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International Conference on

Polymer Science & Engineering

August 22-24, 2016 New Orleans, USA

Grafting PLA onto GO and its effect on derived nanocomposites

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Biodegradable and biocompatible polymers are having been attracting the attention of both academia and industry due to environmental concerns and to satisfy the requirements of the demanding advanced applications, especially in medicine. In this context, Poly(L-lactide) (PLA) has been proposed for several applications as biodegradable thermoplastic. In turn, nanostructured graphene fillers with remarkable characteristics have also been used to enhance the mechanical, thermal, electrical and optical properties of many polymers. However, the full potential of the ensuing composites tends to be hindered by aggregation of the nanofillers. In order to promote a good dispersion of Graphene Oxide (GO) in the PLA matrix, polymer grafting techniques have been explored to anchor PLA onto GO surface which can act as compatibilizers. For that purpose, PLA with a terminal triple bond was synthesized by ring-opening polymerization. By controlling the concentration of monomer to initiator, samples with three different chain lengths have been prepared and later coupled to azide-functionalized GO using the click chemistry. These hybrids mixed with commercial PLA from which cast films have been prepared. The effect of chain length and of two loads of hybrid nanofillers on the properties of the ensuing nanocomposites films was studied using UV-visible spectroscopy, X-ray diffraction (XRD), Differential Scanning Calorimetry (DSC), and nanoindentation and the results obtained will be discussed.

Biography

Ana Barros-Timmons has completed her PhD in Chemistry in the year 1997 from Manchester University. Since 1996 she has been Lecturing at the University of Aveiro on various courses related to Polymer Science and Chemical Engineering laboratories as well as participating in the coordination of a couple of joint European Master Courses in the field of Materials Science and Engineering. She has published 63 papers in reputed journals and over 120 communications. Her research interests are focused on the preparation and characterization of nanocomposite materials with particular emphasis on controlled polymerization mechanisms, thermal analyses and the use of renewable materials.

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