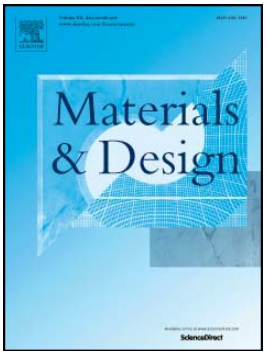

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Weldability Window and the Effect of Interface Morphology on the Properties of Al/Cu/Al Laminated Composites Fabricated by Explosive Welding

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Abstract

Explosive welding is one of the joining techniques which employs high energies derived from explosives to join materials with similar and dissimilar properties. In this paper, the weldability criteria which should be met to achieve good welds were calculated for aluminum-copper joints. Different morphologies for welding interface (straight, wavy and melted layer) were obtained with changing welding parameters. Results on the microstructure, micro-hardness and tensile-shear tests were reported. Tensile-shear test results indicate that shear bond strength increases with increasing explosive ratio. However, shear bond strength decreases when the explosive ratio exceeds R=2.2 due to the formation of brittle intermetallics at the interface. This knowledge may be utilized for establishment of a relation between microstructure and properties in the process of manufacturing.

Keywords: Explosive welding; Welding window; Al/Cu Bimetal; Explosive ratio; Bond strength

1. Introduction

Laminated composite sheets fabricated by alternating metal layers with different properties are increasingly used in modern engineering. These materials consisting of aluminum and copper layers are intermediate products

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