Characteristics of Alkaline Treated Fiber / Polypropylene Biocomposite

Siti Nor Aisha[a], Ng Yik Ru[a] and Noor Ida Amalina[a]*

[a]*Faculty of Chemical and Natural Resources Engineering,*
Universiti Malaysia Pahang, 26300 Gambang, Pahang, Malaysia

*Corresponding author's e-mail: idamalina@ump.edu.my; Tel: +6016-2022940

Nowadays, natural fiber has play important role as reinforcements for composite materials. The increasing demand for natural fiber as reinforced material in biocomposite is due to its inexpensive material, abundantly available and have reasonable strength. Biocomposite also can be applied in wide range of application. In this work, coir fiber was treated with NaOH at concentration of 3 and 5 wt % at room temperature. Then, 30 wt % of treated fiber with size of 160-250 µm was mixed with polypropylene by using extruder. Alkali treatment improved the morphology and thermal stability of coir fiber. From TG analysis, treated fiber had 25 % residue at 600 °C which was 50 % higher than untreated coir fiber. The residue leave mainly containing lignin and ash. This mean that hydrophobicity of treated fiber was improved. Biocomposites prepared from treated coir fiber (5 wt % of NaOH) reinforced PP with 30 wt % fiber content had tensile strength 40 % higher than untreated biocomposite . The hydrophobicity of the treated fiber improved resulted to better adhesion between fiber and polymer. Water absorption of biocomposite prepared from treated fiber was lower than untreated coir fiber biocomposite. From the findings, it is suggested that coir fiber can be used as reinforced material in polymer matrix.

Keywords: Lignocellulose, coir fiber, polypropylene, alkali treatment, tensile strength