

论文

激光熔覆Fe基非晶 / 纳米晶复合涂层的组织与性能

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摘要:

对以激光熔覆方式在45钢基体上制备的FeNiSiBVRE非晶涂层进行激光晶化, 制备非晶 / 纳米晶复合涂层.利用X射线衍射仪、透射电镜、扫描电镜和磨损试验机研究非晶 / 纳米晶复合涂层的组织与性能.研究表明, 涂层存在着分层结构, 组成相有晶化相、非晶相和纳米晶相; 涂层底部和顶部的显微组织由大量的稀土树枝晶、板条状硼化物和粒状碳化物组成, 涂层中部的显微组织是由大量的纳米晶相镶嵌在非晶基体上构成.与没有进行激光晶化的非晶涂层相比, 涂层的耐磨损性能下降.其磨损机制以粘着磨损和剥层磨损为主.

关键词: 激光 非晶 纳米晶 涂层

Microstructure and properties of Fe-based amorphous/nanocrystalline composite coatings

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Abstract:

Amorphous/nanocrystalline composite coatings were prepared by laser crystallization of the FeNiSiBVCRE amorphous coatings fabricated on 45 steel by laser cladding. Microstructure and properties of the amorphous/nanocrystalline composite coatings were studied by X-ray diffraction, transmission electron microscopy, and scanning electron microscopy abrasion tester. The results show that the crystalline phase, amorphous phase and nanocrystalline phase co-existed in the coating. There are a lot of dendritic crystallines of rare earth, boride crystallines in lath shaped and carbide crystallines in graininess both in the bottom and upper zones of the coating. However, in the middle of the coating, there are a lot of nanocrystalline grains embedded on an amorphous matrix. Compared with the amorphous coatings, the wear resistant property of the coating is lowered. The predominant wear mechanisms are adhesion and peeling.

Keywords: laser amorphous nanocrystalline coating

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