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Polydopamine coated graphene oxide for anticorrosive reinforcement of water-borne epoxy coating

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Abstract

This study reports an eco-friendly water-borne epoxy (EP) with enhanced corrosion protection performance by embedding graphene oxide (GO). For this purpose, the dispersion of the GO in ethanol is improved by modifying the GO nanosheets with hydrophilic dopamine (DA), owing to the π - π interactions between the GO and self-polymerized polydopamine (PDA) as well as the covalent bonding between DA and GO. Results obtained from transmittance electron microscopy (TEM), scanning probe microscopy (SPM) Fourier transform infrared (FT-IR) spectroscopy, Raman spectroscopy, UV-vis absorbance spectroscopy and X-ray photoelectron spectroscopy (XPS) reveal the successful modification of PDA on the surface of GO nanosheets. Besides, the GO/EP and GO-PDA/EP coatings are applied on the steel substrates and their corrosion protection performance is investigated via electrochemical measurements, scanning electron microscopy (SEM) and scanning vibration electrochemical technology (SVET). Results demonstrate that inclusion of

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