

High-Performance Electrofluorochromic Devices Based on Electrochromism and Photoluminescence-active Aromatic Polymers

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Abstract:

This talk will cover a majority of the recent works in our laboratory involving the synthesis and property evaluation of functional high-performance polymers (HPPs) as well as their structural design by using the respective novel arylamine/triphenylamine (TPA) containing monomers. Solution-processable functional HPPs were successfully prepared as the application of AIE-based PL luminescent and electrochromic materials with interesting color transitions and good electrochromic reversibility in the visible region or NIR range, electrofluorochromic and polymer memory devices. The relation between structures and properties of the resulted functional high-performance polymers will be discussed in terms of their functionality.

Results and Discussion

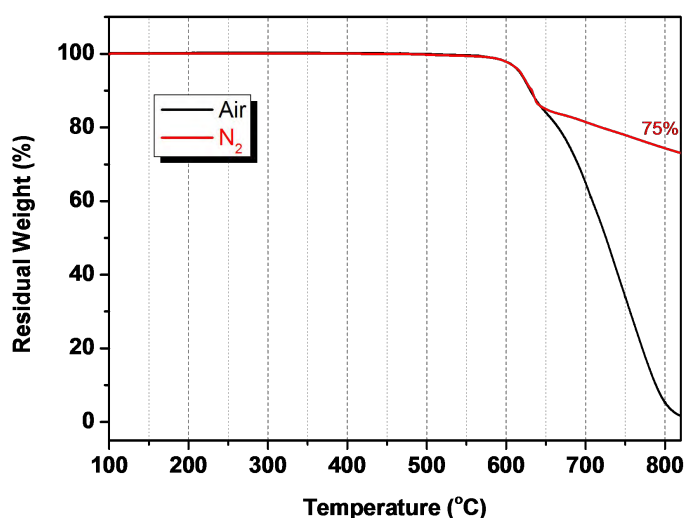
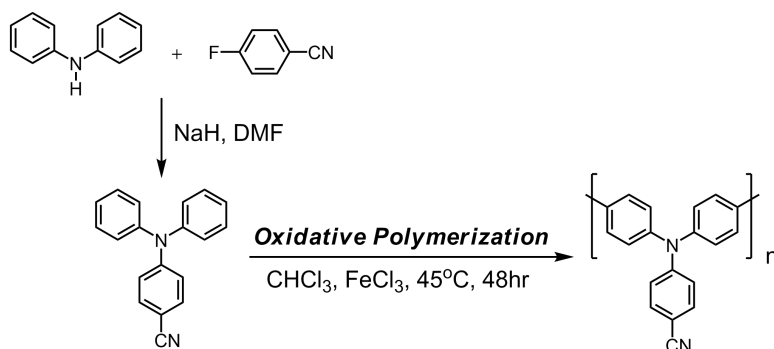


Figure 1. TGA thermograms of CN-PTPA at a scan rate of 20 °C/min.

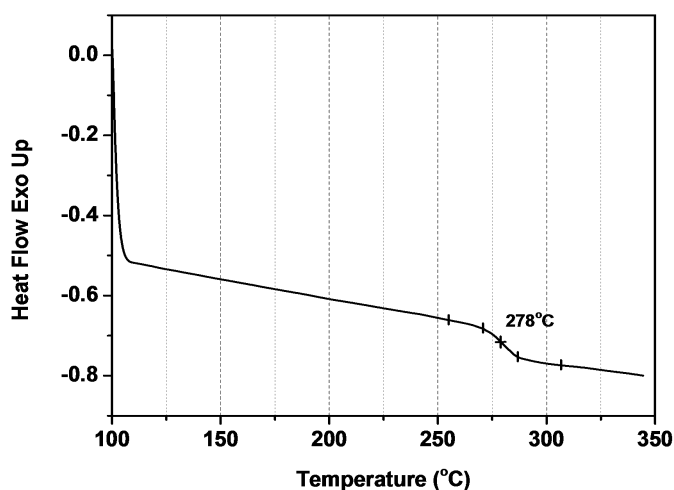


Figure 2. DSC thermogram of **CN-PTPA** at a scan rate of 20 °C/min.

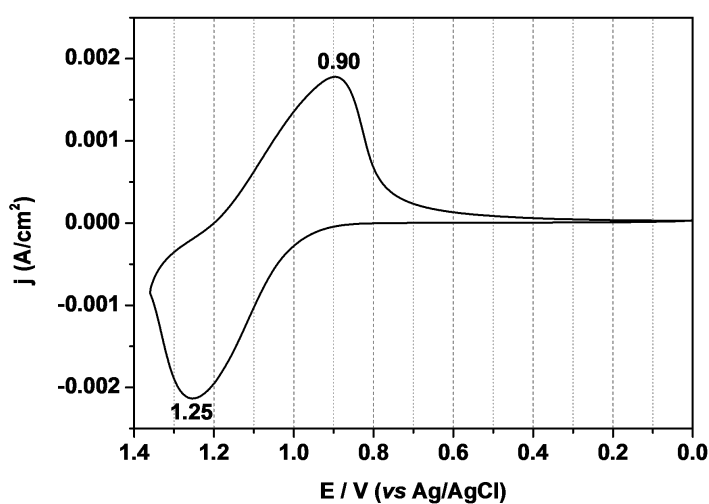


Figure 3. Cyclic voltammetry diagram of **CN-PTPA** film on an ITO-coated glass substrate in 0.1 M TBAP/CH₃CN at a scan rate of 50 mV/s.

Table 1. Inherent viscosity and molecular weights of the polymer **CN-PTPA**

Polymer	yield	η_{inh}^a (dL/g)	M_w^b	M_n^b	PDI ^{b)}	Solvent ^{c)}		
						DMAc	NMP	CHCl ₃
CN-PTPA	80 %	0.27	21000	9100	2.30	++	++	++

^{a)} Measured at a polymer concentration of 0.5 g/dL in NMP at 30 °C; ^{b)} Calibrated with polystyrene standards, using NMP as the eluent at a constant flow rate of 1 ml/min at 40 °C. Polydispersity Index (M_w/M_n); ^{c)} The solubility was determined with 5 mg sample in 1 ml of solvent. ++: soluble in room temperature

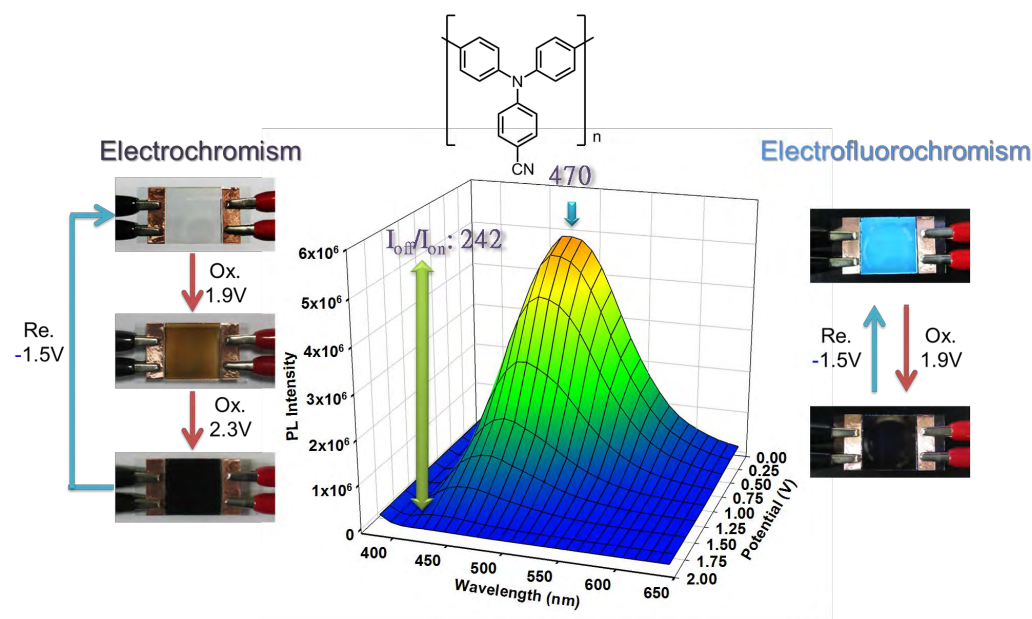
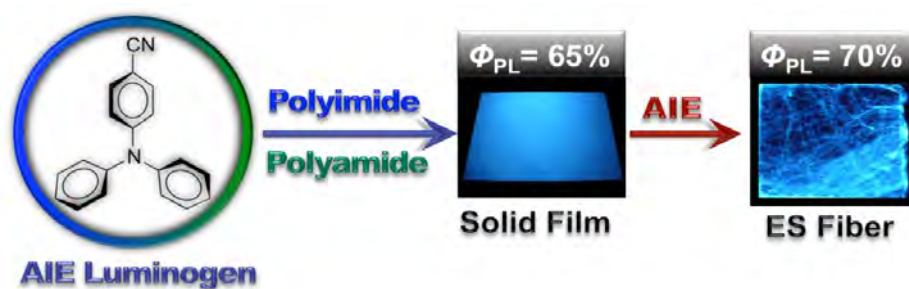


Figure 4. Electrofluorochromic and electrochromic behaviors of CN-PTPA/HV device. (Ref 7)



AIE-active PL fibers (ref 6)

References:

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