

Multicolor, Dual-Image, Printed Electrochromic Displays Based on Tandem Configuration

김건우, 김진곤^{1,†}

포항공과대학교 대학원; ¹포항공과대학교

(jkkim@postech.ac.kr[†])

We prepared multicolor, dual-image, printed electrochromic displays (ECDs) based on three hybrid electrodes containing mesoporous titanium dioxide (TiO₂) functionalized with various phosphonated viologens. When the hybrid electrodes are employed in ECDs, diverse colors (e.g., cyan, green, magenta, emerald, and yellow) are obtained depending on the electron affinity of the N-substituents of the viologen. We also introduced a tandem configuration by inserting double-sided fluorine-doped tin oxide electrode (dsFTO) between two hybrid electrodes to overcome the limitation of the achievable colors (one or maximum two) in a single cell. To extend the functionality of tandem ECDs, the patterned hybrid electrodes are fabricated using electrostatic-force-assisted dispensing printing and applied to ECDs. The resulting devices alternately exhibit two pieces of information in a variety of colors, in which the device operation is controllable in accordance with the direction of applied voltage and the combination of hybrid electrodes. The printed, tandem structured ECDs are expected to have high potential for next-generation transparent displays