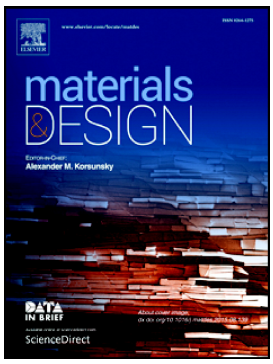

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Effect of Heat Treatments on Microstructural Evolution of Additively Manufactured and Wrought 17-4PH Stainless Steel

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ABSTRACT

Additively manufactured (AM) components usually have nonequilibrium microstructures. Post-built heat treatments are recommended for AM components to achieve homogenous microstructures. In this study, the effects were investigated of conventional solutionizing and precipitation hardening (H-900) heat treatments on the microstructure evolution of 17-4PH AM and wrought components. Microstructural characterization techniques including SEM, TEM and EBSD analysis were used on 17-4PH AM and wrought components to obtain quantitative information about the microstructure and phase evolution during these heat treatments. These microstructural studies demonstrate that 17-4PH AM components can achieve microstructures and hardnesses similar to those of wrought samples by post-built heat treatments.

Keywords

17-4PH stainless steel, Selective laser melting, Heat treatment, EBSD, TEM