

Effect of fiber loadings and treatment on dynamic mechanical, thermal and flammability properties of pineapple leaf fiber and kenaf phenolic composites

ABSTRACT

This study deals with the analysis of dynamic mechanical, thermal and flammability properties of treated and untreated pineapple leaf fiber (PALF) and kenaf fiber (KF) phenolic composites. Results indicated that storage modulus was decreased for all composites with increases in temperature and pattern of slopes for all composites, having almost the same values of E' at glass transition temperature (T_g). The peak of the loss modulus of pure phenolic composites was shown to be much less. After the addition of kenaf/PALF, peaks were higher and shifted towards a high temperature. The Tan delta peak height was low for pure phenolic composites and maximum for 60% PALF phenolic composites. Cole-Cole analysis was carried out to understand the phase behavior of the composite samples. Thermogravimetric analysis (TGA) results indicated that pure phenolic composites have better thermal stability than PALF and kenaf phenolic composites. Vertical and horizontal UL-94 tests were conducted and showed pure phenolic resin is highly fire resistant. The overall results showed that treated KF composites enhanced the dynamic mechanical and thermal properties among all PALF/KF composites.

Keyword: Dynamic mechanical analysis; Flammability; Kenaf fiber; Phenolic resin; Pineapple leaf fiber; Thermogravimetric analysis