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Corresponding Author: noraiham@vlsi.eng.ukm.my


# EPOXIDISED NATURAL RUBBER - ALUMINA NANOPARTICLE COMPOSITES (ENRAN): EFFECT OF FILLER LOADING ON THE TENSILE PROPERTIES

N. Mohamad[1,3], A. Muchtar[1], M.J. Ghazali[1], H.M. Dahlan[2] and C.H. Azhari[1]
[1] *Faculty of Engineering, Universiti Kebangsaaan Malaysia, 43600 Bangi, Selangor, Malaysia*
[2] *Malaysian Nuclear Agency, 43000 Bangi, Selangor, Malaysia*
[3]*Faculty of Manufacturing Engineering, Universiti Teknikal Malaysia Melaka, 75450 Ayer Keroh, Melaka, Malaysia*

## ABSTRACT
Epoxidised natural rubber (ENR)-alumina nanoparticle composites (ENRAN) were produced by melt compounding followed by sulphur curing. Alumina nanoparticles were introduced in 10, 20, 30, 40, 50 and 60 parts per hundred rubbers (phr) in the formulations to study the effect of filler loading on the tensile properties. The fracture surfaces of ENRANs were studied using scanning electron microscopy (SEM). The increase in alumina nanoparticles content in the ENR matrices resulted in the decrease of the tensile strength and the elongation at break (EB) but increased the tensile modulus compared to unfilled ENRs. The reinforcement of alumina nanoparticles in ENR matrices is evident by the increase of crosslink density and glass transition temperature, Tg with increasing alumina nanoparticles content. The SEM micrographs showed the ENRANs were failed in primarily brittle mode when loaded with high filler loading. The alumina particles were observed to be uniformly distributed in the matrices which contributed to the enhancement of the tensile modulus. When present in the matrix, the particles formed spheres of agglomerates thereby enhancing filler-matrix interaction which also contributed to the reinforcement effect.

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