Contribution ID: **39** Type: **not specified**

# Hydrogen diffusion, retention and irradiation-induced damage in fusion-relevant materials

*Thursday, 26 November 2020 15:20 (20 minutes)*

The presentation will outline the proposed research to the CRP. The experimental work will focus on studying hydrogen isotope mobility and trapping in W and MoNbTaVW materials, while the simulations will concentrate on hydrogen isotope diffusion, isotope exchange, and the effects of plasma edge-localized modes during fusion plasma operation in tokamaks.
The suitability of the new class of materials called High Entropy Alloys (HEAs) as first wall for fusion reactors is studied. The most promising refractory HEA material MoNbTaVW, which is classified as a complex, concentrated alloy refractory metal is chosen for this study. Hydrogen isotope diffusion and trapping is studied using ion implantation, and TDS, SIMS, and ERDA techniques. The H isotope exchange in the HEA material (relating to diffusion and tritium removal) is studied using the annealing in hydrogen atmosphere method.
The second proposed task will focus on determining the H trapping vacancy type defects formed in neutron irradited W using PAS.
The third task uses rate equation (RE) simulations to elucidate H isotope exchange experiments and the H isotope retention, vacancy clustering and microstructure change due to plasma edge-localized modes (ELM) during fusion plasma operation in tokamaks.

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**Session Classification:** Neutron-irradiated materials II