

## ABSTRACT

Corrosion is the major challenge world is experiencing in many industries like oil and gas, marine and automobile industry worldwide costing millions of dollars annually to deal with harmful effects of corrosion. Many technologies are under use to mitigate corrosion effects. This study will emphasize on Novel Electroless Nickel Phosphorus based coatings method. In this study Nickel phosphorus incorporated with different concentrations of Titanium carbide nanoparticles (TNPs). A36 Steel was utilized as the substrate to develop Novel electroless coating. The effect of TNPs reinforcement on the structural, morphological, mechanical and corrosion assessment properties were studied. X-ray diffraction (XRD), Field Emission Scanning Electron microscopy (FE-SEM) and Energy dispersive spectroscopy (EDS) confirms the successful incorporation of TNPs over the steel substrate, Vickers Microhardness and Nanoindentation confirms the mechanical properties improvement by NiP-TiC coatings. Better hardness, elasticity and stiffness were reported. Electrochemical Impedance Spectroscopy (EIS) and Tafel evaluated the corrosion resistance response. The increase in the concentration enhanced the corrosion resistance ability of substrate. The reinforcement with 0.75g/L Titanium carbide nanoparticles was reported to be best against corrosion making it a good choice for the future development programs against Corrosion in industries.