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Editorial Preface

Preface

Recently, the demand on sourcing green materials for different engineering and product applications have increased substantially due to the change of worldwide legislations forcing to reduce carbon footprints. Gradually running out of natural resources such as petroleum-based oil and natural gas, causes the substantial increase of fuel price. Under such circumstance, natural materials have been used gradually, as reinforcements or substitutions to replace traditional synthetic polymers, particular for those are made by petroleum-based materials. The most common natural materials include natural fibers (sisal, hemp, flax, bamboo and animal feather), recyclable polymers, bio-resin and nano-particles (like nanoclay) extracted from the nature.

Many research works have been conducted in the past few years to examine the viability and feasibility of using these materials to form new classes of green composites. However, due to these materials are extracted from the nature, their properties are highly dependent on many geographic, environmental and climatic factors of the origin of sources. Manufacturing processes for these materials are also the key on how to produce repeatable and reliable products.

This special issue covers contributions from many world class scientists and researchers working in the fields of natural fibre composites and failure modelling of natural materials to show their recent findings to share with all readers. It also includes many works in relation to the investigation of mechanical, thermal and wear properties of natural fibre reinforced polymer (non-degradable and biodegradable) composites. The flammability of natural fibre reinforced polymer composite structures is also studied in detail. Some issues, on the interfacial bonding properties between the fibre and its surrounding matrix are also covered in articles published in this issue.

Paper 1: *Effects of Wood Constituents and Content, and Glass Fiber Reinforcement on Wear Behavior of Wood/PVC Composites, 2012;43(7):2721–29.*

The wood flour content to be incorporated in PVC for optimum wear resistance was dependent on the constituent and aspect ratio of the wood, and sliding distance during wear testing, and the addition of 10 phr E-glass fiber could improve the wear resistance for the wood/PVC composites.

Paper 2: *Roles and Evidence of Wood Flour as Anti-bacterial Promoter for Triclosan Filled Poly(lactic acid), 2012;43(7):2730–37.*

The wood flour was found to change the hydrophilicity of the PLA and also to act as "antibacterial promoter" in triclosan/PLA blends, and these then facilitated a triclosan migration onto the wood/triclosan/PLA composite surfaces to kill the bacteria.

Paper 3: *Micro and Macro Analysis of Sisal Fibre Composites Hollow Core Sandwich Panels, 2012;43(7):2738–45.*

Analysis of sisal fibre reinforced honeycomb cores using micromechanics theories.

Paper 4: *Effects of different additions of sago starch filler on physical and biodegradation properties of pre-vulcanized NR latex composites, 2012;43(7):2746–50.*

The addition of sago starch before pre-vulcanization process of NRL compound increased the biodegradation properties of NRL films as the molecular interaction between sago starch and NRL particles were optimized. The incorporation of starch after pre-vulcanization process produced NRL films with better tensile properties as the starch agglomeration acts as reinforcing fillers for the films.

Paper 5: *Flexural Properties of Macadamia Nutshell Particle Reinforced Polyester Composites, 2012;43(7):2751–56.*

The flexural modulus of Macadamia nutshell particle reinforced composites increases with the weigh fraction of macadamia nutshell particles, while decreases with increasing void content. The flexural strength is not improved due to the existence of voids.

Paper 6: *Influence of fibre treatment and glass fibre hybridisation on thermal degradation and surface energy characteristics of hemp/unsaturated polyester composites, 2012;43(7):2757–61.*

The effect of surface treatment on the surface energy characteristics of natural fibre composites using contact angle measurement technique.

Paper 7: *Mechanical, thermal and microstructural characteristics of cellulose fibre reinforced epoxy/organoclay nanocomposites, 2012;43(7):2762–71.*

The presence of recycled cellulose fibers has significantly enhanced the flexural strength, fracture toughness, impact strength and impact toughness of the composites.

Paper 8: *Characterization of water absorption, mechanical and thermal properties of recycled cellulose fibre reinforced vinyl-ester eco-nanocomposites, 2012;43(7):2772–81.*

Nanoclay addition has improved the fibre–matrix adhesion and resulted in enhanced mechanical properties for the eco-nanocomposites.

Paper 9: *Development and characterization of a laminate composite material from polylactic acid (PLA) and woven bamboo fabric, 2012;43(7):2782–88.*

Laminated composites based on polylactic acid and Bamboo fabric display excellent energy absorption capability, which can be exploited for the development of engineering structural applications.

Paper 10: *Preparation and characterization of melt processed poly(L-lactide)/layered double hydroxide nanocomposites, 2012;43(7):2789–94.*

The water vapor permeability (WVP) of 5 wt.% PLLA/γ-LDH nanocomposites prepared using the melt blending process is drastically reduced as compared to pure PLLA materials, which demonstrate the feasibility of the PLLA/γ-LDH nanocomposites can be used as packaging materials.

1359-8368/$ - see front matter
http://dx.doi.org/10.1016/j.compositesb.2012.04.054

Paper 11: *Tensile and fracture behavior of PP/wood flour composites, 2012;43(7):2795–800.*

Development of environmentally friendly materials through decreased content of non-biodegradable material and also with cost saving and increased stiffness without sacrificing strength.

Paper 12: *Interfacial Bonding and Degumming Effects on Silk/Polymer Biocomposites, 2012;43(7):2801–12.*

This paper presents discusses important factors that would affect the mechanical, thermal and bio-degradable properties of silkworm silk fibre reinforced polymer biocomposites through experimental and theoretical analyses.

Paper 13: *Bionanocomposite hybrid polyurethane foam reinforced with empty fruit bunch and nanoclay, 2012;43(7):2813–16.*

The finding focused on the reinforcing mechanism shown in the bionanocomposite hybrid polyurethane foam reinforced with empty fruit bunch and nanoclay. The increment of nanoclay in the system demonstrated that the layered silicate was not only filled in the EFB lumens', but evenly dispersed in the PU resin and maximized the surface area for interaction between the filler and matrix phase.

Paper 14: *Plant fibers and wasted fiber/epoxy green composites, 2012;43(7):2817–21.*

The results reveal that different natural fibers have individual contribution on thermal or mechanical properties of epoxy.

Paper 15: *An overview on the cellulose based conducting composites, 2012;43(7):2822–26.*

This paper reviewed the cellulose based conducting composites in terms of their properties and future applications in order to contribute the tailoring of eco-conducting material for future.

Paper 16: *A biodegradable composite material based on polyhydroxybutyrate (PHB) and carnauba fibers, 2012;43(7):2827–35.*

Chemically treated carnauba fibers used for the development of polyhydroxybutyrate (PHB) based biodegradable composites.

Paper 17: *Effect of different knitted structure on the mechanical properties and damage behavior of Flax/PLA (Poly Lactic acid) double covered uncommingled yarn composites, 2012;43(7):2836–42.*

Flax reinforced PLA composite made from double faced plain knitted fabric (DFPKF) ensure the better energy absorption compared to the double faced rib knitted fabric (DFRKF) composite with the aid of double covered uncommingled yarn (DCUY).

Paper 18: *Thermal and mechanical behavior of sisal/phenolic composites, 2012;43(7):2843–50.*

The mechanical characterization of sisal/phenolic composites processed by compression moulding show a tensile strength and a flexural strength values of 25.0 MPa and 11.0 MPa, respectively, independent to the use of sisal fibers with (at 60 °C for 72 h) or without thermal treatment on the fabric, and the thermal characterization by Thermogravimetric analysis-TGA presented an onset temperature of degradation at 200 °C.

Paper 19: *Tannin–Phenolic Resins: Synthesis, Characterization, and Application as Matrix in Biobased Composites Reinforced with Sisal Fibers, 2012;43(7):2851–60.*

Tannin and sisal fiber as raw materials in the preparation of biobased composites with good mechanical properties.

Paper 20: *Nanoindentation contribution to mechanical characterization of vegetal fibers, 2012;43(7):2861–66.*

Interest of nanoindentation to estimate the mechanical properties of elementary fibers cell walls, inside and outside the flax stem.

Paper 21: *Influence of Natural Fibers on the Flammability of Composites from Bio-derived Materials, 2012;43(7):2867–74.*

Natural fibers have a significant influence on flammability performance when introduced into a composite system, as they introduce an additional heat source and exhibit greater deformation than their synthetic counterparts.

Paper 22: *Light-weight honeycomb core sandwich panels containing biofiber-reinforced thermoset polymer composite skins: fabrication and evaluation, 2012;43(7):2875–82.*

"Novel light-weight honeycomb core sandwich panels containing biofiber reinforced polymer composite skins were developed for automotive interior applications. Comparing to some existing commercially available products, the sandwich panels had either similar or superior bending rigidities but much lower areal weights."

Paper 23: *Chemical Treatments on Plant-based Natural Fibre Reinforced Polymer Composites: An Overview, 2012;43(7):2883–92.*

This paper provides a comprehensive overview on recent studies related to the different surface treatments on the mechanical properties of natural fibre for composites applications.

The editors would like to take this opportunity to thank you all reviewers and authors for their time and effort to ensure high quality works are published in this issue.

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