

Anisotropic Films Made from Fluorescent Mesogens

D. Janietz, J. Buchs, H. Sawade

*Fraunhofer Institute for Applied Polymer Research, Geiselbergstr. 69, 14476
Potsdam-Golm, Germany*

The solubility of a fluorescent dichroic dye in a suitable orientation matrix is crucial for devices with efficient emission of polarized light. If reactive mesogens are used as a nematic host it is preferable that the dye displays a nematic phase as well to ensure an efficient miscibility. However, so far the number of compounds that combine a fluorescent chromophoric core with liquid crystalline properties are rather limited.

We present here fluorescent mesogens such as compounds **1** and **2** incorporating a central naphthalene unit. Acrylate moieties were attached to the rigid core via alkyl spacers to enable co-photocrosslinking with nematic benzoate reactive mesogens.

Both compounds **1** and **2** display an enantiotropic nematic phase which can be quenched into a glassy state at room temperature. The fluorescence maximum of the bis-tolane **1** peaks at 420 nm. Replacing the acetylenic units by ethylene groups leads to a bathochromic shift of the emission maximum to 470 nm. The compounds show miscibility with acrylate substituted reactive mesogens up to 10 mass%. Uniaxial orientation of the mixed systems was achieved by annealing of spin-coating films on polyimide orientation layers within the nematic temperature range. The film anisotropy was stabilized by subsequent photocrosslinking at room temperature. The crosslinked films show linear polarized photoluminescence. The fluorescence intensity can be enhanced with films containing both chromophores **1** and **2** due to radiationless energy transfer from the acetylene **1** to the tolane **2**.

Figure.

Chemical structure of the fluorescent nematic mesogens **1** and **2** bearing reactive acrylate end groups.

