Analysis of Tritium in Divertor Materials

Mihails Halitovs[1], Gunta Kizane[1], Liga Avotina[1] and Bronislavs Lescinskis[1]

[1]University of Latvia, Institute of Chemical Physics, Kronvalda blvd. 4, LV-1010, Riga, Latvia

*Authors e-mail: mihails.halitovs@lu.lv

Accumulation of fusion fuel in the vacuum vessel materials is one of the major problems for various fusion devices.

Tritium accumulation induces:

a) efficiency loss of fusion devices due to fuel consumption;
b) retention of unused fusion fuel being reduced;
c) amount of nuclear waste building up.

AIM OF THE RESEARCH:

Analyse the efficiency of W coating and concern the possibility of a future all-tungsten divertor, through evaluating the effect of W coating on reducing the surface and bulk tritium accumulation for several divertor tiles from various JET fusion device campaigns.

MAIN CONCLUSIONS:

1) Tungsten coating is effective in reducing tritium accumulation on the surface and in the bulk of divertor tiles, yet with a certain efficiency limit.
2) Best results of reducing tritium accumulation would be achieved for the tiles that have more plasma-facing surface interaction time and higher energy load.
3) Tungsten coating barely affects the tritium bulk activity and most likely comparably slower processes of diffusion are happening.

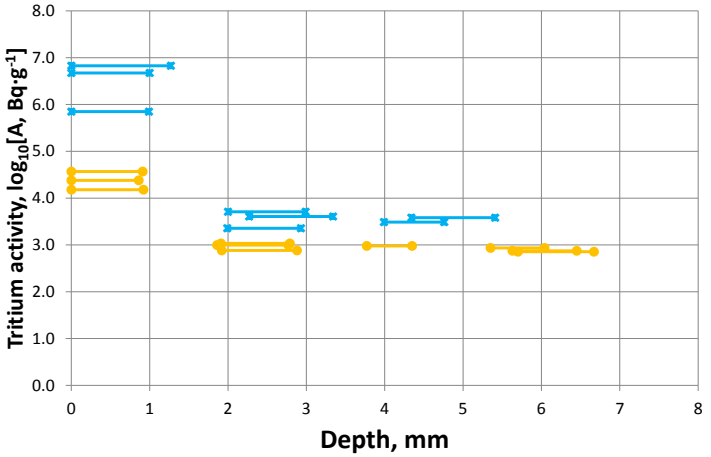

Fig 1. *Tritium activity in depth of divertor tile 4 (**x** indicate tile 2BNG4C samples (no coating), **o** indicate 14BNG4D samples (W coating)).*

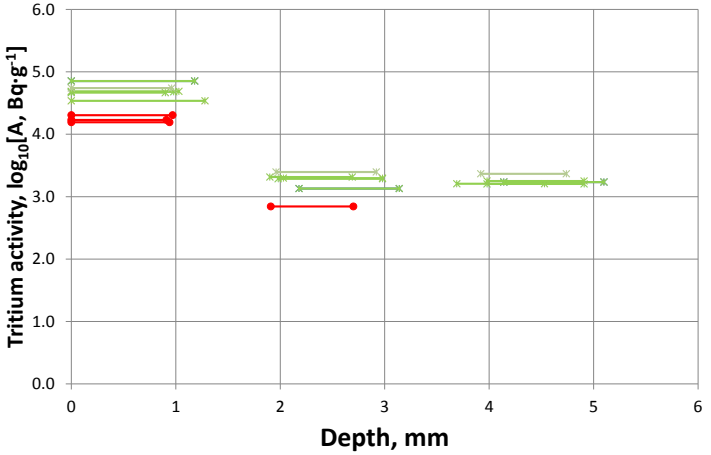

Fig. 2. *Tritium activity in depth of divertor tile 7 (**x** indicate tile 2ONG7A samples (no coating), **o** indicate 2ONG7A* samples (W coating))*