.06E+06	1.09	1.08	1.08
80keV	1.20E-02		7.12E-02	2.90E+06	1.02	1.24	1.24
Zn70 (SMC)							
5keV	5.70E-02		7.81E-02	4.65E+06	1.37	0.42	0.42
30keV	2.15E-02	9.3	2.03E-02	2.97E+06	0.95	0.54	0.54
80keV	1.37E-02		7.81E-02	2.60E+06	0.79	0.51	0.51
Ga69							
5keV	3.31E-01		2.72E-01	1.62E+07	0.82	1.06	1.11
30keV	1.39E-01	4.3	1.22E-01	1.78E+07	0.88	0.85	0.86
80keV	8.70E-02		2.72E-01	1.91E+07	0.92	0.81	0.81
Ga71							
5keV	3.98E-01		2.69E-01	1.60E+07	0.68	0.99	0.90
30keV	1.23E-01	6.5	9.80E-02	1.43E+07	0.80	0.99	0.83
80keV	6.90E-02		2.69E-01	1.50E+07	0.91	1.02	0.85
Ge70							
5keV	2.01E-01		1.16E-01	6.93E+06	0.58	1.03	1.03
30keV	8.80E-02	5.7	6.19E-02	9.03E+06	0.70	1.01	1.01
80keV	5.50E-02		1.16E-01	1.40E+07	1.07	1.02	1.02
Ge72 (SMC)							
5keV	1.99E-01		1.07E-01	6.37E+06	0.54	0.51	0.51
30keV	7.30E-02	9.6	6.63E-02	9.67E+06	0.91	0.73	0.73
80keV	4.70E-02		1.07E-01	1.11E+07	0.99	0.83	0.83
Ge73 (SMC)							
5keV	7.72E-01		8.51E-01	5.07E+07	1.10	0.74	0.74
30keV	2.43E-01	19.3	2.35E-01	3.42E+07	0.97	0.86	0.86

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	1.19E-01		8.51E-01	2.82E+07	0.99	0.90	0.90
Ge74							
5keV	1.06E-01		9.93E-02	5.91E+06	0.94	1.13	1.13
30keV	3.76E-02	10.4	3.62E-02	5.28E+06	0.96	1.21	1.21
80keV	2.34E-02		9.93E-02	5.52E+06	0.99	1.13	1.13
Ge76							
5keV	5.80E-02		9.23E-02	5.50E+06	1.59	0.56	0.56
30keV	2.15E-02	8.4	1.97E-02	2.88E+06	0.92	0.79	0.79
80keV	1.30E-02		9.23E-02	2.27E+06	0.73	1.00	1.00
As75							
5keV	1.12E+00		1.23E+00	7.34E+07	1.10	1.21	1.20
30keV	3.62E-01	5.2	4.17E-01	6.08E+07	1.15	1.24	1.23
80keV	2.11E-01		1.23E+00	5.76E+07	1.15	1.18	1.21
Se74							
5keV	6.87E-01		6.63E-01	3.95E+07	0.97	0.93	1.11
30keV	2.71E-01	5.5	2.59E-01	3.78E+07	0.96	0.77	1.03
80keV	1.73E-01		6.63E-01	4.03E+07	0.98	0.72	1.07
Se76							
5keV	3.63E-01		3.02E-01	1.80E+07	0.83	0.82	0.99
30keV	1.64E-01	4.9	1.39E-01	2.03E+07	0.85	0.58	1.03
80keV	1.14E-01		3.02E-01	2.32E+07	0.85	0.52	0.99
Se77 (SMC)							
5keV	9.99E-01		1.26E+00	7.51E+07	1.26	1.14	1.40
30keV	4.18E-01	17.0	4.61E-01	6.73E+07	1.10	1.06	1.20
80keV	2.40E-01		1.26E+00	6.57E+07	1.15	1.04	1.16
Se78							
5keV	1.60E-01		2.01E-01	1.20E+07	1.26	1.21	1.17
30keV	6.00E-02	16.0	6.03E-02	8.79E+06	1.00	1.51	1.39
80keV	3.80E-02		2.01E-01	1.06E+07	1.17	1.56	1.48
Se79 (SMC)							
5keV	7.41E-01		6.65E-01	3.96E+07	0.90	1.53	2.11
30keV	2.63E-01	17.5	2.73E-01	3.98E+07	1.04	1.58	1.92
80keV	1.38E-01		6.65E-01	3.47E+07	1.05	1.55	1.92
Se80							
5keV	1.16E-01		1.94E-01	1.15E+07	1.67	1.44	1.42
30keV	4.20E-02	7.1	3.99E-02	5.82E+06	0.95	0.94	0.91
80keV	2.50E-02		1.94E-01	6.35E+06	1.07	0.94	0.88
Se82 (SMC)							
5keV	2.50E-02		3.00E-02	1.79E+06	1.20	1.40	0.88
30keV	9.00E-03	88.9	4.00E-03	5.83E+05	0.44	3.45	0.93
80keV	5.00E-03		3.00E-02	4.69E+05	0.39	4.88	1.11
Br79							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	1.77E+00		1.94E+00	1.15E+08	1.10	1.08	1.14
30keV	6.28E-01	5.4	6.37E-01	9.29E+07	1.01	1.09	1.11
80keV	3.71E-01		1.94E+00	8.77E+07	0.99	1.06	1.10
Br81							
5keV	7.33E-01		6.73E-01	4.01E+07	0.92	0.91	1.06
30keV	2.39E-01	2.9	2.35E-01	3.42E+07	0.98	0.96	1.19
80keV	1.43E-01		6.73E-01	3.32E+07	0.97	0.91	1.13
Kr78							
5keV	3.32E-01		4.17E-01	2.48E+07	1.26	2.78	3.32
30keV	3.21E-01	8.1	2.71E-01	3.95E+07	0.84	1.47	1.32
80keV	2.43E-01		4.17E-01	4.54E+07	0.78	1.20	1.08
Kr79 (SMC)							
5keV	1.71E+00		1.96E+00	1.17E+08	1.14	—	—
30keV	9.59E-01	16.9	8.84E-01	1.29E+08	0.92	—	—
80keV	5.76E-01		1.96E+00	1.31E+08	0.96	—	—
Kr80							
5keV	9.35E-01		6.19E-01	3.69E+07	0.66	0.79	0.83
30keV	2.67E-01	5.2	2.52E-01	3.67E+07	0.94	1.10	1.06
80keV	1.80E-01		6.19E-01	3.85E+07	0.90	1.00	0.99
Kr81 (SMC)							
5keV	1.39E+00		1.71E+00	1.02E+08	1.23	—	—
30keV	6.07E-01	17.3	6.22E-01	9.06E+07	1.02	—	—
80keV	3.42E-01		1.71E+00	7.96E+07	0.98	—	—
Kr82							
5keV	1.20E-01		1.89E-01	1.13E+07	1.58	2.56	2.40
30keV	9.00E-02	6.7	7.85E-02	1.14E+07	0.87	1.14	1.06
80keV	6.20E-02		1.89E-01	1.28E+07	0.86	1.02	0.99
Kr83							
5keV	9.02E-01		9.18E-01	5.46E+07	1.02	0.99	1.07
30keV	2.43E-01	6.2	3.49E-01	5.08E+07	1.44	1.10	1.09
80keV	1.20E-01		9.18E-01	4.43E+07	1.55	1.12	1.11
Kr84							
5keV	2.60E-01		1.75E-01	1.04E+07	0.67	0.58	0.44
30keV	3.80E-02	10.5	3.18E-02	4.63E+06	0.84	0.69	1.02
80keV	1.90E-02		1.75E-01	4.66E+06	1.03	1.07	1.31
Kr85 (SMC)							
5keV	1.74E-01		1.13E-01	6.74E+06	0.65	2.16	3.29
30keV	5.50E-02	81.8	5.06E-02	7.37E+06	0.92	2.22	3.59
80keV	2.90E-02		1.13E-01	6.49E+06	0.94	2.32	3.72
Kr86							
5keV	2.10E-03		2.92E-03	1.74E+05	1.39	1.55	1.55
30keV	3.40E-03	8.8	4.08E-03	5.95E+05	1.20	1.49	1.50

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	1.80E-03		2.92E-03	5.59E+05	1.30	1.38	1.90
Rb85							
5keV	7.05E-01		8.37E-01	4.98E+07	1.19	1.07	1.12
30keV	2.34E-01	3.0	2.57E-01	3.75E+07	1.10	1.20	1.24
80keV	1.26E-01		8.37E-01	2.98E+07	0.99	1.19	1.26
Rb86 (SMC)							
5keV	4.50E-01		6.32E-01	3.76E+07	1.40	2.20	2.11
30keV	2.02E-01	80.7	1.99E-01	2.90E+07	0.98	1.57	1.80
80keV	1.22E-01		6.32E-01	2.53E+07	0.87	1.48	1.75
Rb87							
5keV	3.58E-02		5.22E-02	3.10E+06	1.46	1.34	1.40
30keV	1.57E-02	5.1	1.68E-02	2.45E+06	1.07	1.48	1.63
80keV	1.07E-02		5.22E-02	2.26E+06	0.89	1.28	1.35
Sr84							
5keV	7.21E-01		4.42E-01	2.63E+07	0.61	0.98	1.03
30keV	3.00E-01	5.7	2.57E-01	3.75E+07	0.86	1.06	1.03
80keV	1.73E-01		4.42E-01	4.53E+07	1.10	1.18	1.12
Sr86							
5keV	2.11E-01		2.32E-01	1.38E+07	1.10	0.97	1.11
30keV	6.40E-02	4.7	5.63E-02	8.20E+06	0.88	0.96	1.03
80keV	3.40E-02		2.32E-01	9.13E+06	1.13	1.27	1.23
Sr87							
5keV	3.45E-01		2.66E-01	1.58E+07	0.77	0.72	0.73
30keV	9.20E-02	4.3	7.42E-02	1.08E+07	0.81	0.87	0.92
80keV	4.50E-02		2.66E-01	9.41E+06	0.88	0.92	1.00
Sr88							
5keV	1.09E-02		8.83E-03	5.25E+05	0.81	0.81	0.81
30keV	6.13E-03	1.8	5.37E-03	7.82E+05	0.88	0.85	0.87
80keV	3.56E-03		8.83E-03	8.37E+05	0.99	0.80	0.79
Sr89 (SMC)							
5keV	6.90E-02		5.95E-02	3.54E+06	0.86	0.79	1.99
30keV	1.90E-02	73.7	1.43E-02	2.09E+06	0.75	0.76	2.14
80keV	1.00E-02		5.95E-02	2.06E+06	0.86	0.74	2.04
Y89							
5keV	6.80E-02		7.35E-02	4.37E+06	1.08	1.05	1.06
30keV	1.90E-02	3.2	2.31E-02	3.36E+06	1.21	1.12	1.06
80keV	1.10E-02		7.35E-02	3.41E+06	1.30	1.21	1.13
Zr90							
5keV	4.44E-02		4.43E-02	2.63E+06	1.00	1.00	1.00
30keV	1.93E-02	4.7	1.93E-02	2.81E+06	1.00	0.98	0.99
80keV	1.24E-02		4.43E-02	3.21E+06	1.09	0.88	1.02
Zr91							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	2.33E-01		2.98E-01	1.78E+07	1.28	1.19	1.01
30keV	6.20E-02	5.5	6.57E-02	9.58E+06	1.06	1.19	1.00
80keV	3.25E-02		2.98E-01	7.18E+06	0.93	1.08	0.97
Zr92							
5keV	1.19E-01		1.67E-01	9.92E+06	1.40	1.39	1.39
30keV	3.01E-02	5.6	4.53E-02	6.60E+06	1.51	1.51	1.34
80keV	2.10E-02		1.67E-01	5.54E+06	1.11	1.54	1.01
Zr93							
5keV	3.40E-01		3.58E-01	2.13E+07	1.05	1.13	1.04
30keV	9.50E-02	10.5	8.87E-02	1.29E+07	0.93	1.06	1.04
80keV	4.40E-02		3.58E-01	1.06E+07	1.02	1.14	1.13
Zr94							
5keV	7.40E-02		8.26E-02	4.91E+06	1.12	1.11	1.05
30keV	2.60E-02	3.8	2.90E-02	4.23E+06	1.12	1.12	1.00
80keV	2.10E-02		8.26E-02	3.80E+06	0.76	1.01	0.73
Zr95 (SMC)							
5keV	2.96E-01		3.76E-01	2.24E+07	1.27	1.62	1.62
30keV	7.90E-02	15.2	8.35E-02	1.22E+07	1.06	1.63	1.64
80keV	3.90E-02		3.76E-01	9.95E+06	1.07	1.52	1.60
Zr96							
5keV	5.60E-02		6.99E-02	4.16E+06	1.25	1.18	1.12
30keV	1.07E-02	4.7	1.07E-02	1.56E+06	1.00	0.96	1.13
80keV	4.40E-03		6.99E-02	1.20E+06	1.15	1.71	1.81
Nb93							
5keV	8.87E-01		8.60E-01	5.12E+07	0.97	0.92	0.98
30keV	2.66E-01	1.9	2.88E-01	4.19E+07	1.08	1.00	1.00
80keV	1.30E-01		8.60E-01	3.39E+07	1.10	1.07	1.04
Nb94 (SMC)							
5keV	9.25E-01		1.46E+00	8.71E+07	1.58	1.04	1.35
30keV	4.82E-01	19.1	5.49E-01	8.00E+07	1.14	0.66	0.87
80keV	2.45E-01		1.46E+00	6.05E+07	1.04	0.56	0.79
Nb95 (SMC)							
5keV	8.92E-01		1.40E+00	8.35E+07	1.57	1.25	1.69
30keV	3.10E-01	21.0	5.14E-01	7.49E+07	1.66	1.30	1.81
80keV	1.59E-01		1.40E+00	6.74E+07	1.78	1.36	1.94
Mo100							
5keV	2.81E-01		2.62E-01	1.56E+07	0.93	0.92	0.92
30keV	1.08E-01	13.0	1.07E-01	1.56E+07	0.99	0.80	0.79
80keV	7.90E-02		2.62E-01	1.99E+07	1.06	0.65	0.71
Mo92							
5keV	2.77E-01		1.79E-01	1.06E+07	0.65	0.64	0.65
30keV	7.00E-02	14.3	5.33E-02	7.77E+06	0.76	0.99	0.96

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	4.50E-02		1.79E-01	8.19E+06	0.76	0.95	0.90
Mo94							
5keV	3.21E-01		2.74E-01	1.63E+07	0.85	0.82	0.92
30keV	1.02E-01	19.6	1.10E-01	1.60E+07	1.08	1.08	0.99
80keV	7.10E-02		2.74E-01	1.65E+07	0.97	0.99	0.86
Mo95							
5keV	7.85E-01		1.01E+00	6.02E+07	1.29	1.33	1.39
30keV	2.92E-01	4.1	3.68E-01	5.36E+07	1.26	1.29	1.32
80keV	1.64E-01		1.01E+00	4.23E+07	1.09	1.28	1.25
Mo96							
5keV	4.09E-01		2.82E-01	1.68E+07	0.69	0.68	0.68
30keV	1.12E-01	7.1	1.05E-01	1.53E+07	0.94	0.92	0.94
80keV	7.00E-02		2.82E-01	1.57E+07	0.94	0.90	0.93
Mo97							
5keV	9.52E-01		1.04E+00	6.16E+07	1.09	1.13	1.15
30keV	3.39E-01	4.1	3.45E-01	5.02E+07	1.02	1.15	1.14
80keV	1.85E-01		1.04E+00	4.25E+07	0.97	1.13	1.14
Mo98							
5keV	2.98E-01		2.95E-01	1.75E+07	0.99	0.98	0.99
30keV	9.90E-02	7.1	8.97E-02	1.31E+07	0.91	0.96	0.86
80keV	6.00E-02		2.95E-01	1.33E+07	0.93	1.02	0.86
Mo99 (SMC)							
5keV	7.03E-01		8.40E-01	4.99E+07	1.19	1.67	1.46
30keV	2.40E-01	16.7	2.68E-01	3.90E+07	1.12	2.00	1.47
80keV	1.07E-01		8.40E-01	3.02E+07	1.19	2.26	1.58
Tc99							
5keV	1.85E+00		2.17E+00	1.29E+08	1.17	1.09	0.99
30keV	7.81E-01	6.0	8.82E-01	1.28E+08	1.13	1.37	1.02
80keV	4.45E-01		2.17E+00	1.13E+08	1.07	1.32	0.98
Ru100							
5keV	5.25E-01		3.45E-01	2.05E+07	0.66	0.93	1.10
30keV	2.06E-01	6.3	1.82E-01	2.65E+07	0.88	0.99	1.00
80keV	1.26E-01		3.45E-01	2.92E+07	0.98	0.99	1.00
Ru101							
5keV	2.40E+00		2.43E+00	1.44E+08	1.01	0.93	0.83
30keV	9.96E-01	4.0	1.05E+00	1.53E+08	1.05	0.98	0.92
80keV	6.15E-01		2.43E+00	1.36E+08	0.93	0.90	0.87
Ru102							
5keV	4.56E-01		7.48E-01	4.44E+07	1.64	1.12	1.12
30keV	1.51E-01	4.6	2.56E-01	3.73E+07	1.70	1.26	1.26
80keV	8.30E-02		7.48E-01	3.60E+07	1.82	1.41	1.39
Ru103 (SMC)							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	1.11E+00		1.49E+00	8.86E+07	1.35	1.48	1.48
30keV	3.43E-01	15.2	4.36E-01	6.35E+07	1.27	1.69	1.68
80keV	1.58E-01		1.49E+00	4.72E+07	1.26	1.82	1.82
Ru104							
5keV	4.54E-01		5.38E-01	3.20E+07	1.19	1.06	1.06
30keV	1.56E-01	3.8	2.35E-01	3.42E+07	1.50	1.06	1.06
80keV	8.70E-02		5.38E-01	3.48E+07	1.68	1.16	1.15
Ru96							
5keV	4.14E-01		6.46E-01	3.84E+07	1.56	1.65	1.65
30keV	2.07E-01	3.9	1.86E-01	2.70E+07	0.90	1.28	1.28
80keV	1.19E-01		6.46E-01	2.88E+07	1.02	1.36	1.36
Ru98 (SMC)							
5keV	4.61E-01		4.39E-01	2.61E+07	0.95	1.35	1.36
30keV	1.73E-01	20.8	1.70E-01	2.48E+07	0.98	1.37	1.37
80keV	9.70E-02		4.39E-01	2.50E+07	1.08	1.50	1.50
Ru99 (SMC)							
5keV	1.23E+00		1.74E+00	1.03E+08	1.42	1.40	1.40
30keV	6.31E-01	15.7	6.75E-01	9.83E+07	1.07	1.13	1.13
80keV	3.37E-01		1.74E+00	8.27E+07	1.03	1.17	1.17
Rh103							
5keV	1.89E+00		2.39E+00	1.42E+08	1.27	0.95	0.98
30keV	8.11E-01	1.7	1.02E+00	1.48E+08	1.26	0.99	1.08
80keV	4.72E-01		2.39E+00	1.43E+08	1.28	1.00	1.12
Pd102							
5keV	8.84E-01		6.17E-01	3.67E+07	0.70	1.15	0.84
30keV	3.69E-01	4.6	3.66E-01	5.33E+07	0.99	1.24	0.78
80keV	2.33E-01		6.17E-01	5.45E+07	0.98	1.29	0.77
Pd104							
5keV	6.85E-01		9.17E-01	5.45E+07	1.34	1.10	1.00
30keV	2.89E-01	10.0	2.84E-01	4.13E+07	0.98	0.97	0.93
80keV	1.76E-01		9.17E-01	3.93E+07	0.94	1.02	0.97
Pd105							
5keV	2.54E+00		2.67E+00	1.59E+08	1.05	0.98	1.04
30keV	1.20E+00	5.0	1.21E+00	1.76E+08	1.01	0.99	1.02
80keV	7.95E-01		2.67E+00	1.67E+08	0.88	0.91	0.95
Pd106							
5keV	7.00E-01		8.05E-01	4.79E+07	1.15	0.84	0.95
30keV	2.52E-01	9.9	2.86E-01	4.17E+07	1.14	0.94	1.01
80keV	1.44E-01		8.05E-01	4.27E+07	1.25	1.10	1.12
Pd107							
5keV	2.73E+00		2.71E+00	1.61E+08	0.99	1.05	1.04
30keV	1.34E+00	4.5	1.41E+00	2.05E+08	1.05	0.97	0.97

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	8.00E-01		2.71E+00	1.99E+08	1.05	1.01	0.99
Pd108							
5keV	5.55E-01		5.30E-01	3.15E+07	0.96	1.02	1.10
30keV	2.03E-01	9.9	1.98E-01	2.88E+07	0.98	1.03	1.12
80keV	1.18E-01		5.30E-01	2.95E+07	1.05	1.18	1.22
Pd110							
5keV	4.49E-01		3.28E-01	1.95E+07	0.73	0.81	0.98
30keV	1.46E-01	13.7	1.56E-01	2.28E+07	1.07	1.07	1.09
80keV	7.90E-02		3.28E-01	2.52E+07	1.34	1.30	1.28
Ag107							
5keV	1.60E+00		1.64E+00	9.77E+07	1.03	1.04	1.09
30keV	7.92E-01	3.8	6.99E-01	1.02E+08	0.88	1.05	1.06
80keV	4.86E-01		1.64E+00	9.37E+07	0.81	1.05	1.06
Ag109							
5keV	1.67E+00		2.18E+00	1.30E+08	1.31	1.05	1.09
30keV	7.88E-01	3.8	9.04E-01	1.32E+08	1.15	1.15	1.01
80keV	4.81E-01		2.18E+00	1.28E+08	1.12	1.09	1.00
Ag110 (SMC)							
5keV	2.03E+00		2.65E+00	1.58E+08	1.31	—	—
30keV	1.17E+00	16.0	1.15E+00	1.67E+08	0.98	—	—
80keV	7.38E-01		2.65E+00	1.48E+08	0.85	—	—
Cd106							
5keV	6.85E-01		8.07E-01	4.80E+07	1.18	1.68	1.65
30keV	3.02E-01	7.9	3.48E-01	5.06E+07	1.15	1.64	1.64
80keV	1.98E-01		8.07E-01	5.09E+07	1.08	1.39	1.56
Cd108							
5keV	4.96E-01		6.07E-01	3.61E+07	1.22	1.83	1.80
30keV	2.02E-01	4.5	2.04E-01	2.98E+07	1.01	1.98	1.74
80keV	1.25E-01		6.07E-01	2.97E+07	1.00	1.97	1.77
Cd110							
5keV	—		5.45E-01	3.24E+07	—	—	—
30keV	2.37E-01	0.8	2.33E-01	3.39E+07	0.98	0.99	0.95
80keV	1.40E-01		5.45E-01	3.53E+07	1.06	1.10	1.01
Cd111							
5keV	—		1.98E+00	1.18E+08	—	—	—
30keV	7.54E-01	1.6	8.41E-01	1.22E+08	1.11	1.23	0.96
80keV	4.56E-01		1.98E+00	1.19E+08	1.10	1.22	0.94
Cd112							
5keV	—		5.47E-01	3.25E+07	—	—	—
30keV	1.88E-01	0.9	1.98E-01	2.88E+07	1.05	1.16	0.96
80keV	1.15E-01		5.47E-01	3.04E+07	1.11	1.30	1.00
Cd113							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	—		9.07E-01	5.39E+07	—	—	—
30keV	6.67E-01	1.6	6.34E-01	9.23E+07	0.95	1.02	0.89
80keV	4.09E-01		9.07E-01	1.00E+08	1.03	1.05	0.87
Cd114							
5keV	—		3.78E-01	2.25E+07	—	—	—
30keV	1.29E-01	1.0	1.17E-01	1.70E+07	0.91	1.16	1.05
80keV	8.00E-02		3.78E-01	1.79E+07	0.94	1.19	1.06
Cd115 (SMC)							
5keV	7.08E-01		1.50E+00	8.91E+07	2.12	—	—
30keV	2.90E-01	21.4	6.17E-01	8.98E+07	2.13	—	—
80keV	1.76E-01		1.50E+00	8.57E+07	2.05	—	—
Cd115m (SMC)							
5keV	—		1.61E+00	9.60E+07	—	—	—
30keV	6.01E-01	33.3	6.92E-01	1.01E+08	1.15	0.37	—
80keV	—		3.88E-01	9.22E+07	—	—	—
Cd116							
5keV	—		2.32E-01	1.38E+07	—	—	—
30keV	7.48E-02	1.2	8.63E-02	1.26E+07	1.15	1.21	1.02
80keV	4.80E-02		2.32E-01	1.36E+07	1.19	1.23	1.01
In113							
5keV	2.31E+00		2.25E+00	1.34E+08	0.98	0.95	0.75
30keV	7.87E-01	8.9	9.06E-01	1.32E+08	1.15	1.17	0.88
80keV	4.37E-01		2.25E+00	1.28E+08	1.24	1.30	0.93
In114m							
5keV	—		4.32E+00	2.57E+08	—	—	—
30keV	2.60E+00	50.1	2.42E+00	3.52E+08	0.93	—	—
80keV	—		1.69E+00	4.01E+08	—	—	—
In115							
5keV	1.62E+00		1.77E+00	1.05E+08	1.09	1.11	1.09
30keV	7.06E-01	9.9	7.50E-01	1.09E+08	1.06	1.09	1.11
80keV	4.45E-01		1.77E+00	1.04E+08	0.98	1.05	1.05
Sn112							
5keV	4.79E-01		3.65E-01	2.17E+07	0.76	1.07	1.14
30keV	2.10E-01	5.7	1.83E-01	2.66E+07	0.87	0.93	0.96
80keV	1.28E-01		3.65E-01	2.85E+07	0.94	0.99	1.01
Sn114							
5keV	4.05E-01		2.29E-01	1.36E+07	0.57	1.02	0.85
30keV	1.34E-01	1.3	1.17E-01	1.70E+07	0.87	1.14	0.91
80keV	8.40E-02		2.29E-01	1.92E+07	0.96	1.19	0.96
Sn115							
5keV	7.48E-01		7.92E-01	4.71E+07	1.06	1.29	1.29
30keV	3.42E-01	2.5	3.45E-01	5.02E+07	1.01	1.14	1.08

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	2.19E-01		7.92E-01	5.02E+07	0.97	1.11	1.03
Sn116							
5keV	2.81E-01		2.41E-01	1.43E+07	0.86	0.84	0.85
30keV	9.16E-02	0.7	9.59E-02	1.40E+07	1.05	1.09	1.00
80keV	5.80E-02		2.41E-01	1.61E+07	1.17	1.17	1.03
Sn117							
5keV	7.46E-01		7.64E-01	4.54E+07	1.02	0.97	1.13
30keV	3.19E-01	1.5	3.24E-01	4.72E+07	1.02	0.97	1.08
80keV	1.82E-01		7.64E-01	4.23E+07	0.98	0.98	1.06
Sn118							
5keV	2.26E-01		1.00E-01	5.96E+06	0.44	0.82	0.85
30keV	6.21E-02	1.0	5.30E-02	7.71E+06	0.85	1.05	1.15
80keV	4.00E-02		1.00E-01	9.69E+06	1.02	1.08	1.18
Sn119							
5keV	5.58E-01		4.27E-01	2.53E+07	0.76	1.27	1.27
30keV	1.80E-01	5.6	1.64E-01	2.39E+07	0.91	1.25	1.25
80keV	8.80E-02		4.27E-01	1.90E+07	0.91	1.26	1.22
Sn120							
5keV	1.30E-01		1.13E-01	6.69E+06	0.87	0.87	0.91
30keV	3.60E-02	0.8	3.81E-02	5.55E+06	1.06	1.06	1.05
80keV	2.30E-02		1.13E-01	5.82E+06	1.07	1.12	1.11
Sn121 (SMC)							
5keV	4.79E-01		1.06E+00	6.30E+07	2.21	—	—
30keV	1.67E-01	18.0	3.60E-01	5.24E+07	2.16	—	—
80keV	8.60E-02		1.06E+00	4.59E+07	2.24	—	—
Sn122							
5keV	7.30E-02		6.49E-02	3.86E+06	0.89	0.77	1.53
30keV	2.19E-02	6.8	1.97E-02	2.87E+06	0.90	0.68	1.39
80keV	1.31E-02		6.49E-02	2.23E+06	0.72	0.57	1.40
Sn124							
5keV	7.25E-02		1.26E-01	7.50E+06	1.74	0.53	0.85
30keV	1.20E-02	15.0	1.91E-02	2.78E+06	1.59	0.99	1.63
80keV	5.80E-03		1.26E-01	1.69E+06	1.23	0.92	1.85
Sn125 (SMC)							
5keV	2.11E-01		2.06E-01	1.23E+07	0.98	1.24	—
30keV	5.90E-02	15.3	6.60E-02	9.60E+06	1.12	1.66	—
80keV	3.00E-02		2.06E-01	8.20E+06	1.15	2.28	—
Sn126 (SMC)							
5keV	2.60E-02		4.34E-02	2.58E+06	1.67	1.05	0.57
30keV	1.00E-02	40.0	9.91E-03	1.44E+06	0.99	1.08	1.07
80keV	5.50E-03		4.34E-02	2.29E+06	1.76	1.38	1.35
Sb121							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	1.30E+00		1.09E+00	6.48E+07	0.84	0.85	1.08
30keV	5.32E-01	3.0	5.33E-01	7.76E+07	1.00	0.96	0.98
80keV	3.06E-01		1.09E+00	6.78E+07	0.93	0.99	0.87
Sb122 (SMC)							
5keV	1.93E+00		2.22E+00	1.32E+08	1.15	—	—
30keV	8.94E-01	18.1	8.51E-01	1.24E+08	0.95	—	—
80keV	4.96E-01		2.22E+00	9.74E+07	0.83	—	—
Sb123							
5keV	8.05E-01		7.53E-01	4.47E+07	0.93	0.98	1.11
30keV	3.03E-01	3.0	3.10E-01	4.51E+07	1.02	1.06	1.05
80keV	1.76E-01		7.53E-01	4.10E+07	0.98	1.13	0.99
Sb125 (SMC)							
5keV	7.70E-01		8.21E-01	4.88E+07	1.07	1.55	1.55
30keV	2.60E-01	26.9	2.29E-01	3.33E+07	0.88	2.02	2.02
80keV	1.50E-01		8.21E-01	2.97E+07	0.83	2.11	2.11
Te120							
5keV	1.22E+00		9.66E-01	5.74E+07	0.79	0.59	0.59
30keV	5.19E-01	5.0	5.11E-01	7.43E+07	0.98	0.56	0.56
80keV	3.55E-01		9.66E-01	8.44E+07	1.00	0.56	0.57
Te122							
5keV	8.74E-01		6.01E-01	3.57E+07	0.69	0.59	0.76
30keV	2.95E-01	1.0	2.64E-01	3.83E+07	0.89	0.80	0.90
80keV	1.93E-01		6.01E-01	4.91E+07	1.07	0.92	0.95
Te123							
5keV	2.00E+00		2.25E+00	1.34E+08	1.13	0.91	1.00
30keV	8.32E-01	1.0	1.20E+00	1.75E+08	1.44	0.97	0.98
80keV	5.02E-01		2.25E+00	1.90E+08	1.59	1.03	1.03
Te124							
5keV	4.77E-01		3.46E-01	2.05E+07	0.72	0.66	0.84
30keV	1.55E-01	1.3	1.06E-01	1.54E+07	0.68	0.87	0.95
80keV	1.01E-01		3.46E-01	2.28E+07	0.95	0.97	0.99
Te125							
5keV	1.19E+00		1.01E+00	5.98E+07	0.85	0.85	0.85
30keV	4.31E-01	0.9	3.96E-01	5.76E+07	0.92	0.97	0.97
80keV	2.21E-01		1.01E+00	4.97E+07	0.95	1.05	1.05
Te126							
5keV	2.50E-01		1.77E-01	1.05E+07	0.71	0.65	1.00
30keV	8.13E-02	1.7	6.98E-02	1.02E+07	0.86	0.98	1.11
80keV	5.10E-02		1.77E-01	1.03E+07	0.85	1.13	1.17
Te128							
5keV	9.10E-02		5.27E-02	3.13E+06	0.58	0.80	1.02
30keV	4.44E-02	2.9	3.12E-02	4.55E+06	0.70	0.83	0.90

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	3.20E-02		5.27E-02	7.69E+06	1.01	0.87	0.89
Te130							
5keV	3.50E-02		3.75E-02	2.23E+06	1.07	1.06	1.03
30keV	1.47E-02	19.0	1.11E-02	1.61E+06	0.75	0.97	0.97
80keV	9.60E-03		3.75E-02	1.90E+06	0.83	1.03	1.10
I127							
5keV	1.66E+00		1.69E+00	1.00E+08	1.02	1.12	1.04
30keV	6.35E-01	4.7	6.58E-01	9.57E+07	1.04	1.14	1.04
80keV	3.45E-01		1.69E+00	8.46E+07	1.03	1.14	1.04
I129							
5keV	1.13E+00		1.13E+00	6.69E+07	0.99	0.94	0.96
30keV	4.41E-01	5.0	4.12E-01	5.99E+07	0.93	0.99	1.00
80keV	2.50E-01		1.13E+00	5.29E+07	0.89	1.01	1.01
Xe124							
5keV	1.78E+00		1.64E+00	9.76E+07	0.92	1.50	1.22
30keV	6.44E-01	12.9	6.93E-01	1.01E+08	1.08	1.94	1.43
80keV	4.65E-01		1.64E+00	1.13E+08	1.02	1.48	1.36
Xe126							
5keV	9.00E-01		9.62E-01	5.71E+07	1.07	1.41	1.20
30keV	3.59E-01	14.2	3.72E-01	5.42E+07	1.04	1.87	1.53
80keV	2.55E-01		9.62E-01	5.96E+07	0.98	1.89	1.45
Xe128							
5keV	—		4.76E-01	2.83E+07	—	—	—
30keV	2.63E-01	1.4	2.96E-01	4.31E+07	1.13	1.07	0.98
80keV	1.73E-01		4.76E-01	5.02E+07	1.22	1.15	0.98
Xe129							
5keV	—		1.30E+00	7.75E+07	—	—	—
30keV	6.17E-01	1.9	5.74E-01	8.35E+07	0.93	0.68	0.97
80keV	3.26E-01		1.30E+00	7.64E+07	0.99	0.69	0.93
Xe130							
5keV	—		2.94E-01	1.75E+07	—	—	—
30keV	1.32E-01	1.6	1.48E-01	2.15E+07	1.12	1.15	1.01
80keV	8.90E-02		2.94E-01	2.52E+07	1.19	1.18	0.93
Xe131 (SMC)							
5keV	1.04E+00		8.38E-01	4.98E+07	0.81	0.74	1.11
30keV	3.40E-01	19.1	3.49E-01	5.08E+07	1.03	0.90	1.19
80keV	1.91E-01		8.38E-01	5.04E+07	1.11	0.91	1.15
Xe132							
5keV	1.67E-01		1.41E-01	8.39E+06	0.85	0.72	1.38
30keV	6.46E-02	8.2	7.14E-02	1.04E+07	1.10	0.73	0.95
80keV	4.08E-02		1.41E-01	1.19E+07	1.23	0.80	0.92
Xe133 (SMC)							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	3.72E-01		2.96E-01	1.76E+07	0.80	1.08	1.05
30keV	1.27E-01	26.8	1.20E-01	1.75E+07	0.95	1.00	0.99
80keV	7.40E-02		2.96E-01	1.70E+07	0.97	0.98	0.95
Xe134							
5keV	4.75E-02		3.15E-02	1.87E+06	0.66	0.74	1.79
30keV	2.02E-02	8.4	1.60E-02	2.33E+06	0.79	1.12	1.26
80keV	1.28E-02		3.15E-02	3.23E+06	1.06	1.36	1.14
Xe136							
5keV	5.60E-03		1.38E-02	8.20E+05	2.47	0.60	0.68
30keV	9.10E-04	8.8	9.64E-04	1.40E+05	1.06	1.30	0.96
80keV	4.10E-04		1.38E-02	8.81E+04	0.90	2.25	1.11
Cs133							
5keV	1.36E+00		1.52E+00	9.05E+07	1.12	0.97	1.02
30keV	5.09E-01	4.1	5.21E-01	7.57E+07	1.02	0.91	1.06
80keV	2.96E-01		1.52E+00	6.82E+07	0.97	0.92	0.99
Cs134 (SMC)							
5keV	2.42E+00		2.53E+00	1.50E+08	1.05	1.49	0.71
30keV	7.24E-01	9.0	7.34E-01	1.07E+08	1.01	1.60	0.75
80keV	3.72E-01		2.53E+00	8.40E+07	0.95	1.61	0.69
Cs135							
5keV	5.52E-01		5.59E-01	3.32E+07	1.01	1.16	0.96
30keV	1.60E-01	6.2	1.64E-01	2.38E+07	1.02	1.26	1.02
80keV	8.90E-02		5.59E-01	2.15E+07	1.02	1.28	1.01
Ba130							
5keV	1.70E+00		1.82E+00	1.08E+08	1.07	0.92	0.94
30keV	7.46E-01	4.6	8.14E-01	1.18E+08	1.09	0.99	0.99
80keV	5.34E-01		1.82E+00	1.37E+08	1.08	1.03	1.03
Ba132							
5keV	9.22E-01		1.02E+00	6.08E+07	1.11	1.15	1.14
30keV	3.97E-01	4.0	3.98E-01	5.79E+07	1.00	1.15	1.15
80keV	2.90E-01		1.02E+00	6.71E+07	0.97	1.15	1.15
Ba134							
5keV	3.60E-01		3.55E-01	2.11E+07	0.99	1.05	1.16
30keV	1.76E-01	3.2	1.81E-01	2.63E+07	1.03	1.29	1.31
80keV	1.17E-01		3.55E-01	3.15E+07	1.13	1.45	1.45
Ba135							
5keV	1.27E+00		1.27E+00	7.54E+07	1.00	0.93	1.22
30keV	4.55E-01	3.3	5.01E-01	7.29E+07	1.10	1.06	1.10
80keV	2.66E-01		1.27E+00	7.37E+07	1.17	1.13	1.14
Ba136							
5keV	1.80E-01		1.67E-01	9.94E+06	0.93	0.93	1.01
30keV	6.12E-02	3.3	6.10E-02	8.88E+06	1.00	1.14	1.16

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	3.93E-02		1.67E-01	1.07E+07	1.14	1.26	1.26
Ba137							
5keV	2.06E-01		1.54E-01	9.12E+06	0.74	0.66	0.99
30keV	7.63E-02	3.1	7.44E-02	1.08E+07	0.97	0.77	0.83
80keV	4.71E-02		1.54E-01	1.11E+07	1.00	0.82	0.83
Ba138							
5keV	1.34E-02		1.21E-02	7.17E+05	0.90	0.96	0.77
30keV	4.00E-03	5.0	3.60E-03	5.23E+05	0.90	0.93	1.08
80keV	2.52E-03		1.21E-02	5.32E+05	0.89	1.03	1.15
La138 (SMC)							
5keV	1.29E+00		1.61E+00	9.55E+07	1.24	0.67	0.67
30keV	4.19E-01	14.1	5.00E-01	7.27E+07	1.19	0.75	0.75
80keV	2.51E-01		1.61E+00	6.62E+07	1.11	0.71	0.71
La139							
5keV	1.11E-01		1.50E-01	8.92E+06	1.35	1.05	1.03
30keV	3.24E-02	9.6	4.68E-02	6.81E+06	1.44	1.12	1.16
80keV	1.84E-02		1.50E-01	5.21E+06	1.19	1.07	1.13
Ce132 (SMC)							
5keV	5.05E+00		4.50E+00	2.67E+08	0.89	—	—
30keV	1.57E+00	26.8	1.53E+00	2.23E+08	0.98	—	—
80keV	1.09E+00		4.50E+00	2.49E+08	0.96	—	—
Ce133 (SMC)							
5keV	7.29E+00		7.05E+00	4.19E+08	0.97	—	—
30keV	2.60E+00	15.4	2.47E+00	3.59E+08	0.95	—	—
80keV	1.57E+00		7.05E+00	3.62E+08	0.97	—	—
Ce134 (SMC)							
5keV	3.30E+00		2.63E+00	1.56E+08	0.80	—	—
30keV	9.67E-01	36.3	9.00E-01	1.31E+08	0.93	—	—
80keV	7.02E-01		2.63E+00	1.53E+08	0.92	—	—
Ce135 (SMC)							
5keV	4.08E+00		3.89E+00	2.31E+08	0.95	—	—
30keV	1.32E+00	19.7	1.26E+00	1.84E+08	0.96	—	—
80keV	7.76E-01		3.89E+00	1.78E+08	0.96	—	—
Ce136							
5keV	1.02E+00		8.19E-01	4.87E+07	0.81	0.94	—
30keV	3.00E-01	7.0	2.89E-01	4.20E+07	0.96	1.13	—
80keV	2.27E-01		8.19E-01	4.94E+07	0.92	1.02	—
Ce137 (SMC)							
5keV	3.17E+00		2.89E+00	1.72E+08	0.91	—	—
30keV	9.73E-01	26.3	9.36E-01	1.36E+08	0.96	—	—
80keV	6.03E-01		2.89E+00	1.36E+08	0.95	—	—
Ce138							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	4.62E-01		3.90E-01	2.32E+07	0.84	1.29	—
30keV	1.79E-01	2.8	1.72E-01	2.51E+07	0.96	1.16	—
80keV	1.29E-01		3.90E-01	3.02E+07	0.98	1.14	—
Ce139 (SMC)							
5keV	7.69E-01		9.51E-01	5.65E+07	1.24	1.71	—
30keV	2.14E-01	56.1	2.31E-01	3.36E+07	1.08	1.90	—
80keV	1.34E-01		9.51E-01	3.22E+07	1.01	1.82	—
Ce140							
5keV	2.30E-02		1.17E-02	6.92E+05	0.51	0.68	0.83
30keV	1.10E-02	3.6	8.83E-03	1.28E+06	0.80	0.70	0.91
80keV	7.20E-03		1.17E-02	1.96E+06	1.14	0.71	0.89
Ce141 (SMC)							
5keV	2.60E-01		3.66E-01	2.17E+07	1.41	3.00	1.33
30keV	7.60E-02	43.4	1.02E-01	1.48E+07	1.34	3.62	1.33
80keV	4.30E-02		3.66E-01	1.36E+07	1.33	3.83	1.32
Ce142							
5keV	7.19E-02		5.37E-02	3.19E+06	0.75	0.93	1.02
30keV	2.80E-02	3.6	2.21E-02	3.22E+06	0.79	0.71	0.71
80keV	2.00E-02		5.37E-02	3.08E+06	0.65	0.68	0.68
Pr141							
5keV	4.12E-01		3.65E-01	2.17E+07	0.89	1.04	1.05
30keV	1.11E-01	1.3	9.68E-02	1.41E+07	0.87	0.98	1.06
80keV	5.62E-02		3.65E-01	1.20E+07	0.90	0.99	1.11
Pr142 (SMC)							
5keV	1.67E+00		1.20E+00	7.12E+07	0.72	0.83	—
30keV	4.15E-01	42.9	3.85E-01	5.60E+07	0.93	0.87	—
80keV	1.94E-01		1.20E+00	4.05E+07	0.88	0.80	—
Pr143 (SMC)							
5keV	1.19E+00		8.90E-01	5.28E+07	0.75	0.32	0.32
30keV	3.50E-01	24.6	2.68E-01	3.90E+07	0.77	0.31	0.31
80keV	1.83E-01		8.90E-01	3.48E+07	0.80	0.30	0.30
Nd142							
5keV	9.86E-02		8.72E-02	5.17E+06	0.88	0.86	1.03
30keV	3.50E-02	2.0	3.56E-02	5.17E+06	1.02	0.96	1.02
80keV	2.29E-02		8.72E-02	6.11E+06	1.12	0.97	1.02
Nd143							
5keV	9.25E-01		8.04E-01	4.77E+07	0.87	0.90	0.87
30keV	2.45E-01	1.2	2.53E-01	3.67E+07	1.03	0.97	0.94
80keV	1.38E-01		8.04E-01	3.57E+07	1.09	1.00	0.99
Nd144							
5keV	2.39E-01		1.76E-01	1.05E+07	0.74	0.75	0.93
30keV	8.13E-02	1.8	7.63E-02	1.11E+07	0.94	0.92	0.91

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	5.42E-02		1.76E-01	1.43E+07	1.11	0.98	0.98
Nd145							
5keV	1.48E+00		1.46E+00	8.69E+07	0.99	1.00	0.96
30keV	4.25E-01	1.2	4.22E-01	6.14E+07	0.99	0.99	0.96
80keV	2.27E-01		1.46E+00	5.45E+07	1.01	0.95	0.98
Nd146							
5keV	2.10E-01		3.73E-01	2.21E+07	1.78	1.10	0.96
30keV	9.12E-02	1.1	1.29E-01	1.87E+07	1.41	1.08	1.00
80keV	6.56E-02		3.73E-01	1.94E+07	1.25	1.02	1.01
Nd147 (SMC)							
5keV	2.19E+00		2.00E+00	1.19E+08	0.91	1.41	1.58
30keV	5.44E-01	16.5	5.32E-01	7.74E+07	0.98	1.53	1.83
80keV	2.51E-01		2.00E+00	6.13E+07	1.03	1.59	2.07
Nd148							
5keV	4.14E-01		2.83E-01	1.68E+07	0.68	0.70	0.75
30keV	1.47E-01	1.4	1.26E-01	1.84E+07	0.86	0.95	0.92
80keV	1.01E-01		2.83E-01	2.22E+07	0.93	0.99	0.99
Nd150							
5keV	5.91E-01		3.52E-01	2.09E+07	0.60	0.58	0.57
30keV	1.59E-01	6.3	1.45E-01	2.11E+07	0.91	0.98	0.98
80keV	8.60E-02		3.52E-01	2.10E+07	1.03	1.13	1.11
Pm147							
5keV	2.26E+00		3.21E+00	1.91E+08	1.42	1.53	1.08
30keV	7.09E-01	14.1	8.71E-01	1.27E+08	1.23	1.48	0.99
80keV	4.55E-01		3.21E+00	1.17E+08	1.09	1.38	0.91
Pm148 (SMC)							
5keV	1.35E+01		6.32E+00	3.75E+08	0.47	0.42	0.23
30keV	2.97E+00	16.8	1.67E+00	2.42E+08	0.56	0.57	0.31
80keV	1.54E+00		6.32E+00	2.04E+08	0.56	0.64	0.32
Pm148m (SMC)							
5keV	—		1.71E+01	1.01E+09	—	—	—
30keV	2.45E+00	48.9	4.96E+00	7.21E+08	2.02	2.94	0.75
80keV	—		2.48E+00	5.89E+08	—	—	—
Pm149 (SMC)							
5keV	9.73E+00		6.45E+00	3.83E+08	0.66	0.35	0.19
30keV	2.51E+00	29.9	1.72E+00	2.49E+08	0.68	0.41	0.23
80keV	1.37E+00		6.45E+00	2.24E+08	0.69	0.43	0.24
Sm144							
5keV	2.17E-01		2.39E-01	1.42E+07	1.10	0.88	0.91
30keV	9.20E-02	6.5	4.41E-02	6.41E+06	0.48	0.95	0.96
80keV	6.40E-02		2.39E-01	9.44E+06	0.62	0.99	1.00
Sm147							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	3.25E+00		3.75E+00	2.22E+08	1.15	1.05	0.99
30keV	9.73E-01	1.0	1.06E+00	1.54E+08	1.09	0.99	0.99
80keV	5.73E-01		3.75E+00	1.44E+08	1.06	0.94	0.98
Sm148							
5keV	6.64E-01		8.06E-01	4.78E+07	1.21	0.99	0.86
30keV	2.41E-01	0.8	2.47E-01	3.60E+07	1.03	1.02	0.98
80keV	1.83E-01		8.06E-01	4.51E+07	1.04	0.98	0.98
Sm149							
5keV	7.33E+00		9.05E+00	5.37E+08	1.24	0.87	0.86
30keV	1.82E+00	0.9	2.28E+00	3.32E+08	1.25	0.98	1.00
80keV	1.04E+00		9.05E+00	2.89E+08	1.17	0.99	1.01
Sm150							
5keV	1.18E+00		1.14E+00	6.77E+07	0.97	0.95	0.86
30keV	4.22E-01	0.9	4.23E-01	6.15E+07	1.00	1.00	1.00
80keV	3.12E-01		1.14E+00	7.84E+07	1.06	1.01	1.01
Sm151							
5keV	—		1.24E+01	7.33E+08	—	—	—
30keV	3.03E+00	2.2	2.97E+00	4.31E+08	0.98	0.95	0.95
80keV	1.54E+00		1.24E+01	3.01E+08	0.83	0.90	0.89
Sm152							
5keV	1.25E+00		1.11E+00	6.56E+07	0.89	0.89	0.88
30keV	4.73E-01	0.8	4.59E-01	6.67E+07	0.97	0.97	0.99
80keV	2.83E-01		1.11E+00	6.31E+07	0.94	0.98	1.01
Sm153 (SMC)							
5keV	5.24E+00		7.12E+00	4.22E+08	1.36	0.82	0.81
30keV	1.09E+00	16.0	1.46E+00	2.12E+08	1.33	0.83	0.96
80keV	4.77E-01		7.12E+00	1.46E+08	1.29	0.76	0.92
Sm154							
5keV	5.61E-01		5.47E-01	3.25E+07	0.98	1.19	1.27
30keV	2.06E-01	4.4	2.03E-01	2.94E+07	0.98	1.36	1.37
80keV	1.09E-01		5.47E-01	2.48E+07	0.96	1.34	1.37
Eu151							
5keV	1.16E+01		1.15E+01	6.81E+08	0.99	0.96	1.04
30keV	3.48E+00	2.2	3.82E+00	5.56E+08	1.10	1.03	1.02
80keV	2.04E+00		1.15E+01	5.37E+08	1.11	0.99	0.97
Eu152 (SMC)							
5keV	2.08E+01		2.61E+01	1.55E+09	1.25	0.00	0.68
30keV	7.60E+00	15.8	7.02E+00	1.02E+09	0.92	0.00	0.64
80keV	3.70E+00		2.61E+01	7.01E+08	0.80	0.00	0.65
Eu153							
5keV	7.11E+00		6.79E+00	4.03E+08	0.96	1.11	1.03
30keV	2.56E+00	1.8	2.42E+00	3.52E+08	0.95	1.04	0.96

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	1.48E+00		6.79E+00	3.20E+08	0.91	0.97	0.91
Eu154							
5keV	1.29E+01		2.08E+01	1.23E+09	1.60	0.77	0.75
30keV	4.42E+00	15.2	5.29E+00	7.69E+08	1.20	0.79	0.79
80keV	2.22E+00		2.08E+01	5.29E+08	1.00	0.83	0.78
Eu155							
5keV	4.66E+00		7.03E+00	4.17E+08	1.51	0.83	0.81
30keV	1.32E+00	6.4	1.75E+00	2.54E+08	1.32	0.86	0.96
80keV	6.46E-01		7.03E+00	1.94E+08	1.27	0.89	1.00
Gd152							
5keV	3.27E+00		4.41E+00	2.62E+08	1.35	0.80	0.83
30keV	1.05E+00	1.6	1.09E+00	1.59E+08	1.04	0.94	0.97
80keV	7.56E-01		4.41E+00	1.86E+08	1.04	0.93	1.02
Gd153 (SMC)							
5keV	1.63E+01		2.08E+01	1.23E+09	1.28	0.51	0.56
30keV	4.55E+00	15.4	5.14E+00	7.47E+08	1.13	0.58	0.72
80keV	2.24E+00		2.08E+01	5.43E+08	1.02	0.55	0.83
Gd154							
5keV	2.80E+00		2.61E+00	1.55E+08	0.93	0.94	0.88
30keV	1.03E+00	1.2	1.09E+00	1.59E+08	1.06	0.93	0.97
80keV	6.53E-01		2.61E+00	1.59E+08	1.03	0.89	0.99
Gd155							
5keV	7.26E+00		5.94E+00	3.53E+08	0.82	1.01	0.98
30keV	2.65E+00	1.1	2.81E+00	4.09E+08	1.06	0.99	1.03
80keV	1.44E+00		5.94E+00	4.01E+08	1.17	0.98	1.06
Gd156							
5keV	1.63E+00		1.65E+00	9.80E+07	1.01	1.05	0.98
30keV	6.15E-01	0.8	6.10E-01	8.87E+07	0.99	0.97	0.97
80keV	3.64E-01		1.65E+00	8.15E+07	0.94	0.95	0.98
Gd157							
5keV	4.25E+00		3.48E+00	2.07E+08	0.82	1.03	0.95
30keV	1.37E+00	1.1	1.35E+00	1.96E+08	0.98	1.02	1.00
80keV	6.83E-01		3.48E+00	1.60E+08	0.99	1.02	1.02
Gd158							
5keV	8.42E-01		7.02E-01	4.16E+07	0.83	0.88	1.00
30keV	3.24E-01	0.9	2.97E-01	4.32E+07	0.92	0.95	0.99
80keV	1.74E-01		7.02E-01	3.98E+07	0.96	0.97	0.99
Gd160							
5keV	5.46E-01		3.89E-01	2.31E+07	0.71	0.77	1.10
30keV	1.54E-01	13.0	1.55E-01	2.26E+07	1.01	1.11	1.21
80keV	8.00E-02		3.89E-01	1.90E+07	1.00	1.08	1.16
Tb159							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	4.37E+00		3.86E+00	2.29E+08	0.88	1.31	0.92
30keV	1.58E+00	9.5	1.60E+00	2.33E+08	1.01	1.31	0.99
80keV	9.10E-01		3.86E+00	2.14E+08	0.99	1.27	0.99
Tb160 (SMC)							
5keV	9.15E+00		2.45E+01	1.45E+09	2.67	0.71	0.74
30keV	3.24E+00	15.7	5.88E+00	8.55E+08	1.81	0.74	0.80
80keV	1.71E+00		2.45E+01	5.94E+08	1.46	0.67	0.76
Dy156							
5keV	4.34E+00		5.36E+00	3.18E+08	1.23	1.03	0.96
30keV	1.61E+00	5.7	1.80E+00	2.62E+08	1.12	0.95	0.92
80keV	1.08E+00		5.36E+00	2.79E+08	1.09	0.92	0.90
Dy158 (SMC)							
5keV	3.19E+00		3.73E+00	2.21E+08	1.17	1.01	0.74
30keV	1.06E+00	37.7	1.29E+00	1.87E+08	1.22	1.05	0.85
80keV	6.84E-01		3.73E+00	1.87E+08	1.15	0.98	0.80
Dy160							
5keV	2.27E+00		2.36E+00	1.40E+08	1.04	0.95	0.95
30keV	8.90E-01	1.3	8.26E-01	1.20E+08	0.93	0.94	0.98
80keV	5.24E-01		2.36E+00	1.18E+08	0.95	0.98	0.98
Dy161							
5keV	5.71E+00		5.83E+00	3.46E+08	1.02	1.02	1.07
30keV	1.96E+00	1.0	1.98E+00	2.88E+08	1.01	0.99	1.01
80keV	9.77E-01		5.83E+00	2.27E+08	0.98	0.98	1.00
Dy162							
5keV	1.13E+00		1.33E+00	7.92E+07	1.18	1.10	1.09
30keV	4.46E-01	0.9	4.96E-01	7.21E+07	1.11	1.02	1.04
80keV	2.50E-01		1.33E+00	7.01E+07	1.18	1.01	1.01
Dy163							
5keV	3.18E+00		3.31E+00	1.96E+08	1.04	1.03	1.02
30keV	1.11E+00	1.0	1.12E+00	1.62E+08	1.00	0.98	1.00
80keV	6.06E-01		3.31E+00	1.40E+08	0.97	0.98	1.00
Dy164							
5keV	5.92E-01		6.53E-01	3.87E+07	1.10	1.09	0.99
30keV	2.12E-01	1.4	2.11E-01	3.06E+07	0.99	1.02	0.99
80keV	1.09E-01		6.53E-01	2.58E+07	1.00	1.00	0.98
Ho163							
5keV	5.81E+00		2.30E+01	1.36E+09	3.95	—	—
30keV	2.12E+00	4.5	5.97E+00	8.68E+08	2.81	—	—
80keV	1.37E+00		2.30E+01	7.36E+08	2.26	—	—
Ho165							
5keV	3.30E+00		4.25E+00	2.52E+08	1.29	1.14	—
30keV	1.28E+00	7.8	1.38E+00	2.00E+08	1.07	1.04	—

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	7.61E-01		4.25E+00	1.82E+08	1.01	1.01	—
Er162							
5keV	4.91E+00		5.52E+00	3.27E+08	1.12	0.45	0.45
30keV	1.62E+00	7.6	1.82E+00	2.65E+08	1.12	0.53	0.53
80keV	1.14E+00		5.52E+00	2.73E+08	1.00	0.50	0.50
Er164							
5keV	3.07E+00		3.80E+00	2.25E+08	1.24	1.61	1.61
30keV	1.08E+00	4.7	1.34E+00	1.94E+08	1.23	1.77	1.77
80keV	6.94E-01		3.80E+00	1.99E+08	1.21	1.77	1.77
Er166							
5keV	1.30E+00		1.20E+00	7.13E+07	0.92	1.22	1.29
30keV	5.63E-01	9.9	5.20E-01	7.56E+07	0.92	1.24	1.25
80keV	3.32E-01		1.20E+00	7.53E+07	0.96	1.13	1.13
Er167							
5keV	4.46E+00		4.22E+00	2.50E+08	0.95	0.95	1.00
30keV	1.43E+00	10.0	1.45E+00	2.11E+08	1.02	1.09	1.09
80keV	9.33E-01		4.22E+00	1.87E+08	0.84	0.95	0.95
Er168							
5keV	7.90E-01		8.94E-01	5.31E+07	1.13	0.74	1.06
30keV	3.38E-01	13.0	3.22E-01	4.68E+07	0.95	0.89	1.00
80keV	1.88E-01		8.94E-01	4.32E+07	0.97	0.92	0.95
Er169 (SMC)							
5keV	1.93E+00		2.30E+00	1.36E+08	1.19	—	—
30keV	6.53E-01	17.5	6.47E-01	9.41E+07	0.99	—	—
80keV	3.20E-01		2.30E+00	7.40E+07	0.97	—	—
Er170							
5keV	6.00E-01		5.45E-01	3.23E+07	0.91	0.97	1.04
30keV	1.70E-01	4.1	1.77E-01	2.58E+07	1.04	1.27	1.21
80keV	8.54E-02		5.45E-01	2.04E+07	1.01	1.24	1.19
Tm169							
5keV	3.38E+00		4.10E+00	2.43E+08	1.21	1.02	0.91
30keV	1.13E+00	5.0	1.17E+00	1.70E+08	1.03	0.95	0.93
80keV	6.68E-01		4.10E+00	1.40E+08	0.88	0.90	0.91
Tm170 (SMC)							
5keV	4.94E+00		8.75E+00	5.19E+08	1.77	1.11	—
30keV	1.87E+00	17.6	2.06E+00	2.99E+08	1.10	0.97	—
80keV	1.12E+00		8.75E+00	2.40E+08	0.90	0.90	—
Tm171 (SMC)							
5keV	1.58E+00		4.57E+00	2.71E+08	2.90	—	—
30keV	4.86E-01	29.6	9.93E-01	1.44E+08	2.04	—	—
80keV	2.79E-01		4.57E+00	1.39E+08	2.10	—	—
Yb168							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	3.00E+00		3.58E+00	2.12E+08	1.19	—	1.03
30keV	1.21E+00	4.0	1.24E+00	1.81E+08	1.02	—	1.00
80keV	7.28E-01		3.58E+00	1.95E+08	1.13	—	1.12
Yb170							
5keV	1.86E+00		1.84E+00	1.09E+08	0.99	—	0.98
30keV	7.68E-01	0.9	7.72E-01	1.12E+08	1.01	—	1.01
80keV	4.64E-01		1.84E+00	1.16E+08	1.06	—	1.04
Yb171							
5keV	3.05E+00		2.95E+00	1.75E+08	0.97	—	1.04
30keV	1.21E+00	1.0	1.22E+00	1.78E+08	1.01	—	1.04
80keV	6.57E-01		2.95E+00	1.61E+08	1.03	—	1.05
Yb172							
5keV	8.27E-01		9.96E-01	5.91E+07	1.20	—	1.05
30keV	3.41E-01	0.9	3.96E-01	5.76E+07	1.16	—	1.04
80keV	1.90E-01		9.96E-01	5.04E+07	1.12	—	1.05
Yb173							
5keV	2.19E+00		2.51E+00	1.49E+08	1.15	—	1.00
30keV	7.54E-01	0.9	8.44E-01	1.23E+08	1.12	—	1.03
80keV	4.10E-01		2.51E+00	1.01E+08	1.04	—	1.05
Yb174							
5keV	3.74E-01		4.97E-01	2.95E+07	1.33	—	1.03
30keV	1.51E-01	1.1	1.62E-01	2.36E+07	1.07	—	1.05
80keV	7.80E-02		4.97E-01	1.95E+07	1.05	—	1.06
Yb175 (SMC)							
5keV	1.58E+00		2.71E+00	1.61E+08	1.72	—	—
30keV	5.58E-01	14.9	7.93E-01	1.15E+08	1.42	—	—
80keV	3.22E-01		2.71E+00	1.10E+08	1.44	—	—
Yb176							
5keV	2.95E-01		2.55E-01	1.51E+07	0.86	—	0.98
30keV	1.16E-01	1.7	1.01E-01	1.46E+07	0.87	—	1.04
80keV	5.80E-02		2.55E-01	1.22E+07	0.89	—	1.08
Lu175							
5keV	—		3.32E+00	1.97E+08	—	—	—
30keV	1.22E+00	0.8	1.26E+00	1.83E+08	1.04	1.08	—
80keV	7.01E-01		3.32E+00	1.71E+08	1.03	1.12	—
Lu176							
5keV	—		6.76E+00	4.01E+08	—	—	—
30keV	1.64E+00	0.9	1.90E+00	2.76E+08	1.16	0.94	—
80keV	9.81E-01		6.76E+00	2.73E+08	1.17	1.03	—
Hf174							
5keV	2.52E+00		2.56E+00	1.52E+08	1.02	0.96	1.01
30keV	9.83E-01	4.7	1.02E+00	1.49E+08	1.04	0.97	1.00

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	6.93E-01		2.56E+00	1.64E+08	1.00	0.94	0.93
Hf176							
5keV	—		1.48E+00	8.76E+07	—	—	—
30keV	6.26E-01	1.8	5.58E-01	8.10E+07	0.89	0.72	0.95
80keV	3.80E-01		1.48E+00	8.45E+07	0.94	0.73	0.97
Hf177							
5keV	—		4.75E+00	2.82E+08	—	—	—
30keV	1.54E+00	0.8	1.62E+00	2.35E+08	1.05	0.90	0.98
80keV	9.65E-01		4.75E+00	2.38E+08	1.04	0.90	1.00
Hf178							
5keV	—		6.37E-01	3.78E+07	—	—	—
30keV	3.19E-01	0.9	3.18E-01	4.62E+07	1.00	0.93	1.14
80keV	1.91E-01		6.37E-01	4.67E+07	1.03	0.92	1.11
Hf179							
5keV	—		3.03E+00	1.80E+08	—	—	—
30keV	9.22E-01	0.9	9.70E-01	1.41E+08	1.05	1.06	1.07
80keV	5.50E-01		3.03E+00	1.37E+08	1.05	1.05	1.10
Hf180							
5keV	—		3.58E-01	2.13E+07	—	—	—
30keV	1.57E-01	1.3	1.41E-01	2.05E+07	0.90	1.48	1.24
80keV	8.80E-02		3.58E-01	1.77E+07	0.85	1.42	1.22
Hf181 (SMC)							
5keV	5.75E-01		1.21E+00	7.20E+07	2.11	—	1.44
30keV	1.94E-01	16.0	3.84E-01	5.58E+07	1.98	—	1.32
80keV	9.30E-02		1.21E+00	5.03E+07	2.28	—	1.24
Hf182							
5keV	3.30E-01		4.40E-01	2.61E+07	1.33	—	1.06
30keV	1.41E-01	5.7	1.44E-01	2.09E+07	1.02	—	1.02
80keV	7.80E-02		4.40E-01	1.75E+07	0.94	—	1.04
Ta179 (SMC)							
5keV	2.85E+00		1.01E+01	5.97E+08	3.53	—	—
30keV	1.33E+00	31.6	3.13E+00	4.54E+08	2.34	—	—
80keV	8.90E-01		1.01E+01	4.40E+08	2.08	—	—
Ta180m							
5keV	—		5.56E+00	3.30E+08	—	—	—
30keV	1.47E+00	6.8	1.65E+00	2.40E+08	1.13	—	—
80keV	9.42E-01		5.56E+00	2.42E+08	1.08	—	—
Ta181							
5keV	2.77E+00		2.65E+00	1.57E+08	0.96	1.04	0.94
30keV	7.66E-01	2.0	7.74E-01	1.12E+08	1.01	1.11	0.98
80keV	4.23E-01		2.65E+00	1.01E+08	1.00	1.07	0.98
Ta182 (SMC)							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	2.48E+00		4.21E+00	2.50E+08	1.70	1.37	—
30keV	1.12E+00	16.1	1.20E+00	1.74E+08	1.07	0.92	—
80keV	7.05E-01		4.21E+00	1.49E+08	0.89	0.82	—
W180							
5keV	1.79E+00		1.48E+00	8.81E+07	0.83	0.00	0.77
30keV	6.60E-01	8.0	5.59E-01	8.13E+07	0.85	0.00	0.85
80keV	4.33E-01		1.48E+00	7.54E+07	0.73	0.00	0.83
W182							
5keV	6.37E-01		1.10E+00	6.54E+07	1.73	0.00	1.19
30keV	2.74E-01	2.9	3.23E-01	4.70E+07	1.18	0.00	1.02
80keV	1.73E-01		1.10E+00	4.34E+07	1.06	0.00	0.93
W183							
5keV	1.59E+00		2.01E+00	1.19E+08	1.26	0.00	1.11
30keV	5.15E-01	2.9	5.80E-01	8.43E+07	1.13	0.00	1.11
80keV	2.77E-01		2.01E+00	6.83E+07	1.04	0.00	1.06
W184							
5keV	6.88E-01		9.50E-01	5.63E+07	1.38	0.00	0.95
30keV	2.23E-01	2.2	2.72E-01	3.94E+07	1.22	0.00	1.09
80keV	1.32E-01		9.50E-01	3.77E+07	1.20	0.00	1.10
W185							
5keV	1.65E+00		2.93E+00	1.74E+08	1.78	—	—
30keV	5.84E-01	9.1	8.28E-01	1.20E+08	1.42	—	—
80keV	2.99E-01		2.93E+00	1.01E+08	1.43	—	—
W186							
5keV	6.02E-01		6.66E-01	3.95E+07	1.11	0.00	0.81
30keV	2.35E-01	3.8	1.99E-01	2.90E+07	0.85	0.00	0.82
80keV	1.62E-01		6.66E-01	2.85E+07	0.74	0.00	0.71
Re185							
5keV	3.44E+00		4.49E+00	2.66E+08	1.30	1.11	—
30keV	1.53E+00	4.0	1.70E+00	2.48E+08	1.11	0.76	—
80keV	1.06E+00		4.49E+00	2.53E+08	1.00	0.68	—
Re186 (SMC)							
5keV	3.12E+00		5.97E+00	3.54E+08	1.91	—	—
30keV	1.55E+00	16.1	1.91E+00	2.78E+08	1.23	—	—
80keV	1.04E+00		5.97E+00	2.67E+08	1.08	—	—
Re187							
5keV	3.75E+00		3.35E+00	1.99E+08	0.89	0.90	—
30keV	1.16E+00	4.9	1.16E+00	1.69E+08	1.00	0.87	—
80keV	7.29E-01		3.35E+00	1.66E+08	0.96	0.86	—
Os184							
5keV	1.56E+00		1.45E+00	8.62E+07	0.93	—	1.20
30keV	5.90E-01	6.6	5.86E-01	8.51E+07	0.99	—	1.23

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	3.96E-01		1.45E+00	8.11E+07	0.86	—	1.19
Os186							
5keV	1.11E+00		6.55E-01	3.89E+07	0.59	—	1.16
30keV	4.10E-01	4.1	3.86E-01	5.61E+07	0.94	—	1.11
80keV	2.92E-01		6.55E-01	5.77E+07	0.83	—	1.00
Os187							
5keV	3.75E+00		4.16E+00	2.47E+08	1.11	—	1.22
30keV	9.66E-01	3.2	1.10E+00	1.59E+08	1.13	—	1.23
80keV	5.01E-01		4.16E+00	1.28E+08	1.07	—	1.19
Os188							
5keV	7.62E-01		1.02E+00	6.06E+07	1.34	—	1.42
30keV	2.93E-01	4.8	2.52E-01	3.65E+07	0.86	—	1.24
80keV	2.21E-01		1.02E+00	3.45E+07	0.66	—	1.06
Os189							
5keV	4.39E+00		4.16E+00	2.47E+08	0.95	—	0.90
30keV	1.17E+00	4.0	1.26E+00	1.83E+08	1.08	—	0.93
80keV	5.80E-01		4.16E+00	1.60E+08	1.17	—	0.88
Os190							
5keV	6.79E-01		7.99E-01	4.74E+07	1.18	—	1.23
30keV	2.74E-01	4.4	3.10E-01	4.50E+07	1.13	—	1.30
80keV	1.85E-01		7.99E-01	4.90E+07	1.12	—	1.35
Os191 (SMC)							
5keV	3.26E+00		3.76E+00	2.23E+08	1.15	—	—
30keV	1.29E+00	21.7	1.22E+00	1.77E+08	0.95	—	—
80keV	8.14E-01		3.76E+00	1.84E+08	0.95	—	—
Os192							
5keV	4.16E-01		4.16E-01	2.47E+07	1.00	—	1.30
30keV	1.55E-01	4.5	1.59E-01	2.31E+07	1.03	—	1.52
80keV	1.01E-01		4.16E-01	2.69E+07	1.12	—	1.65
Ir191							
5keV	4.35E+00		4.09E+00	2.43E+08	0.94	0.99	—
30keV	1.35E+00	3.2	1.34E+00	1.95E+08	0.99	0.94	—
80keV	7.85E-01		4.09E+00	1.96E+08	1.05	0.94	—
Ir192 (SMC)							
5keV	4.28E+00		6.67E+00	3.96E+08	1.56	—	—
30keV	2.08E+00	21.6	2.38E+00	3.46E+08	1.15	—	—
80keV	1.53E+00		6.67E+00	3.21E+08	0.88	—	—
Ir193							
5keV	3.10E+00		2.85E+00	1.69E+08	0.92	1.23	—
30keV	9.94E-01	7.0	9.17E-01	1.33E+08	0.92	1.12	—
80keV	5.61E-01		2.85E+00	1.31E+08	0.98	1.11	—
Pt190							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	1.29E+00		2.53E+00	1.50E+08	1.95	—	—
30keV	5.08E-01	8.7	9.31E-01	1.35E+08	1.83	—	—
80keV	3.87E-01		2.53E+00	1.77E+08	1.93	—	—
Pt192							
5keV	1.35E+00		3.78E-01	2.24E+07	0.28	—	—
30keV	5.90E-01	20.3	4.29E-01	6.23E+07	0.73	—	—
80keV	4.50E-01		3.78E-01	1.17E+08	1.10	—	—
Pt193 (SMC)							
5keV	3.11E+00		2.48E+00	1.47E+08	0.80	—	—
30keV	1.12E+00	21.4	8.08E-01	1.17E+08	0.72	—	—
80keV	6.50E-01		2.48E+00	1.12E+08	0.73	—	—
Pt194							
5keV	8.73E-01		5.20E-01	3.09E+07	0.60	—	—
30keV	3.65E-01	23.3	3.20E-01	4.65E+07	0.88	—	—
80keV	2.68E-01		5.20E-01	6.10E+07	0.96	—	—
Pt195							
5keV	2.17E+00		2.08E+00	1.23E+08	0.96	—	—
30keV	8.60E-01	23.3	8.00E-01	1.16E+08	0.93	—	—
80keV	4.72E-01		2.08E+00	1.20E+08	1.07	—	—
Pt196							
5keV	4.85E-01		4.70E-01	2.79E+07	0.97	—	—
30keV	1.83E-01	8.7	2.00E-01	2.90E+07	1.09	—	—
80keV	1.32E-01		4.70E-01	3.72E+07	1.19	—	—
Pt198							
5keV	2.82E-01		4.86E-01	2.88E+07	1.72	—	—
30keV	9.22E-02	5.0	1.19E-01	1.73E+07	1.29	—	—
80keV	6.28E-02		4.86E-01	1.69E+07	1.13	—	—
Au197							
5keV	2.05E+00		1.98E+00	1.17E+08	0.97	0.97	1.02
30keV	5.82E-01	1.5	6.30E-01	9.15E+07	1.08	1.05	1.05
80keV	3.56E-01		1.98E+00	8.98E+07	1.06	1.04	1.03
Au198 (SMC)							
5keV	2.10E+00		2.83E+00	1.68E+08	1.35	—	—
30keV	8.40E-01	17.5	9.01E-01	1.31E+08	1.07	—	—
80keV	5.16E-01		2.83E+00	1.31E+08	1.07	—	—
Hg196							
5keV	5.81E-01		6.20E-01	3.68E+07	1.07	0.17	0.17
30keV	2.04E-01	3.9	2.14E-01	3.11E+07	1.05	0.17	0.17
80keV	1.28E-01		6.20E-01	3.92E+07	1.29	0.17	0.17
Hg198							
5keV	5.88E-01		4.05E-01	2.40E+07	0.69	0.67	0.67
30keV	1.73E-01	8.7	2.43E-01	3.53E+07	1.41	0.93	0.93

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
80keV	1.39E-01		4.05E-01	4.89E+07	1.48	0.77	0.77
Hg199							
5keV	1.35E+00		9.94E-01	5.89E+07	0.74	0.79	0.79
30keV	3.74E-01	6.1	3.34E-01	4.86E+07	0.89	1.04	1.04
80keV	2.24E-01		9.94E-01	4.97E+07	0.94	1.04	1.04
Hg200							
5keV	3.24E-01		5.43E+00	3.22E+08	16.76	0.82	0.82
30keV	1.15E-01	10.4	1.19E+00	1.73E+08	10.34	1.11	1.11
80keV	8.60E-02		5.43E+00	8.97E+07	4.40	0.98	0.98
Hg201							
5keV	9.50E-01		1.21E+00	7.15E+07	1.27	1.09	1.09
30keV	2.64E-01	5.3	3.28E-01	4.77E+07	1.24	0.97	0.97
80keV	1.22E-01		1.21E+00	3.91E+07	1.35	1.00	1.00
Hg202							
5keV	1.59E-01		9.60E-02	5.70E+06	0.60	1.35	1.35
30keV	6.32E-02	3.0	3.11E-02	4.52E+06	0.49	1.35	1.35
80keV	4.49E-02		9.60E-02	7.33E+06	0.69	1.33	1.33
Hg203 (SMC)							
5keV	3.75E-01		1.71E+00	1.01E+08	4.55	—	—
30keV	9.80E-02	17.3	3.86E-01	5.61E+07	3.94	—	—
80keV	4.90E-02		1.71E+00	5.00E+07	4.30	—	—
Hg204							
5keV	9.84E-02		1.79E-01	1.06E+07	1.82	1.01	1.01
30keV	4.20E-02	9.5	4.74E-02	6.89E+06	1.13	1.03	1.03
80keV	3.02E-02		1.79E-01	6.84E+06	0.96	1.00	1.00
Tl203							
5keV	3.80E-01		5.54E-01	3.28E+07	1.46	1.56	—
30keV	1.24E-01	6.5	9.32E-02	1.35E+07	0.75	1.37	—
80keV	5.00E-02		5.54E-01	1.63E+07	1.38	2.22	—
Tl204 (SMC)							
5keV	8.74E-01		1.39E+00	8.26E+07	1.59	—	—
30keV	2.15E-01	17.7	5.04E-01	7.32E+07	2.34	—	—
80keV	1.22E-01		1.39E+00	7.47E+07	2.58	—	—
Tl205							
5keV	1.02E-01		1.67E-01	9.90E+06	1.64	1.32	—
30keV	5.40E-02	7.4	1.09E-01	1.58E+07	2.01	0.97	—
80keV	2.50E-02		1.67E-01	1.53E+07	2.58	1.33	—
Pb204							
5keV	3.12E-01		3.11E-01	1.84E+07	1.00	0.87	0.97
30keV	8.10E-02	2.8	1.07E-01	1.56E+07	1.32	0.89	1.03
80keV	5.44E-02		3.11E-01	1.33E+07	1.03	0.71	1.17
Pb205 (SMC)							

	KADoNiS	$\Delta\sigma_E$	TENDL-2014			ENDF/B7.1	JENDL4.0
	σ(b)	%	σ(b)	R(cm^3/s)	C/E	C/E	C/E
5keV	6.04E-01		6.16E-01	3.65E+07	1.02	—	—
30keV	1.25E-01	17.6	2.13E-01	3.09E+07	1.70	—	—
80keV	6.80E-02		6.16E-01	2.94E+07	1.82	—	—
Pb206							
5keV	2.09E-02		2.02E-02	1.20E+06	0.97	0.97	1.01
30keV	1.45E-02	2.1	1.36E-02	1.97E+06	0.94	0.94	1.01
80keV	1.19E-02		2.02E-02	2.59E+06	0.92	0.92	0.98
Pb207							
5keV	1.62E-02		1.62E-02	9.62E+05	1.00	1.07	1.23
30keV	9.90E-03	5.1	1.18E-02	1.72E+06	1.19	0.83	1.04
80keV	5.30E-03		1.62E-02	6.40E+06	5.09	1.21	1.19
Pb208							
5keV	5.80E-05		2.36E-06	1.40E+02	0.04	0.07	1.05
30keV	3.60E-04	8.3	6.45E-04	9.37E+04	1.79	1.82	1.04
80keV	3.95E-04		2.36E-06	2.35E+05	2.51	2.58	1.42
Bi209							
5keV	1.30E-02		1.51E-02	8.96E+05	1.17	1.17	1.02
30keV	2.56E-03	11.7	2.90E-03	4.21E+05	1.13	1.31	1.15
80keV	1.75E-03		1.51E-02	5.46E+05	1.32	2.15	1.04
Bi210 (SMC)							
5keV	1.80E-02		2.48E-02	1.47E+06	1.38	—	—
30keV	6.00E-03	83.3	9.77E-03	1.42E+06	1.63	—	—
80keV	4.00E-03		2.48E-02	1.45E+06	1.53	—	—

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