Thermo- and electro-dual responsive ion gel for high-performance electrochromic devices with outstanding electrochromic switching and long-term stability

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Abstract

We present a new strategy for improving the thermo- and electro-chromic properties of single-layered ion gels for electrochromic devices (ECDs) by incorporating viologen, ferrocene and poly(ionic liquid) as electrolyte. The prepared ECDs exhibit tunable transparency and electrochromic properties due to the thermo-sensitive property of newly synthesized poly (ionic liquid) and the electrochromic property of viologen moieties, respectively. Poly(ionic liquid) contributed to the suppression of dimer production. The suppression of dimer formation can provide ECDs with improved colouration efficiencies, faster switching times, and longer cycle lives, and potentially reduce costs. In addition, the fabricated device maintained its switching stability for up to >2000 cycles with a fast switching speed.

Keywords: Ion gel electrolytes; Viologens; All-in-one device; Electrochemical displays.