

Color and transparency tuning of PEDOT:PSS films upon the change of doping states.

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Conductive polymers have gotten a lot of attention with the advantage that it can be tailored as desired in a molecular level. Poly(3,4-ethylenedioxythiophene):poly(styrene sulfonate) (PEDOT:PSS) is one of the most successful examples among the conductive polymers. Highly doped PEDOT:PSS thin film has light blue color and transparent. The color can be changed to purple and opaque upon de-doping of PEDOT with simple chemical treatment. In this study, we have de-doped PEDOT:PSS thin films and investigated their optical properties. Non-treated PEDOT:PSS film transmits over 80% in 680 nm wavelength and absorbs broad range in the near-infra-red region. De-doping of PEDOT:PSS with a base resulted in a reduction of absorption in NIR region and evolution of peaks in 600–800 nm. This change originates from the conversion of the bi-polaron states into polaron and neutral states. As a result, the de-doped thin films became deep blue and opaque.