

EFFECT OF ULTRASONIC TREATMENT ON THE TENSILE PROPERTIES OF THERMOPLASTIC NATURAL RUBBER (TPNR) NANOCOMPOSITES

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ABSTRACT

This paper discussed the effect of ultrasonic treatment time on the tensile properties of TPNR nanocomposites. Melt compounding technique was employed to prepare thermoplastic natural rubber (TPNR) nanocomposite. The ultrasonic bath was used to improve the filler-matrix interfacial adhesion. TPNR nanocomposites were prepared in the ratio of (70:20:10) from polypropylene (PP), natural rubber (NR) and liquid natural rubber (LNR) as a compatibilizer, with 4% organophilic montmorillonite (MMT). The composites samples were prepared using in-situ method at the optimum processing parameter of 180°C with 100 rpm mixing speed and 13 minutes processing time. The clay layers were found to be separated further with ultrasonic treatment as compared to the sample without ultrasonic treatment as exhibited by X-ray diffraction. Young's modulus, tensile strength and elongation at break of TPNR nanocomposites increased with ultrasonic treatment. The optimum result was achieved at 3h, the enhancement of these properties confirms by the fact that ultrasonic treatment can promote the dispersion of the clay in TPNR also it improves the compatibility of clay filler and the TPNR matrix.

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