

An approach to assess the rheological behavior relevant to the intumescence process of polyolefin – chalk – silicone elastomer formulations

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ABSTRACT

The evolution of melt viscosity with increasing polymer degradation is of tremendous importance for char formation processes in polymer combustion. An increasing melt viscosity can stabilize bubbles in the material and thus lower the escape rate of volatiles that feed the flame and lead to the formation of an isolating cellular structure. This is demonstrated on the example of acrylate-ethylene copolymers blended with calcium carbonate filler and polydimethylsiloxane. A combination of plate-to-plate rheological measurements and thermal gravimetric analysis permitted to study of the impact of oxygen access to the melt viscosity and bubble stabilization. A mechanistic explanation of the char formation during combustion in the cone calorimeter will be presented.