

Hybridization Effect of Nickel-Zinc Coating on Carbon Steel for Service Life Improvement

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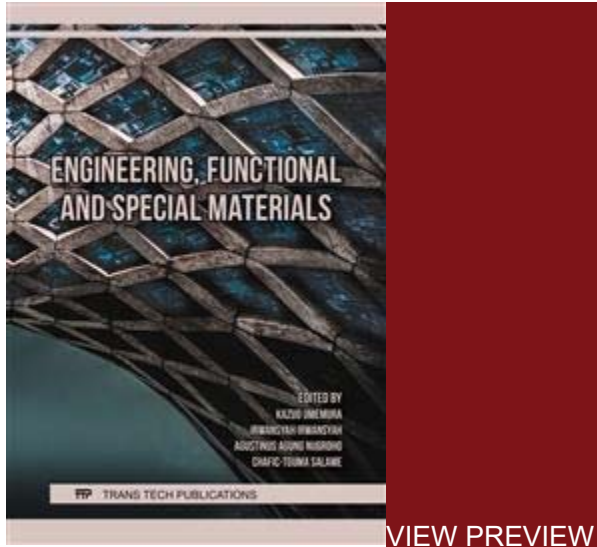
Abstract:

Deterioration of metals and alloys due to corrosion has been observed to be a serious challenge in coastal or marine environments. Exposure of mild steel to marine environments often results into dilapidation of physical structure over time. This study addresses the quick response of mild steel failure using NiZnP modified Al_2O_3 functional composite by electrolytic process. The deposition was done with stable pH of 4.5, heated bath temperature of $95^\circ C$, stirring rate of 200 rpm and deposition time of 20 min. The materials chemistry of the developed alloy was examined using open circuit potential and linear polarization technique. The structural mechanism and crystal phase formation was characterized using scanning electron microscope (SEM) equipped with energy dispersive spectrometer (EDS) and X-ray diffraction analyzer. The corrosion results under 3.65% saline environment reveals improved corrosion rate of NiZnP modified Al_2O_3 . The surface site of the crystal formation evolves perfectly with hexagonal structure seen along the grain boundaries.

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