

Intercalation Process of Organoclay in Thermoplastic Polyurethane with Different Melt Compounding Methods

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In clay nanocomposites, the dispersion of clay with intercalated or exfoliated structure in polymer matrix, which may be governed by shear stress generated during melt compounding, is a significant factor to control physical properties of the nanocomposite. In this study, thermoplastic polyurethane(PU) nanocomposites incorporated with organoclay(5wt%) were prepared via melt compounding process using both a twin screw extruder and kneader. Depending on compounding method, the degree of intercalation and exfoliation of nanoclay was evaluated and compared based on results from XRD measurements and TEM observations for the nanocomposites. In addition, the tensile mechanical property and oxygen/water barrier property of the nanocomposite prepared from different compounding method were also investigated and compared. In preparation of low molecular weight PU based nanocomposite, the continuous twin extrusion process was found to be more effective in producing PU nanocomposites with a high extent of intercalation of clay and improved physical properties compared with batch-type mixing process.