Contribution ID: **18** Type: **invited**

Experiments and modeling of hydrogen isotope inventory in damaged tungsten

Monday 26 May 2025 09:50 (30 minutes)

In a fusion reactor, tungsten will be exposed to high heat flux, neutrons, helium ash, and tritium-containing fuel plasma. Neutron irradiation generates defects in tungsten, and the migration of these defects under irradiation leads to their clustering and annihilation. These irradiation-induced defects serve as strong trapping sites for hydrogen isotopes. Therefore, predicting the accumulation of irradiation-induced defects during reactor operation is crucial for evaluating the tritium inventory in the vacuum vessel and assessing the hazard of a loss-of-vacuum accident.
In this study, the accumulation of irradiation-induced defects and the trapping of hydrogen isotopes in tungsten were experimentally evaluated. These phenomena were also modeled using rate equations, which were combined to predict the tritium inventory in the first wall of the fusion reactor.
In this presentation, we will compare experimentally obtained results on hydrogen isotope retention and release behaviors in damaged tungsten with predictions from the model. Additionally, recent advancements in experiments and modeling related to this study will be discussed.

Primary author: KOBAYASHI, Makoto (National Institute for Fusion Science)

Presenter: KOBAYASHI, Makoto (National Institute for Fusion Science)

Session Classification: invited