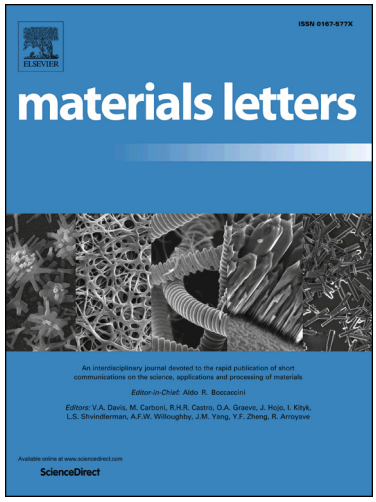

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Tailoring microstructural features of wire arc additive manufacturing 2Cr13 part via varying inter-layer dwelling time

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Abstract

The phase constitution, the microstructural growth behavior, and the anti-indentation performance of 2Cr13 thin-wall part were successfully tailored through inter-layer dwelling time alteration using cold metal transfer (CMT) technology. The short inter-layer dwelling time induced the presence of a low amount of γ-Fe phase, as well as extremely elongated ferrite grains containing ultrafine needle-shaped martensite throughout the entire part. This finally led to a narrow fluctuation in microhardness. The long dwelling time contributed to the α-Fe phase formation only and a periodic microhardness trendline, which was related to a periodic microstructure featured by martensite laths within the block-shaped ferrite matrix. This method, in an intentional manner, could be adopted to manufacture a particular component with local properties that are altered with location through a single material deposition.

Keywords

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