Various imaging techniques using polarization color

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Introduction

Retarder films exhibit polarization color by polarizer. We produced polarization colors with dual images using retarder films and polarizers. We calculated the polarization states by using Poincare sphere, and produced three types of polarization color devices: Polarization image with viewing angle dependence, polarization image with stacking order dependence, and polarization visual cryptography with stacking position dependence. In this paper, we show the experiment of polarization image with stacking order dependence.

Experimental methods

Polarization image with stacking order dependence is fabricated. λ/4 retarder films and λ retarder films are used. Cutting machine is used when we cut out the images. Two sets of films are sandwiched with crossed-polarizer shown in fig. 1. Images 1and 2 are produced by using various retarder films, and λ /4 retarder films are set to 45° and 135° to image 1 and 2, respectively. Figure 2 shows the dual view color image with stacking order dependence. By changing the stacking order of the films, different images are observed.

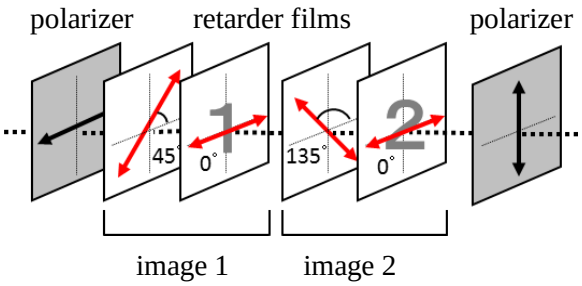

Fig. 1 Optical setup for dual view image.

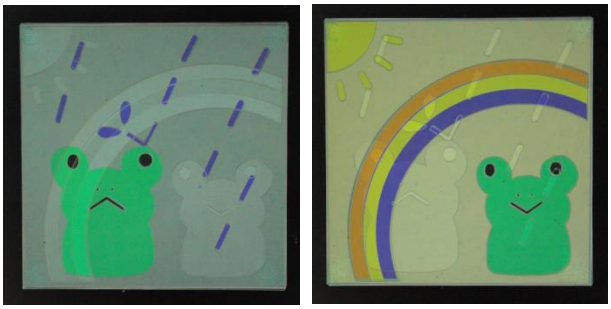

Fig. 2 Example of dual view color image.

Conclusions

We have produced an effective display method using polarization color. We produced three types of dual images using polarization color. Polarization image with stacking order dependence was discussed here. Other types of dual view images are discussed in this presentation. This technique is simple and can be applied for security, entertainment, and educational use.