

The effect of the GNP-SDS loadings on the properties of the NRL/GNP-SDS composites

Abstract

Stretchable conductive polymer composites (CPC) are fabricated by incorporating the conductive particles into the polymer matrix. In this paper, CPC was fabricated by incorporating the sodium dodecyl sulfate (SDS) modified graphene nanoplatelet (GNP) into natural rubber latex (NRL) by varying loading from 0 phr to 9 phr using a simple mechanical stirring method. The effect of the GNP-SDS loadings on the properties of the composites were studied by investigating the crosslink density, tensile properties, morphology of the tensile fracture surface and electrical conductivity. The crosslink density of the composites shows a decreased trend. Then, due to the well dispersed GNP-SDS, the tensile strength increased but decreased at high filler loading caused by the agglomeration issue. The tensile modulus also increased with increasing filler loading due to the intrinsic high modulus of GNP and the reduction of chain mobility. However, the electrical properties of the composites improved as GNP-SDS loading increased and achieved a percolation threshold at 7 phr.