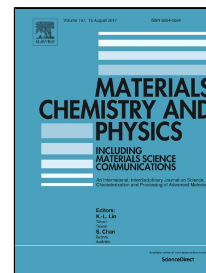


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Effect of graphene oxide nanosheets and ultrasonic electrodeposition technique on Ni-Mo/graphene oxide composite coatings

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Abstract:

Nano Ni-Mo/graphene oxide (GO) sheet composites were successfully prepared by direct current electrodeposition with ultrasonic (WS) vibration on low-carbon steel. The composite coatings's roughness, microhardness, corrosion and oxidation resistance, which were influenced by GO and ultrasonic factors, were investigated. Results from scanning electron microscopy (SEM), Raman spectroscopy and X-ray photoelectron spectroscopy (XPS) showed reduced graphene oxide (rGO) distributed in the coatings. X-ray diffraction patterns indicated that a decreased grain size of the nanocrystalline composite coatings after ultrasonic modification. In addition, results from thermogravimetric analysis from 25 °C to 600 °C showed that incorporating GO enhanced oxidation resistance. Best corrosion resistance value of 3.62 KΩ cm² and 7.4 μA cm⁻² of the ultrasonicated coatings (Ni-Mo/GO) were detected compared with coatings (Ni-Mo/GO) without sonic treatment or Ni-Mo coating.

Keywords: Ni-Mo/Graphene oxide, Ultrasonic, Low-carbon steel

1. Introduction

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