

Pseudocapacitive behaviour of Zn-TiO₂-WO₃ nano-composite coatings

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This work is based on development of active system of coating with energy storage capability to protect mild steel structures and components against corrosion attack. Nanocrystalline composite of Zn-TiO₂-SO₂ was produced via electrocodeposition on plain carbon steel. The effect of current density on the morphological, mechanical strengthening and polarization (corrosion) properties were compared. The microstructural characteristic of the composite coating was examined by scanning electron microscope (SEM) equipped with energy dispersive spectrometer (EDS); mechanical properties were carried out using a diamond base Dura Scan hardness tester and CERT UMT-2 multi-functional tribological tester while the opto-electrical property was carried out with Keithley 2400 Series Source meter with Multimeters and Newport Solar Simulator . The corrosion properties were investigated by potentiodynamic studies in 3.5% NaCl. The result showed that the electrocodeposits displayed good stability and Zn-TiO₂-SnO₂ nanocomposite deposits exhibited enhanced microstructural qualities, good electrical conductivity and exhibited enriched corrosion resistance.

Keywords: Active, Coating, Nanocomposites, Potentiodynamics, Corrosion

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