

## **Fabrication of epoxy nanocomposites from oil palm nano filler: mechanical and morphological properties**

### **ABSTRACT**

The aim of this research was to fabricate epoxy nanocomposites by utilizing the developed nano filler from oil palm mills agricultural wastes oil palm empty fruit bunch (OPEFB) fibers for advanced applications. Epoxy-based polymer nanocomposites were prepared by dispersing 1, 3, and 5 wt. % nano OPEFB filler by using a high speed mechanical stirrer through hand lay-up technique. The mechanical (tensile and impact) properties and morphological properties of nano OPEFB/epoxy nanocomposites were examined and compared. Morphological properties were analyzed by transmission electron microscopy (TEM) and scanning electron microscopy (SEM) to look at the dispersion of the nano OPEFB filler in the epoxy matrix. The tensile and impact properties of nanocomposites increased until 3% nano filler loading, but beyond 3% they decreased. Overall mechanical properties reached maximum values for 3% loading, due to better stress transfer owing to homogenous dispersion of nano OPEFB filler within epoxy matrix. The observed results were also confirmed by SEM and TEM micrographs.

**Keyword:** Epoxy; Oil palm empty fruit bunch fiber; Nano filler; Nanocomposites; Mechanical properties; Morphological properties