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Design and Initial Results from the Dynamic Lithium Corrosion Test Bed[1] CODY MOYNIHAN, STEVEN STEMMLEY, ALFONSO DE CASTRO, University of Illinois at Urbana-Champaign, JOERG ZIMMERMANN, General Fusion, DAVID RUZIC, University of Illinois at Urbana-Champaign — Liquid metals as plasma-facing components (PFCs) present the opportunity to overcome some of the drawbacks of solid high-Z refractory PFCs, such as irreversible erosion and melting during plasma disruptions. However, it is well know that liquid metals can be highly corrosive to many common structural materials. While static corrosion studies have been performed in the past, there is little known about the effects of surface shear and tensile stress on the corrosion of structural materials submerged in liquid metals. With the support of General Fusion, a dynamic liquid metal corrosion test bed has been developed at the Center for Plasma Material Interactions, allowing rotation and tensile stress to be applied to submerged metallic samples. The design and testing of the experimental setup are presented, along with initial results of the corrosion studies. Initial testing involves rotation of metallic samples in a bath of liquid lithium at $300°C$ for 100 hours at a rotation speed of 50 Hz. Mechanical and surface properties of the materials are characterized through the use of tensile strength testing and surface imaging and compared to samples exposed to rotation in the liquid metal allowing observation of both macroscopic and microscopic changes.

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