Thermal analysis of bamboo fibre and its composites

ABSTRACT

Thermogravimetric analysis and differential scanning calorimetry were used to study the thermal degradation and thermal stability of bamboo powder and its composites (EP-BFC) in a nitrogen atmosphere. The thermal stability of EP-BFC decreased as the bamboo filler-loading increased. Compared with epoxy, bamboo powder had a lower thermal stability, which reduced the thermal stability for the higher filler-loading composites. The addition of glass fibre to the EP-BFC improved the thermal stability of the new hybrid composites. Both the hybrid and non-hybrid composites exhibited similar thermal-induced degradation profiles that had only one mass loss step. However, a noticeable difference between the percentage value of the degradation between both the hybrid and non-hybrid composites showed that the EP/G-BFC hybrids were more thermally stable than the non-hybrid EP-BFC. Different materials experienced different activities, which were clearly shown from the DSC analysis. Bamboo fibre and non-fully cured epoxy exhibit exothermic peaks, while fully cured epoxy exhibits an endothermic peak.

Keyword: Bamboo; Thermal degradation; Filler; Hybrid