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Erosion of bulk TZM evaluated with an implanted depth marker in EAST[1] KEVIN WOLLER, ZACH HARTWIG, MIT Plasma Science and Fusion Center, ZHENHUA HU, Institute of Plasma Physics, Chinese Academy of Science, LEIGH ANN KESLER, MIT Plasma Science and Fusion Center, GUANG-NAN LUO, Institute of Plasma Physics, Chinese Academy of Science, RAJESH MAINGI, Princeton Plasma Physics Laboratory, CHRIS REIS, National High Magnetic Field, Laboratory, DENNIS WHYTE, MIT Plasma Science and Fusion Center, JING WU, YUDONG XIE, MING-ZHONG ZHAO, Institute of Plasma Physics, Chinese Academy of Science — Erosion of molybdenum (TZM) at the mid-plane on the low and high field side in the Experimental Advanced Superconducting Tokamak (EAST) was characterized by utilizing a novel implanted depth marker. Exposure on the Material And Plasma Exposure System (MAPES) on the outboard mid-plane at low fluence (<10ˆ24 mˆ-2) shows limited erosion, <40 nm, near the sensitivity limit of the technique, x_sensˇ20 nm. Lithium (Li) and deuterium (D) content in the near surface (<200 nm) was characterized by Elastic Recoil Detection (ERD) and Nuclear Reaction Analysis (NRA). Accumulation of Li from plasma exposure without prior Li wall conditioning is apparent, even with the sample surface positioned 3 cm radially outward of the limiter, exhibiting Li migration on the run-day time-scale, at low fluence. The HFS samples incorporated in modified tiles with dovetail slot design were exposed for a full run campaign, and net erosion of 0.5-1 um is observed. Erosion of bulk TZM plasma-facing components has been quantified for the first time with the novel implanted depth marker technique, which can be utilized with in situ wall monitoring diagnostics, such as Laser-Induced Breakdown Spectroscopy (LIBS) or Accelerator-based In-situ Material Surveillance (AIMS).

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