

Alignment of LCs using polyimide doped with SiO₂ nanoparticles for a high-transmittance LCD

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As demand for high-quality display devices is increased recently, more attention has been given to the realization of an ultrahigh resolution display panel. Because the decrease in pixel size for high-resolution LCDs results in a small aperture ratio, researches to increase the transmittance of an LCD panel are needed.

In this work, we demonstrate a high-transmittance LC cell fabricated by using polyimide doped with SiO₂ nanoparticles. There have been many researches about doping nanoparticles into LCs or polyimide to obtain superior electro-optical characteristics in a LC device [1-3]. However, doped nanoparticles have been used to reduce the response time of LCs in most of the studies. We doped nanoparticles to polyimide for homogeneous alignment of LCs and measured electro-optic characteristics of the LC cell fabricated by using substrates coated with the mixture. We confirmed that the transmittance of a LC cell fabricated using substrates coated with the mixture was higher than that of LC cells fabricated using substrates coated with pure polyimide, as shown in Figure 1. To analyze the result of the increased transmittance, we examined the order parameter of the fabricated cells and investigated the surface morphology of the fabricated cells using atomic force microscopy (AFM).

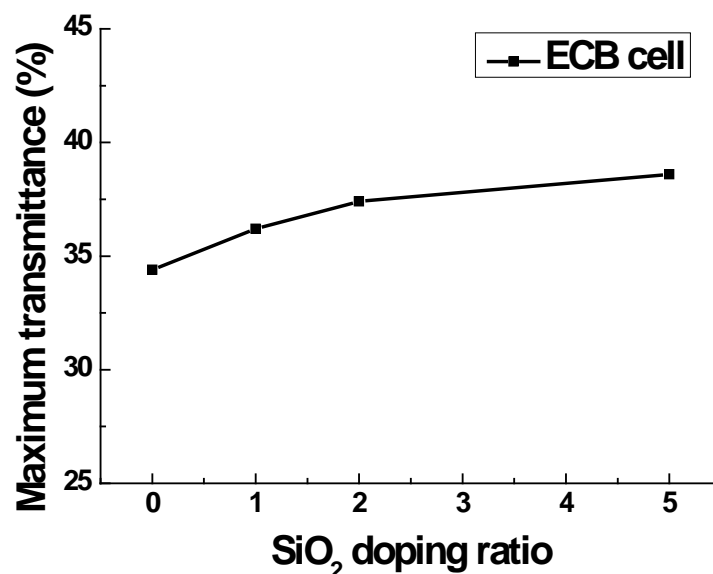


Fig. 1. Measured transmittance curve of the fabricated cells as functions of SiO₂ concentration.

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References

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