

Synthesis of hockey stick-shaped reactive mesogens and their E/O-property in VA mode cell

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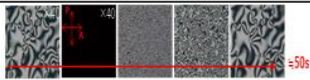
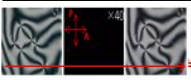
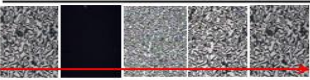
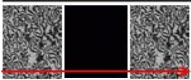
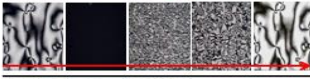
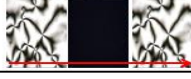
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Response time is a drawback of LCD, because it is not enough fast to ultrahigh quality moving pictures. Recently, to solve this problem, the new method for surface control using reactive mesogens (RMs) has been proposed. The RMs are liquid crystalline monomers which contain polymerizable groups such as acrylate end groups. Therefore, RMs can be polymerized with one another in the presence of photo-initiators and UV light to form a LC network. More recently, it has been reported that the pretilt angle can be controlled by polymerization of a RM mixture with a host LC or alignment agent in the presence of electric field.^[1] If the pretilt angle can be adjusted optimally, threshold voltage can be decreased, and thus the response time may be drastically improved.^[2]

In this study, we have synthesized and characterized two RMs which contain hockey stick-shaped mesogen with 2,3,4- (1a) or 1,3,5-trifluorinated phenyl terminal group (2a). And, we mixed the RMs with a vertical alignment agent (PI, AL60702) for fabrication of VA mode cell. Solution of RMs 1a, 1b and commercial 257 with 2 wt% PI mixtures, respectively, were spin coated onto the substrate and cured by UV irradiation. Then, coating tendency and E/O properties for the mixtures of RMs with PI were measured. As the result of time resolution, the LC host (MLC-6608) showed faster response in the VA cell after curing by UV irradiation than before curing.

Table 1. The time-resolved optical textures under crossed polarizers for the VA mode with 10 V

PI	UV	LC	PVA POM Image
AL60702+ RM257 (2.0 wt.%)	Before	MLC-6608	
	After (30min)		
AL60702+ RM 1a (2.0 wt.%)	Before		
	After (30min)		
AL60702+ RM 1b (2.0 wt.%)	Before		
	After (30min)		

References

1. Y.-J. Lee, Y.-K. Kim, S. I. Jo, J. S. Gwag, C.-J. Yu, and J.-H. Kim, *Optics Express*, **17**, 10298 (2009).
2. S.-G. Kim, S.-M. Kim, Y.-S. Kim, H.-K. Lee, S.-H. Lee, G.-D. Lee, J.-J. Lyu, and K.-H. Kim, *Appl. Phys. Lett.*, **90**, 261910 (2007).