Development of Bio-Based Nanocomposites from Functionalized Soybean Resin and Organomodified Nanoclay

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In this study, an environmental friendly bio-based composite has been developed as an alternative source of petroleum-based materials. Soybean resins are based on triglycerides, which are the major component of plant. Nanoclay is widely used as a reinforcing filler to improve physical properties of polymeric materials. In this study, bio-based nanocomposites was prepared from functionalized soybean resins and an organomodified nanoclay. An organomodified nanoclay was directly dispersed in a functionalized soybean resin and copolymerized with styrene. Tert-butyl peroxy benzoate (TBP) radical initiator as a high temperature-curing agent was used to cure the composites. The dispersion of the clay was studied by X-ray diffraction (XRD) and TEM. The thermal properties were investigated using DSC, TGA and DMA. The morphology showed a mix of intercalated and exfoliated structure and the thermo-mechanical properties are significantly improved by the addition of organomodified nanoclay.