Preparation and Corrosion Inhibition of Single and Biphasic Composite Coating Based on PEDOT in 0.1M NaOH

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In this study, a compact poly(3,4-ethylenedioxythiophene) (PEDOT) film was deposited onto the surface of stainless steel (SS) to prepare PEDOT/SS by chronoamperometry. The porous polymer film is highly hydrophobic with a water contact angle of $\sim 140^\circ$ after the modification by fluorinate agents. Perfluorinated lubricant/PEDOT/SS (PFL/PEDOT/SS) was prepared by the infusion of perfluorinated lubricant. The corrosion inhibition properties of SS, PEDOT/SS and PFL/PEDOT/SS in acidic, neutral and alkaline solutions were investigated by electrochemical impedance spectroscopy and potentiodynamic polarization techniques. It is found that the PEDOT/SS matrix has a compact surface, and the biphasic composites show significant corrosion inhibition effects on SS in alkaline solutions.

Keywords: Stainless steel; poly(3,4-ethylenedioxythiophene); slippery liquid-infused porous surfaces; perfluorinated lubricant; corrosion inhibition.

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