

Optimal design of all-solid polymer electrolytes for efficient flexible electrochromic device

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Electrochromic device (ECD) can efficiently control the transmittance of visible light by the redox reactions of the electrochromic materials by applying a voltage. High performance ECDs should possess high optical contrast, fast bleaching/coloring rates, excellent chemical stability and long cycle life. Electrolyte is the key component having the greatest impact on the ECD performance. In view of durability, obviously, it is preferable to use quasi-solid or solid polymer electrolytes rather than liquid electrolytes. In particular, flexible ECD using a plastic substrate requires the use of a solid polymer electrolyte with good adhesive properties. Therefore, in this study, all-solid polymer electrolytes with excellent adhesion was developed using polyvinyl butyral (PVB) as a base material. In addition, it was possible to improve their adhesion and ionic conductivity by using a suitable plasticizer. As a result, the ECD employing the prepared electrolyte showed excellent optical density and fast bleaching/coloring rates. This work was supported by the Environmental Industry Advancement Technology Development Project funded by the MOE (No.2017000140002/RE201702218).