A study of clay-epxy nanocomposites consisting of unmodified clay and organo clay

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Abstrak

Clay-epoxy nanocomposites were synthesized from DGEBA resin and montmorillonite clay with an in-situ polymerization. One type of untreated clay and two types of organo clay were used to produce the nanocompsoites. The aims of this study were to examine the nanocomposite structure using different tools and to compare the results between the unmodified clay and modified clays as nanofillers. Although diffractogram in reflection mode did not show any apparent peak of both types of materials, the transmitted XRD (X-Ray Difraction) graphs, DSC (Differential Scanning Calorimeter) analysis and TEM (Transmission Electron Microscope) images revealed that the modified clay-epoxy and unmodified clay-epoxy provides different results. Interestingly, the micrographs showed that some of the modified clay layers possessed non-exfoliated layers in the modified clay-epoxy nanocomposites. Clay aggregates and a hackle pattern were found from E-SEM images for both types of nanocomposite materials. It is shown that different tools should be used to determine the nanocomposite structure.