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Phototropic liquid crystal materials containing naphthopyran dopants MARIACRISTINA RUMI, SETH CAZZELL, Air Force Rsch Lab - WPAFB, TAMAS KOSA, LUDMILA SUKHOMLINOVA, BAHMAN TAHERI, Alpha Micron Inc., TIMOTHY BUNNING, TIMOTHY WHITE, Air Force Rsch Lab - WPAFB — Dopant molecules dispersed in a liquid crystalline material usually affects the order of the system and the transition temperature between various phases. If the dopants undergo photoisomerization between conformers with different shapes, the interactions with the liquid crystal molecules can be different for the material in the dark and during exposure to light of appropriate wavelength. This can be used to achieve isothermal photoinduced phase transitions (phototropism). With proper selection of materials components, both order-to-disorder and disorder-to-order photoinduced transition have been demonstrated. Isothermal order-increasing transitions have been observed recently using naphthopyran derivatives as dopants. We are investigating the changes in order parameter and transition temperature of liquid crystal mixtures containing naphthopyrans and how they are related to exposure conditions and to the concentration and molecular structure of the dopants. We are also studying the nature of the photoinduced phase transitions, and comparing the behavior with that of azobenzene-doped mixtures, in which exposure to light leads to a decrease, instead of an increase, in the order of the system.

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