

研究论文

工艺参数对复合材料伪半固态触变模锻成形的影响

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摘要:

采用基于粉末成形及半固态成形工艺而提出的伪半固态触变模锻成形工艺, 成功制备出力学性能良好的Al/Al<sub>2</sub>O<sub>3</sub> 复合材料桶制件, 其中37%(体积分数)Al/Al<sub>2</sub>O<sub>3</sub> 桶形件抗弯强度达570--690 MPa, 断裂韧性达8.5--16.8 MPa·m<sup>1/2</sup>. 测试结果表明, 复合材料伪半固态触变模锻成形工艺参数, 如成形温度、成形压力以及金属相体分率等对制件的性能具有较大的影响. 研究结果有利于促进该工艺在高熔点材料或复合材料领域的实际应用.

关键词: 复合材料 伪半固态触变成形 工艺参数 影响

Influence of technological parameters on thixoforging of the composites in pseudo-solid state

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Abstract:

Al/Al<sub>2</sub>O<sub>3</sub> cup shells with excellent mechanical properties were prepared successfully by thixoforging in pseudo-solid state proposed based on the powder metallurgy technology and semi-solid metal forming process. Bend strength and fracture toughness of 37% (mass fraction) Al/Al<sub>2</sub>O<sub>3</sub> are about 570--690 MPa and 8.5--16.8 MPa·m<sup>1/2</sup> respectively. It showed that the technology parameters have great influences on the mechanical properties. All results show that the composite presented is propitious to be used in more fields as the ceramic composites and high-melt point materials.

Keywords: composites thixoforging in pseudo-solid state technology parameter influence

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