***Investigation of Ionic Liquids Isolated Iron for Ductile Iron Castings***

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Note: 150-word limit

TMS Abstract

As research continues for missions beyond low-Earth orbit, in-situ resource utilization (ISRU) methods are critical. For Lunar and Martian colonization, the ability to manufacture mechanical and structural components with local resources is essential. Ionic liquids (IL) are being studied at NASA Marshall Space Flight Center (MSFC) to harvest elemental metals from meteorites and regolith oxides. In this investigation, the viability of casting ductile iron using ionic liquids sourced iron and nickel was explored given ductile iron’s range of applications and performance as an as-cast alloy. Ingots were produced using commercial elements to simulate the use of IL iron with carbon sourced from the by-products of a life support system currently tested at MSFC. Samples were cast and compared to commercial ductile iron with phase transformation diagrams, microstructures, and hardness*.* Results showed ionic liquids sourced elements are a viable source of elemental alloying materials for a range of ductile iron alloys.