

Study the Effects of Increasing Unsaturation in Palm Oil and Incorporation of Carbon Nanotubes on Resinous Properties

Authors : Muhammad R. Islam, Mohammad Dalour H. Beg, Saidatul S. Jamari

Abstract : Considering palm oil as non-drying oil owing to its low iodine value, an attempt was taken to increase the unsaturation in the fatty acid chains of palm oil for the preparation of alkyds. To increase the unsaturation in the palm oil, sulphuric acid (SA) and para-toluene sulphonic acid (PTSA) was used prior to alcoholysis for the dehydration process. The iodine number of the oil samples was checked for the unsaturation measurement by Wijs method. Alkyd resin was prepared using the dehydrated palm oil by following alcoholysis and esterification reaction. To improve the film properties 0.5 wt% multi-wall carbon nano tubes (MWCNTs) were used to manufacture polymeric film. The properties of the resins were characterized by various physico-chemical properties such as density, viscosity, iodine value, acid value, saponification value, etc. Structural elucidation was confirmed by Fourier transform of infrared spectroscopy and proton nuclear magnetic resonance; surfaces of the cured films were observed by scanning electron microscopy. In addition, pencil hardness and chemical resistivity was also measured by using standard methods. The effect of enhancement of the unsaturation in the fatty acid chain found significant and motivational. The resin prepared with dehydrated palm oil showed improved properties regarding hardness and chemical resistivity testing. The incorporation of MWCNTs enhanced the thermal stability and hardness of the films as well.

Keywords : alkyd resin, nano-coatings, dehydration, palm oil

Conference Title : ICNMM 2015 : International Conference on Nanostructured Materials and Nanotechnology

Conference Location : Miami, United States

Conference Dates : March 09-10, 2015