

Evaluation of bulk polymerization process for clay-tethered polyurethane nanocomposites

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Abstract

Clay-tethered polyurethane nanocomposites offer synergistic improvement in properties, which are difficult to obtain separately from the individual entity. For industrial implementation of this technology, bulk polymerization schemes must be developed. In this study, the nanocomposites were prepared by the sequential addition of reactants and organically treated layered silicate particles having $-\text{CH}_2\text{OH}$ functional groups to produce clay-tethered polyurethane nanocomposites by bulk polymerization. Two methods were evaluated which differed in the extent of tethering reactions. The resultant materials showed about 280% increase in stress and about 60% increase in strain with almost no increase in modulus at 5wt% clay.