عنوان مقاله:

Optimization of pH and Current Density for Polypyrrole Electropolymerization to Form Corrosion Protective Film on the Surface of ۳۱۶ Stainless Steel

محل انتشار:

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خلاصه مقاله:

In recent decades, conductive polymers have been widely used to prevent corrosion in many industries. In this regard, polypyrrole is of great importance that creates a protective layer against corrosion on the surface of metals in various ways, including electrochemical synthesis. Many parameters, such as pH, temperature, time, concentration and current density, affect the properties and morphology of the polypyrrole coating. In this study, the effect of pH and current density on the polypyrrole coating formed on ۳۱۶ stainless steel immersed in ۰.۵ molar hydrochloric acid was investigated. Electrochemical impedance spectroscopy, polarization, EDS, optical microscopy and scanning electron microscopy were used. It was found that at pH ۱۲ and a current density of ۵ mA / cm۲, the best polypyrrole coating is formed on the surface of the ۳۱۶ steel. The formed coating in these conditions had a uniform thickness, without any crack and it was dispread all over the sample's surface and it had the most increase in the corrosion potential and coating electrical resistance.

کلمات کلیدی:

Conductive polymers, Coating, Polypyrrole, ۳۱۶ Stainless steel, Electrochemical synthesis,
پلیمر هادی, پوشش, پلی پیرول, فولاد زنگ نزن ۳۱۶, سنتز الکتروشیمیایی