A liquid Crystalline Material Applicable to Full-Color Rewritable Recording in a Photon Mode

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We designed a new molecular system by combining photochromic compounds that change molecular structure by the action of light and liquid crystals that show different iridescent colors depending on the molecular alignment. In this system, information transfer from photochromic compounds to liquid crystals is regulated utilizing the glass-forming property of the liquid crystals. Medium molecular-weight liquid crystals made it possible to attain both stable molecular order in the glassy state and fast molecular re-alignment in the liquid crystalline state. This new molecular assembly responding light and temperature enables us to record color information repeatedly in a photon mode and is expected to be applied to the rewritable paper and card.

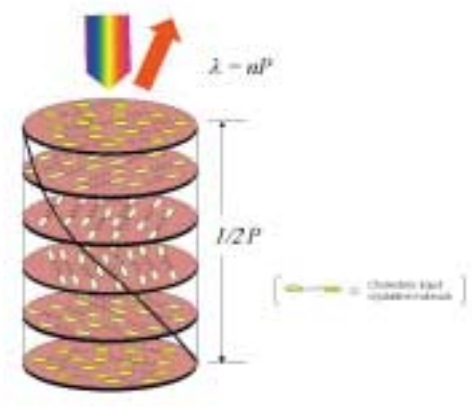

Diagram of the structure of the cholesteric phase. Liquid crystals in the cholesteric phase reflect incident white light selectively, provided that the incident light has a wavelength satisfying the Bragg condition, $\lambda = nP$

Novel Ferroelectric Thin Films Via a Tailored Liquid Source

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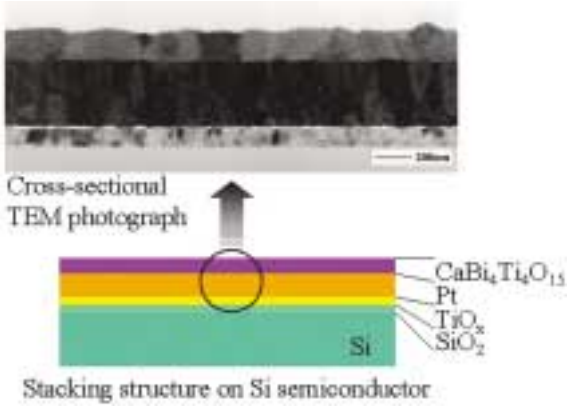
$CaBi_4Ti_4O_{15}$ thin films were prepared by spin-coating a tailored liquied source as a mixture solution of double alkoxides. As-deposited thin films began crystallization below 550ºC and reached full crystallinity of a single phase of layered-perovskite at 650ºC via rapid thermal annealing in oxygen. 650ºC-annealed $CaBi_4Ti_4O_{15}$ thin film showed random orientation on Pt-passivated Si substrate and exhibited P-E hysteresis loops. The remanent polarization (P_r) and coercive electric field (E_c) were 9.4 mC/cm^2 and 106 kV/cm, respectively, at 11 V. The polarization did not change after 10^{11} switching cycles with voltage of 5 V. The dielectric constant and loss factor were 300 and 0.033, respectively, at 100 kHz.



A cross-sectional TEM photograph of $CaBi_4Ti_4O_{15}$ ferroelectric thin film on Pt layer and its stacking structure on Si semiconductor