Fire reaction behavior of epoxy/carbon nanotube composites

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Summary. An increasing number of aerospace structures are being made from fiber reinforced composites using an insulating epoxy matrix. Their increasing utilization brings these composites into extreme temperatures at any time, adding urgency to improve and to understand their thermal and fire reaction behavior.

Carbon nanotubes (CNT) are interesting candidates for flame retardancy because they can form closed residue layers, which protect the polymer surface; the large aspect ratio of nanotubes acts as a gas barrier; nanotubes may influence the fire behavior of polymers by changing the energy absorption and heat conductivity.

This work presents the results of fire reaction behavior of epoxy/carbon nanotube composite materials produced from different masterbatches of the same resin charged with 1.91wt% of carbon nanotubes (CNT). A medium viscosity epoxy resin system and traditional flame retardant additives were used as references. The performance of the produced materials was determined by fire reaction tests.