Flame-retardant

Subjects: Polymer Science

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Flame-retardant additives and comonomers slow the ignition or the spread of a fire in a polymer. Four general mechanisms are distinguished: gas-phase radical scavenging, condensed-phase char formation, dilution by an inert filler, and physical cooling by an endothermic decomposition [1]. Halogenated compounds act in the gas phase and are efficient at low loading, but their combustion products are corrosive and persistent, which has driven substitution [2]. Phosphorus-based systems favour char and are the main alternative for engineering thermoplastics [3]. Intumescent formulations combine an acid source, a carbon source, and a blowing agent, so the coating expands into a foam that insulates the underlying material [4]. The additive normally degrades the mechanical properties, and the balance between the loading needed for a fire rating and the property loss is the central design problem [5].

char formation | intumescent | halogen-free | gas-phase radical scavenging | phosphorus additive | limiting oxygen index | endothermic decomposition

References

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