

# 플렉서블 액정 디스플레이를 위한 PDMS 기반 pixel-wall bonding 기술

김영환, 박홍규, 오병윤, 김병용, 백경갑\*, 서대식  
연세대학교, 대전대학교\*

## PDMS-based pixel-wall bonding technique for a flexible liquid crystal display

Young-Hwan Kim, Hong-Gyu Park, Byeong-Yun Oh, Byoung-Yong Kim,  
Kyeong-Kap Paek\*, and Dae-Shik Seo  
Yonsei University, Daejin University\*

**Abstract** : Considerable attention has been focused on the applications of flexible liquid crystal (LC)-based displays because of their many potential advantages, such as portability, durability, light weight, thin packaging, flexibility, and low power consumption. To develop flexible LCDs that are capable of delivering high-quality moving images, like conventional glass-substrate LCDs, the LC device structure must have a stable alignment layer of LC molecules, concurrently support uniform cell gaps, and tightly bind two flexible substrates under external tension. However, stable LC molecular alignment has not been achieved because of the layerless LC alignment, and consequently high-quality images cannot be guaranteed. To solve these critical problems, we have proposed a PDMS pixel-wall based bonding method via the IB irradiation was developed for fasten the two substrates together strongly and maintain uniform cell gaps. The effect of the IB irradiation on PDMS with PI surface was also evaluated by side structure configuration and a result of x-ray photoelectron spectroscopic analysis of PDMS interlayer as a function of binder with substrates. large number of PDMS pixel-walls are tightly fastened to the surface of each flexible substrate and could maintain a constant cell gap between the LC molecules without using any other epoxy or polymer. To enhance the electro-optical performance of the LC device, we applied an alignment method that creates pretilt angle on the PI surface via ion beam irradiation. Using this approach, our flexible LCDs have a contrast ratio of 132:1 and a response time of about 15 ms, resulting in highly reliable electro-optical performance in the bent state, comparable to that of glass-substrate LCDs.

**Key Words** : flexible, cell gap, pixel-wall

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