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Graphene-based polymer nano composites

Ahmed Ibrahim

Farmingdale State College, USA

Graphene nanoplatelets (GNPs) were used as a nanofiller in preparing polymer nanocomposites. The effect of GNPs on the mechanical properties of polymer nanocomposites was investigated using the nanoindentation technique. Nanocomposites with several GNP volume fractions (0.1 and 0.3) were evaluated. The prepared nanocomposites exhibited a significant improvement in mechanical properties at a very low xGNP loading. Elastic modulus and hardness of the nanocomposites measured from the load-displacement curve were higher compared to the neat polymer. Furthermore, the indentation creep tests were performed during the hold time in the loading cycle. The results indicated viscous deformation occurs during indentation and the creep rate becomes lower at higher GNP volume fraction. Raman spectrum of the nanocomposites showed the two characteristic peaks of graphene, G and 2D at 1580 cm^{-1} and 2690 cm^{-1} respectively. Scanning electron microscopy (SEM) conformed that GNP were uniformly distributed in the graphene epoxy nanocomposites.

ibrahiaz@farmingdale.edu