

Redox-active and Electrochromic Poly(amide-triarylamine) Films Generated by Electropolymerization

Bei-Yu Lin (林倍瑜), Sheng-Huei Hsiao (蕭勝輝)*

Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taipei, Taiwan

E-mail: shhsiao@ntut.edu.tw

ABSTRACT. Two diamide derivatives, coded as **TPPA-(TPA)₂** and **TPPA-(NPC)₂**, containing *N,N,N',N'*-tetraphenyl-1,4-phenylenediamine (TPPA) centers and triphenylamine (TPA) or *N*-phenylcarbazole (NPC) terminal groups were synthesized. The electrochemical coupling reactions of the triphenylamine and carbazole end-groups produce the electroactive polymer film directly on the surface of the ITO/glass electrode from these two diamide compounds in the electrolyte. The electro-generated polymer films showed reversible redox behavior, multi-colored electrochromism, high coloration efficiency, and good cycling stability. Single-layer electrochromic devices using the electrodeposited polymer films as active layers were fabricated and tested as preliminary investigation for their electrochromic applications.

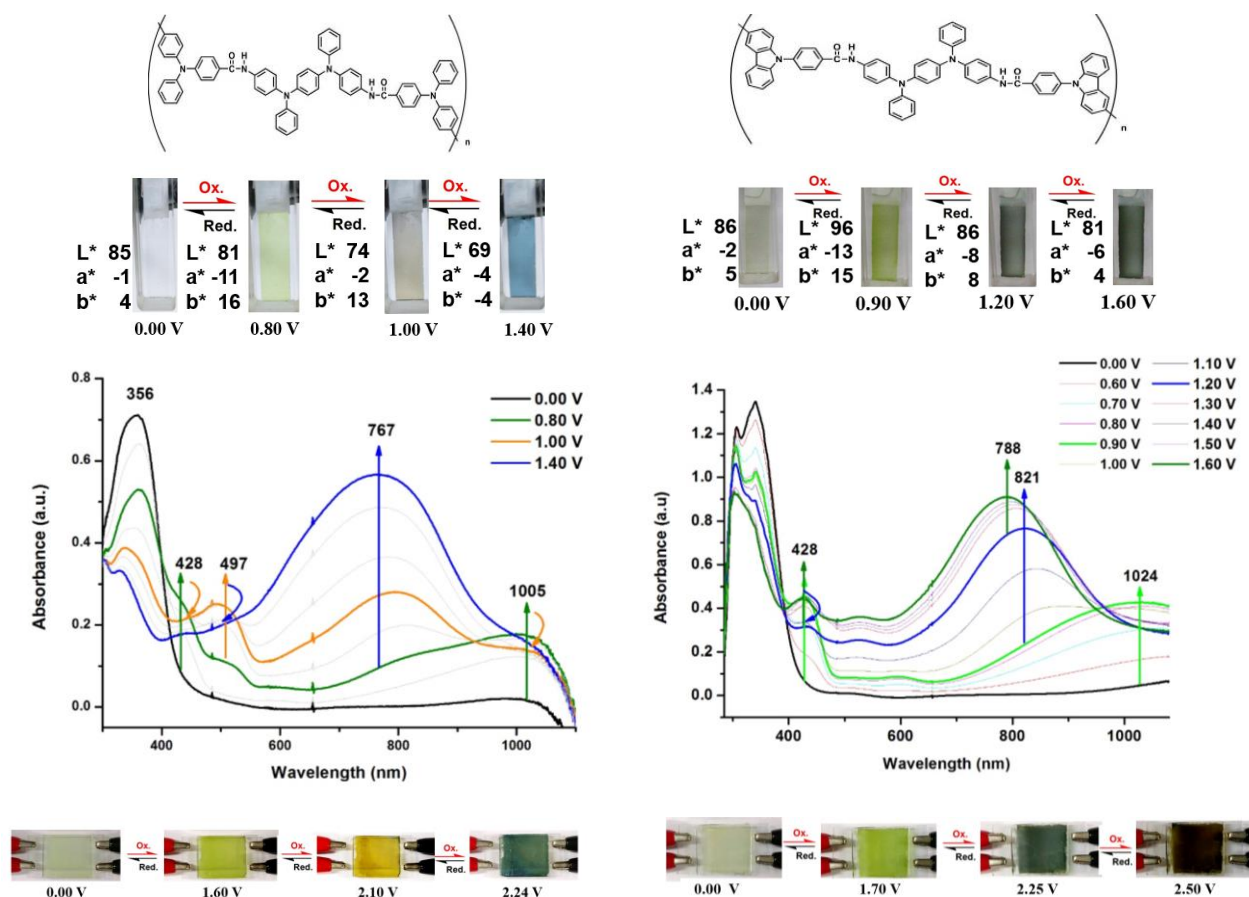


Figure 1. Spectral changes of the **TPPA-(TPA)₂** and **TPPA-(NPC)₂** films on an ITO-coated in 0.1 M $\text{Bu}_4\text{NClO}_4/\text{CH}_2\text{Cl}_2$ at various applied potentials.