

Synthesis of silane modified nano ZnO and application in epoxy coating for corrosion protection of carbon steel

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Abstract

Nano ZnO modified by 2-aminoethyl-3-aminopropyltrimethoxysilane (APS) was prepared and incorporated in epoxy coatings. Modified nano ZnO by silane (ZnO-APS) was characterized by FTIR, XRD, SEM, TEM. Corrosion protection of epoxy coatings containing ZnO-APS at 0.1wt% were evaluated and compared with pure epoxy coating and epoxy coating containing 0.1wt% nano ZnO by electrochemical impedance spectroscopy, salt fog spray test and adhesion measurement. The results show that nano ZnO-APS has spherical structure with particle size around 10-15 nm. Nano ZnO-APS improved significantly corrosion resistance of epoxy coatings and has inhibition effect at the artificial defect of coating.

Keywords: epoxy coatings, silane modified nano ZnO, corrosion protection, electrochemical impedance spectroscopy