

Transflective Liquid Crystal Display Mode without Subpixels using Cholesteric LC Film

Kwang-Soo Bae¹, Uiyeong Cha², Yeong-Joon Jang², Jae-Hoon Kim^{1,2}, and Chang-Jae Yu^{1,2*}

¹Department of Information Display Engineering, Hanyang University, Seoul 133-791, Korea

²Department of Electronics and Communications Engineering, Hanyang University, Seoul 133-791, Korea

*e-mail: cju@hanyang.ac.kr

Transflective liquid crystal displays (LCDs) have been widely studied for mobile applications such as mobile phone and electronic books because of their superior device performances under both indoor and outdoor environments [1]. In general, the transflective LCDs consist of two sub-pixels for the transmissive and reflective modes. Therefore, they have unavoidable drawbacks which are involved in the complicated process or the degradation of the display performances such as aperture ratio [2, 3].

In this study, we propose a transflective LCD mode without sub-pixels for the transmissive and reflective modes using a cholesteric liquid crystals (CLCs) film. The proposed transflective LCD mode consists of the LC cell for switching the polarization and the static CLC film acting as the polarization-dependent reflector as well as the circular polarizer. The dual-functional CLC film used in our work reflects whole visible light with a circular polarization from 400 to 700 nm and transmits the complementary circular polarized light. As a result, a single pixel was operated a whole reflective mode and a transmissive mode. Using the CLC film with the wide reflecting (transmitting) spectrum, we obtained the transflective LCDs with high aperture ratio.

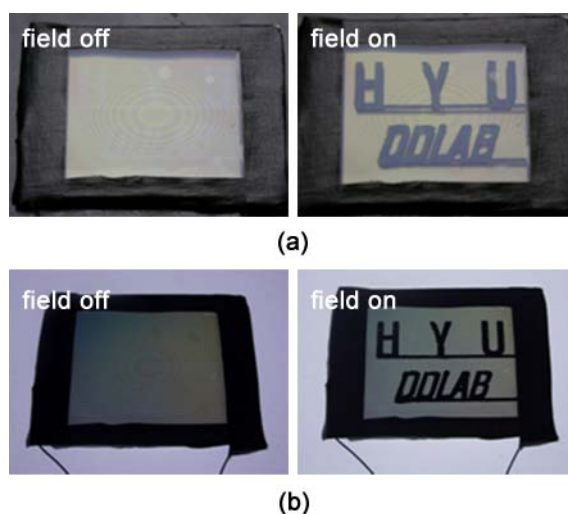


Figure 1: A prototype of our transflective LCD operated under (a) the reflective mode and (b) the transmissive one.

Acknowledgment: This research was supported by a grant (2009-000-0000-1537) from Samsung Advanced Institute of Technology.

References

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