

论文

## 重氮偶合反应合成超支化偶氮聚合物的光响应性能研究

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**摘要** 利用重氮偶合反应和后重氮偶合反应制备了主链和端基含有不同假茛苳型偶氮苯生色团的超支化偶氮聚合物. 利用氢核磁共振、紫外光谱、红外光谱等分析手段确定了合成聚合物的结构、玻璃化转变温度和光谱特性等. 研究了聚合物光致二向色性的性能, 此聚合物的取向有序度为0.063. 用两束相干的P偏振Ar<sup>+</sup>激光对聚合物膜进行光加工, 得到形状规则的正弦波形表面起伏光栅, 末端偶氮苯基团的引入极大地增加了超支化偶氮聚合物的光响应速度.

**关键词** [超支化聚合物](#) [重氮偶合](#) [光致二向色性](#) [表面起伏光栅](#) [光响应速度](#)

分类号

## PHOTO-INDUCED DICHROISM AND SURFACE-RELIEF-GRATINGS OF HYPERBRANCHED AZO POLYMERS SYNTHESIZED BY AZO-COUPLING REACTION

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**Abstract** A novel hyperbranched azo precursor polymer containing electron donor-acceptor type azobenzene chromophores was synthesized by step-growth polymerization of an AB<sub>2</sub> monomer, di[2-(N-ethyl-anilino)ethyl]-5-aminoisophthalate, through azo coupling reaction. The hyperbranched precursor polymer was then reacted with the diazonium salts of 4-amino benzonitril to introduce another kind of donor-acceptor azo chromophores in the peripheral groups. The structure and properties of the azo polymers were characterized by the spectroscopic methods and thermal analysis. The photo-induced dichroism of the hyperbranched polymer was studied and the orientation order parameter of the polymer was estimated to be 0.063. Thin films of the hyperbranched azo polymers were used to fabricate surface-relief-gratings (SRGs) by exposing the thin films to an interference pattern of Ar<sup>+</sup> laser beam at modest intensities (150 mW / cm<sup>2</sup>). The azobenzene chromophore introduced by post-azo-coupling reaction in the para-positions of the terminal azobenzene units shows a significant effect on the SRG inscription rate. The hyperbranched azo polymers can potentially be used for applications such as reversible optical data storage, photoswitching, sensors, and other photo-driven devices.

**Key words** [Hyperbranched polymers](#) [Azo-coupling reaction](#) [Photo-induced dichroism](#) [Surface-relief-gratings](#) [Inscription rate](#)

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