

Biomaterials as Green Flame Retardants

Phytic acid: A novel phosphate bio-Based flame retardant

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Abstract

The development and application of sustainable flame-retardant agents have become a research hotspot due to the urgent need for eco-friendly materials and the demand for a sustainable environmental protection. Phytic acid has gained popularity as a natural substance that is present in plant seeds with the potential to be a bio-based flame retardant. Its distinct structure, which consists of six phosphate groups, connected to a myoinositol core, confers inherent flame retardancy, making it a suitable candidate for fire safety in polymeric materials. Phytic acid can be added to polymer matrices through physical mixing, chemical grafting, or covalent bonding. This alters the thermal and mechanical properties of the resulting flame-retardant composite, as well as its fire performance. Ongoing research aims to maximize the potential of phytic acid in different polymeric systems, with the goal of creating safe, eco-friendly, and sustainable materials for fire safety applications in fields, such as: construction, automotive, electronics, and textiles.