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Novel Anticorrosion Epoxy Reinforced Graphitic Nanocomposite as a Durable Surface

Authors : Shimaa A. Higazy, Mohamed S. Selim, Olfat E. El-Azabawy, Abeer A. Hassan

Abstract : We designed novel epoxy/graphitic carbon nitride (g-C_3N_4) nanocomposite materials as suitable surface coatings. g-C_3N_4 nanosheets were facilely prepared and dispersed in the epoxy resin via solution casting. This research focuses on the mechanical and anticorrosion properties of g-C_3N_4 nanofiller reinforced epoxy nanocomposites. The structures, sizes, and morphologies of designed polymeric nanocomposites and nanofillers were elucidated using various techniques such as FT-IR, NMR, FE-TEM, FE-SEM. The developed nanocomposite was applied as a surface coating by air-assisted spray method. The structure-property relationship was studied for different concentrations of nanofiller in the epoxy matrix. The anticorrosive properties were studied via electrochemical experiments, including potentiodynamic polarization, electrochemical impedance, and open-circuit potential analyses, as well as salt spray test. Mechanical durability was assessed by various methods, such as impact, T-bending, and crosscut tests. Surface heterogeneity, elasticity, and corrosion-resistance features are among the merits of developed composite. The highest improvement was achieved with well dispersion of g-C_3N_4 sheets fillers. This fascinating epoxy nanostructured coating provides a promising anticorrosive coatings for a sustainable future environment.

Keywords : epoxy, nanocomposite, surface coating, anticorrosive properties, mechanical durability
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