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Preparation of Polyaniline-based Conducting Composites and Performance Evaluation against Corrosion

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This work describes the preparation of conducting polymer composites and their use as corrosion protection coatings for aluminum and mild steel. Two doped forms of Polyaniline (PANI) (PANI- Dodecylbenzenesulfonic acid-DBSA and PANI-Graphite) were prepared. A new procedure for synthesis of Polyaniline has been developed by inverse emulsion process in order to make it readily soluble in Polyurethane (PU) paint which can then be directly applied on the substrate and dried easily within 20-30 minutes without evolution of toxic vapors. The two forms of PANI blended with PU were coated on aluminum and mild steel sheets. The corrosion protection performance of the coating was tested using salt spray and immersion techniques. Rate of corrosion was determined by measurement of change in metal weight after the exposure. To produce a good comparison, the corrosion study was performed on both polymer-coated and uncoated metal samples. It was found that PANI-PU coatings can provide considerable protection, as well as a physical barrier against corrosive environments (NaCl) in which the metal are exposed. The corrosion rate for the polymer-coated mild steel and aluminum sheets were significantly lower than the bare sheets. The PANI composites have been found to be promising materials for corrosion prevention.

Biography:

Dr. Wondalem Misganaw has completed his PhD in Chemical Engineering from Indian Institute of Technology Delhi in 2017. Currently, he is Assistant Professor and Head of Chemical Engineering at Defence University, College of Engineering. He has published more than 7 papers in a peer reviewed journals and presented his research findings in more than 4 International conferences. His research interest is smart materials for environmental applications.

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