

Influence of Single Source Irradiation on the Homogeneous Alignment of Liquid Crystals Molecules on Glass Substrates

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Abstract : A detailed study of homogeneous alignment of liquid crystal molecules on a glass substrate will be presented. Thin films of polyimide were coated on several glass substrates. Various methods were employed to prepare coated surfaces to achieve desired alignment; these include traditionally rubbing the surface with a felt cloth then exposing them perpendicular to the easy axis with incandescent light (IL), linearly polarized ultraviolet (LPUVR) and un-polarized ultraviolet (UPUVR) radiation. The quality of the alignment was tested by measuring the tilt angle in the temperature range between 30°C to 55°C. Regression analysis of the data using 'SigmaPlot' suggests a gradual increase in tilt angle (1.1°-1.8°) for the rubbed, 0.6° to 3.6° increase for the rubbed plus IL radiated and 1.6° to 4.6° for the rubbed plus UPUVL radiated samples, respectively. However to our surprise, we found tilt angle to be decreasing from 2.4° to 1.6° for the rubbed plus LPUVL radiated samples. We hope that these findings will be helpful in the fabrication of display panels and other electro-optic devices.

Keywords : homogeneous, liquid crystals, polyimide, tilt angle

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