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Friction Stir Processing of AlSi10Mg parts produced by Selective Laser Melting

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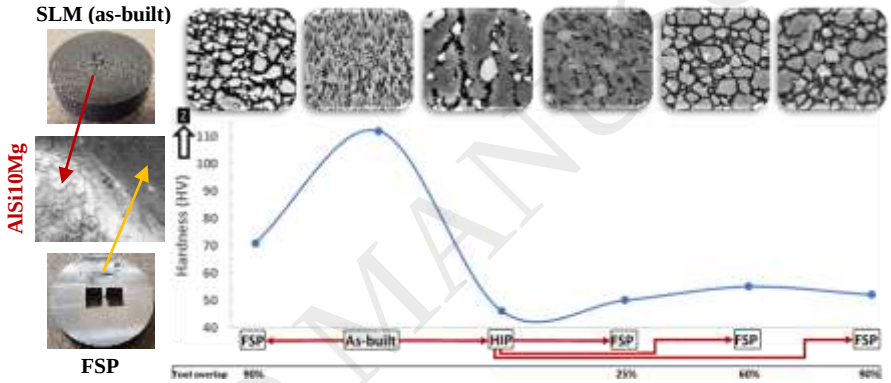
Graphical abstract



Abstract

The additive manufacturing (AM) of aluminum alloys promises a performance enhancement of lightweight parts produced using Selective Laser Melting (SLM). Post-processing for AM parts produced using SLM is often an essential step homogenizing their microstructure and reducing as-built defects. In this study, friction stir processing (FSP) was used as a localized treatment on a large surface area of AlSi10Mg parts using multiple FSP tool passes. The influence of FSP on the microstructure, hardness, and residual stresses of both as-built and hot isostatic pressed (HIPed) parts were investigated. FSP transforms the microstructure of parts into an equiaxed grain structure. Microstructure homogenization was achieved consistently over the processed