Balochistan Journal of Engineering & Applied Sciences (BJEAS) – (p-ISSN: 2518-2706)
Volume 4, No. 1

Inhibition Efficacy of Electrodeposited Zinc Composite Coating Formulated with ZnO, CeO_2 and MoS_2 Nanoparticles on Mild Steel

Filza Naz, Mukesh Kumar, Umair Aftab, M. Ishaque Abro,
Department of Metallurgy and Materials Engineering, Mehran UET, Jamshoro, Pakistan
Corresponding Email: mukesh.kumar@faculty.muet.edu.pk

Abstract—Mild steel is widely used in marine, construction, automation, aerospace etc. due to set of attractive mechanical properties and economics. However, its susceptibility to corrosion is of great concern since years. Coatings are considerably effective to apply and prolong service life of steel. In present work, Zn - $ZnO/CeO_2/MoS_2$ additive composite coatings were applied on mild steel substrate through electrodeposition. Morphological and phase analysis were studied by using scanning electron microscopy (SEM) and x-ray diffraction studies (XRD) respectively. Tafel polarization and electrochemical impedance spectroscopy (EIS) studies were carried out to compute electrochemical characteristics of coated coupons in 3.5 wt.% solution of NaCl. Results showed, MoS_2 doped zinc coating significantly enhanced corrosion inhibition property of Zn coating and reduced the corrosion current (I_{corr}) to 2.8 x 10^{-2} A/cm^2.

Keywords—Corrosion, Nanocomposite Coatings, Electrodeposition, Inorganic Coatings, Zinc Composite Coating