

Nanocomposites and Nanomaterials Area

Impact of Nano Silicon Nitride on mechanical and tribological behaviour of epoxy composites

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Abstract

In the area of nanotechnology and nanocomposites are attracting remarkable amount of attention in recent literature[1-3]. The main reason is the good properties are offered by such composites compared to the traditional fibre/polymer composites, [3, 4]. Many different thermosets and thermoplastics, as well as elastomer rubbery materials, have been broadly used as polymeric matrices in the production of PNCs. In comparison, thermosets plastic materials—such as epoxy, vinyl ester and unsaturated polyester—have not been quantitatively researched to understand the property changes in relation to the morphological structures of the nanocomposites. In the light of this, the current study is focusing to investigate and determine the effects of NSN on the material characteristics of epoxy nanocomposites. The effects of nano-reinforcements on the material characteristics of thermoset nanocomposites in relation to their mechanical and tribological behaviour are not yet well understood. This study investigates the effects of Nano Silicon Nitride (NSN) on the mechanical and tribological performance of epoxy nanocomposites. The morphological structures of NSN particles will be examined using SEM machine. Mechanical properties viz. tensile strength, Young's modulus, elongation at break, flexural strength and modulus of the developed materials will be determined. The tribological performance of nanocomposites will be explored under abrasive condition. Wear resistance was evaluated using block-on-ring (BOR) configuration against a different SiC papers with different operating parameters. The topography analysis of worn surfaces was examined using scanning electron microscopy (SEM) analysis to determine the wear mechanisms occurring in such materials.

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