Effect of Plasticization of Poly(Vinyl Cinnamate) on Liquid Crystal Orientation Stability

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A cinnamate group is a well-known compound group used in the dimerization reaction by ultraviolet irradiation, and cinnamate polymers are studied as photoalignment materials. In this study, the radical reaction of cinnamate side groups attached to a flexible polymer backbone is considered feasible using thermal energy. To induce the thermal reaction of cinnamate side groups, we modified the flexibility of poly(vinyl cinnamate) by introducing a plasticizer into the polymers and investigated the thermal reaction behavior of cinnamate side groups. The plasticization of poly(vinyl cinnamate) makes the induction of the thermal reaction of cinnamate side groups easier than that of unmodified poly(vinyl cinnamate). The thermal reaction of cinnamate side groups is closely related to the enhancement of the thermal stability of the liquid crystal orientation of polymer films with polarized UV irradiation.