

Abstract Submitted
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Distillation Column for Fuel Recovery From Liquid Lithium PFCs¹ CODY MOYNIHAN, DAVID RUZIC, University of Illinois at Urbana-Champaign — Use of liquid lithium as a plasma-facing material may present benefits over the use of high-Z refractory metals. Lithium's high affinity for ionized species is one of the major concerns surrounding the use of lithium plasma-facing components. Recovery of the fuel species, specifically tritium, is required for the technological readiness of flowing lithium loops and lithium PFCs. A distillation column has been designed for the recovery of hydrogen isotopes from lithium melts at the Center for Plasma-Material Interactions at the University of Illinois. This prototype column utilizes thermal treatment of lithium and lithium-hydride melts to desorb hydrogen isotopes, along with condensation stages to collect the clean lithium. Previous work has shown that the column can recover hydrogen to balance the fuel wall losses in an ignited ITER scenario. Moving forward, the column needs to be integrated into a flowing lithium loop to demonstrate steady-state operation. Before designing a second generation column, the parameters that effect hydrogen desorption must be understood. This work gives insight into the effect of sample geometry and hydrogen concentration on hydrogen evolution from bulk lithium mixtures. These results guide the design of the next-generation column.

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