NATURAL SEPIOLITE NETWORK IN SBR NANOCOMPOSITES

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The addition of clay into elastomers generally leads to improvement in tensile stiffness, strength and toughness. Improved tensile properties are found by adding low amounts of organomodified clay to silicone rubber [1], polyurethane [2, 3] and EPDM rubber [4]. It has been shown that natural rubber/organomodified montmorillonite (MMT) nanocomposites [5], prepared by solution mixing, present mechanical properties that depend strongly on the level of intercalation/exfoliation of the clay within the matrix, and thus depends on the chemical modification of the clay. The stiffening effect can be easily observed in tensile tests and in low amplitude dynamic experiments [6-8].

Recently, needle-like silicates have shown a real impact on the mechanical behaviour of polymers [9] due to the good adhesion. It has been shown by Gonzalez Hernandez [10] that sepiolite based SBR compounds have lower viscosities than those produced using precipitated colloidal silica. The reinforcing effect of sepiolite used with silane coupling agent was much higher than kaolin.

The present work is aimed at studying the effect of natural sepiolite (needle-like clay) on the mechanical reinforcement and thermal behaviour of vulcanised SBR systems. A “networking” phenomenon has been observed and compared to the aggregated systems based on natural MMT (layered clay). The laboratory compounding process has been able to produce nanostructured materials as shown by TEM.

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