

European Chemistry Congress

June 16-18, 2016 Rome, Italy

Flame Retardants Nanocomposites-Synergy Effect Of Combining Conventional Antypirenes With Carbon Nanofillers

Ewa Kicko-Walczak and Grażyna Rymarz

Institute for Engineering of Polymers Materials and Dyes, Poland

The thermoset resins are proven construction materials for the technical and highly demanding applications. Heat stability, high thermal, low shrinkage, mechanical properties are typical for their type of polymers. Above applications also requires a good flame retardants (FR). Undertaken activities refer to official draft recommendations in UE states.

This paper presents positive effect of reduced flammability of thermoset resins thanks to the use of nanocomposites containing multi-ingredient halogen-free flame retardants which combine phosphorus/nitrogen modifiers interacting with nanofillers: expandable graphite (EG) graphene (G), graphene oxide (GO), anthracite (AN).

The flame retardancy of modified polymers has been investigated by LOI analysis, TG and by using CC method. The fine-plates, phase morphology of nanocomposites was assessed by SEM. We confirm that nanocomposites formation is an important concept for the flame retardants industry. Laminates made of modified resins meet requirements LOI over 28-34 %, reduced 30-70% head release rate (HRR) by CC method. No adverse impact on strength properties.

A multi-ingredient combine of FR turned out to make significant progress in achieving a desired flammability. It should be assumed that the presence of conventional flame retardants led to a synergy effect promoting faster formation of a protection layer hindering oxygen flow-through resulting from the process of thermal destruction.

Biography

Ewa Kicko-Walczak graduated from Polytechnic University in Warsaw, Chemical Department. In 1979 started working in Industrial Chemistry Research Institute (ICHRI). In 1985 receipt of Doctor Technical Science title from ICHRI and in 2012 she received a D.Sc. Chemistry Faculty of Cracow University. Since 2010 she started to cooperate with The Institute for Engineering of Polymers Materials and Dyes (IIMPd) and since 2015 - General Director of IIMPd. Prof. E. Kicko-Walczak is the author more than 80 original research publications and author 90 scientific presentations in International Conference.

e.kicko-walczak@impib.pl

Notes: