

Color Purity in Multicolored Dual Polymer Electrochromic Window Devices on ITO and Single-Walled Carbon Nanotube Electrodes

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The typical dual polymer absorptive/transmissive window device (ECD) configuration consists of two facing transparent electrodes covered with complementarily-colored electrochromic polymers, separated by a layer of gel electrolyte to insure switching of the device between a colored and a bleached state.

In this work, we report the construction and characterization of dual polymer window ECDs using cathodically coloring polymers as functional layers for the working electrode and non-color changing (NCCP) polymers as electroactive materials for the counter electrode on ITO and SWNT/glass and plastic substrates. The polymers are solution processable and form highly homogeneous films via spray-casting. This approach allows us to achieve enhanced transmittance in the bleached state along with maximum contrast and to retain highly saturated (pure), vibrant color of the devices. This is almost impossible in the case of the combination of two electrochromic polymers having different color hues. Fast switching and high stability of the devices suggest their utility in broadband electrochromic applications.