

论文

电化学合成聚吡咯及其腐蚀防护性能研究

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摘要:

采用循环伏安法在304不锈钢(304SS)基体上电化学合成聚吡咯(PPy)膜层,并通过Tafel极化曲线、电化学交流阻抗谱法(EIS)研究聚吡咯膜层的腐蚀防护性能.结果表明,聚吡咯膜层使304不锈钢基体的自腐蚀电位正移60 mV,腐蚀电流密度由 10^{-6} A/cm²变化到 10^{-7} A/cm².覆有聚吡咯膜层的304不锈钢在腐蚀液中浸泡的过程中,由于聚吡咯的氧化还原能力,在金属表面加速钝化层的形成及修复破坏的钝化层,进一步提高了金属的抗腐蚀性能;聚吡咯膜层的防腐机制归结为物理屏蔽作用和钝化机制.

关键词: 循环伏安法 导电聚合物 金属腐蚀 电化学交流阻抗谱

ELECTROSYNTHESIS AND CORROSION PERFORMANCE OF POLYPYRROLE FILM

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Abstract:

The polypyrrole(PPy)film was synthesized by cyclic voltammetry method on 304 stainless steel(304SS). Its corrosion performance in 3.5 wt% NaCl solution is then investigated by measurements of open circuit potential(OCP), potentiodynamic polarization curves and electrochemical impedance spectroscopy(EIS). Results show that the PPy film may shift the corrosion potential of steel from 60mV to positive direction, and decrease the corrosion current density from 10^{-6} A/cm² to 10^{-7} A/cm². The mechanism of good corrosion resistance of PPy film may be due to both of its barrier effect and passivation ability.

Keywords: cyclic voltammetry method conducting polymer corrosion electrochemical impedance spectroscopy

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