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Synthesis and mechanical properties of novel Ti-(SiC_f/Al₃Ti) ceramic-fiber-reinforced metal-intermetallic-laminated (CFR-MIL) composites

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Abstract

The innovative Ti-(SiC_f/Al₃Ti) ceramic-fiber-reinforced metal-intermetallic-laminated (CFR-MIL) composites were successfully fabricated by vacuum hot pressing using titanium foils, aluminum foils and SiC ceramic fibers. The synthesized Ti-(SiC_f/Al₃Ti) composite showed a unique multilayered microstructure consisting of alternating SiC_f/Al₃Ti composite layers (SiC fiber as reinforcement) and Ti layers. In addition, reaction annealing technique was employed to improve the interfacial performance of SiC fiber with Al₃Ti matrix. The microstructure evolution of the laminated composite during hot-pressing and annealing was experimentally characterized using scanning electron microscopy and energy dispersive spectroscopy. The formation mechanism of micro-laminated structure was discussed. Furthermore, the mechanical properties of the Ti-(SiC_f/Al₃Ti) laminated composite and its components were investigated by tensile and

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