INFLUENCE OF TANTALUM IMPURITY on Deuterium retention in W-Ta alloy [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2021.48.1.190

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At the present time, tungsten is considered as one of the plasma-facing materials of future fusion reactors. As plasma-facing material, W will be subjected to intensive fluxes of deuterium, tritium, helium particles as well as 14 MeV neutrons (n) from the D–T fusion reaction. Neutron irradiation will cause a change in the microstructure of W by creating displacements in the bulk and Re and Os formation [1]. It was shown that the addition of 5 at.% Re to W strongly reduced hydrogen isotopes retention after heavy ion irradiation [2]. It is interesting to study effects of other dopant elements, such as Mo and Ta, on hydrogen isotopes retention.

In this study plates of monocrystalline W, W-xTa alloys (*x*= 1; 3; 5 concentration in at.%) were used as experimental samples. All the samples were polished to a mirror surface and outgassed in vacuum at 1100 K during 2 hours. Sets of W, W-1Ta, W-3Ta, W-5Ta samples were exposed in D gas in a temperature range of 400÷600 K at pressure 104 Pa. The D retention in W and W-Ta alloys was measured by thermal desorption spectroscopy (TDS).

An influence of Ta dopant on deuterium retention in W monocrystals after gas exposure investigated by TDS is discussed.

This work was supported by the Russian Science Foundation (No. 18-72-10162).

References

1. H. Bolt et al., J. Nucl. Mater.,307–311 (2002) 43–52
2. Y. Hatano et al., Nucl. Mater. Energy, 9(2016)93-97.
1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/XLVIII/E/ru/IF-Bobyr.docx) [↑](#footnote-ref-1)