OP-3-343

Wednsday, May 11, 2011, 09:45-10:05 am
Room: Fez 1

MECHANICAL AND THERMAL CHARACTERISATION OF BIOPOLYMER NANOCOMPOSITES BASED ON PLA/NANOGRAPHENE PLATELETS

Esmaeil Narmissa, Margaret Jollands, Nhol Kao and Rahul K.Gupta*

Rheology and Materials Processing (RMPC) Centre, School of Civil, Environmental and Chemical Engineering, RMIT University, 124 Trobe St, Melbourne, Vic 3000, Australia

**Corresponding author: E-mail:* rahul.gupta@rmit.edu.au

Recently, developed techniques of isolating single-layer one dimensional carbon sheets from graphite, known as graphene or carbon nanotubes, have empowered the production of mechanically robust and electrically conductive bionanocomposites with enhanced gas barrier performance, at very low loading weight fractions (3- 5 wt%) of these fillers. This work has focussed on the development and optimizing of polylactide (PLA) and nanographene (NGP) based bionanocomposites to display superior mechanical and improved thermal stability. Fundamental issues, such as degree of dispersion of nanographene platelets (NGPs), effect of NGPs loadings, effect of nano-additive functionality to PLA/NGP bionanocomposites was also investigated. Melt blending mixing method for PLA/NGP bionanocomposites was investigated by feeding the physically mixed PLA/nanoadditives to a Brabender twin screw extruder at temperatures of 180oC. Loading fractions of 0, 1, 3, 5, 7 and 10 wt % NGP containing bionanocomposites were investigated. Mechanical properties such as Young's modulus, tensile modulus, were also evaluated and correlated to structural morphologies of these bionanocomposites. Thermal properties of nanocomposites were also investigated. It was concluded that bionanocomposites containing 3 wt% NGP showed optimum mechanical performance without any significant change in the thermal characteristics.