

Development of Switchable Anti-peeping Devices

Le Zhou^a, Tingjun Zhong^b, Cheng Han^a, Haipeng Ma^a, Lanying Zhang^{a*}

^a Department of Materials Science and Engineering, College of Engineering, Peking University, Beijing, China

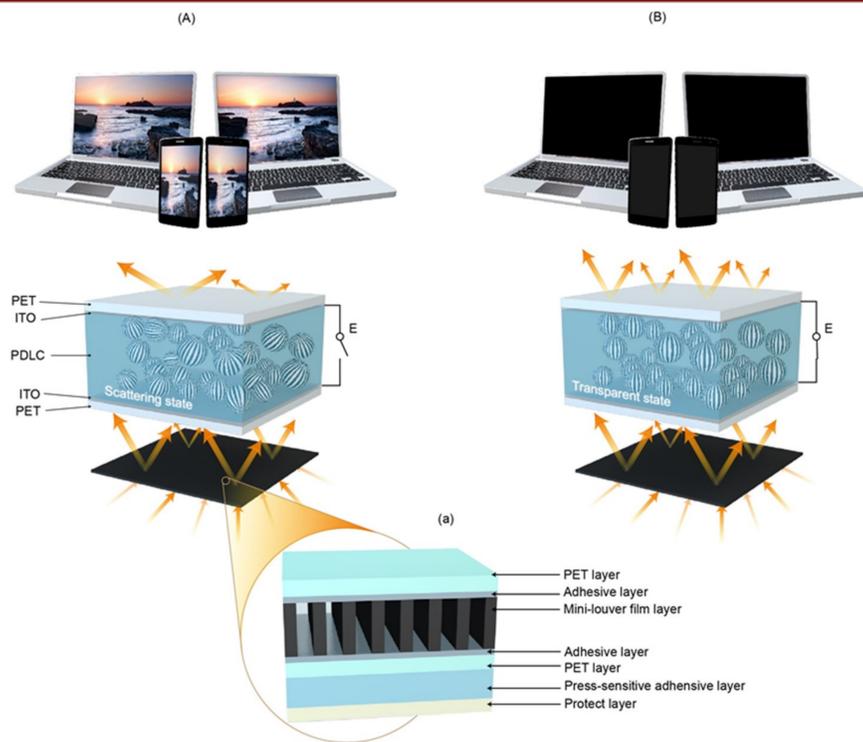
^b Department of Chemistry, College of Science, China Agricultural University, Beijing, China

Contact: zhanglanying@pku.edu.cn

Abstracts

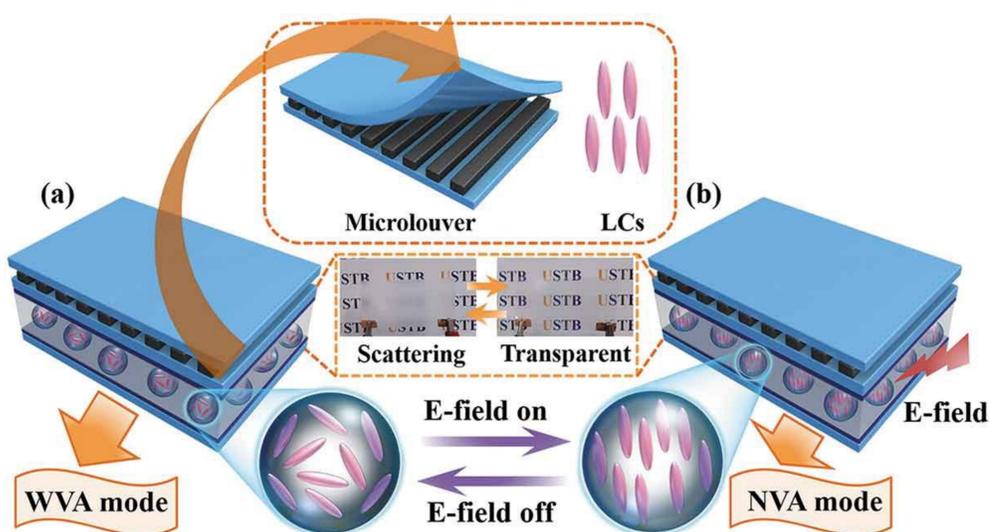
Polymer/liquid crystal composite films can be electrically switched between a zero-field opaque state and an activate clear state. The physical performance of polymer/liquid crystal composite films has led to their use in a wide range of applications, such as smart windows, bistable devices and optical diffusers. In order to widen the applications, we have fabricated four kinds of switchable anti-peeping devices, which has contributed to our privacy protection.

Type I switchable anti-peeping device



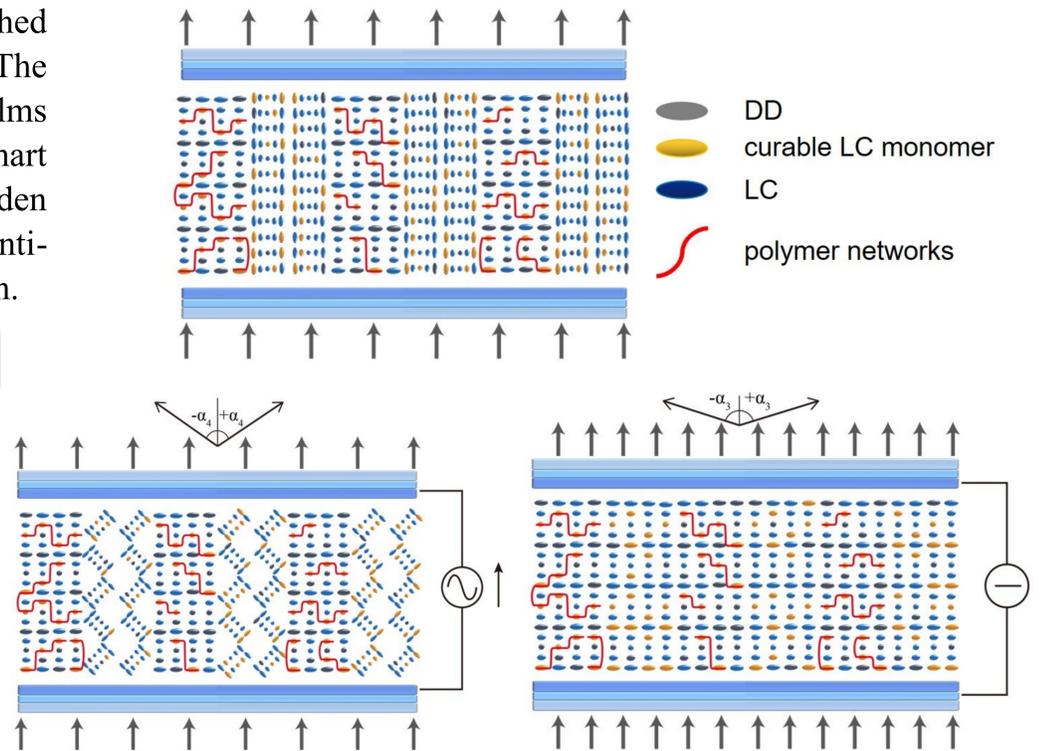
A novel switchable viewing angle film has been reported to make the viewing angle of an LCD electrically switchable between $\pm 30^\circ$ and $\pm 60^\circ$.

Type II switchable anti-peeping device



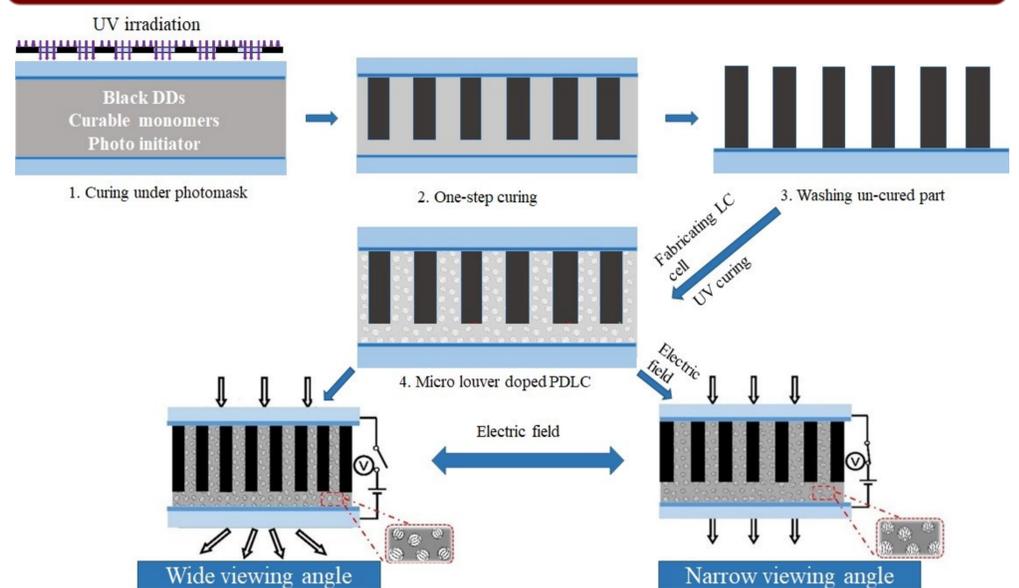
This work proposes a novel method for fabricating a controllable anti-peeping device with a laminated structure of micro louver and a polymer dispersed liquid crystal (PDLC) film. The viewing angle ranges of the controllable anti-peeping device can be dynamically tuned by varying dimensions of the micro louver structures and applying various voltages across the PDLC film from 0 V to 8 V.

Type III switching anti-peeping device



An electrically switchable viewing angle device that fabricated by dichroic dyes doped polymer stabilized cholesteric liquid crystals (DD-PSCLCs) has been developed.

Type IV switching anti-peeping device



Here, we have developed an electrically switchable viewing angle device that fabricated by black dichroic dyes doped polymer dispersed cholesteric liquid crystals (DD-PSCLCs). By varying dimensions of the fabricated micro louver structures and voltages of electric field, view angle of the device can be tuned between wide viewing angle and narrow viewing angle.

Acknowledgements

This work was supported by the the National Key R&D Program of China (2019YFC1904702, 2018YFB0703704), the National Natural Science Foundation of China (NSFC) (Grant no. 51927806), the joint fund of the ministry of education for equipment pre research (6141A020222).