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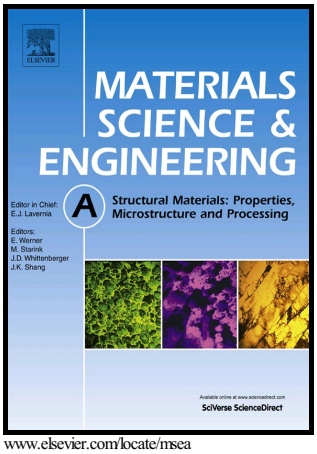

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Fabrication and Characterization of in-situ Al/Nb Metal/Intermetallic Surface Composite by Friction Stir Processing

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Abstract

In this study severe plastic strains were imposed to distribute the Nb particles into an Al1050 matrix by friction stir processing (FSP). Scanning electron microscopy (SEM) and optical microscopy (OM) examinations illustrated the formation of finer Al_3Nb and core-shell Nb-Al_3Nb coarser particles. During the processing, exothermic reactions between the Al and Nb particles formed Al_3Nb intermetallic compounds which increased the hardness and strength of the fabricated surface composite. Increasing the FSP pass number led to the more uniform distribution of the reinforcing particles in addition to the more grain refinement.

Keywords: Friction Stir Processing, Exothermic Reaction, Al_3Nb, surface composite, grain refinement

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