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材料物理和化学

聚合电场频率对聚合物稳定胆甾相液晶光电性能的影响

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摘要: 研究了聚合时外加电场对聚合物稳定胆甾相液晶(PSCT)光电性能的影响。采用紫外光聚合诱导相分离法(PIPS)制备了聚合物稳定胆甾相液晶, 通过改变光聚合时的外加电场频率控制聚合物网络结构, 改善PSCT的光电性能。结果表明: 电场频率影响聚合单体的扩散, 从而影响聚合物网络形貌。聚合电场频率低, 聚合单体扩散快, 形成的聚合网络疏松, 网孔较大, 响应速度慢, 关态透过率大, 阈值和饱和电压小; 聚合电场频率高, 阻碍单体的扩散, 形成的聚合物网络致密, 网孔较小, 响应速度快, 关态透过率低, 阈值电压和饱和电压大。

关键词: 聚合物稳定胆甾相液晶(PSCT) 光电性能 快速响应光阀 聚合电场频率

Effects of Curing Electric Field Frequency on Electro-Optic Property of Polymer-Stabilized Cholesteric Texture

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Abstract: The effects of curing electric field frequency on the electro-optic property of Polymer-Stabilized Cholesteric Texture (PSCT) is investigated. PSCT samples were prepared by means of polymerization induced phase separation (PIPS). By changing the curing electric field frequency, we can control the network morphology of PSCT and improve the electro-optic property. It was demonstrated that the diffusion of monomer and network morphology were related with curing electric field frequency. In addition, lower frequency promotes the diffusion of monomer and generally results in a open network with large void inside which often shows fast response, high closed transmittance, low threshold and low saturated voltage. On the other side, higher frequency inhibits the diffusion and generally results in a closed network with smaller void inside which often shows slower response, lower transmittance, higher threshold and higher saturated voltage.

Keywords: polymer-stabilized cholesteric texture electro-optic property fast-response light shutter curing electric field frequency

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