

## **Effect of inorganic fillers on the flammability behavior of polypropylene composites**

### **Abstract**

This report summarizes the effect of various inorganic fillers such as alumina ( $\text{-Al}_2\text{O}_3$ ), calcium carbonate ( $\text{CaCO}_3$ ), silica ( $\text{SiO}_2$ ), and feldspar ( $\text{KAlSi}_3\text{O}_8$ ) on the flammability behavior of polypropylene (PP) composites. The effect of various filler loadings (by weight percent), typically at 40 and 60% has also been investigated for each of the fillers used. Initially, the compounding of composites (filler and polypropylene) was carried out using a two-roll mill; later, the test specimens were prepared using the compression molding technique. For each composite system, the linear rate of burning at two filler loadings was calculated, analyzed, and compared. Consequently, the characteristics of the flame, typically smoke suppression and char formation, were also analyzed as recommended by ASTM and UL 94 methods. From the results, it is clear that adding alumina fillers to polypropylene, at both percentages, results in decreasing the linear rate of burning, and hence improves flammability resistance. It is also interesting to note that alumina-filled PP shows greater flame-retardant behavior at both the 40 and 60% filler loadings.

**Keywords** — Composites, flammability, polypropylene