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Solid State Electrochromic Devices Based on PPV Polymers
AMANDA HOLT, JANELLE LEGER, SUE CARTER, University of California at Santa Cruz — We present a solid state electrochromic device structure employing a PPV-based light-emitting polymer more commonly used in devices such as LED's and photovoltaics. We explore device performance as a function of salt type, salt concentration and polymer layer thickness. These devices display high reversibility, dramatic optical contrasts, and low operating voltages comparable to state of the art conducting polymer electrochromic devices. We found that salts employing organic anions display slightly improved optical contrasts. Also, thicker devices, higher voltages and higher salt concentrations produce higher optical contrasts at the cost of slowed switching speeds. Apart from novel electrochromic applications these devices also provide insight into the fundamental process of doping in PPV-based polymer solid-state devices, crucial knowledge for the development of applications of polymer light emitting electrochemical cells (LECs), actuators and sensors. We explore the dependence of PL efficiency on doping level and discuss possible implications for the doping of PPV polymers in a solid state device configuration.

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