

Additive Manufacturing of Magnetic Shields

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Abstract : Recent advances in the understanding and control of manufacturing technologies, such as various additive manufacturing technologies made considerable development in many industries. This technology was developed not only for polymers but also for ceramics, metals, composites, etc. Here we demonstrate the use of laser powder bed fusion, an additive manufacturing method, as a production technique relevant to the manufacture of magnetic shielding materials. As a demonstration, we have constructed a few key components using additive manufacturing, namely magnetic shielding. Samples were manufactured with the M2 Cusin laser machine, 350 concerns to the build platform. Initially, simple geometries were printed, such as tubes, rings, tensile strips etc. Permalloy 80 (80% Ni, 5% Mo and the remaining is Fe), called Mu metal, is used to manufacture magnetic shielding products. As a result, printed parts were characterized in terms of both magnetic and microstructural scales. Currently, the industry manufactures magnetic shields with different thicknesses of Mu-metal sheets using traditional manufacturing techniques such as rolling, bending, cutting, casting, etc. This research shows the experimental procedure of manufacturing magnetic shields additively with laser powder bed fusion technology to replace conventional manufacturing methods of magnetic shields.

Keywords : laser powder bed fusion, additive manufacturing, Mu-Metal, magnetic shields

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