

عنوان مقاله:

Multi-response Optimization of the Mechanical and Metallurgical Properties of Al7075-T6 Deposition Process on Al2024-T351 by Friction Surfacing Using RSM and the Desirability Approach

محل انتشار:

مجله شکل دهی مواد, دوره 7, شماره 1 (سال: 1399)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

Coating plays a significant role in surface engineering, which leads to the improvement of the mechanical and metallurgical properties of products. It also brings about economic benefits thanks to the cost savings of the improved properties of the surface of a product in particular. Friction surfacing is a relatively new way to create a homogeneous, fine-grained coating with amended resistance to wear and corrosion. In this study, the deposition of Al7075-T6 coating on Al2024-T351 substrates is investigated. Response surface methodology is implemented to study the effects of the rotational speed, axial force, and feed rate on the mechanical properties and microstructure of the specimens. Coating width, coating thickness, ultimate tensile strength, and grain size of coating are considered as the output responses. The input parameters are optimized to attain a wider and thicker coating with higher ultimate tensile strength and of course smaller grain size. Results display the joining of two materials without any porosity at the interface. Moreover, an entirely fine-grained homogeneous microstructure of the deposition is observed. Furthermore, the average grain size of the deposition is diminished by 65% compared to the consumable rod.

کلمات کلیدی:

Friction surfacing, Mechanical properties, Aluminum deposition, Optimization, Design of experiments

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