Photoinduced dynamics of amino-azobenzene self-assembled monolayers for high efficient photo control of liquid crystals

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Abstract

Azobenzene containing molecular monolayers have been of great interest for photo manipulation of liquid crystals.[1-3] Detailed dynamics of photoinduced anisotropy (PIA) of the monolayers will enhance the development and application of them. We report high efficient aminoazobenzene type chemically adsorbed monolayers* for photo-switching of nematic liquid crystals (see figure (a)). Photo-induced dynamics of the monolayers are studied by a high sensitivity birefringence detection system (see figure (b)). The dynamics can be simulated by a mechanism, which includes anisotropic absorption, repopulation, and rotational diffusion of azobenzene groups, assuming that the monolayer has multiple domains. Detection and simulation of effect of cis-population on PIA development of the monolayer are also reported.

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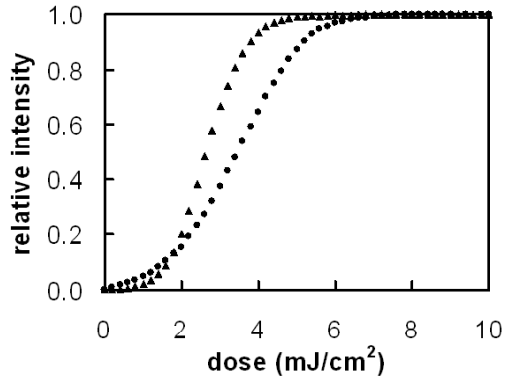
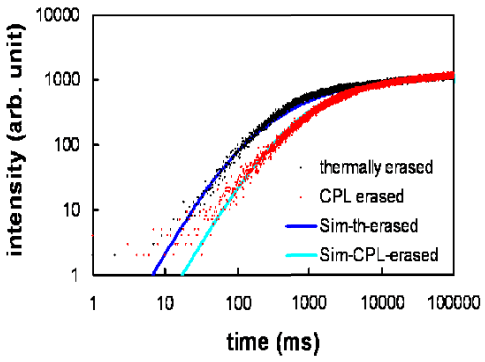


(a) Photo switching of a nematic liquid crystal cell with an amino-azobenzene self assembled monolayer.



(b) Photo induced anisotropy and it's simulation for an amino-azobenzene monolayer with different initial cis populations. The intensity of the writing beam is 50 mW/cm^2.

References

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