

Synthesis and Properties of Polyurethane/Clay Nanocomposite by the Clay Modified with Polymeric MDI

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Polyurethane (PU)/clay nanocomposite was synthesized from the polyol, polymeric 4,4' diphenylmethane diisocyanate (PMDI), and the clay modified with the PMDI. To achieve the clay modified with the PMDI, silanol group of the clay and NCO group of the PMDI were reacted for 24 hours at 50°C to form urethane linkage. FT-IR analysis of the clay modified with the PMDI demonstrated that the NCO characteristic peak was observed in the clay after modification reaction with the PMDI. From the result of X-ray pattern, it was suggested that the clay layers were exfoliated from the PU/clay nanocomposite. From the results of the mechanical property, the maximum values of the flexural and tensile strength were observed when the 3 wt % of the clay based on PMDI was added into the PU/clay nanocomposites. The Tg and ΔC_p of the PU/clay nanocomposite decreased with an increase in the modified clay content. We suggested that the decrease in the ΔC_p with the modified clay content might be due to the increase of steric hindrance by the exfoliated clay layers.