

Mechanical Properties of Rice Husk Filled Impact Modified PVC-U Composite

Mazatusziha Ahmad, Azman Hassan and Abdul Razak Rahmat

Department of Polymer Engineering, FKKKSA, Universiti Teknologi Malaysia,
81310 UTM Skudai, Johor.

E-mail: mzih80m@yahoo.com

ABSTRACT

The growing interest in environmentally friendly materials has produced reevaluation of organic materials as fillers in plastics. Composite materials made from plant fibre are receiving a great deal of attention today since they are biodegradability, very low cost, recyclability, and renewable nature. Rice husk (RH) is one of the natural fillers that offer a number of advantages over inorganic fillers. This study investigates the performance of RH as filler for unplasticised polyvinyl chloride (PVC-U) composites. Acrylic impact modifier at 4,8,10 and 12 phr were used to enhance the impact properties of PVC. The composites with RH loadings varied from 10 to 40phr were prepared using two roll mill at temperature 165°C for 10 minutes of milling time. The composites milled sheets were then placed into a mould and hot pressed at temperature 185°C and pressure of 120kg/m² for 5 minutes. The cooling time used was 5 minutes before the specimens being removed from the mould.

Testing such as tensile, flexural and izod impact test were conducted in order to investigate the mechanical properties of the composites. It was found that incorporation of RH improved the Young modulus and flexural modulus of the composites. However, tensile strength, elongation at break, flexural strength and impact strength decreased with increasing RH content of impact modified PVC-U composites. Impact modifier has resulted in enhancing the impact strength at all levels of RH content. The improvement was about 8 to 30% from 40 to 10phr of RH. Effectiveness of the impact modifier in enhancing the impact strength decreased with increasing RH content. From the result, it may conclude that the impact properties of the composites are optimized at 8phr of acrylic impact modifier content, and the optimum compositions which give a balance properties of PVC-U composites is at 20phr of RH and 8phr of acrylic impact modifier.

(Key words: PVC-U, rice husk,, acrylic impact modifier, mechanical properties)