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论文

高透明抗冲聚苯乙烯树脂的辐射合成与性能表征

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摘要 以过氧化苯甲酰为引发剂, 采用苯乙烯、甲基丙烯酸甲酯为共聚单体, 先经本体自由基预聚合, 再经γ辐照聚合法合成甲基丙烯酸甲酯-苯乙烯共聚物(MS)树脂. 系统研究了吸收剂量和剂量率对MS树脂的分子量及其分布的影响, 同时研究了树脂的化学结构、热性能、透过率和力学性能. 结果表明, 辐射合成的MS树脂是一种无规共聚物, 具有很好的光学性能, 较好的韧性和强度.

关键词 苯乙烯 甲基丙烯酸甲酯 共聚 透明 抗冲 辐射引发聚合

分类号

PREPARATION AND CHARACTERIZATION OF TRANSPARENT HIPS THROUGH GAMMA RADIATION POLYMERIZATION

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Abstract In order to produce transparent HIPS,the methyl methacrylate(MMA) was used to copolymerlze with styrene (St) by using chemically initiated prepolymerization followed by radiation-induced polymerization at room temperature. The influence of the absorbed dose and dose rate on the molecular weight of P(St-*co*-MMA) copolymers was investigated. The chemical structure of resulting P(St-*co*-MMA) copolymers was confirmed by using FTIR,^{1}H-NMR and DSC. In addition. the transparency of copolymers was measured by means of a UV-Vis spectrometer. and their mechanical strength was compared with that of the pure PS. Experimental results show that it is helpful to obtain the high molecular weight copolymers by increasing the conversion of prepolymefization and decreasing the dose rate. With increasing the absorbed dose,the accelerated polymerization occurred,and molecular weight of copelymers reached a maximum,then decreased slighdy with the dose. The synthesized P(St-*co*-MMA) copolymers were identified to be ataetic polymers and they have nsrrow polydispersity of molecular weight. Comparing with pure PS,the copolymer has higher mechanical strength and better transparency,particularly the toughness was improved significantly. Therefore,transparent P(St-*co*-MMA) copolymers with high mechanical performance could be produced by combining chemical initiation polymerization and radiation-induced polymerization. The process is easy to control and will be expected to be used for preparing transparent HIPS.

Key words Radiation-induced polymerization Prepolymerization P（St-*co*-MMA） copolymers Mechanical strength Transparency Chemical structure

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