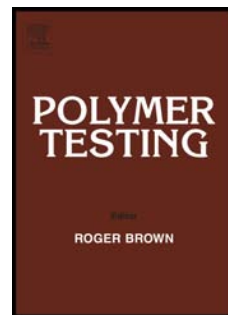


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Zhong Xian Ooi, Hanafi Ismail, Azhar Abu Bakar



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Material Properties

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Zhong Xian Ooi, Hanafi Ismail*, Azhar Abu Bakar

*Division of Polymer Engineering, School of Materials and Mineral Resources
Engineering, Universiti Sains Malaysia, Engineering Campus, 14300 Nibong Tebal,
Penang, Malaysia*

ABSTRACT

This paper studies the effectiveness of the surface treatment of Oil Palm Ash (OPA) by Liquid Epoxidized Natural Rubber (LENR) and its effect on the properties of Natural Rubber (NR) composites. Curing characteristics, mechanical properties, morphology and swelling were studied. Two series of OPA filled NR composites, raw OPA and LENR-coated OPA, were used alternately to compare the improvement of mechanical properties, degree of swelling and curing characteristics. The LENR-coated OPA filled NR composites showed shorter scorch and cure times than those of raw OPA. The addition of LENR-coated OPA reduced the torque variation, tensile modulus and hardness of the filled NR composites, due to the rigidity of OPA being reduced after the LENR coating process. LENR-coated OPA increased the rubber phase volume in the OPA filled NR composites and, therefore, reduced the swelling resistance and retarded the crosslink density of the OPA filled NR composites. However, an improvement of tensile strength and elongation at break was obtained for the LENR-coated OPA filled NR composites when compared to the raw OPA samples. The tensile fractured surface of the LENR-coated OPA filled NR composites clearly showed the penetration of the rubber chains into the porous-structured OPA and supported the tensile strength results obtained.

Keywords: Liquid epoxidized natural rubber; Oil palm ash; Natural rubber; Curing characteristics; Mechanical properties

* To whom correspondence should be addressed

Email address: hanafi@eng.usm.my

Tel.: +604 5996113

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