Development and characterization of organoclay filled polyetherimide nanocomposites for anticorrosive coatings

Ajith James Jose

Department of Chemistry, St.Berchmans College (Autonomous), Changanassery, Kerala-686101, India

Abstract

Polyetherimide (PEI)/organically modified Fluorohectorite (OFH) clay nanocomposites were prepared by dispersing OFH clay in PEI matrix. The structural as well as morphological characteristics of the nanocomposites were investigated using X-ray diffraction (XRD), Atomic Force Microscopy (AFM) and Transmission Electron Microscopy (TEM). The thermal, mechanical properties of the PEI nanocomposites were found to be significantly improved by the incorporation of organically modified flurohectorite nano clay into the PEI matrix. The water uptake of the nanocomposites was investigated in detail as a function of clay content. The water uptake was minimum for composites with 3 wt % of filler. The anticorrosion properties of clay polymer nanocomposite (CPN) coatings were evaluated by means of various electrochemical methods which include Electrochemical Impedance Spectroscopy (EIS), Open Circuit Potential Measurements (OCP) and water adsorption test. The topological changes on the PEI/OFH clay nanocomposite coated metallic surfaces during immersion test were evaluated by means of SEM and AFM analyses. The results obtained from various analyses showed that the PEI/OFH nanocomposites coatings possess better anticorrosion properties.

Keywords: Nanocomposite; Polyetherimide; Thermal properties, Mechanical properties; Anticorrosion.