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**Rapid and low temperature spark plasma sintering synthesis of novel carbon
nanotube reinforced titanium matrix composites**

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Abstract: Multi-walled carbon nanotube (MWCNT) reinforced titanium matrix composites were synthesized using a spark plasma sintering method at a low sintering temperature of 550 °C. The effects of the weight fraction of MWCNTs on the microstructures and the mechanical and thermal properties of the composites were investigated. No reaction products were detected in the composites, indicating that the MWCNTs in the composites maintained their structural integrity after sintering, and thus, because of their advantageous properties, could reinforce the titanium matrix. As a result, the compressive strength of the composite containing 0.4 wt. % MWCNTs reached 1106 MPa, which was an increase of 61.5% compared to that of pure titanium

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