Abstract

Hybridization can be defined as, the combination of two or more basic polymers to produce new polymers, which have far superior properties than the participating starting polymers. The new materials that are formed are called as hybrid materials. The each particle of hybrid polymer made up of at least two distinct types of polymer.

The main aim of this research work was to synthesize stable one pack hybrid epoxy resin emulsion for corrosion resistance performance. Hybrid emulsion was synthesized with conventional emulsion polymerization technique. Acrylate monomers were polymerized in the presence of epoxy resin to obtain hybrid emulsion polymer. Performance properties of coatings with different curing agents were reported. Polyamide cured coatings gives good corrosion resistance but shelf life stability of these emulsions was not satisfactory.

Microwave assisted hybrid emulsion polymerization was performed and compared with conventional heating method. Microwave reactor was found to be an effective tool for emulsion polymerization which reduce the time of reaction by a great extent. Coupling reaction of nano silica particles was performed with different silane agents. The modified nano silica particles were incorporated in the hybrid emulsion, which gives improvement in performance properties.

Reproducibility of hybrid emulsion and thire performance properties is important criteria from industrial point of view. The reproducibility of hybrid polymerization was performed with respect to different parameters and analysed for performance properties.

Electrochemical impedance spectroscopy was used for study of corrosion resistance properties. Effect of saltwater immersion on corrosion performance was studied with nyquist and bode plot. The EIS was found to be an effective and reliable tool for study of corrosion performance of hybrid polymer coatings.

Keywords: Hybrid, Epoxy resin, Emulsion Polymerization, Corrosion resistance