

论文

## 重氮偶合方法合成主链型光响应偶氮聚合物

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**摘要** 提出了一种利用重氮偶合方法合成主链偶氮聚合物的新方法, 合成了一种主链含有假茛菪型偶氮生色团的聚合物. 对合成聚合物的结构、热性能以及光响应性能进行了详细表征. 在线偏振激光的作用下, 聚合物膜中的偶氮生色团发生光致取向, 用偏振紫外-可见光谱测量了此聚合物膜的二向色性, 得到聚合物膜的取向有序度为0.03. 用波长为488 nm, 能量密度为150 mW/cm<sup>2</sup>的相干Ar<sup>+</sup>激光对聚合物膜照射1000s, 得到形貌规整的正弦波形表面起伏光栅, 光栅的周期为900nm, 起伏深度为89nm.

**关键词** [重氮偶合](#) [偶氮聚合物](#) [光致二向色性](#) [表面起伏光栅](#)

分类号

## SYNTHESIS OF A MAIN-CHAIN PHOTO-RESPONSIVE AZO POLYMER THROUGH AZO-COUPLING REACTION

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**Abstract** A novel polymer PAPE, containing electron donator-acceptor azobenzene chromophores in the main chain, has been synthesized by azo-coupling reaction. The azo polymer was characterized by <sup>1</sup>H-NMR, UV-Vis spectrometry and thermal analysis. The  $\lambda_{\max}$  of the polymer film and DMF solution determined to be 445 nm and 446 nm, respectively. The number average molecular weight determined by GPC was  $M_n=5600$  with a polydispersion index 2.2. The glass transition temperature ( $T_g$ ) of the polymer was 132 °C observed from DSC thermogram. The results showed the azo polymer can be successfully synthesized through azo-coupling reaction. The synthetic scheme demonstrated in this work is a feasible way to prepare main-chain azo polymers under an extremely mild condition. Dichroism was optically induced in the PAPE films under the irradiation of Ar<sup>+</sup> laser beam at 488 nm, and the orientational order parameter obtained was 0.03. Surface-relief-gratings were observed on PAPE films after irradiated by an interference pattern of Ar<sup>+</sup> laser beam for 1000s. The surface modulation depth and the grating spacing were measured by AMF to be 89 nm and 900 nm.

**Key words** [Azo-coupling reaction](#) [Azo polymer](#) [Dichroism](#) [Surface-relief-gratings](#)

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