

**Title:** A review of recent developments in flammability of polymer nanocomposites

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**Abstract:** Polymer nanocomposite flame retardancy has become a critical parameter in industrial material application. Recent environmental policies have prohibited the incorporation of halogenated flame-retardant compounds into polymers owing to the high level of environmental degradation caused by high levels of toxic gas and smoke emission. The demand for zero-halogen flame-retardant compounds by both researchers and manufacturers is due to the inherent advantages accruable from their incorporation like very minimal toxic emission, minimal smoke release, zero corrosive gas release, reduced corrosion activities and absence of dripping in fire condition. This has necessitated the quest for eco-compliant replacements for halogenated flame suppressants. Recent insight has shown the eco-compliance of exfoliated graphene nanoplatelets as flame retardants when incorporated into polymer nanocomposites (PNCs). Relative to the propensity to retard flame, increasing quantities of exfoliated graphene nanoplatelets have exhibited the capability to significantly repress critical flammability parameters like heat release rate (HRR), peak HRR (PHRR), rate of carbon monoxide production, smoke production rate and total mass loss rate while simultaneously increasing limiting oxygen index, time of ignition and total PHRR, thereby retarding flammability and creating better chance to reduce loss and casualty in real-life fire situation through the formation of even layers of carbonaceous char in the condensed phase capable of efficiently suppressing the thermal decomposition caused by oxygen and heat to the polymer matrix and cutting off the flaming path. This paper gives an insight into recent developments in flame retardancy of PNCs, with special emphasis on the flame-retardancy propensity of exfoliated graphite nanoplatelets.