

Control of ionic distributions and electrochemical redox states in thin films of conjugated polymer for electronic devices

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One strategy in organic electronics is to integrate ionic components into the electronic systems of conjugated polymers for diverse applications ranging from low-voltage transistors to deformable electronics, to chromic displays, to sensors, and to memory devices. In this talk, we present our work on electrochemical transistors and spectroelectrochemical characterization of conjugated polymers in contact with an electrolyte. Our electrochemical transistors consist of well known polythiophene derivatives and a solid-state iongel. We show that, through application of an overcoating layer or blending of electronic and ionic materials, the electrical characteristics such as current modulation and hysteresis can be tuned. Spectroelectrochemical analysis reveals in-situ changes of polymer states during device operations. Static and dynamic responses of the devices are also studied to quantify the transient memory effects and to seek the relevant applications.