Monolayer amino-modified graphene oxide reinforced epoxy nanocomposites coatings with superior corrosion resistant

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Abstract Epoxy resin (EP) serves as a prevalent material for anti-corrosion coatings, yet its corrosion resistance demands further refinement. Functional nanofillers such as graphite and graphene oxide (GO) have been became key materials for high-performance coatings for the protection of metals from corrosion. Our research focuses on the preparation of monolayer amino-modified graphene oxide and its application in epoxy nanocomposite coatings. In this work, monolayer amino-modified graphene oxide with an average height of 0.930 nm and 1.023 nm was synthesized using urea and melamine, named NGO and MGO, respectively. When incorporated into EP coatings, the NGO and MGO exhibit outstanding protective properties. The impact of different concentrations of NGO and MGO on the corrosion resistance of EP coated Q235 samples were meticulously examined. Through electrochemical measurements and salt spray tests, it was determined that the coatings containing 0.1 wt.% NGO or 0.3 wt.% MGO exhibited remarkable corrosion resistance. Furthermore, we conducted a comparative analysis of the corrosion resistance between the NGO and MGO composite EP coatings.Our findings provide fresh insights and methods for further research and application in the field of metals protection.

Keywords Graphene oxide; Epoxy resin; Coatings; Corrosion resistant

Reference

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