and the patterned regions, respectively. Similarly, under the RHC polarizer as shown in Fig. 3(b), the dark stripes and the reddish stripes depict the patterned regions and the non-patterned regions, respectively. Wearing eyeglasses with the orthogonal circular polarizations, the left and right images were divided by the patterned retarder and the 3D images were constructed.

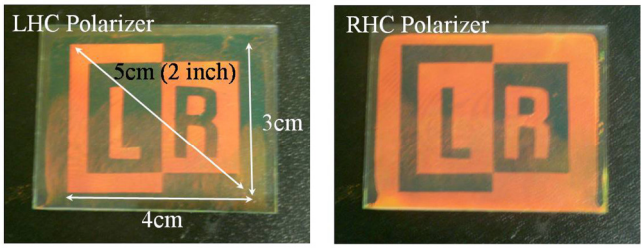

Fig. 4. Prototype images of our reflective 3D ChLC cell in a stereoscopic type using the circularly polarized eyeglasses: images under (a) left-handed circular polarizer and (b) left-handed circular polarizer.

Figure 4 shows a 2-inch prototype of the reflective 3D display with the inner patterned retarder. To demonstrate two different images for left and right eyes, we directly patterned the LCP retarder by using the UV exposure to the RM layer through the photo-mask. Therefore, the inverted images were observed under the LHC polarizer and the RHC polarizer. The maximum reflectance and the contrast ratio were measured to be about 32% and 15:1, respectively. In the real display mode, the LCP retarders are formed at one of two subpixels in each pixel. The images for left and right eyes are constructed from each subpixel in a whole panel. Operating the ChLC, their memory characteristics could be useful for low power consumption.

4. Conclusion

In this work, we proposed the reflective stereoscopic 3D display based on the ChLC panel with inner patterned retarder acting as the half-wave retarder. The inner patterned retarder was fabricated by the selective UV exposure to the RM through an amplitude photo-mask. Since the ChLC mode with the polarization-selective reflectance, no polarizer is required and thus the inner patterned retarder is applicable in the stereoscopic 3D display. In addition, the ChLC mode with the wavelength-selective reflectance gives rise to elimination of the color filter and the backlight unit. Also, a multi-pitch stabilized ChLC mode [15] would be adoptable to produce a full color ChLC display under a single panel configuration in this stereoscopic 3D display. This reflective 3D display proposed here is expected to create the novel 3D displays with low power consumption.

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