

激光与光电子技术应用

激光堆焊单道Co基合金与WC混合粉末的性能研究

徐国建¹, 刘爽¹, 杭争翔¹, 于恩洪², 李永波², 范荣博²

1. 沈阳工业大学 材料科学与工程学院, 沈阳 110870;
2. 沈阳新松机器人自动化股份有限公司, 沈阳 110168

摘要: 为了提高低碳钢表面的耐磨性能, 采用CO₂激光堆焊系统, 将Co基合金与WC混合粉末(WC的质量分数为0~0.47)用单道堆焊于低碳钢表面。利用X射线衍射仪、能谱分析仪、扫描电子显微镜、激光显微镜、维氏硬度计和耐磨试验机对单道堆焊层的相结构、显微组织、维氏硬度、耐磨性和裂纹敏感性进行了比较分析。结果表明, 这种堆焊方法的堆焊层均为亚共晶组织, 且未分解WC弥散分散在Co基合金的基体上; 堆焊层的维氏硬度均随WC含量的增加而增加。该方法具有较低的裂纹敏感性。

关键词: 激光技术 激光堆焊 亚共晶组织 裂纹敏感性 耐磨性能

Characteristics of clad layer of mixture of stellite-6 and tungsten carbide powder by means of single-pass laser cladding

XU Guojian¹, LIU Shuang¹, HANG Zhengxiang¹, YU Enhong², LI Yongbo², FAN Yongbo²

1. School of Materials Science and Engineering, Shenyang University of Technology, Shenyang 110870, China;
2. Shenyang Siasun Robot & Automation Co., Ltd., Shenyang 110168, China

Abstract: In order to improve the wear resistance of the clad layer, the powder mixture of stellite-6 and tungsten carbide (WC) in the range of 0~0.47 mass fraction of WC was deposited on mild steel plates by CO₂ laser cladding system. The phase constitution, microstructure, hardness and wear resistance of the clad layer were studied with an X-ray diffractometer, energy dispersive spectroscopy, scanning electron microscope, laser microscope, Vickers hardness tester and wear tester. According to the analyzed results, the microstructure of the clad layer consists of hypoeutectic structure and undissolved tungsten carbides dispersed in the matrix of the Co-based alloy. The Vickers hardness increases with the increase of WC weight fraction. On the other hand, the crack sensitivity of the laser clad layer is low.

Keywords: laser technique laser cladding hypoeutectic structure crack sensitivity wear resistance

收稿日期 2013-03-30 修回日期 2013-06-13 网络版发布日期 2013-12-02

DOI: 10.7510/jgjs.issn.1001-3806.2014.01.029

基金项目:

辽宁省自然科学基金资助项目(20092047)

通讯作者:

作者简介: 徐国建(1959-), 男, 教授, 博士, 主要从事先进激光制造技术方面的研究。E-mail:

xuguojian1959@qq.com

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