

**EFFECT OF A COMPATIBILIZER ON FLAMMABILITY OF COMPOSITES BASED ON ALUMINUM HYDROXIDE AND POLYETHYLENE MIXTURE***Mustafayeva F. A., Kakhramanov N. T.*

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In addition to their high performance, polymeric materials also have some disadvantages – they are prone to ignition and the spread of flame, the production of smoke and toxic products during fires that result in death and property damage. For this reason, the development of a new generation of high-performance, non-flammable polymeric materials, effective reduction of the flammability of multi-tonnage industrial polymeric materials is an urgent problem. This is mainly achieved by adding flame retardants directly to the melt during the mixing process. Given the fact that smoke and toxic combustion products are one of the main hazards during a fire, the use of environmentally friendly, "green" flame retardants has increased in recent years, and aluminum hydroxide is one of these fillers.

The objects of study were industrial samples of high-density polyethylene (HDPE), low-density polyethylene (LDPE), filler – aluminum hydroxide, compatibilizer – DuPont™ Fusabond® P353 Polymer Modifier. Samples based on HDPE / LDPE blend on 50/50 ratio were obtained by mixing the components on laboratory rollers at a temperature of 160 °C within 8–10 minutes. The flammability of the composites was assessed by the method of determining the limiting oxygen index (LOI). Tests were carried out in accordance with ASTM-2863 on a MODUL FTA instrument, STANTON REDGROFT (Great Britain). The sample sizes were 120 mm × 6.0 mm × 3.5 mm.

To assess the effect of a compatibilizer on the fire resistance of composites, a comparative analysis of the values of the oxygen indices of composites with and without a compatibilizer was made. In this case, it seemed interesting to establish the effect of the filler concentration on the fire resistance of the composite. The results of these studies are shown in figure 1. The limiting oxygen index is an indicator that characterizes the minimum concentration of oxygen in a mixture of oxygen and nitrogen, necessary to maintain the flame of combustion of a material. The latter circumstance allows us to state that the loading of a compatibilizer contributes to an increase in the fire resistance of the composite.

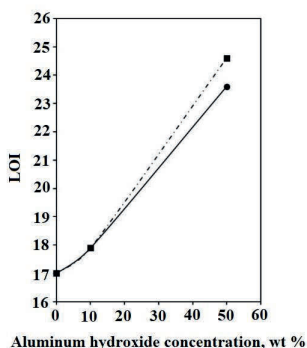


Figure 1. The dependence of the oxygen index on the concentration of aluminum hydroxide (wt. %) in composites: ●—LDPE / HDPE + Al(OH)<sub>3</sub>, ■—LDPE / HDPE + Al(OH)<sub>3</sub> + 3 % compatibilizer