Determination of the Influence of Fly Ash Particles on the Properties of Low-Density Polyethylene

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Abstract

Polymers are the materials whose structure can be very easily influenced by e.g. physical modification, which determines at the same time the manner of their use [1, 2]. One way of the mentioned modification is the use of various kinds of fillers: organic, inorganic, and others, e.g. waste [3]. Because of big amounts of fly ash being produced [4], their spherical shapeand its acknowledged ability to distribute forces more evenly than other types of particles, the authors decided to modify low-density polyethyelene with this additive. Fly ash, as an additive to polymeric materials, can successfully act as a reinforcing phase [5].The poster presents the results of examining the influence of fly ash particles on the mechanical properties and flame retardancy[6,7] of LDPE. Several grain fractions of the fly ash were used, mixed with molten LDPE, and the samples were prepared by injection molding. The effect of grain size of as well as amount of the additive on the mechanical strength of the resulting composite, with attention paid to tensile strength and compressive strength weredetermined. Also, hardness, flammability and thermal stability of the composites were examined. Thanks to scanning electron microscopy one obtained useful informationonmorphology (*Figure 1*) and elemental composition of the prepared material. The obtained results showed that the addition of FA to LDPE is a well-founded and effective solution to modify LDPE. Thus, with the acceptable mechanical properties and convenient processing, there are no obstacles to substitute even 20% of the polymer mass by fly ash.

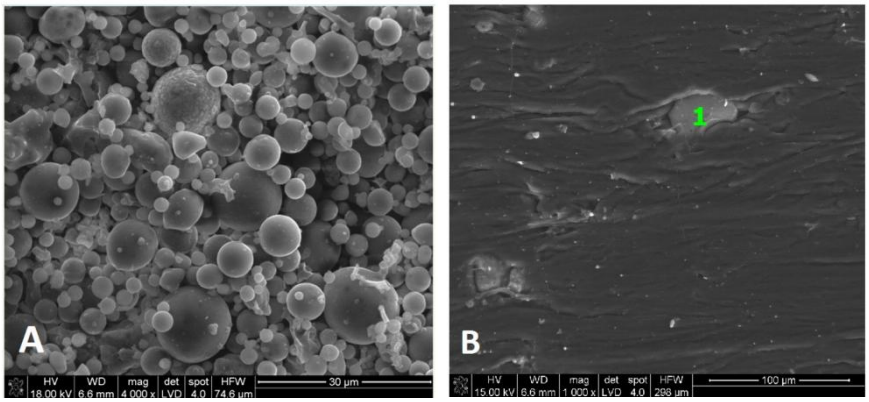

Figure 1 A SEM image of the fly ash particles <15 μm, **B** SEM image of the surface of LDPE + 5% FA 30-60 μm composite

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