

Improved fire retardancy of thermoset composites modified with carbon nanofibers

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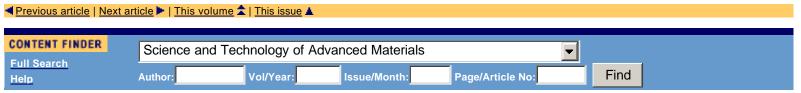
Abstract. Multifunctional thermoset composites were made from polyester resin, glass fiber mats and carbon nanofiber sheets (CNS). Their flaming behavior was investigated with cone calorimeter under well-controlled combustion conditions. The heat release rate was lowered by pre-planting carbon nanofiber sheets on the sample surface with the total fiber content of only 0.38 wt.%. Electron microscopy showed that carbon nanofiber sheet was partly burned and charred materials were formed on the combusting surface. Both the nanofibers and charred materials acted as an excellent insulator and/or mass transport barrier, improving the fire retardancy of the composite. This behavior agrees well with the general mechanism of fire retardancy in various nanoparticle-thermoplastic composites.

Keywords: flame retardance, carbon nanofiber, composites

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