

Green Natural Rubber Composites Reinforced with Synthetic Graphite: Effects of Reinforcing Agent on Film's Mechanical Properties and Electrical Conductivity

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Abstract : Green natural rubber (NR) composites reinforced with synthetic graphite, using alginate as thickening and dispersing agent, were developed to improve mechanical properties and electrical conductivity. The film fabrication was performed using a latex aqueous microdispersion process. The research found that up to 60 parts per hundred rubbers (phr) of graphite could be successfully integrated into the NR matrix without causing agglomeration and phase separation. Accordingly, the mechanical properties, in terms of tensile strength and Young's modulus of the composite films, were significantly increased, while the elongation at break decreased with higher graphite loading. The reinforcement strongly improved the hydrophilicity of the composite films, resulting in a higher water absorption rate compared to the neat NR film. Moreover, the incorporation of synthetic graphite significantly improved the chemical resistance of the composite films when exposed to toluene. It is demonstrated that the electrical conductivity of the composite films was considerably enhanced with graphite loading. According to the obtained properties, the developed composites offer potential for further development as conductive substrate for electronic applications.

Keywords : alginate, composite, graphite, natural rubber

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