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CORROSION RESISTANCE BEHAVIOUR OF GRAPHENE/POLYVINYL ALCOHOL NANOCOMPOSITE COATING FOR ALUMINIUM-2219 ALLOY

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Abstract: This paper details about the preparation of graphene blended polyvinyl alcohol (G-PVA) nanocomposite to be used as an effective corrosion resistance coating for Aluminum-2219 alloy. Structural characterizations of graphene, PVA, GPVA composites were performed using XRD, FTIR, SEM, EDX mapping, Particle size analyzer, etc. Corrosion resistance of G-PVA composite coated on Al-2219 was evaluated using potentiodynamic polarization studies and electrochemical impedance analysis. Al-2219 exhibits a corrosion rate of 45.25 mpy, which has been reduced to 2.576 mpy for PVA coated Al-2219 and further diminished to 3.853×10^{-4} mpy for GPVA coated Al-2219 in 3.5 % NaCl solution. Other parameters such as protective efficiency, corrosion current density, polarization resistance, etc. were evaluated which further validates the corrosion resistance nature of the prepared composite. The electrochemical impedance analysis also supports the fact that the GPVA coated Al displays better corrosion resistant property than the bare Al.

Keywords: polymer nano composite, dip coating method, corrosion, potentiodynamic polarization test, electrochemical impedance analysis

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