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4.19 Study of the properties of thin Li films and their relationship with He and H plasmas using Ion Beam Analysis in the DIONISOS Experiment

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Plasma facing component (PFC) conditioning dramatically affects plasma performance in magnetic confinement fusion experiments. Lithium (Li) has been used in multiple machines to condition PFC with subsequent improvements to plasma performance. Multiple studies have investigated the interactions of Li with deuterium (D) and oxygen (O) in order to ascertain the mechanisms behind improvements in performance. Ion Beam Analysis (IBA) is a useful tool to interrogate PFC surfaces as they interact with plasmas. DIONISOS is a linear plasma device, capable of generating discharges with fluxes~10^21m^-2s^-1 and Te~6 eV, coupled to an ion accelerator. DIONISOS is capable of analyzing samples using Elastic Recoils Detection (ERD) and Rutherford Backscattering Spectroscopy (RBS) during plasma exposures. The facility has been equipped with a Li deposition system for evaporation of thin coatings on different substrates. The evaporator enables real time ERD and RBS measurements of deposition and erosion of Li coatings on different substrates and the interaction of the Li with the vacuum and plasma. Considerations for ERD and RBS, e.g. ion species, energy, and data acquisition frequency, are presented. This work is the basis for further investigation of He, H and D retention in solid and liquid Li

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