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Effect of Initial Texture and Microstructure of Mg on Mechanical Properties of Mg – Stainless Steel Laminated Metal Composites

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Abstract

Laminated metallic composites consisting of an AZ31 magnesium alloy layer and two SS304 austenitic stainless steel layers were fabricated by a reactive transient liquid phase bonding method to achieve a metallic composite exhibiting an exceptional combination of specific strength and ductility. Three different initial microstructures were selected for the Mg layer on the basis of initial texture and grain size distribution (hot-rolled small grains, hot-rolled large grains and hot-extruded large grains). During deformation, the overall texture of all three samples approached the same preferential orientation. Since the original texture of the hot-extruded sample was very different from the final preferential orientation, its slip systems were able to accommodate more deformation in the Mg layer before saturation. It was also