

UKAEA-CCFE-CP(23)59

Thomas Stokes Mirjana Damjanovic Joe Berriman
Stephen Reynolds

Detritiation of JET Beryllium and Tungsten

This document is intended for publication in the open literature. It is made available on the understanding that it may not be further circulated and extracts or references may not be published prior to publication of the original when applicable, or without the consent of the UKAEA Publications Officer, Culham Science Centre, Building K1/O/83, Abingdon, Oxfordshire, OX14 3DB, UK.

Enquiries about copyright and reproduction should in the first instance be addressed to the UKAEA Publications Officer, Culham Science Centre, Building K1/O/83 Abingdon, Oxfordshire, OX14 3DB, UK. The United Kingdom Atomic Energy Authority is the copyright holder.

The contents of this document and all other UKAEA Preprints, Reports and Conference Papers are available to view online free at scientific-publications.ukaea.uk/

Detritiation of JET Beryllium and Tungsten

Thomas Stokes Mirjana Damjanovic Joe Berriman Stephen
Reynolds

Detritiation of JET Beryllium and Tungsten

1. Thomas Stokes:

¹ Waste Innovation Unit, UKAEA, Oxford, United Kingdom

Email: tom.stokes@ukaea.uk

Received xxxxxx

Accepted for publication xxxxxx

Published xxxxxx

Abstract

Investigations were undertaken into the thermal treatment of beryllium and tungsten to see if these materials can be detritiated in the Material Detritiation Facility (MDF) at UKAEA, allowing for the declassification of intermediate level waste (ILW) to low level waste (LLW). When heated in oxygen, both tungsten and beryllium readily oxidise, with a series of different oxides forming as temperature increases. These oxide layers act as a tritium barrier, reducing the amount that can be removed by thermal treatment and as such need to be avoided by heating at lower temperatures. Additionally, the formation of beryllium oxide presents health and safety concerns due to its toxicity and physical form. Experiments were undertaken using tungsten and beryllium samples from JET ILW campaigns. The samples were heated in a pyrolyser, and the tritium released was captured in a series of bubblers. The remaining tritium in the material was characterised by acid dissolution at external labs to allow for detritiation factors to be calculated. Tritium was successfully removed from the samples by heating in air, and detritiation factors of 16.95 for tungsten and 121 for beryllium were found. Future trials will use are being using JET ILW samples that have had their tritium content increased via soaking. This would allow for samples representative of ILW to be detritiated and could demonstrate the ability of the process to reduce the tritium inventory and allow declassification of ILW to LLW.

Keywords: detritiation, beryllium, tungsten, JET
