

14th International Workshop on Hydrogen Isotopes in Fusion Reactor Materials

Meeting objective: This workshop is a satellite meeting of the 23rd International Conference on Plasma Surface Interactions in Controlled Fusion Devices (23rd-PSI) held on June 18 through 22, 2018 at Princeton University in Princeton, NJ, USA. It follows the tradition of the series of the last thirteen International Workshops on Hydrogen Isotopes in Fusion Reactor Materials (H-Workshop) that were organized as satellite workshops to PSI conferences. As its predecessors it is intended as a platform for experts in the field to present and discuss the latest scientific results. To fulfill its scope as a workshop, ample time for discussion will be provided. The workshop will focus on experiments and modeling of hydrogen isotope interactions with fusion-reactor materials. Each speaker is given 25 minutes total (18 minutes presentation + 7 minutes discussion).

25 June, Room 405, John D. Tickle Engineering Building

Session 1: Experimental Techniques, Chairs: Thomas Schwarz-Selinger and Brian Wirth

8:45 am, Welcome, introductions and meeting logistics, Brian Wirth

9:00 am, Guang-Nan Luo, "Hydrogen isotopes release behavior in tritium breeding materials"

9:25 am, Rob Kolasinski, "A multi-technique analysis of chemisorbed hydrogen on tungsten surfaces"

9:50 am, Xunxiang Hu, "Experimental Techniques Used for Investigating Hydrogen Isotope Retention in Fusion Reactor Materials"

10:15 am, break

10:45 am, Chase Taylor, "Surface chemical and morphological characterization of neutron irradiated tungsten"

11:10 am, R. Bisson, "Laser induced desorption of deuterium from polycrystalline tungsten: the role of grain boundaries and the native oxide layer"

11:35 am, Discussion of Session 1 and Working lunch

1:00 pm, Session 2: Tritium processing and behavior in Steels & Beryllium, Chairs: Guang-Nan Luo and David Donovan

1:00 pm, Y. Martynova, "D trapping in RAFM steel exposed to D+Ar plasma"

1:25 pm, Y.X. Wang, "H behaviors in metallic and ceramic materials"

1:50 pm, H.S. Zhou, "Plasma driven permeation of D through a Chinese reduced activation martensitic/ferritic steel CLF-1"

2:15 pm, break

2:45 pm, Y.-P. Xu, "High energy Fe ion irradiation effects on the hydrogen isotope retention behavior in RAFM steels"

3:10 pm, M. Kumar, "Observation of blister formation by D Implantation in Be: confocal, atomic force, Raman and electron microscopies analysis" (Moved from WED am)

3:35 pm, G. Kizane, "Comparison of the structure of the plasma-facing surface and tritium accumulation in beryllium tiles from JET ILW campaigns 2011-2012 and 2013-2014" (Moved from WED am)

4:00 pm, Xunxiang Hu, "Deuterium Trapping Capability of Nanostructures in Steels for Fusion Reactor Structural Application"

4:25 pm, Discussion of Session 2

5:45 pm, Adjourn

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26 June, Room 405, John D. Tickle Engineering Building

Session 3a: Tungsten and Boundary Physics/PMI, Chairs: Rob Kolasinski and Yves Ferro

8:45 am, Thomas Schwarz-Selinger, "The influence of helium on deuterium retention in tungsten"

9:10 am, Elodie Bernard, "Influence of He and He-D irradiation on T retention in W"

9:35 am, J. Zhao, "Bubbles formation and hydrogen retention in tungsten: results from hydrogen implantation, thermal annealing, TEM and ToF-SIMS"

10:00 am, break

10:30 am, Tim Younkin, "Reflection and Retention of Deuterium in D-He Plasma Exposed Tungsten, as modeled by the GITR – F-TRIDYN – Xolotl Integrated Simulation for Plasma Surface-Interactions"

10:55 am, J.S. Hu, "Control of fuel recycling and hydrogen content for the achievement of record-long pulse H-mode plasma in EAST"

11:20 am, Discussion of Session 3a

12:00 pm, Lunch and optional Nuclear Engineering materials laboratory tour (or informal campus tour)

1:30 pm, Session 3b: Tungsten modeling, Chairs: Elodie Bernard and Dimitrios Maroudas

1:30 pm, Yves Ferro, "Temperature Dependent Saturation Limits of hydrogen with tungsten surfaces: A Density Function Theory and Thermodynamic model corroborated by Low Energy Ion Scattering experiments"

1:55 pm, Li Yang, "Energetics of hydrogen and helium-vacancy complexes in bulk and near surfaces of tungsten: First-principles study"

2:20 pm, A. Muthali, "Diffusion and Recombination Mechanisms of Hydrogen Saturated W(110) surface via Density Functional Calculations"

2:45 pm, break

3:15 pm, M.J. Simmonds, "Expanding the Capability of Reaction-Diffusion Codes using Pseudo Traps and Temperature Partitioning"

3:40 pm, M.I. Patino, "He Nanobubble growth in W"

4:05 pm, David Martin, "Large-Scale Molecular Dynamic Simulations of Hydrogen in Tungsten"

4:30 pm, Zack Bergstrom, "Understanding Hydrogen Interaction with Helium Bubbles in Tungsten"

4:55 pm, Discussion of Session 3

6:00 pm, Adjourn

14th International Workshop on Hydrogen Isotopes in Fusion Reactor Materials

27 June, Room 405, John D. Tickle Engineering Building

Session 4: Neutron and Ion Irradiation of Tungsten, Chairs: Xunxiang Hu and Masa Shimada

8:45 am, M. Shimada, "Hydrogen isotope retention in neutron-irradiated tungsten exposed to high flux plasma under US-Japan PHENIX program"

9:10 am, Wendy Garcia, "Deuterium Retention in Neutron Irradiated Tungsten"

9:35 am, Guin Shaw, "Comparative Analysis of Helium and Hydrogen Retention in Tungsten using Laser Induced Breakdown Spectroscopy Coupled with Laser Ablation Mass Spectrometry" (Move from Tuesday am)

10:00 am, break

10:30 am, Eric Nicholson, "Crystallographic dependence of near-surface hardness changes in D⁺ irradiated tungsten"

10:55 am, Closing Discussion

12:00 pm, Adjourn + optional laboratory tours at ORNL

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