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研究报告

电化学阻抗谱法对304不锈钢孔蚀生长和再钝化阶段的原位研究

张胜寒，檀玉，梁可心

华北电力大学环境科学与工程学院 保定 071003

摘要： 利用动电位电化学阻抗谱(DEIS)法研究了304不锈钢在0.1 mol/L NaCl 溶液中的孔蚀行为，比较了孔蚀前后钝化膜的电化学阻抗谱的变化。提出了一种改进的双层膜结构，用以评价不锈钢在孔蚀的初始阶段和再钝化阶段各个参数的不同，指出孔蚀对钝化膜外层破坏较内层严重。使用活化控制的膜破裂模式评价孔蚀的初始阶段和再钝化阶段各个参数变化。

关键词： 不锈钢 动电位电化学阻抗谱 孔蚀 钝化膜

IN-SITU IMPEDANCE INVESTIGATION OF 304 STAINLESS STEEL BETWEEN PIT GROWTH AND REPASSIVATION STATE

ZHANG Shenghan, TAN Yu, LIANG Kexin

School of Environmental Science and Engineering, North China Electric Power University, Baoding 071003

Abstract: Pitting corrosion investigations of 304 stainless steel in 0.1 mol/L sodium chloride borate buffer solution have been investigated by dynamic electrochemical impedance spectroscopy (DEIS). The electric equivalent circuit of the classic double-layer structure has been proposed to evaluate the changes of EIS data. According to the fitting results, the outer-layer of passive film of 304 stainless steel is highly destroyed during pitting process and can not return to the original condition. However, during repassivation process the inner-layer can be repassivated entirely. An active controlled model of film breakdown was proposed to analysis the film between the pit initiation and repassivation states.

Keywords: stainless steel DEIS pitting corrosion passive films

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通讯作者: 檀玉

作者简介: 张胜寒，男，1962年生，教授，博士，研究方向为金属腐蚀与防护

通讯作者E-mail: lucifertan@163.com

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