

Structural and Electrochemical Investigation of Nickel-Graphene Composite for Corrosion Resistance Coating

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Abstract:

Graphene oxide emerges as the effective corrosion resistant coating. However, the influence of graphene oxide sheets size on the corrosion protection remains unclear. In this report, we investigate the effect of different graphene oxide (GO) sheets sizes and nickel additive in the formation of a corrosion resistant coating. We provide valuable input for electrophoretic deposition in which smaller size GO sheets with nickel additive diffuse faster during the deposition causes more oxygen reduction, thereby forms a coating with higher hydrophobicity, stronger adhesion, and lesser pinholes. Detailed electrochemical impedance analysis shows that the coating formed from smaller size GO sheets with nickel additive exhibits higher activation energy for water diffusion, causing slower water diffusion rate and permeation into the coating. The findings suggest that smaller size GO sheets with nickel additive produces a reliable coating with excellent corrosion resistance behavior

Keywords: : Sheet Size; Coating; Electrodeposition; EIS; Corrosion Protection.

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