Contribution ID: **61** Type: **Oral**

Tungsten Oxidation AeroSol Transport (TOAST) Experiments

Monday, 4 June 2018 13:20 (20 minutes)

The TOAST experiments were performed to investigate how much tungsten becomes airborne by tungsten oxidation at temperatures up to above 1400 C. The mass fraction of the oxidised amount that is airborne after passage through the system, was measured to be up to 50% .

In these experiments, large tungsten blocks of 0.25 - 0.5 kg are oxidised, compared to the smaller filaments or rods such as used in other tungsten oxidation experiments described in the references. The blocks are inductively heated in a controlled air flow with speeds of the order of 1 m/s. Then the oxide laden flow is led through an about 4 m long system of 1.5 inch stainless piping, which has similarities with a possible escape path from a high power spallation target. The piping has vertical and horizontal sections as well as several bends, in order to promote and study aerosol deposition by different phenomena.

A HEPA filter is placed at the end of the system. The blocks and the filter are weighed before and after the tests in order to calculate the release fraction. Several other variables are measured in the tests, such as block and air temperature and wall deposition. The aerosols are measured with an impactor at the end of the system and by a Fast Aerosol Mobility Size Spectrometer at two extraction points in the system. Transmission Electron Microscopy is also used to study the generated particles.

The purpose of the tests is to simulate bulk conditions, i.e. full size and flow, hence the large blocks. The conditions are intended to be realistic for highly improbable accident events in neutron spallation targets, i.e. events were the beam is continuously on and no safety systems or confinements are functional.

Primary author: Dr NILSSON, Per (European Spallation Source)

Co-authors: Prof. GUDMUNDSSON, Anders (Lund University, Faculty of Engineering); Prof. KLINGMANN, Jens (Lund University, Faculty of Engineering); LOVEN, Karin (Lund University, Faculty of Engineering)

Presenter: Dr NILSSON, Per (European Spallation Source)

Session Classification: Session 1-R&D to Support Concepts

Track Classification: 1-R&D to Support Concepts