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**An investigation into the mechanism for enhanced mechanical properties in friction
stir welded AA2024-T3 joints coated with cold spraying**

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Abstract:

Using cold spraying (CS), a surface layer with a modified microstructure and enhanced mechanical properties was formed on a 3.2 mm thick friction stir welded (FSWed) AA2024-T3 joint. The combined effect of “shot peening effect (SPE)” and “heat flow effect (HFE)” during CS were used to enhance joint mechanical properties. The microstructure evolution of the FSWed AA2024-T3 joints in the surface layer following CS coatings and their effect on mechanical properties were systematically characterized with electron back-scattered diffraction, transmission electron microscopy, differential scanning calorimetry and mechanical tests. Based on these experiments, a grain refinement, finer and more S phases, and improved amount of Guinier-Preston-Bagaryatsky (GPB) zones produced by CS treatments are proposed. The deposition of aluminium coating on the joint, lead to hardness recovery in the stir zone

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