

# Technical Meeting on Nuclear Fusion Fuel Permeation in Reactor First Wall Components

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## Influence of Interfaces on the Hydrogen Permeation - Round Robin Test: Gas-Driven Permeation in Fusion Materials (GDPFM)

*Tuesday, 5 October 2021 13:25 (30 minutes)*

Fuel retention and permeation in the wall of future fusion devices are among crucial factors for the reactor safety and its economical operation. For the prediction, evaluation and calculation of hydrogen permeation and retention in fusion reactor walls, it is essential to know fundamental parameters of hydrogen transport and retention.

In order to obtain such basic parameter for hydrogen isotopes, gas-driven permeation measurements have to be performed. In order to investigate the influence of the microstructure and sample conditions, sample characterization is crucial before and after permeation and retention measurements by surface analysis techniques.

Especially for the prediction of the hydrogen permeation through fusion reactor components, the influence of interfaces on the permeation of magnetron-coated substrates is investigated. Cu layers with different thicknesses were deposited on polished 316L-IG steel substrates. After annealing and pre-characterization, gas-driven permeation measurements were performed on these samples. A comparison of the Cu layered and bare steel substrate samples will be given.

In the second part of this talk, the Round Robin test about 'Gas-Driven Permeation in Fusion Materials (GDPFM)' will be introduced. Polished and annealed Eurofer97 samples were prepared, pre-characterized and sent to the participating institutes:

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NRC, Russia: Anna Golubeva

ASIPP, China: Hao-Dong Liu

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The test aims to verify the permeation measurements at different devices and small deviations in the measurements method. This study enables and simplifies the comparison of permeation parameter obtained by gas-driven permeation measurements within this CRP.

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