

Industrial Applications of Flame Retardants for Thermoplastics

Polyolefins, polyamides and polyesters are important thermoplastics with a broad range of applications in electrical and electronics industry, such as cable materials, connectors, gears, appliance housing, building and construction, etc. Flame retardancy (FR) then becomes very important criteria for these applications. These polymers themselves are easily ignited when in contact with fire sources. The decomposition products are combustible, and contribute to the further spread of the fire.

Among the commercially used FR additives, halogenated types have the largest market share due to their high efficiency and low price. However, there is an increasing demand of halogen-free FR additives. Halogen-free FR additives can be divided in general into three groups: metal hydroxides, P-containing compounds and N-containing compounds. Each exhibits different mode of FR actions, including radical trapping, surface char formation, heat absorbance, fuel diluting, etc. Very often, a combination of various FR additives and synergists is necessary to obtain the optimized performance. An overview of halogen-free FR systems for thermoplastics will be given in this presentation. Industrial standards and flame tests will also be included. The effects of the FR additives on other polymer properties, such as flowability, mechanical properties, etc., will also be addressed.