

Thematic course: Possibility of using the brabender plastometer to study the peroxide crosslinking of polyethylene. Part 1.

Polyethylene peroxide crosslinking in the presence of triallyl cyanurate

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Abstract

In this work, we address the problem of processing of polyolefins in the production of which used cross-linking agents based on peroxides. The peroxide method of production of foamed polymers is one of the most popular in Russia, so the relevance of its improvement is not in doubt. The main problem with working with peroxides is the high content of by-products, which are often toxic and have a negative impact on the staff. In this article, the authors proposed to reduce the concentration of toxic peroxide used by adding a less toxic crosslinking agent – triallylcyanurate to the formulation. The degree of crosslinking of polyethylene is directly proportional to the viscosity of the system, so It was proposed to use the brabender plastometer for studies of the viscosity index of samples. In this work, it was found that the optimal degree of crosslinking has samples with a torque indicator in the range of 1700-1900 g·m. it was found that adding 2 m.p. to the formulation. triallylcyanurate allows, while maintaining the necessary degree of crosslinking, to reduce the peroxide content by 50%. Lowering the peroxide content directly reduces the amount of volatile acetophenone-the product of thermal decomposition of peroxide, which accumulates in the air of the working area. The dependence of the torque index of samples on the amount of triallylcyanurate and Dicumyl peroxide content was studied. The minimum concentration of Dicumyl peroxide (0.2 m.p.) was determined, which allows to obtain the degree of crosslinking of the required level. It is shown that the replacement of Dicumyl peroxide with the crosslinking agent triallylcyanurate makes it possible to obtain a foam that is not inferior to the original composition in terms of main performance indicators.

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