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Fabrication of Ni-Aluminides Long-Fiber Reinforced Ni Matrix Composite by a Reaction at Narrow Holes Method

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Abstract

A novel method (reaction at narrow holes method, RANH method) to fabricate an intermetallic compound fiber / metal matrix composite is proposed. Narrow holes are drilled in the metal matrix A , and then metal fibers B are inserted into these holes. The assembly is heated to elevated temperatures to obtain molten metal B in the holes. Then the reaction between A and B should cause within the narrow holes. During the reaction, intermetallic compound of A_mB_n replaces the metal B keeping its fiber shape embedded in the metal matrix A . In this study, a Ni-aluminides fiber / Ni composite is fabricated by the novel method. Microstructure and mechanical property of these specimens were investigated. To evaluate the reaction during the RANH method, *in-situ* observation by laser scanning microscope and differential thermal analysis (DTA) were also carried out. From obtained results, effects of swaging treatment and heating condition on these microstructure and mechanical properties were discussed.

Keywords: Metal-matrix composites (MMCs), Fiber, Intermetallic compound, Reaction, Heating

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