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Ion Beam Analysis of Deuterium and Helium Retention in Li-coated Plasma-Facing Components[1] F. BEDOYA, K.B. WOLLER, D.G. WHYTE, PSFC - MIT — Plasma-Facing Components (PFCs) influence plasma behavior in magnetic confinement devices, and conditioning of the plasma-facing surfaces is highly relevant to optimize their performance. The deposition of low-Z thin films on PFCs has been successful in decreasing contamination and radiation losses from the plasma. In particular, the use of Li coatings on PFCs has shown encouraging results in several tokamaks. The outstanding capability of Li to bind D and O allows low recycling walls and flatter temperature profiles, reducing edge instabilities. To elucidate the complex relationship between plasma, coating and substrate, we studied thin Li coatings ($<100\mu$m), vapor-deposited in-situ on graphite and TZM using Ion Beam Analysis (IBA). The samples were irradiated with plasma fluences of up to 10^{24} m^{-2} of either D or helium (He). The exposures were performed with relatively low ion incident energy (15 eV) and fluxes in the range of 10^{21}-$10^{22}m^{-2}s^{-1}$. Lithium-coated graphite and TZM had increased deuterium retention, with D/Li greater than 1.0 on the graphite, in contrast with the maximum D/C=0.1 on bare graphite and near zero retention observed with bare TZM. These results support the idea that Li PFC are a promissory solution to the PMI issue.

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Felipe Bedoya
MIT

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