

High Contrast and Low-power Consuming Electrochromic Polymer Windows

김영훈, 한민수, 이우재, 김은경[†]
연세대학교
(eunkim@yonsei.ac.kr[†])

Electrochromic devices (ECDs) change their color depending on the applied potential, thus have been actively pursued because of their various potential applications, such as smart windows, optical modulators, e-paper. In terms of the materials for these applications, fast response, and high color contrast, and stability are key elements to becoming a successful candidate. Further, to access the portable applications, lightness, flexibility, and low-power consumption are desired. To meet these needs, π -conjugated polymers (CPs) have intensively researched as a promising materials. Of the various CPs, the poly(3,4-propylenedioxythiophene) derivatives (PRs) can reach high color contrast maintaining the high cycle stability. We synthesized several PRs for high color contrast and bistability. Further control on the potential at both working electrode and counter electrode through charge balancing reactions afforded ECDs with a high color contrast, long stability, and high bistability. Here, the optimum material combination will be discussed along with charge balancing mechanism and demonstrate the application of the low-power consuming display into an automatic electrochromic windows.