Electrochemical Impedance Spectroscopy Investigation of a Polyimide Coating on Q345 Steel

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In the present work, polyimide coated turbodrill Q345 steel was prepared with different coating thicknesses (30, 50 and 80 μm). The corrosion resistance properties of those samples (exposed to a 3.0% NaCl solution) were performed by electrochemical impedance spectroscopy (EIS). Obtained impedance parameters were utilized to evaluate the effectiveness of anticorrosive properties. Pull-off adhesion and microhardness of samples which was exposed before and after to the corrosive environment were carried out to reveal the relationships between the degradation process and the mechanical properties changes in coating/metal system. Polyimide coated samples exhibit high adhesion and enhanced anticorrosion characteristics.

Keywords: Electrochemical impedance spectroscopy; Corrosion; Polyimide; Pull-off adhesion; Microhardness

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