Supporting Information

Color purifying optical nano-thin film for three primary colors in optoelectronics

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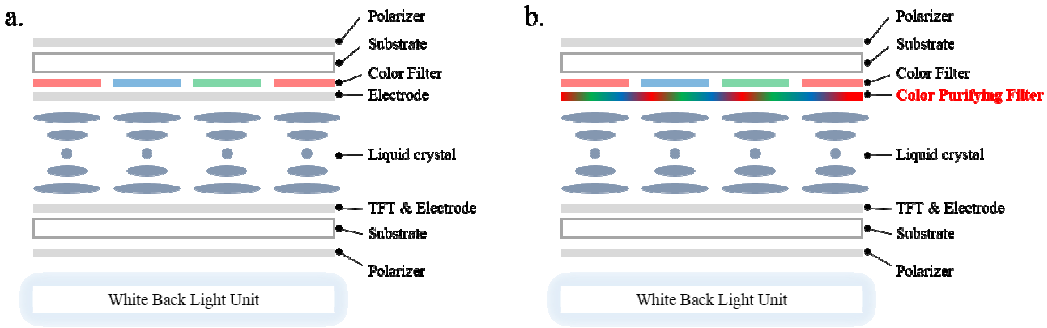

Figure S1. Example of utilization of color purify filter. (a) The original structure of the liquid crystal display. (b) The modified structure of the liquid crystal displays with the color purifying filter instead of an electrode that controls the liquid crystal.

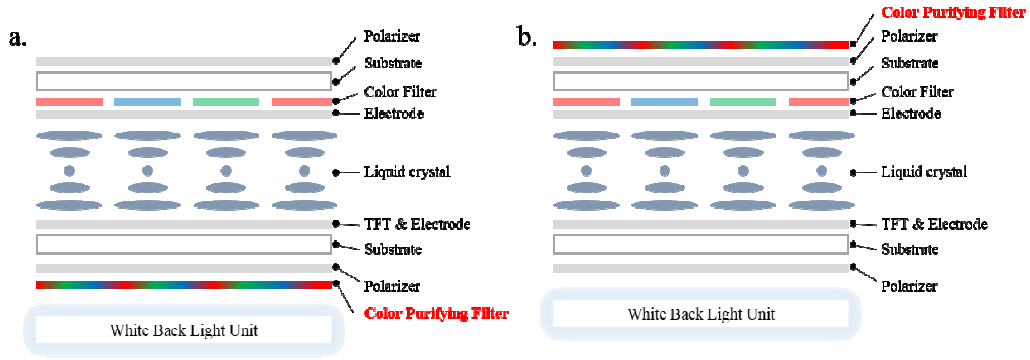

Figure S2. Example of utilization of the color purifying filter inside a liquid crystal display structure by adding the color purifying filter in (a) front of white back light unit and (b) in front of color filters.

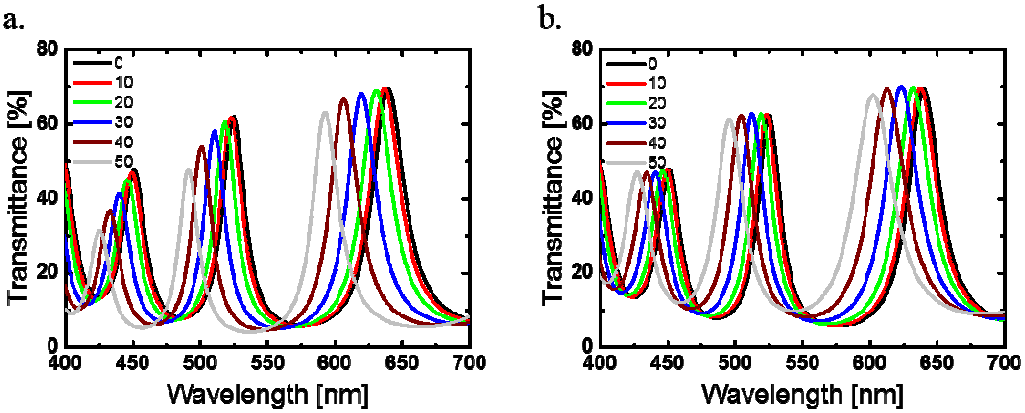

Figure S3. Transmittance of color purifying filter according to the viewing angle with (a) transverse electric wave and (b) transverse magnetic wave.

Figure S3a shows the angular property of the CPF when a transverse electric wave is incident on the CPF. Figure S3b shows the angular property of the CPF when a transverse magnetic wave is incident on the CPF. As the graph shows, the shift of the transmittance data according to the angle is reduced when the transverse magnetic wave is incident, compared with the data obtained from the transverse electric wave. Furthermore, the peak transmittance values barely decrease when the transverse magnetic wave is incident according to the viewing angle.

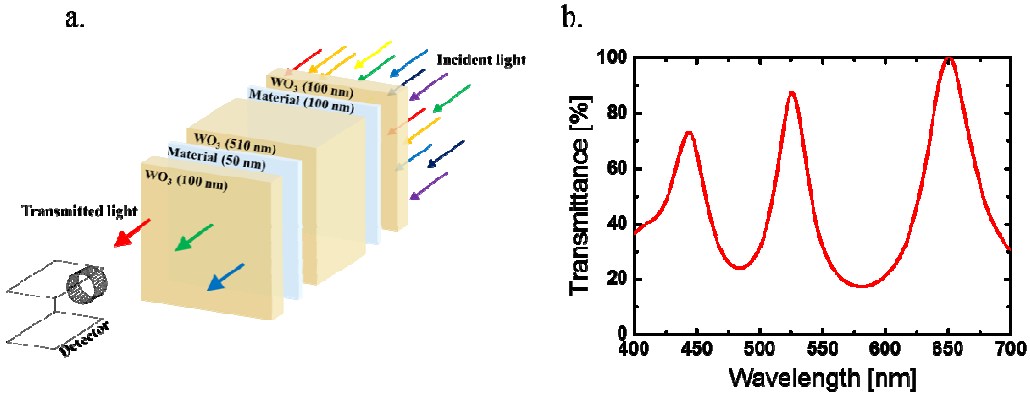

Figure S4. (a) Schematic representation of the modified design of the color purifying filter, and the transmittance measurement method. (b) Simulation transmittance data of the color purifying filter with air instead of Ag thin layers.

If the Ag thin film used in this study is replaced by air, which has a refractive index of 1 without an imaginary part, as shown in Figure S4a, the transmittance can be obtained as shown in Figure S4b. Although there is room for further improvement because the structure described herein is not optimized, the transmittance at the region of red adjacent from 650 nm is already almost 100 %. These results suggest that the transmittance of the CPF may be improved, achieving a sharper, high transmittance characteristic, through material and structure design.