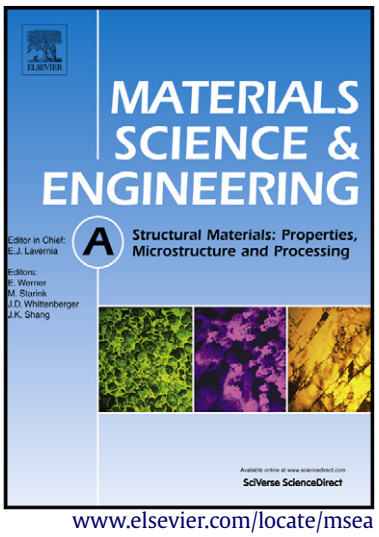

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Microstructure and Mechanical Properties of Tri-metal Al/Ti/Mg Laminated Composite Processed by Accumulative Roll Bonding

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Abstract

Metal matrix composites are of great interest in automotive and aerospace applications due to their superior properties that help in designing light weight structures. In the present work, tri-metal Al/Ti/Mg laminated composite processed by accumulative roll bonding (ARB). Al, Ti, and Mg strips were sandwiched as alternate layers and rolled at 150 C up to 5 passes. In order to study microstructural evolution and mechanical properties of the Al/Mg/Ti composite during different ARB cycles, various tests such as optical and scanning electron microscopes, energy dispersive spectrometer, X-ray diffraction, micro-hardness, and tensile tests were performed. The results showed that at the first ARB cycle, Mg and Ti layers were necked and fractured, respectively. Layer thickness was decreased and the process was completed in the early cycles, and the cycles of heterogeneous distribution of the final distribution made a more uniform layer. This showed the influence of the concentration profiles of adjacent layers as an adjunct link. In this process, the preheat temperature did not form an intermetallic layer at the interface. Maximum ultimate tensile strength was 335.9 MPa after imposing four

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