

Preparation and Characterization of Green Epoxy Resin Composites and Its Use in Corrosion Resistance

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Abstract

In this work, appropriate alternative for diglycidyl ether bisphenol A (DGEBA) was found to avoid the destructive effects of bisphenol A. Lignin, an aromatic compound from palm tree leaves, was used as a renewable material to synthesize a bio-based epoxy resin. Lignin extracted using Kraft pulping process. Kraft Lignin was epoxidized with epichlorohydrin in alkaline medium. Nano-titanium dioxide was used as filler with ratio of 10% to prepare the green epoxy composite. The structure of the Kraft lignin and lignin-based epoxy resin was proven via Infrared spectra (FT-IR) were recorded using solid KBr disk by testing Shimadzu (FT-IR-8300) spectrophotometer. The thermal properties of the curing process of lignin-based epoxy resin and composite were investigate using Differential scanning calorimetry (DSC) analysis. Potentiodynamic measurements data revealed that the anti-corrosion performance of the lignin based epoxy resin. The study demonstrates successful of epoxidation of Kraft lignin. In addition, lignin based epoxy resin showed effective inhibitor for carbon steel in 3.5 wt. % NaCl electrolyte solutions.