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表面与界面工程

PVD法及与电镀复合制备光纤腐蚀传感器的Fe-C合金敏感膜

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摘要 用PVD法制备光纤腐蚀传感器(FOCS)的Fe-C合金敏感膜，在光纤纤芯上得到厚度大约1 μm的Fe-C合金膜，而且光信号对敏感膜的腐蚀信息有响应. 为了增加敏感膜的厚度，根据平面波导与圆柱波导的相似性，采用PVD与电镀复合的方法在平板石英玻璃上制备Fe-C合金膜，研究该膜层的形貌、结构和在不同NaCl溶液中的耐蚀性. 结果表明：复合制备的Fe-C合金膜的结构和耐蚀性与普通碳钢近似，并初步监测了光信号对敏感膜腐蚀信息的响应，为光纤腐蚀传感器奠定了基础.

关键词 PVD 光纤腐蚀传感器(FOCS) 电镀 Fe-C合金

分类号

PVD AND ITS INCORPORATION WITH ELECTROPLATING TO FABRICATE Fe-C ALLOY FILM OF FIBER OPTICAL CORROSION SENSOR

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Abstract

In this paper, a Fe-C alloy corrosion sensing film of the Fiber Optical Corrosion Sensor (FOCS)was fabricated by PVD on the fiber core.The thickness of this film is about 1 μm and the optical signal can respond to the film[DK]’s corrosive information.Furthermore, on the basis of the comparability between the planar wave-guide and column wave-guide，a method of PVD and its incorporation with electroplating was used to fabricate the Fe-C alloy film onto quartz in order to increase the film thickness. The surface morphology of electroplating the Fe-C alloy film was investigated by metallographic microscopy. The structure of film was studied by X-ray diffraction and an electrochemical method was used to evaluate the corrosion resistance of the Fe-C alloy film in NaCl (sodium chloride) solution of different concentration. The initial results showed that the structure and corrosion resistance of the Fe-C alloy film were close to that of carbon steel,and the response between the optical signal and corrosion information of film could be detected. These data have formed the basis of a FOCS.

Key words PVD Fiber Optical Corrosion Sensor (FOCS) electroplating Fe-C alloy

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