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Enhanced of Corrosion Resistance of Carbon Steel C1018 with Nano-Tio2 Films Using Dip-Coating Method

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Abstract : A new good application for the sol gel method is to improve the corrosion inhibition properties of carbon steel by the dip coating method of Nano TiO2 films and its modification with Poly Ethylene Glycol (PEG). The prepared coating samples were investigated by different techniques, X-ray diffraction, Scanning Electron Microscopy (SEM), transmission electron microscopy and Energy Dispersive X-ray Spectroscopy (EDAX). The corrosion inhibition performance of the blank carbon steel and prepared coatings samples were evaluated in 0.5 M H2SO4 by using Electrochemical Impedance Spectroscopy (EIS) and potentiodynamic polarization measurements. The results showed that corrosion resistance of carbon steel increases with increasing the number of coated layers of both nano–TiO2 films and its modification of PEG. SEM-EDAX analyses confirmed that the percentage atomic content of iron for the carbon steel in 0.5 M H2SO4 is 83% and after the deposition of the steel in nano TiO2 sol and that with PEG are 94.3% and 93.7% respectively.

Keywords : dip-coatings, corrosion protection, sol gel, TiO2 films, PEG
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