

**MECHANICAL PROPERTIES AND MORPHOLOGY OF UV-CURED  
GLASS FIBER/EPOXY ACRYLATES COMPOSITE**

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## **ABSTRACT**

### **MECHANICAL PROPERTIES AND MORPHOLOGY OF UV-CURED GLASS FIBER/EPOXY ACRYLATES COMPOSITE**

The performance of the UV – cured glass fiber/epoxy acrylates composites has been investigated. Preliminary formulation of epoxy acrylates resin mixtures was done to select the most suitable formulation for this study. The woven glass fiber was used as the reinforcement in the composite and the layer used was varies. Coupling agent was incorporated to the other UV – cured samples to study the effects in strength. The thermal cured sample was fabricated to make comparisons between these two curing system. The testing conducted were tensile test, 3 – point bending test, FTIR and SEM. The strength increased with the increasing number of glass fiber layers and incorporation of coupling agent in the UV – cured samples. UV – cured samples having higher crosslink density that makes them having higher rigidity and stiffness compared to the thermal cured sample. Low crosslink density in thermal cured sample makes it exhibit more elastic property and give positive results in both tensile and flexural strain. However, the thermal cured sample easily fails under lower stress.

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 Background and Problem Statement**

Polymer composite nowadays are widely used in the world in the production of aircrafts, automobiles, coatings and many other products that needs the strong and light weight of polymer composite materials. The increasing of demands in the polymer composite manufacturing makes the scientist to invent more machines, equipment and provide with the new type and high technology in processing polymer composite. So, with the new high technology in processing of polymer composite such as Electron Beam Radiation Curing system (EBR), Ultra-Violet Light Exposure Curing system (UV system) and high Thermal Curing system was developed to increase the productivity and also the quality of the polymer composite materials in term of physical and mechanical properties.

Ultra-Violet Curing System (UV System) is the second fastest curing technique after the Electron Beam Radiation Curing system (EBR) in the process of polymerize and curing the polymer. Generally, it was certainly widely used in polymer composite, surface technology and adhesive industries characterize by the fast production line speed that apply the high energy radiation that came with the UV light to initiates the reaction of polymerization. These advantages brought significant advantages to the polymer