

**Ionic Liquid Based Liquid and Polymer Electrolytes:  
Electrochromic Behaviour of PEDOT and Prussian Blue (PB) Films and  
Complete Devices**

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The focus of the Specific Targeted Research European Program “Nanoeffects” in which we are involved concerns electrochromic devices based on plastic substrates. The aim is to produce leakage-free flexible systems with good conductivity, good transparency and high contrast and response time

Ionic liquid (IL) polymer electrolytes present high interest for reliability and safety reasons: non volatility, non flammability, relatively high ionic conductivity of the IL, leakage-free devices. Moreover, hydrophobic ILs such as BMITFSI, avoid water entrance in the electrolytic membrane, which is beneficial to the long term behaviour.

The presentation will first focus on the synthesis and study of the electrochromic materials PEDOT and Prussian Blue (PB) as thin films on FTO-glass and ITO-plastic substrates. These preliminary tests will provide well-known working electrodes (PEDOT) and counter electrode (PB) available to test complete devices.

The results concerning the electrochemical and spectroelectrochemical performances (kinetic of coloration / bleaching, response time, CR, CE, long term and electrochemical cycling properties) of electrochromic materials and devices with IL liquid and polymer electrolytes depending on the ration of polymer (PMMA) in the electrolytic membrane will then be presented.

As an illustration, spectroelectrochemistry measurements of a system made with PEDOT and BP films on FTO on glass and ionic liquid encapsulated in a gel electrolyte with increasing concentration of PMMA are given in figures 1 and table 1.

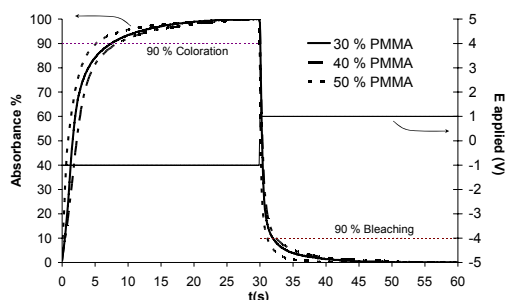


Figure 1: Kinetic of coloration and bleaching depending on wt% PMMA for 0.1M LiTFSI in the membrane (increase of membrane resistivity is compensated by higher [Li salt] in the IL)

X (wt% PMMA)	CR ( $\lambda = 610 \text{ nm}$ )	CE ( $\text{cm}^2/\text{C}$ ) reduction
E applied	-1V +1V	-1V +1V
30	3.8	320
40	2.9	243
50	2.1	195

Table 1: Contrast Ratio (CR) and coloration efficiency (CE) depending on wt% PMMA