

STUDY OF MECHANICAL PROPERTIES OF COPPER SLAG REINFORCED PARTICULATE POLYMER COMPOSITE

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Abstract. Copper slag is one of the by-products that is extracted from the copper waste, during the smelting process. It is an environmentally friendly material that also, has some industrial benefits too. The composite prepared using this copper slag improves the mechanical strength of the products. From this, an idea to promote over some of the waste to enhance the strength of the composite for effective mechanical applications. In this paper, the tensile, flexural, and impact mechanical strength of the copper (Cu) slag powder in different weight percentages as 5wt. %, 10wt. %, 15wt. %, and 20wt. % were analyzed. The composites were fabricated with hand layup techniques. The mechanical properties of the composites were tested using the universal testing machine for tensile and flexural tests and Izod impact tester for an impact study. These results show the different mechanical behaviours of the varying copper weight percentage in the composites was observed with enhanced mechanical properties. SEM analysis gives information about the poor bonding, micropores, and lack of copper inclusion in the various weight percentage copper slag reinforced in the polyester composite.

Keywords: copper slag, polyester resin, particulate composite, mechanical properties, SEM morphology.

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1. Introduction

The exploitation of industrial and agricultural waste materials for the improvement of Polymer matrix composites, providing through a well-judged analysis of a sample and varied references source from the oldest to the newest ones an approaching into the challenges and opportunities for the exploitation to their full potential uses. The apposite use of industrial and agricultural waste materials entails acquaintance generation as a qualification for incubation of pilot-plant and industrialization stages, culminating with all related benefits to humanity.

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