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Hydrogen retention in Li and Li-C-O films[1] LUXHERTA BUZI, ANDREW O. NELSON, YUXIN YANG, ROBERT KAITA, BRUCE E. KOEL, Princeton Univ — The efficiency of Li in binding H isotopes has led to reduced recycling in magnetic fusion devices and improved plasma performance. Since elemental Li surfaces are challenging to maintain in fusion devices due to the presence of impurities, parameterizing and understanding the mechanisms for H retention in various Li compounds (Li-C-O), in addition to pure Li, is crucial for Li plasma-facing material applications. To determine H retention in Li and Li-C-O films, measurements were done under ultrahigh vacuum conditions using temperature programmed desorption (TPD). Thin Li films (20 monolayers) were deposited on a nickel single crystal substrate and irradiated with 500 eV H_2^+ ions at surface temperatures from 90K to 520K. Initial measurements on Li and Li-O films showed that the retention was comparable and dropped exponentially with surface temperature, from 95% at 90 K to 35% at 520 K. Auger electron spectroscopy and TPD showed that H was retained as lithium hydride (LiH) in pure Li and as lithium hydroxide (LiOH) in Li_2O, which decomposed to H_2O and Li_2O at temperatures higher than 470K. H retention in Li-C and Li-C-O films will be determined over a similar temperature range, and the sputtering rate of these layers with H ions will also be reported.

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