FREE RADICALS IN ELECTRON BEAM IRRADIATED BLENDS OF POLYETHYLENE AND BUTADIENE-STYRENE BLOCK COPOLYMER

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Two-phase blends, of compositions in a range from 0% low density polyethylene (PE) to 100% butadiene-styrene block copolymer (SBS) were investigated from the point of view of basic radiation chemistry and modifications of technological and chemical properties. Irradiations were performed with 10 MeV electrons to the doses of 30, 60, 120 kGy, by the split dose technique to avoid thermal effects. EPR spectra were measured with the Bruker 300 ESP spectrometer, using computer programme for the deconvolution and analysis of spectra. First spectra were recorded in minutes time resolution; later the lapses of time were extended to hours and days.

The investigated system is interesting from the point of view of radiation chemistry of solid state, because it represents a two phase system of highly developed area of the interface, allowing partial transfer of high energy products of radiolysis. Both components exhibit different radiation chemistry: especially the block copolymer (SBS) which contains aromatic units shows specific energetic changes during irradiation. In the intermediate ranges of component participations, a new signal is observed from paramagnetic product, which does not occur in irradiated pure PE and SBS macromolecules.

Presented results will be compared with other findings obtained in similar systems, published in separate papers which help to propose the identification of intermediates and their reactions.

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