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Impact of DED process parameters on the metallurgical characteristicsof 17-4 PH SS deposited using DEDI

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Abstract

This study investigated the influence direct energy deposition (DED) process parameters have on the metallurgical characteristics (porosity, microstructural evolution, microhardness, and corrosion behavior) of 17−4 PH stainless steel powder. During the deposition, laser power and scanning speed were varied from 300 W to 400 W and from 7.62 mm/s to 12.7 mm/s, respectively while powder feed rate and the hatch overlap were kept constant at 4.7 g/min and 75%, respectively. Coupons were prepared for metallographic characterization in the as-built and heat treated condition. It was established that laser power scanning speed, and heat treatment had a meaningful impact on metallurgical characteristics studied.