

BIO CHAR AS CHEAP AND ENVIRONMENTAL FRIENDLY FILLER ABLE TO IMPROVE POLYMER MECHANICAL PROPERTIES

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Composites and in particular polymer matrix composites (PMCs) have a growing interest in all the applications where both lightweight and mechanical properties are requested. At the same time, environmental problems force to study the low impact materials and, in particular, recycling materials are an added value. To meet both, the ever increasing demands of the PMCs market and develop environmental compatibility, bio based fillers from natural sources have gained substantial interest to reinforce polymer matrices. In this work we study biochar derived by maple based biochar (BC) and same BC heat treated (BCHT) used as carbon filler in epoxy resin (E0). Different loading percentages of 1%, 1.5 %, 2%, 3%, 4% and 20% are used. The mechanical responses of PMCs are evaluated using the stress-strain behavior. We found that mechanical properties changed significantly at 2% weight addition from brittle to ductile as shown in the figure 1. Further addition did not improve the results significantly. Morphology and dispersion of the filler in the PMCs were studied with the aim to explain this behavior.

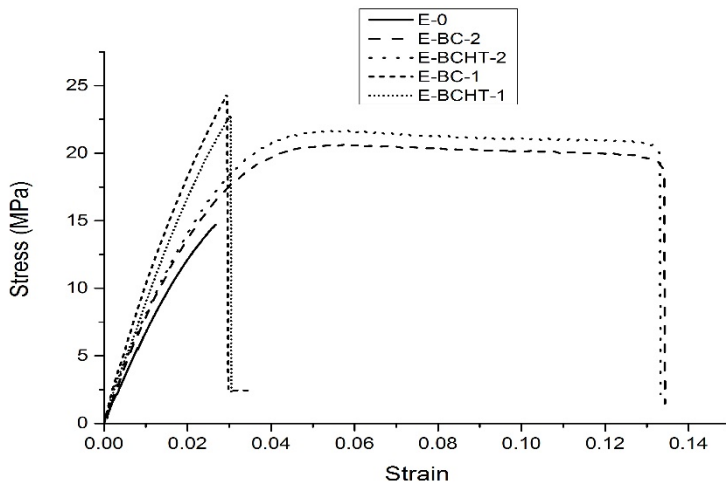


Figure 1: Mechanical analysis on blank and filled epoxy.

Future work includes

- Study of friction and wear properties of the same composites.
- Designing of a model to understand the interaction of the filler with matrix that led to improved properties.

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