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Effect of Inorganic Nanomaterials Types Functionalized with Smart Nanogel on Anti-corrosion and Mechanical Performances of Epoxy Coatings

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Nanomaterials based on metal oxides play an important role to fill the micro-cracks and porosity of epoxy coats but fail to act as self-healing for damage coats. In the present work, the surfaces of metal oxides such as titania, silica and montmorillonite nanomaterials were modified with smart crosslinked copolymers based on N-isopropylacrylamide monomer (NIPAm) by surfactant free dispersion polymerization technique. The surface morphology, particle size distributions, surface charges and nanogel contents of the prepared composites were investigated to study the effect of modification on the dispersion stability of metal oxide nanoparticles. The modified nanogel composites were blended with epoxy matrix in curing process with polyamide hardener at different concentrations to stud the surface properties of modified epoxy coats. The incorporation of nanogel composites with epoxy enhances the mechanical properties and anticorrosion behavior of epoxy resins as coat for steel substrate.

Keywords: Epoxy coats; Salt spray; Mechanical properties; Corrosion; Nanogel composites.

FULL TEXT