

# Acknowledgment

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## Abstract

Nanocomposites of polyurethane (PU)-organoclay materials have been synthesized via *in situ* polymerization. The organoclay is first prepared by intercalation of tyramine into montmorillonite (MMT) through ion exchange process. The syntheses of polyurethane-organoclay hybrid films containing different ratios of clay were carried out by swelling the organoclay into diol or diamine followed by addition of diisocyanate and then cured. The nanocomposites with dispersed and exfoliated structure of MMT were examined by X-ray diffraction and Scanning electron microscope. X-ray diffraction showed that there is no peak corresponding to  $d_{001}$  spacing in organoclay with the ratios up to 20 wt%. SEM images and elemental mapping for Si confirmed the dispersion of nanometer silicate layers in the PU matrix. Also, it was found that the presence of organoclay leads to improvement in the mechanical properties. The tensile strength was increased with increasing the organoclay contents up to 20 wt% by 194% for nanocomposites of PU/Tyr-MMT and 193% for PU/ALA-MMT nanocomposites. Also, PU/ N,N-dimethyl-n-octadecyl-(p-vinylbenzyl)-ammonium-MMT nanocomposites were prepared via *solution* polymerization. The tensile strength and also elongation were increased with increasing the organoclay contents up to 10wt. % by 221% and 118% respectively.

**Keywords:** Polyurethane-Montmorillonite, Nanocomposites, Tyramine-clay, Aminolauric acid-clay