

Effect of Laser Power and Laser Speed on the Defect Volume Ratio and Magnetic Properties of Nd-Tb-Fe-B alloys manufactured by Laser-Bed Powder Fusion

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In this study the effect of laser power and laser speed on the Defect Volume Ratio (DVR) and the magnetic properties of Nd-Tb-Fe-B alloys are studied. The melt-spun ribbons (spinning speed of 30m/s) were taken as precursor for Laser Based Powder Fusion (LBPF). The printing was done with different laser speeds and laser powers. Thereafter, the magnet blocks were studied by various characterization techniques to establish the effect between the Laser parameters and the Defect Volume Ratio of the blocks. XCT scan was done to qualitatively and quantitatively estimate the DVR percentage. X-Ray Diffraction study along with the Rietveld refinement was performed to understand the phase formation behavior and phase fraction quantification. SQUID measurements were done to investigate the magnetic properties of the ribbons. Microstructural observation with the help of Field Emission Scanning Electron Microscope (FESEM) revealed that the solidification morphology post LBPF process. The EDS analysis was performed to know the composition post LBPF process.