

Synthesis and Electrochromic Properties of Aromatic Polyamides with Bulky 2,4,6-Tri-*tert*-butylphenoxy-Substituted Triphenylamine Units

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ABSTRACT. A series of aromatic polyamides (**7a–7f**) with triphenylamine in the main chain together with bulky 2,4,6-tri-*tert*-butylphenoxy pendent group were synthesized from 4,4'-diamino-4''-(2,4,6-tri-*tert*-butylphenoxy)-triphenylamine (**5**) and various aromatic dicarboxylic acids (**6a–6f**) by the phosphorylation polyamidation technique. The polyamides were highly soluble in polar organic solvents and can be readily solution cast into robust films with moderately high thermal stability and glass transition temperatures (242–310 °C). The electrochemical and electro-optical properties of the synthesized polyamides are also characterized. The polymer films cast on the ITO-glass substrate showed reversible redox and remarkable electrochromic behaviors. The oxidation onset (E_{onset}) and half-wave potentials ($E_{1/2}$) of these polyamides were recorded in the range of 0.63–0.68 V and 0.73–0.80 V (vs. Ag/AgCl), respectively. The polymer films could switch from colorless neutral state to bluish-green oxidized state, with high optical contrast, high coloration efficiency, and moderate cycling stability.

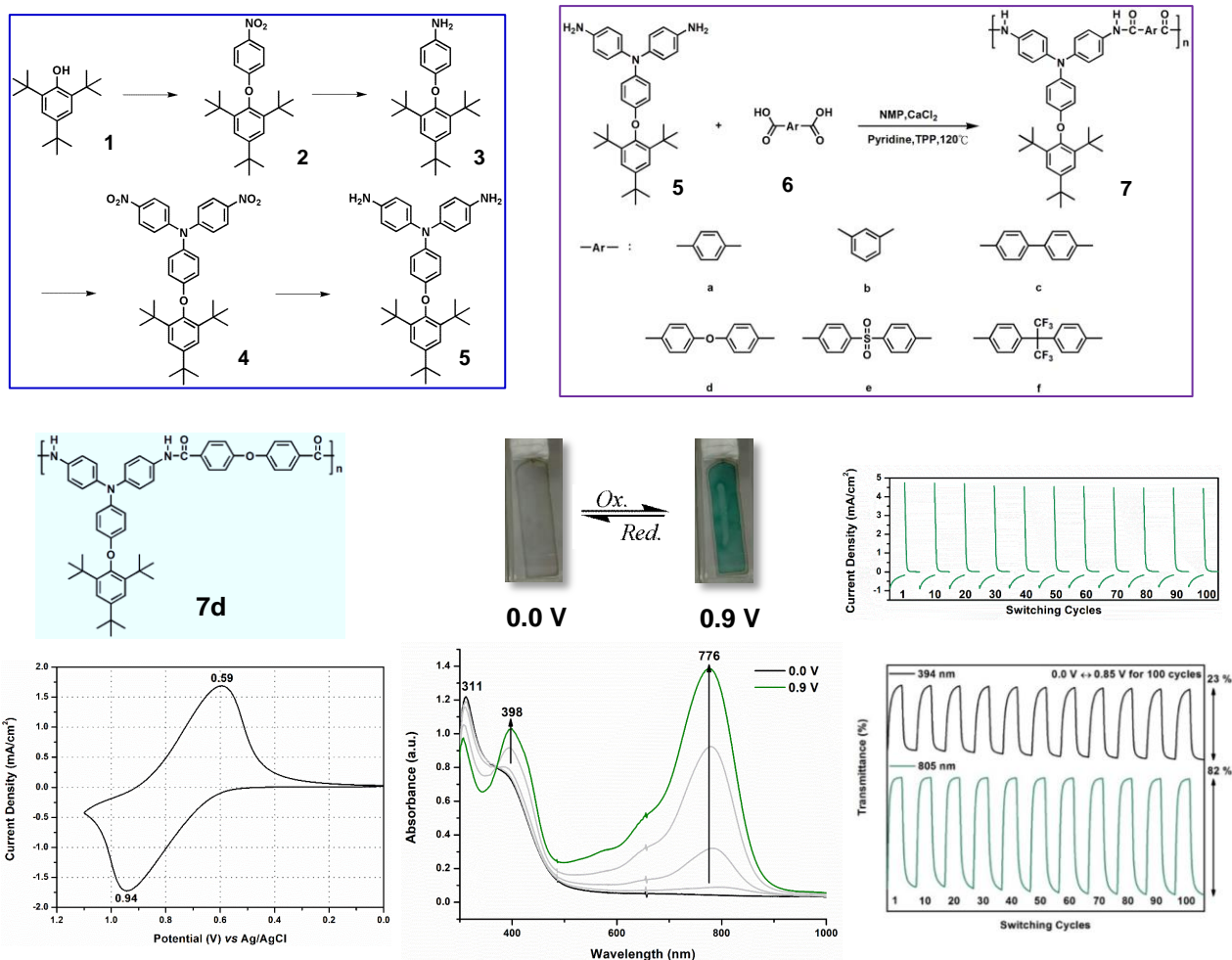


Figure 1. Typical cyclic voltammety diagram, spectral and color change upon oxidation, and switching test of a representative polyamide **7d** on an ITO-glass slide.