

New Azo-dyes for Photoalignment: Exploring the New Path

Gurumurthy Hegde, V.G.Chigrinov

Hong Kong University of Science and Technology, Clear Water Bay, Kowloon, Hong Kong

E-mail addresses: eeemurthy@ust.hk, eechigr@ust.hk

ABSTRACT

The field of LC photoalignment is very rapidly developing and a vast amount of the new materials, techniques and LCD prototypes based on photoalignment (PA) technology have appeared recently [1]. The effect of LC photoalignment is a direct consequence of the appearance of the photo-induced optical anisotropy and dichroic absorption in thin amorphous films, formed by molecular units with anisotropic absorption properties. However, despite these potential advantages, the application of PA to LCD production is still limited to the laboratory. Large scale development of PA is hampered by the lack of good material and by long term stability, not to mention the lack of suitable mass production scale equipment. Here this paper opens up the path for using new azo dyes for photo alignment technology.

Nevertheless azodye materials remain among the best candidates for technological importance. Among all azo dyes, sulfuric azo dye was the promising one. There has been a variety of papers on SD-1 sulfuric dye about extraordinary good photoalignment properties [2]. The SD-1 films provide alignment characterized by strong anchoring, high thermal and photostability and excellent electrooptic performance. In this report we showed that similar results on different sulfuric dyes shows (see the macroscopic and microscopic view of excellent alignment for different azo dyes in the figure 1) that the field of the highly effective sulfuric azo dyes is broader than we conceived. Here in this report successfully gives a new path for fabrication of LCD devices using photo alignment technology with new azo dyes.

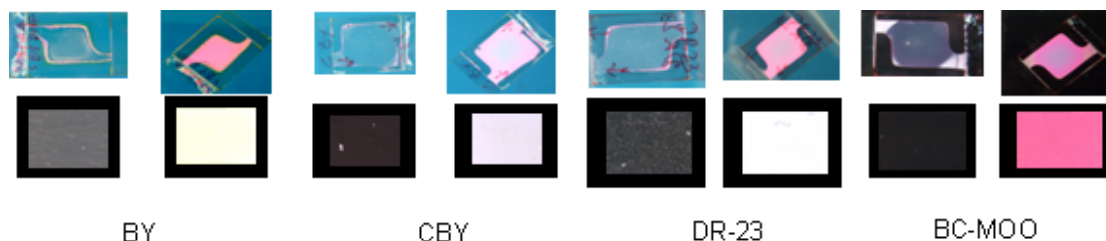


Figure 1: Macroscopic (top) and microscopic (bottom) photographs of the symmetric cells filled with E7 (room temperature liquid crystal) photo aligned by different azo dyes. Magnification used is 200 X. Easy axis is parallel to the polarizer (in one picture) and cells are rotated to 45 degree with respect to the polarizer light (another picture) shows excellent alignment properties. Azo dyes used are BY (brilliant yellow), CBY (cibacron brilliant yellow), Dr-23 (direct red 23), BC-MOO (brilliant crocin MOO).

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