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研究论文

碳化硅增强铝基复合材料的力学性能和断裂机制

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摘要:

研究了碳化硅颗粒(SiCp)尺寸对用粉末冶金法制备体积分数为15%的SiCp/2009铝基复合材料力学性能和断裂机制的影响. 结果表明, 复合材料的强度随着SiCp尺寸的增大而减小, 塑性则随着颗粒的增大而增大. 当SiCp尺寸为1.5 μm 时, SiCp/2009Al复合材料的断裂主要以界面处撕裂和基体材料的开裂为主; 当SiCp尺寸为20 μm 时, 复合材料的断裂主要以SiCp断裂为主; 当SiCp尺寸处于两者之间时, SiCp/2009Al复合材料界面处撕裂和SiCp断裂的共同作用决定复合材料的断裂.

关键词: 复合材料 铝基复合材料 颗粒尺寸 粉末冶金法 力学性能 断裂机制

Effects of SiC particle size on tensile property and fracture behavior on particle reinforced aluminum metal matrix composites

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Abstract:

In this paper the tensile properties and fracture behaviour of aluminum alloy 2009 reinforced with silicon carbide particulates (SiCp) fabricated via elemental powder metallurgical technique were presented. The results indicate that the strength of 15%SiC/2009Al composite decrease with increasing particulates size, but ductility inversely. When particulates were 1.5 μm , the breakage is due to tearing of matrix near interface. The failure of composites with 20 μm particulate results from crack of SiCp. When particulates are between above sizes, the failure of composite results from tearing of matrix near interface and crack of SiCp.

Keywords: composites aluminum matrix composites particle size powder metallurgical mechanical property fracture mechanism

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