عنوان مقاله:

Additive manufacturing of AISI ۳۰۴L stainless steel : A review of processing parameters and mechanical performance

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خلاصه مقاله:

Additive manufacturing (AM) has become a favorable method for producing ۳۰۴L stainless steel (SS) for various industrial applications, which is owing to its favorable characteristics including corrosion resistance, mechanical performance, and design flexibility. This review paper presents a comprehensive overview of the processing factors along with the mechanical performance of AM-fabricated ۳۰۴L SS (AM۳۰۴LSS). Firstly a discussion is provided for the fundamental principles of AM techniques that are common for processing SS۳۰۴L. This includes selective laser melting (SLM), laser beam powder bed fusion (LB-PBF), direct metal laser sintering (DMLS), directed energy deposition (DED), wire-and-arc additive manufacturing (WAAM). Subsequently, the impact of key processing factors i.e. laser power, and powder characteristics on the microstructure and mechanical properties of AM۳۰۴LSS is presented. In addition, this article examines recent progress in process optimization strategies and post-processing techniques for improving and enhancing the mechanical properties and surface finish of AM ۳۰۴L stainless steel components. Finally, significant insights are provided for researchers, engineers, and practitioners involved in the advancement and application of AM۳۰۴LSS components.Additive manufacturing (AM) has become a favorable method for producing ۳۰۴L stainless steel (SS) for various industrial applications, which is owing to its favorable characteristics including corrosion resistance, mechanical performance, and design flexibility. This review paper presents a comprehensive overview of the processing factors along with the mechanical performance of AM-fabricated ۳۰۴L SS (AM۳۰۴LSS). Firstly a discussion is provided for the fundamental principles of AM techniques that are common for processing SS۳۰۴L. This includes selective laser melting (SLM), laser beam powder bed fusion (LB-PBF), direct metal laser sintering (DMLS), directed energy deposition (DED), wire-and-arc additive manufacturing (WAAM). Subsequently, the impact of key processing factors i.e. laser power, and powder characteristics on the microstructure and mechanical properties of AM۳۰۴LSS is presented. In addition, this article examines recent progress in process optimization strategies and post-processing techniques for improving and enhancing the mechanical properties and surface finish of AM ۳۰۴L stainless steel components. Finally, significant insights are provided for researchers, engineers, and practitioners involved in the advancement and application of AM۳۰۴LSS components.

کلمات کلیدی:

Direct metal laser sintering, ۳۰۴L stainless steel, Selective laser melting, Directed energy deposition (DED), Three-dimensional printing

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