

# Temperature Independent Chiral Pitch Characteristics for Full Color Cholesteric Liquid Crystal Display

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Cholesteric liquid crystals (ChLC) have attracted great interest for color display devices without optical components owing to their characteristics of selectively reflecting a specific wavelength associated with the LC helical pitches [1-3]. The wavelength of the reflected light and corresponding color of the wavelength are directly governed by a helical pitch of the ChLCs. However, pitches of the ChLCs are changed by temperature due to thermal expansion and solubility of chiral agents.

In this work, we propose a temperature independent pitch ChLC display device using chiral dopant mixture. Two different chiral dopants which has opposite tendency of reaction with temperature variation are mixed with proper conditions [4]. Contrast to conventional ChLCs with one chiral dopant and host LC, our proposed LC device represent temperature independent pitch characteristics. And, by dividing the each color pixels, full color ChLCs in a single substrate are accomplished for display device applications.

## References

- [1] D. W. Berreman et al., *Phys. Rev. Lett.* **25**, 577 (1970)
- [2] S. P. Paltoet al., *J. Experimental and Theoretical Physics*, **74**, 260 (2002).
- [3] R. A. van Delden et al., *Adv. Funct. Mater.* **13**, 319 (2003).
- [4] K. S. Shin et al., *Opt. Exp.* **22**, 15467 (2014).