

## Novel Anti-flammable Polymer Materials: Synthesis and Characterization

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### **Abstract**

Flame retardants are required to reduce the flammability of polymer materials used in various commercial applications, including materials for aircraft cabins. The widely-employed halogenated flame-retardant additives, such as bromoaromatic derivatives, are non-ideal, due to their associated environmental and bio-accumulation. Thus, there is a pressing need for new inherently flame-resistant polymers that are both halogen-free, and that possess low heat release capacities and high char yields. Deoxybenzoin-containing polymers represent one such polymer candidate, as they possess high char yields, due to thermally-induced rearrangement chemistry that leads to diphenylacetylene precursors to char. In this presentation, the use of the bisphenol and diisocyanate of deoxybenzoin will be described for the preparation of step-growth polymers, ranging from polyphosphonates to polyurethanes. In addition, the processing of nanocomposite materials will be presented, especially using an electrospinning and melt-processing sequence for the preparation of high-performance low-flammability polymers.