

论文

激光形成原位TiC颗粒增强涂层的组织及性能

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摘要: 利用激光熔覆制备了TiC颗粒(TiC<sub>p</sub>)增强金属基复合材料涂层,其中TiC<sub>p</sub>为激光熔覆过程中原位形成细小的原位TiC<sub>p</sub>尺寸为几十至几百纳米,弥散分布于晶粒内部,并在涂层中呈密度梯度分布;高分辨电子显微镜证实TiC/涂层合金的相界面洁净,无界面反应物及非晶结构存在;涂层具有较高的显微硬度及耐磨损性能

关键词: 激光熔覆 原位形成 TiC颗粒 复合材料

MICROSTRUCTURAL CHARACTERISTICS AND WEAR PROPERTIES OF IN SITU FORMED TiC PARTICLE REINFORCED COATINGS BY LASER CLADDING

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Abstract: A new method was realized to produce a Ni-alloy composite coating reinforced by in situ reacted and gradiently distributed TiC particles (TiC<sub>p</sub>) by one step laser cladding. TiC<sub>p</sub> was introduced by an in situ reaction of titanium and graphite during laser clad process. It was observed that the dispersed TiC<sub>p</sub> with size of sub-micrometer formed in the layer. And, TiC<sub>p</sub> possessed density--gradient distribution and a maximum volume fraction of 38% at the layer surface. Furthermore, the in situ generated TiC<sub>p</sub>/matrix interfaces is found to keep clean and free from deleterious surface reactions. The microhardness revealed a gradient variation with the layer depth, and the highest value was 1250 HV0.2. The wear properties of the layer is significantly enhanced due to a large amount of TiC<sub>p</sub> and strong phase interface combination without evidently increasing the friction coefficient.

Keywords: laser cladding in situ formation TiC particle composite material

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