

Biodegradable Polyurethane/Clay Nanocomposites Prepared by Twin Extrusion Compounding Process

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Biodegradable polyurethane/clay nanocomposites were prepared by a twin extrusion process. The properties were investigated as a function of organoclay contents (0, 3, 5, 7 wt%) in the PU matrix. TEM images showed that most layered clays were nearly exfoliated, although some particles of clay were observed to be agglomerated. In comparison with pure PU, the thermal stability and mechanical properties of nanocomposites were significantly improved by the clay presence. In addition, the effects of the incorporated silicate content on the viscoelastic and rheological properties of nanocomposites were investigated by DMA and RMS. Transparency of nanocomposites film was improved with incorporation of clay which may be due to action of nucleation agent of nanoclay. Oxygen and water barrier characteristics of the nanocomposites films were also measured. When the clay content was 5wt%, water vapor permeability of PU/nanocomposites decreased by about 83%. Using compost test method, the biodegradability of the pure PU and nanocomposite films with various clay content was evaluated as a function of decomposition period.