THERMOPLASTIC NATURAL RUBBER: PREPARATION AND APPLICATIONS

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ABSTRACT

Thermoplastic natural rubber (TPNR) is a class of thermoplastic having both the elastomeric and plastic properties. The high strain behavior of NR embedded in the high stress and easy-to-process thermoplastic in TPNR enable the material to be widely applicable in polymer industry. However the NR and thermoplastic are normally incompatible or at best partially miscible. The physical blend of NR and a thermoplastic has to be compatibilised to ensure proper mixing and homogeneity of the mixture. The mixing conditions: temperature, rate of mixing and duration, has to explored and optimized for any pair of polymers. TPNR consisting of NR-LLDPE, NR-HDPE, NR-PP and NR-PS had been prepared with LNR as the compatibiliser at the pre-determined mixing parameters. Addition of filler such as carbon black was shown to help improve the homogeneity of blends. Increasing the melt viscosity of rubber to be comparable to the thermoplastic via partial curing with organic peroxides had also proved to be effective in increasing the mixing. Industrial applications of TPNR will be in areas between rubber and thermoplastic such as synthetic woods. The advantages of the wood composites are moisture and fire resistant, mechanical properties tailored to specific application and composition and additives dependent properties.

Keywords*: Natural rubber, thermoplastic, liquid natural rubber, thermoplastic blend, synthetic wood.*