OP-3-64

Tuesday, May 10, 2011, 11:30am-11:50 am
Room: Ministres

INTERFACIALLY COMPATIBILIZED RTV SILICONE RUBBER/EXPANDED GRAPHITE NANOCOMPOSITE AS A CONDUCTIVE PRESSURE SENSOR

R. Soltani[a], A.A. Katbab[a,b*]

[a] *Department of Polymer Engineering, Amir Kabir University of Technology, Tehran, Iran and* [b] *Department of Polymer Engineering, Amir Kabir University of Technology, Tehran, Iran.*

**Corresponding author: katbab@aut.ac.ir*

Electrically conductive polymer nanocomposites based on conductive fillers such as expanded graphite have attracted numerous attentions due to their practical applications in EMI, electromagnetic coatings and gas sensors. One of the most interesting applications of these materials is in manufacturing pressure sensors. Electrical and piezoresistive behavior of these nanocomposites are mainly governed by the filler parameters such as geometry, aspect ratio and concentration as well as extent of interfacial interaction with the polymer matrix. Taking into account these factors, attempts have been made to prepare nanocomposite based on silicone rubber as a high flexible and elastic matrix with unique mechanical properties, expanded graphite as a good conductive nano material and an alkylammonium based interfacial compatibilizer having amine and acidic functional groups to improve interaction and consequently the state of dispersion of the graphite nanolayers. Nanocomposites have been prepared via solution mixing method. Although inclusion of interfacial compatibilizer led to the decrease of conductivity percolation threshold from 3 to 1 wt%, but showed adverse effect upon the piezoresistivity of the nanocomposites. This is mainly attributed to the higher dispersion state and hence proximity of the graphite nanolayers, which leads to the less pressure sensitivity of the sample. This has been evidenced by performing SEM and EDS analysis on the cross linked samples and melt rheomechanical spectrometry (RMS) on uncured nanocomposites. Degree of the restricted motions of the SR segments has been evidenced by the increase in melt dynamic elasticity and been correlated with piezoresistive behavior using DMTA analysis.