

NANOSILICA BASED NYLON 6 CHLOROPRENE SHORT FIBRE COMPOSITES

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Nanosilica was synthesized by acid hydrolysis of sodium silicate using dilute hydrochloric acid. The synthesized silica was characterized by XRD and SEM. The particle size of silica as obtained from XRD analysis was 13 nm. This synthesized nanosilica was used in place of commercial silica in HRH bonding system for chloroprene rubber / nylon 6 short fibre composite and also used as reinforcing filler in the hybrid composite. Cure characteristics and mechanical properties of the hybrid composites were evaluated. Minimum torque and cure time were increased with silica content and varied with fibre loading. Scorch time decreased with silica content. Nanosilica improved the tensile strength, modulus, tear strength, abrasion loss and hardness of the vulcanizates compared to conventional silica.

Keywords: Composite, Fibres, Nylon, Rubber, Silica

INTRODUCTION

Short fibre reinforced elastomers combine the rigidity of fibre with the elasticity of rubber. Short fibre reinforced rubber composites offer a great advantage over traditional composites in manufacturing and processing operations (Foldi *et al.*, 1996). In comparison with particulate filler composites, short fibre reinforced systems possess a high degree of reinforcement even at relatively low fibre content (Saikrasun *et al.*, 1999). Short-fibre-reinforced rubber has been successfully used in the production of V-belts, hoses, tire treads, seals, and complex-shaped mechanical goods (Foldi *et al.*, 1996). The

ultimate properties of the composite depend on fibre concentration, fibre dispersion, fibre-rubber adhesion, fibre orientation, and fibre aspect ratio (Varghese *et al.*, 1997; Sreeja *et al.*, 2002; Sreeja *et al.*, 2002a; Sreeja *et al.*, 2003; Seema *et al.*, 2006; Abdelmouleh *et al.*, 2007). A number of synthetic and natural fibre were used by earlier workers in natural and various synthetic rubbers. The fibre-matrix interfacial bond has a decisive effect on the service properties of composites. The effect of adhesion system on the physico-mechanical and electrical properties of SBR/Polyester short fibre composite was studied by Ismail *et al.* (1999). Atomic force microscopy study of short melamine fibre reinforced EPDM rubber