Ogah Anselm Ogah, Int J Mater Sci Res. 2017
http://dx.doi.org/10.18689/2638-1559.a1.004

Rheological and Impact Properties of Exfoliated Graphite Nanoplatelet-filled Impact Modified Polystyrene Nanocomposites

Ogah Anselm Ogah
Department of Industrial Chemistry, Faculty of Science, Ebonyi State University, Nigeria

In this study exfoliated graphite nanoplatelets (xGnP)-filled impact modified polystyrene (IMPS) composites were prepared at 2,4, 6 and 8 wt% xGnP with and without the addition of a coupling agent and compounded using melt mixing followed by injection molding. The coupling agent utilized in this study was polystyrene-graft-maleic anhydride. The nanoparticles used were xGnP with three different sizes: xGnP5 has an average thicknes of 10 mm, and an average platelet diameter of 5 μm, whereas xGnP15 and xGnP25 have the same thickness but average diameters are 15 and 25 μm, respectively. Results indicate that nanocomposites with smaller xGnP diameter exhibited improved impact properties for both pristine and compatibilized composites. However, unnotched and notched impact strengths as well as fracture initiation resistance were markedly deteriorated with the incorporation of xGnP. This brittle behavior in nanoplatelet-filled IMPS is explained using melt flow index and transmission electron microscopy.

Keywords: Impact properties, Rheology, Graphite, Coupling agent, Nanocomposite, Injection molding

Biography:

Dr. Ogah Anselm Ogah holds a PhD in Polymer Chemistry and Technology. He is a Lecturer in the Dept. of Industrial Chemistry, Ebonyi State University, Abakaliki, Nigeria and an adjunct lecturer with Dept. of Polymer and Textile Engineering, Nnamdi Azikiwe University, Akwa, Nigeria. He was a visiting scholar to the Composite Materials and Engineering Center, Washington State University, Pullman, WA, USA. Published over sixteen peer reviewed national and international journals.