Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

On the Development of Hydrogen Isotope Extraction Technologies for a Full LiMIT-Style PFC Liquid Lithium Loop[1] MICHAEL CHRISTENSON, MATTHEW SZOTT, STEVEN STEMMLEY, JEREMY METTLER, JOHN WENDEBORN, CODY MOYNIHAN, CHISUNG AHN, DANIEL ANDRUCZYK, DAVID RUZIC, Univ of Illinois - Urbana — Lithium has proven over numerous studies to improve core confinement, allowing access to operational regimes previously unattainable when using solid, high-Z divertor and limiter modules in magnetic confinement devices. Lithium readily absorbs fuel species, and while this is advantageous, it is also detrimental with regards to tritium inventory and safety concerns. As such, extraction technologies for the recovery of hydrogenic isotopes captured by lithium require development and testing in the context of a larger lithium loop recycling system. Proposed reclamation technologies at the University of Illinois at Urbana-Champaign (UIUC) will take advantage of the thermophysical properties of the lithium-hydrogen-lithium hydride system as the driving force for recovery. Previous work done at UIUC indicates that hydrogen release from pure lithium hydride reaches a maximum of 7 x 10^{18} s^{-1} at 665 C. While this recovery rate is appreciable, reactor-scale scenarios will require isotope recycling to happen on an even faster timescale. The ratio of isotope dissolution to hydride precipitate formation must therefore be determined, along with the energy needed to recoup trapped hydrogen isotopes. Extraction technologies for use with a LiMIT-style loop system will be discussed and results will be presented.

[1]DOE/ALPS DE-FG02-99ER54515

Michael Christenson
Univ of Illinois - Urbana

Date submitted: 14 Jul 2017 Electronic form version 1.4