

Properties of Bio-Phenol Formaldehyde Composites Filled with Empty Fruit Bunch Fiber

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Abstract : Bio-composites derived from plant fiber and bio-derived polymer, are likely more ecofriendly and demonstrate competitive performance with petroleum based. In this research, the green phenolic resin was used as a matrix and oil palm empty fruit bunch fiber (EFB) was used as filler. The matrix was synthesized from soda lignin, phenol and hydrochloric acid as a catalyst. The phenolic resin was synthesized via liquefaction and condensation to enhance the combination of phenol during the process. Later, the phenolic resin was mixed with EFB by using mechanical stirrer and was molded with hot press at 180 oC. In this research, the composites were prepared with EFB content of 5%, 10%, 15% and 20%. The samples that viewed under scanning electron microscopy (SEM) showed that the EFB filler remained embedded in the resin. From impact and hardness testing, samples 10% of EFB showed the optimum properties meanwhile sample 15% showed the optimum properties for flexural testing. Thermal stability of the composites was investigated using thermogravimetric (TGA) analysis and found that the weight loss and the activation energy (E_a) of the composites samples were decreased as the filler content increased.

Keywords : EFB, liquefaction, phenol formaldehyde, lignin

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