

Vol. 14, Number 4, 2005

**Study On Reactive Freeform Fabrication of
Ti-Ni Alloy By 3-D Micro-Welding**

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ABSTRACT

A new freeform fabrication method named 3D MW (three-dimensional MW) is proposed, which can be applied to refractory metals and intermetallics. Formation of some simple objects was preliminarily studied using Ti and Ni wires or a TiNi alloy wire with the aid of a computer. The relation of pulsed-arc welding current to morphology, microstructure, composition, and hardness of objects thus produced was investigated. Intermetallic phases such as TiNi and Ti₂Ni were identified. The alternate stacking of Ti and Ni layers formed the uniform composition, which can be explained by the successive heat supply of arc discharging and the occurrence of the exothermic self-propagating high temperature synthesis (SHS) reaction between Ti and Ni.

Keywords: *Freeform fabrication, Ti-Ni, TIG, Intermetallics, SHS.*