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Research Interests:

Main Research : Polymer electrolyte as solid state batteries 、conducting polymer 、electrochromic device and polymer light-emitting diodes.

1. Polymer electrolyte for lithium ion batteries :

Batteries fabricate from lithium ion polymer electrolyte have the advantages of light and high energy density when compare to conventional batteries.

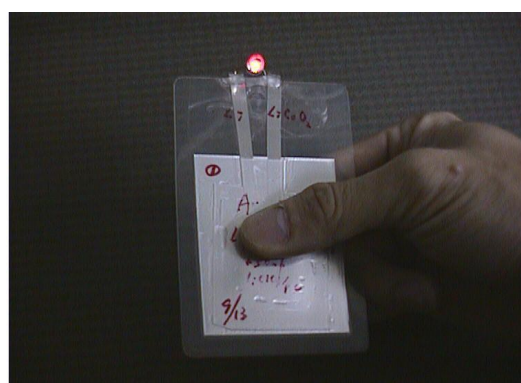
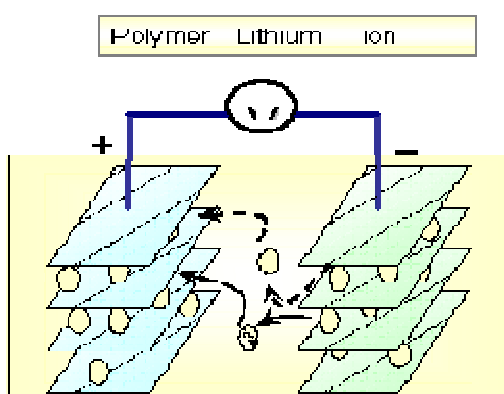


Figure 1. This device could give an output potential of 3.97V and thus able to light a LED

2. Conducting polymers and electrochromic devices :

Conducting polymers are an important and interesting class of organic conductors. Among the member of this family, polyaniline(PANI) is promising due to the ease of preparation and its

high environmental stability. Our researches are focused on PANI and its derivatives which synthesized by electrochemical polymerization or chemical polymerization. We have studied the electrochemical, optical and physical properties of conducting polymer, on the side, we made use of lithium ion batteries, chemical sensor, electrochromic devices and light emitting diodes.

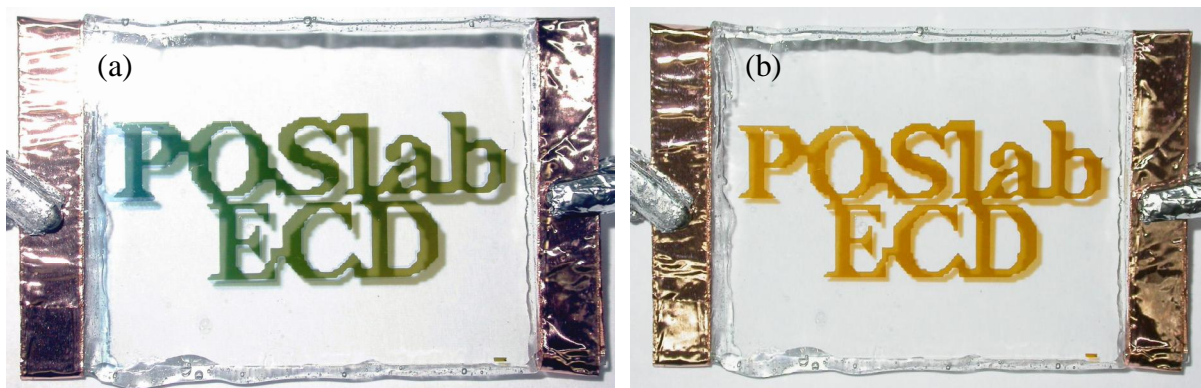


Figure 2. The electrochromic device is fabricated from blend of PDMA and polystyrene sulfonate is found to show good reversible electrochromic behaviors. (a) Colored state (b) bleached state

3. Polymer light emitting diode :

Electroluminescence (EL) polymers are one kind of conjugated polymers and the fabrication of PLED devices exhibit great potential for application. We could obtain different colors from different light emitting materials or blend with another material. Besides, we could achieve moderately low operating voltage and high luminance efficiency by inserting modified conducting polymer and polymer electrolytes or blending with metal nanoparticles. Polarized EL device is also investigated for applications in our researches.



Figure 3. Photographs of PLED Devices with emitting layer are : (a) polyfluorene (b) SY-PPV on ITO glass and (c) MEH-PPV on flexible substrate, the area of each dot is 4 mm^2