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Evaluation the Performance of Polyaniline_Graphene Oxide Nanocomposite Coating toward Corrosion Protection of Carbon Steel in Acidic and Saline Environments

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Majority of industries are inherently faced with the problem of corrosion and steps for protection of materials from corrosion have been of large interest to them. In this research the potential of graphene oxide nanosheets (GO) dispersed in polyaniline (PANI) network as an efficient coating for corrosion prevention was investigated[1]. GO was synthesized from natural flake graphite by the modified Hummers method. Also, polyaniline was chemically synthesized by oxidation of aniline monomer under acidic condition (0.5 M H_2SO_4) using potassium permanganate and potassium iodate as an initiator of oxidative polymerization[2]. GO was dispersed in a PANI solution which was dissolved in tetrahydrofuran (THF) with the aid of ultrasonic agitation and the obtained dispersion denoted as PANI-GO that was used as a thick film for coating the corten steel. Characterization of the PANI-GO by scanning electron microscope (SEM) revealed that GO nanosheets were well dispersed in PANI network. Anodic polarization curves were used to evaluate the corrosion rate of bare and PANI and PANI-GO coated electrodes in 3.5% NaCl, HCl 0.1 M and seawater[3]. The results showed that the presence of GO in coating significantly increased the corrosion potential and drastically reduced the corrosion current and corrosion rate of corten steel. The highest protection efficiency was achieved when a PANI film containing 0.005 g GO was used as coating on the metal surface.

Keywords: Corrosion; Corten steel; Polyaniline; Graphene oxide nanosheets; Polarization curve.

References

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