Synthesis of Nano-graphite and its effects on the properties of Nano-graphite filled natural rubber composites

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Abstract

Vein Nano-graphite (NG) filled natural rubber composites were prepared and measured effects on the properties of Nano-graphite filled natural rubber (NR) composites. I report the Exfoliation method for synthesis of Nano-graphite from chemical techniques. Produced Nano-graphite filtrated by vacuum filtration. Nano-graphite have been characterized by various physico-chemical techniques (include X-ray diffraction and scanning electron microscopy). Raman spectroscopy, transmission electron microscopy, atomic force microscopy, Fourier transform infrared, have been use to examine the morphology, determine the size and chemical structure of Nano-graphite particles.

Exfoliated Nano-graphite treated different loading level for NR. (0 phr,1 phr, 2 phr, 3 phr, 4 phr, and 5 phr). After observed effects of properties, Physico-mechanical properties (according to ISO methods, such as Tensile strength, Modulus, Tear strength, Elongation, Resilience), Cure characteristics (such as Minimum toque (ML), Maximum torque (MH), Scorch time (Ts_2), Cure time (T_{90}), Delta cure, Cure rate index (CRI), and
Chemical resistance by swelling method (% of swelling index (SI). The maximum tensile strength is 23 Mpa at1 phr NG/NR composite. Respectively, 1.033 Mpa, 2.3966 Mpa, 6.603 Mpa are best evaluation of Modulus at 100%, 300% and 500% elongation from 4 phr NG/NR composite. 77 is maximum resilience of NG loading NR composites shows in 4 phr NG/NR composite. 2 phr NG/NR composite is exhibit (36.4 N/mm) maximum value of tear strength. Chemical resistance tested by toluene, n-hexane, and water absorption according to swelling method. Higher loading of NG/NR composites represent better enhancement of chemical resistance compare with NR composite (control).

Keywords: Chemical resistance, Exfoliation, Nano-graphite (NG), Natural rubber (NR)

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