

PROGRESS IN THE DEVELOPMENT OF A LITHIUM DIODE FOR THE CHARGER-1 PULSE POWER FACILITY FOR FUSION SPACE PROPULSION RESEARCH. W. T. Rogerson, Jr.¹, S. W. Brown¹, and B. D. Green¹, ¹Y-12 National Security Complex, P.O. Box 2009, Oak Ridge, TN, 37831.

Introduction: Charger 1 is under construction at the University of Alabama, Huntsville (UAH). Supported by UAH, Marshall Space Flight Center, and The Boeing Company, Charger 1 is intended to serve as a multi-purpose pulse power laboratory, with a primary focus on z-pinch based fusion propulsion. In order to realize this goal, a diode design incorporating deuterium and isotopic 6-lithium must be developed. As a collaborator, Y-12 National Security Complex is providing expertise in deuterium and isotopic 6-lithium safety, handling and manufacturing, and is a key participant in the design of the z-pinch diode.

In this presentation, we will discuss the development of isotopic 6-lithium wires and straws for the z-pinch diode design, and build upon the initial research development presented at NETS 2013. Since that status update, the Y-12 National Security Complex has done exploratory work looking at sintering techniques, “printing” or vacuum adding liquid metal to substrate material, extrusion and needle injecting, and other deposition methods. This presentation will discuss the results of this exploratory work, the status of down selection of the best processes, and collaboration with UAH partners to incorporate this experience into the design of the z-pinch diode.