STEADY-STATE AND TIME-RESOLVED FLUORESCENCE ANALYSIS FOR CYANOBIPHENYL MESOGEN IN POLYMER-DISPERSED LIQUID CRYSTAL FILMS

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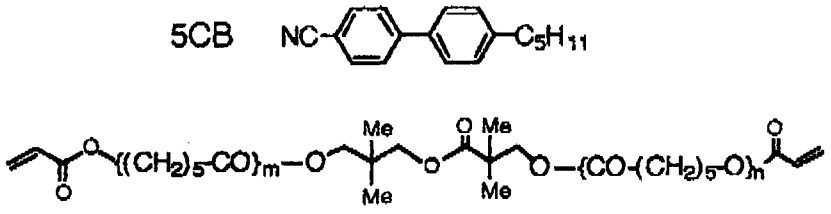
Heterogeneous thin films of polymer-dispersed liquid crystal (PDLC) have been attracting considerable current interest in fundamental scientific fields as well as for electro-optic applications (*e.g.*, a new type of LC display panels which do not need back light nor alignment film).[1] These materials have complex features not only in macroscopic structure of LC droplet size and distribution but also in microscopic inhomogeneity for alignments and mobilities of LC molecules at interface with the substrate as well as with the polymer matrix. It can be easily predicted that microscopic features of LC molecules at the interfaces should affect the electro-optic functions of PDLC. Nevertheless, little has been explored on the physico-chemical behavior of LC molecules in microscopic regions of PDLC, probably because of difficulties in selective detection of limited number of molecules present in the ultra-thin interface regions.

In order to analyze unique features of LC molecules at the interface with the substrate, we have investigated the steady-state and time-resolved fluorescence behavior of 4-pentyl-4'-cyanobiphenyl (5CB), a typical nematic LC, in PDLC films fabricated by photopolymerization-induced phase separation of diacrylate monomer/5CB mixtures, using the *surface-limited excitation* and *through-film excitation* methods.[2] We have found that the fluorescence behavior of 5CB in the interface layer is unique, particularly in the dominant formation of "abnormal" excimer in contrast to the exclusive formation of "normal" excimer in the interior domain which is typical of the nematic phase. Details will be reported at the conference site.



diacrylate monomer (m + n = 2)

1. Bouteiller, L.; LeBarny, P. *Liq Cryst.* **1996**, *21*, 157 - 174 and references cited therein.
2. Kato, S.; Lee, B.; Pac, C. *Liq. Cryst.* **1997**, *22*, 595 - 603.