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## SiC<sub>f</sub>/Ti6Al4V/Cu复合材料的界面行为及力学性能

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**摘 要:** 采用箔-纤维-箔法制备SiC<sub>f</sub>/Ti6Al4V/Cu复合材料, 研究Ti6Al4V在连续SiC纤维增强Cu基复合材料中作界面改性涂层时的界面反应结合特征。利用光学显微镜、扫描电镜和能谱仪分析复合材料显微组织、断口形貌以及SiC<sub>f</sub>/Ti6Al4V界面和Ti6Al4V/Cu界面的反应扩散特征。结果表明: 该复合材料的抗拉强度并没有显著提高; SiC<sub>f</sub>/Ti6Al4V界面反应非常微弱; 而Ti6Al4V/Cu界面反应非常明显, 主要是Ti原子与Cu原子之间的反应, 反应层厚度约为20 μm; 反应产物主要呈4层分布, 分别为CuTi<sub>2</sub>、CuTi、Cu<sub>4</sub>Ti<sub>3</sub>和Cu<sub>4</sub>Ti。

**关键字:** SiC纤维; Ti6Al4V/Cu界面; 铜基复合材料; 界面反应

## Interfacial behavior and mechanical properties of SiC<sub>f</sub>/Ti6Al4V/Cu composite

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**Abstract:** SiC<sub>f</sub>/Ti6Al4V/Cu composite was prepared by foil-fiber-foil method in order to study the interfacial reaction and bonding characteristics when Ti6Al4V was used as interfacial modification coating on the continuous SiC fiber reinforced copper matrix composites. The microstructure, fracture surface, SiC<sub>f</sub>/Ti6Al4V interface and Ti6Al4V/Cu interface were studied by optical microscopy (OM), scanning electron microscopy (SEM) and energy-dispersive spectrometry (EDS). The results show that the tensile strength of the composites is not improved distinctly. The SiC<sub>f</sub>/Ti6Al4V interfacial reaction is very weak, while the Ti6Al4V/Cu interfacial reaction is obvious, with about 20 μm thick reaction layer, which occurs mainly between Ti and Cu atoms. The reaction products distribute in four layers, which are CuTi<sub>2</sub>, CuTi, Cu<sub>4</sub>Ti<sub>3</sub> and Cu<sub>4</sub>Ti.

**Key words:** SiC fiber; Ti6Al4V/Cu interface; copper matrix composites; interfacial reaction

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