

Light Adaptable Display for Future Advertising Service

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We have proposed and demonstrated a new structure of a light adaptable display (LAD) for future advertising service with minimum power consumption. A organic light emitting diode with colour reflection (coloured OLED) has been applied for reflective and emissive mode device and a guest host liquid crystal device (GH-LC) has been adopted for a light shutter device. The current efficiency and reflectance of the colored OLED were 35.15 cd/A at 457 cd/m² luminance and 63% for yellow color, respectively. The measured contrast ratio of GH-LC was 15.5 :1 at the pixel area. Transparent oxide thin film transistors have been used for back-plane and its average mobility was 9.08 cm²/V·s with 0.5 standard-deviation, respectively. Through the optimization of the fabrication process and the structures of each device, we have successfully demonstrated the LAD adaptively operating according to environmental illuminance from dark to 10,000 nit. Moreover, we proposed the new driving method of LAD for minimizing the power consumption. To develop the driving scheme, we measured the illuminance according to time and location, and deduce the appropriate timing of mode conversion and the optimum lumance of LAD for securing a visibility, based on the measured data.

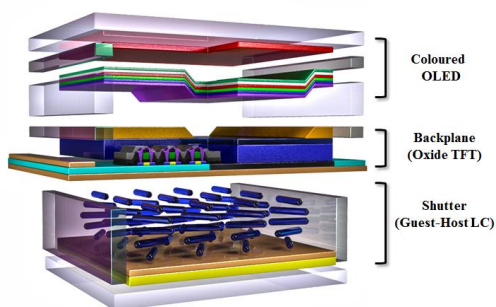
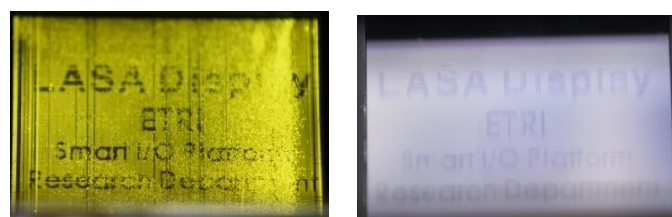


Fig. 1. The proposed structure of light adaptable display

Table 1. Specifications of light adaptable display

Item	Spec.	Item	Spec.	
Diagonal Size	3.5"	Emissive Mode	Device	Coloured OLED
Resolution	QVGA(mono)		Pixel	2TFT 1CAP
Backplane	Oxide TFT	Reflective Mode	Device	GH-LCD
Substrate	Glass		Pixel	1TFT 1CAP



(a) Emissive mode (@ 200 nit) (b) Reflective mode (@ 10,000 nit)

Fig. 2. Operation image of light adaptable display

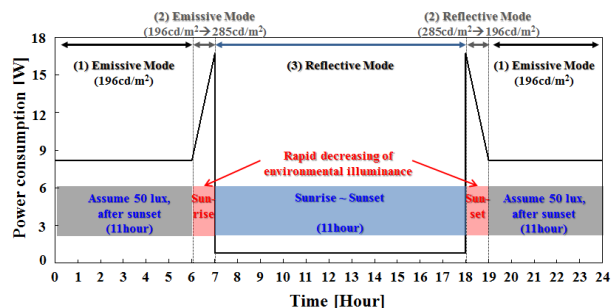


Fig. 3. Driving scheme of light adaptable display

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