

Corrections

Corrections to “Designs of High Color Purity RGB Color Filter for Liquid Crystal Displays Applications Using Fabry–Perot Etalons”

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Abstract—We correct some mistakes in the published paper [JDT 8(4), 174-178 (2012)]. Equation (1), RGB spectra (see Fig. 4), and some minor mistakes have been corrected. On the other hand, the main descriptions, reported mechanisms, figure captions, and others are kept unchanged.

The equation (1) in the original version has inadvertently omitted the absorption (A). The equation should be corrected as the following one [1].

$$I_T = I_0 \left(\frac{1 - A - R}{1 - R} \right)^2 \times \frac{1}{1 + F \sin^2 \frac{\Delta}{2}} \quad (1)$$

Therefore, all the values of the curves shown in Figs. 1(b), 2, 3(b), 4(a) and 4(b) should multiple the parameter, $\left(\frac{1-A-R}{1-R} \right)$.

The RGB spectra (Fig. 4) have been replaced by the correct ones [2]. Thus, the RGB curves of the first design [Fig. 1(b)] should be corrected to obtain the maximum light utilization efficiency. Thus, the ordinary and extraordinary refractive indices of the original LCs are revised to be 1.52 and 2.11, respectively. The corresponding effective refractive indices of LCPs in sections A , B and C are corrected as 2.11, 1.753, and 1.52, respectively. Moreover, the produced transmission spectra of the cell are shown in Fig. 1(b) when the phase change caused by LCPs is 2π (633 nm). Accordingly, an additionally undesirable transmission peak appears at 422 nm for R-CF.

Thus, Figs. 1(b), 2, 3(b), 4(a) and 4(b) are re-plotted as shown below. Additionally, because Figs. 4(a) and 4(b) are revised, Tables I and II should be corrected.

The spelling of “slid” in the caption of Fig. 4 in the original version should be “solid”. Moreover, an extra dot in the sentence (p. 175) “. . . adjacent rays in the LCPs bulk..” should be eliminated. The adverb “slightly” in the sentence (p. 176) “. . . the color purity slightly decreases with the decrease..,” should be deleted. It should be noted that the main descriptions, reported mechanisms, figure captions and others are kept unchanged.

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Color versions of one or more of the figures are available online at <http://ieeexplore.ieee.org>.

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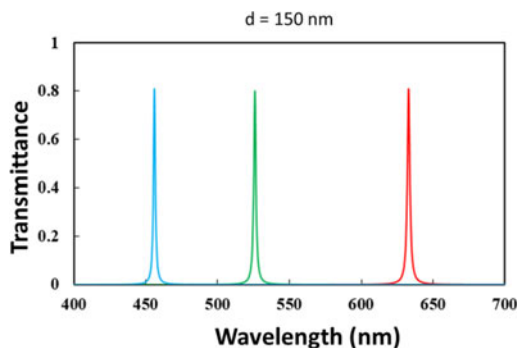


Fig. 1. (b) Transmissive spectra of the proposed high color purity RGB-CF.

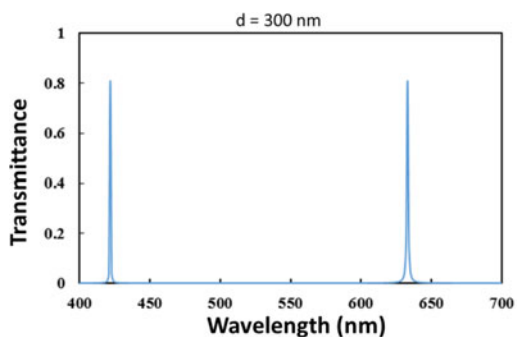


Fig. 2. Transmissive spectra of Fig. 1(a) with a cell gap of 300 nm.

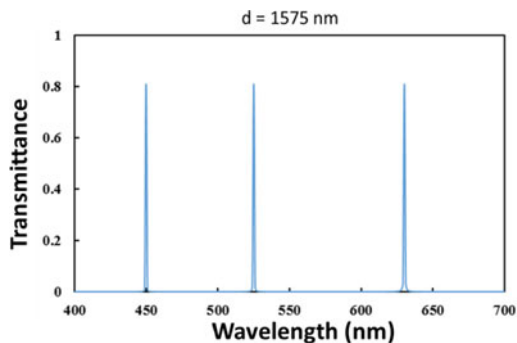


Fig. 3. (b) Transmissive spectra of the proposed large cell gap of high color purity RGB-CF.

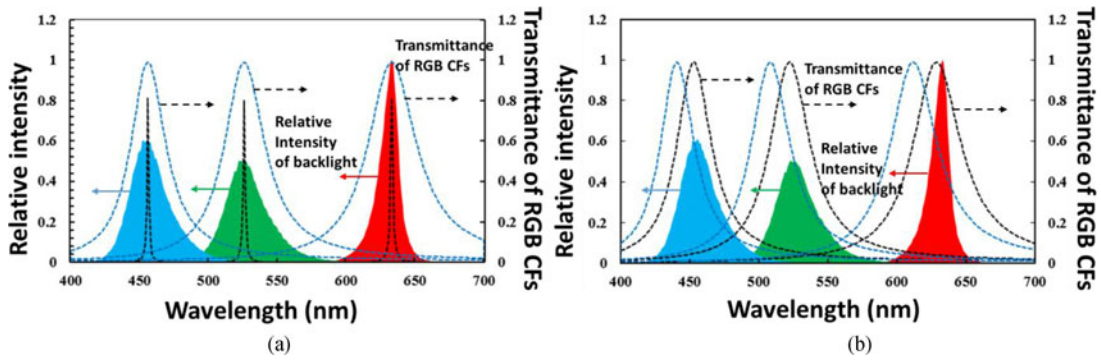


Fig. 4. Solid RGB area and black (blue) dashed line in (a) represent the spectra of the RGB backlight, and transmittance distribution of the RGB-CFs in which the reflectance of the DMFs is 0.99 (0.81), respectively. The solid RGB area and black (blue) dashed line in (b) represent the spectra of the three peaks backlight, and transmittance distribution of the RGB-CFs in which the cell gap is 149 nm (145 nm), respectively.

TABLE I
CALCULATED RESULTS OF BACKLIGHT UTILIZATION EFFICIENCY (BL-U-E) WITH REGARD TO THE REFLECTANCE OF THE DMFS OF THE FIRST DESIGN OF RGB-CFS

Reflectance	0.99	0.94	0.91	0.87	0.85	0.81	0.75	0.7	0.65	0.5	0.3
Transmittance parameter	0.810	0.967	0.978	0.985	0.987	0.990	0.992	0.993	0.994	0.996	0.997
BL-U-E(%)	2.5	12.9	17.0	21.4	23.3	26.6	31.3	35.0	38.8	50.7	68.4

TABLE II
CALCULATED RESULTS OF BACKLIGHT UTILIZATION EFFICIENCY (BL-U-E) WITH REGARD TO THE TOLERANCE OF CELL GAP OF THE FIRST DESIGN OF RGB-CFS. THE ACCURATE CELL GAP IS 150 NM

inaccuracy of cell gap, Δd (nm)	5	3	1	0	-1	-3	-5
BL-U-E(%)	19.7	23.2	26.0	26.6	26.5	24.3	20.7

REFERENCES

[1] G. R. Fowles, *Introduction to Modern Optics*. Mineola, NY, USA: Dover Publications, 1975.

[2] T.-L. Chiu and J.-H. Lee, "Color gamut variation of LED-lit LCD at different module temperatures," *Opt. Commun.*, vol. 283, pp. 373–378, Oct. 2010.