The Effect of Epoxidized Natural Rubber Toughening on Static and Dynamic Mechanical Behavior of Poly(Lactic Acid)-Multiwalled Carbon Nanotubes Nanocomposites

M.SZ. Mat Desa, [1]A. Hassan,[2]*A. Arsad,[2]M. Yusop3

[1]Faculty of Chemical & Natural ResourcesEngineering, Universiti Malaysia Pahang, 26300 Gambang, Pahang, Malaysia.
[2]Enhanced Polymer Research Group, Department of Bioprocess and Polymer Engineering Faculty of Chemical Engineering, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor
[3]Department of Physic, Faculty of Science, Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor

**Corresponding author: azmanh@ump.edu.my*

Extended Abstract

Poly(lactic acid) (PLA) is an amorphous thermoplastic biopolymer which comes from the family of biodegradable polyester. It is commonly produced from renewable resources such as starch, crop residues (stem, straw, husks and leaves) mainly from corn. More recently, the synthesis of PLA is being commercially produced in large scale at reasonable price comparable with commercial polymers[1]. PLA possess Young's modulus and tensile strength of up to 70 MPa and 3.6 GPa respectively, which is at par with polyethylene terephthalate (PET) in term of stiffness and strength[1].The good mechanical properties of PLA has make it as one of the best candidate to replace petroleum based polymers.Incorporation of nanofillers such as halloysite, carbon nanotubes (CNT), sepiolite, exfoliated graphite, and montmorrilonite into PLA was commonly known to produce PLA nanocomposite with enhanced stiffness and strength. Among these nanofillers, CNT is gaining wide interest in polymer nanocomposite studies due to its excellentmechanical, electrical and magnetic properties. Moreover, the tubular features of CNT can withstand large strain under compression thus making it suitable to be used as reinforcement in polymer matrix. Several researchers has successfully developed PLA/CNT nanocomposites with enhanced mechanical, thermal, conductivity, rheology and flame retardancy properties[2-4].

Keywords: Poly(lactic) acid, multi-walled carbon nanotubes, epoxidized natural rubber, naocomposites, mechanical properties.