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Photoaging of methyl methacrylate-methacrylic acid copolymer doped by laser dyes and diphenylthiourea

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Abstract

For methyl methacrylate-methacrylic acid copolymer colored by laser dyes (Rhodamine 6G and Coumarin 7), the mutual effect of polymeric matrix and dyes on the kinetics of their photochemical aging was studied. Diphenylthiourea was introduced into the copolymer as a modifying additive. It was established that, upon irradiation with a mercury lamp, both the dyes and diphenylthiourea exert photostabilizing effects on the copolymer. It was found that there exists a correlation between the photofading of the dyes and the processes related to the photoaging of the copolymer, such as the degradation of macrochains, the accumulation of free radicals, and a reduction in the transmission coefficient. Introduction of diphenylthiourea causes a tenfold increase in the generation photostability of the copolymer samples colored by Rhodamine 6G, and consequently, their operating life as the laser-active elements.
