

论文

316L不锈钢钝化膜在Cl⁻介质中的耐蚀机制

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摘要:

研究了316L不锈钢在以硝酸为主体的氧化性介质中经过化学钝化处理形成的钝化膜在3.5%NaCl溶液中的电化学行为,运用X射线光电子能谱(XPS)分析了钝化膜的组成与结构,运用交流阻抗技术研究了钝化膜的电性能.结果表明,经过化学钝化处理后的成膜试样在Cl⁻介质中耐点蚀性能明显提高;钝化膜的主要组成元素Cr、Fe、Ni在膜中分别以Cr₂O₃、FeO、NiO存在;钝化膜呈p型半导体特性.

关键词: 316L不锈钢 点蚀 交流阻抗 钝化膜

CORROSION BEHAVIOR IN 3.5% NaCl SOLUTION OF 316L SS

Abstract:

The electrochemical behavior of passive film formed on 316L stainless steel in an oxidizing acid solution was studied in the 3.5% NaCl solution. The compositions and structures of passive film were studied by X-ray Photoelectron Spectroscopy (XPS) and the electronic property was studied by AC impedance technology. The results indicated that the pitting resistance of passive film in 3.5% NaCl solution was greatly improved. The pitting potential was increased from 229 mV before passive treatment to 931 mV after passive treatment. The main composed elements in the passive film were existed in Cr₂O₃, FeO and NiO, and Cr was existed in hydroxide too. The Mott-Schottky curve of passive film in 1mol/L NaCl solution indicated that the passive film was p-semiconductor. The relations between the compositions and structures of passive film and pitting resistance, and between the electronic property of passive film and pitting resistance were disclosed in this work.

Keywords: 316L stainless steel pitting corrosion AC impedance passive film

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