Erosion of tungsten and beryllium under action of intense plasma stream

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Beryllium and tungsten protective coatings of ITER vacuum chamber will be exposed to powerful plasma-thermal loads. It will cause strong erosion of armour materials [1]. Splashing of molten metal leads to a reduction in protective coatings resource and contamination of a hot plasma by impurities. Experimental data describing these processes are important for creation theoretical models of material erosion mechanisms and forecasts for plasma-surface components operation under ITER conditions. In the presented work, tungsten and beryllium targets were irradiated by powerful deuterium plasma streams at QSPA-T and QSPA-Be facilities [2], [3]. Thermal loads on the samples corresponded to current disruptions in ITER: 1.7—2.0 MJ/m^2 with an exposure time 0.75 ms in case of tungsten and 1.0 MJ/m^2 during 0.3 ms in case of beryllium. Influence of magnetic field and angle of the plasma stream incidence on a structure of irradiated surface were studied. Data on the tungsten and beryllium droplets erosion obtained and analyzed. Erosion due to movement of the molten layer and formation of a crater on the target surface has been studied. The work is supported by contract H.4a.241.19.22.1123 dated 14.02.2022.

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