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Effect of Laser Scanning Strategies on Texture, Physical and Mechanical Properties of Laser Sintered Maraging Steel

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Abstract

Direct Metal Laser Sintering (DMLS) is one of the most emerging metal Additive Manufacturing (AM) process due to its ability to quickly form complex designs with maximal surface finish. In this research, DMLS is used to additively manufacture 18% Ni Maraging steel 300 samples by adopting a bidirectional and a cross-directional laser scanning strategy. The density, surface finish, texture, residual stress and mechanical properties of the DMLSeD samples are investigated. Higher densification and surface finish are obtained using the cross-directional scan strategy. The formation of γ -austenite in the bidirectional scanning strategy is found to be nearly 60% in comparison to the cross-directional scan strategy. A preferential growth of columnar cells followed by epitaxial formation was found in both the directions for cross-directional scan strategy

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