

Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Aluminum Surface Morphology Evolution under High-Flux Helium Ions Bombardment OLEKSII GIRKA, OLEKSANDR BABYCH, OLEKSANDER BIZYUKOV, ANATOLII CHUNADRA, OLEKSANDER CHIBISOV, IVAN BIZYUKOV, V. N. Karazin Kharkiv National University — Aluminum samples with purity 99.99% wt. were irradiated with He ion beam under ITER-like conditions using FALCON ion source. Aluminum has been used as the surrogate for plasma-material interaction studies. Typical parameters during steady-state expose were the following: He ion flux was $2-4 \times 10^{22} \text{ m}^{-2}\text{s}^{-1}$, heat flux was above 1 MW m^{-2} , average ion energy was 2 keV. The exposure fluence was well above 10^{26} m^{-2} . Surface morphology evolution was investigated with SEM. Cone-like surface structures of a different size and shape were found on the surface. These structures are similar to cones observed after experiments on PISCES-B, Magnum-PSI, Pilot-PSI. Cone-like structures are arranged separately from each other at lower fluence. At higher fluence, their number is increased and they tend to form mountain-like clusters. Column-like structures growth with fluence and become higher. Grass-type structures and flakes were not readily observable on the surface at lower fluence, but could be found anywhere at higher fluence. Increasing the fluence, one can also observe formation of the crack network and its propagation. The observed structures, if present on the beryllium first wall, may cause exfoliation and local melting of the material with consequent excessive erosion of the first wall and contamination of the edge plasma.

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Date submitted: 04 Jun 2016

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