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Thermal Degradation and Combustion of Polypropylene Nanocomposite

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Polypropylene (PP) has wide acceptance for use in many application areas. However, low thermal resistance complicates its general practice. The new approach in thermal stabilization of PP is based on the synthesis of PP nanocomposites. This paper discusses new advances in the study of the thermo-oxidative degradation of PP nanocomposite. The observed results are interpreted by a proposed kinetic model, and the predominant role of the one-dimensional diffusion type reaction. According to the kinetic analysis, PP nanocomposites had superior thermal and fireproof behavior compared with neat PP. Evidently, the mechanism of nanocomposite flame retardancy is based on shielding role of high-performance carbonaceous silicate char which insulates the underlying polymeric material and slows down the mass loss rate of decomposition products.