论文

钢筋腐蚀监测的光纤传感技术

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摘要:

采用电化学方法制备了用于混凝土结构钢筋腐蚀监测的光纤传感器，该方法基于电沉积于光纤纤芯上的敏感膜能够将腐蚀信息传递给光纤内传导的光波，从而获取腐蚀信息，实现腐蚀监测。证明了采用光纤传感技术监测混凝土结构筋腐蚀是可行的。

关键词： 光纤传感器 腐蚀监测

FIBER OPTICS SENSING TECHNIQUEFOR MONITORING CORROSION OF STEEL IN REINFORCED CONCRETE

Abstract:

This paper reports the research and development' of a Fiber Optics Corrosion Sensor (FOCS) fabricated by electroplating a corrosion sensing film onto an optic fiber core. The structure of film electroplated in an Iron (1) sulfate electrolyte containing a small amounts of citric acid and L-ascorbic acid was studied by X-ray diffraction and burning gas capacity method. The electrochemical corrosion test and chemical corrosion test were used to evaluate the sensing ability of the Fe-C alloy film. The initial results showed : (1) the peak potential of scanning process was in accord with the potential for the largest changing speed of output power in 3.5SNaCl solution; (2) the time taken to rise td maximum output power for FOCS was shortened with increasing the concentration of nitric acid; (3) the responding time was prolonged by almost 3 times, compared with that for non-passivated film. 'The re- sults demonstrated the feasibility of using optical fiber corrosion sensors for monitoring ror- rosion of steel in civil structures.

Keywords: fiber optics sensor corrosion monitoring reinforced concrete structure Fe-C alloy

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