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Mechanical, Thermal and Rheological Behavior of Styrene-Butadiene Rubber Filled with Nano Organoclay as a Filler

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In recent years nanocomposites have attracted great interest because these often exhibit remarkable improvement in properties, when compared with virgin polymer or conventional macro and micro-composites at the same loading. In this work nanosized clay was synthesized by chemical intercalation of Na-Montmorillonite (Na-MMT) by a secondary amine compound. The increasing of the interlayer distance of MMT intercalated was confirmed by X-ray diffraction measurements. Styrene-butadiene rubber (SBR) was filled with 2-10 wt % nano-clay. Nano-clay-SBR rubber composites were compounded on a two-roll mill and molded on a compression-molding machine. Properties such as the thermal, curing and rheological behavior, hardness, tensile strength, abrasion resistance, modulus, elongation, flame retardancy, and elongation at break were measured. Oxen induction time test results showed a considerable improvement in thermal resistance of nano clay filled SBR compounds. The mechanical measurements have described noticeable increasing of tensile strength and modulus of samples. The elongation at break has improved with increasing nanosized clay content. With rheometrical measurements, obvious that nano clay content is not influence on curing rate but maximum-minimum torque has increased with nano clay loading.