



Additive manufacturing of metallic components – Process, structure and properties



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ABSTRACT

Since its inception, significant progress has been made in understanding additive manufacturing (AM) processes and the structure and properties of the fabricated metallic components. Because the field is rapidly evolving, a periodic critical assessment of our understanding is useful and this paper seeks to address this need. It covers the emerging research on AM of metallic materials and provides a comprehensive overview of the physical processes and the underlying science of metallurgical structure and properties of the deposited parts. The uniqueness of this review includes substantive discussions on refractory alloys, precious metals and compositionally graded alloys, a succinct comparison of AM with welding and a critical examination of the printability of various engineering alloys based on experiments and theory. An assessment of the status of the field, the gaps in the scientific understanding and the research needs for the expansion of AM of metallic components are provided.

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