

DEVELOPMENT OF COMPOSITES USING BAMBOO WASTE AND POLYMERS FOR INDUSTRIAL APPLICATION

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ABSTRACT

The demand of Polymer Matrix Composite in numerous industries are becoming popular day by day due to its significant enhancement in mechanical and physical properties over conventional materials. The aim of this study is to develop and analysis of the Polymer Matrix Composite. Polymer Matrix Composites are fabricated by combining epoxy resin (matrix) and bamboo dust (reinforcement) particles with each other. To prepare the composite, reinforcement and the matrix material are mixed together in three weight percentage (wt. %) i.e. 40-60%, 50-50% & 60-40% respectively. Moreover, to investigate material property composite samples has fabricated by using individual three different micro sized bamboo particles i.e. 60 microns, 110 microns and 220 microns. Water absorption capacity and swelling test has checked to determine the physical property of the fabricated samples. Micro-structural evaluation of the specimen is done by using and optical microscope and Scanning Electron Microscope (SEM). Also, EDS has been performed to observe the distribution characteristics of the bamboo particulates into the epoxy resin as well as the percentage of carbon & oxygen into the fabricated composites has been evaluated. Tensile test and hardness have done to examine the mechanical performance. Maximum tensile strength is obtained 17.86MPa and maximum hardness is 27.2HV0.05. It is concluded that the mechanical property has shown an increasing trend with decreasing the size of bamboo particles when the mixing ratio is kept constant. Also, the mechanical performance increased with increasing the percentage of epoxy resin on the fabricated composites when bamboo particle size is constant.

Keywords: Polymer Matrix Composites, Epoxy resin, Tensile Strength, Micro hardness, Micro structure

