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Thermal measurements on epoxy-expandable graphite composite material

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Abstract content
   (Max 300 words)
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Special chars

Polymer-based materials are competing with metallic alloys in terms of cost and functionality (durability, strength, and other physical and chemical properties). Organic polymers with inorganic reinforced composites are in daily use both domestically and industrially- in coating, adhesives, primers, aeronautic utilities, electro-optical devices and sensors, among others. The effect of heat on some of these polymer-based composites, however, brings some undesirable changes that affect product functionality. Inorganic intumescent additives such as expandable graphite (EG) to organic epoxy resin have shown promising flame retardant effects. One particular epoxy polymer, PrimeTM 20LV, with EG inorganic filler of different weight percentages, is the focus of this study. Heat measurements such as heat release rate, critical flux, time-to-ignition, thermal inertia and kinematics – activation energy as well as pre-exponential factor - of the composites were performed with the Dual Cone Calorimeter and the Thermogravimetric analysis (TGA). It was found that increasing the amount of EG in this epoxy leads to reduction in the following parameters: critical flux, the time-to-ignition, and the thermal inertia of the composite samples. There was, however, increase in the heat of gasification with increasing EG content while the activation energy was not significantly affected. Explanations to these findings will be presented.

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Main supervisor (name and email)
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