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Effect of secondary relaxation transitions on photo-induced anisotropy in glassy azobenzene-functionalized polymers

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Abstract

© The Royal Society of Chemistry 2017. We propose a physical mechanism for the photo-induced orientation alignment of azo-dyes incorporated in polymers at temperatures far below the glass transition temperature. Using polarized FT-IR spectroscopy, we show that optical dichroism undergoes an observable change at the β-relaxation transition of the azo-polymer when the mobility of the short backbone fragments is increased. We explain this effect using temperature-dependent local strains that occur within the polymer backbones in a glassy state. These strains underlie the enhanced thermal relaxation that drives the orientation kinetics.

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