ELECTROCHROMIC AND FLUORESCENT PROPERTIES OF A COPOLYMER BASED ON TERTHIOPHENE AND PYRROLE DERIVATIVE.

Ana Júlia C. Silva1,2 (PG), Rayanna U. Gomes1 (IC), Viviane C. Nogueira2 (PQ), Thebano E. A. Santos2 (PQ), Roger J. Mortimer3 (PQ), Adriana S. Ribeiro1,3 (PQ)*.

1 – Universidade Federal de Alagoas, Inst. de Química e Biotecnologia, Campus A. C. Simões, 57072-970, Maceió-AL.
2 – Centro de Tecnologia da Informação Renato Archer, Divisão de Mostradores da Informação, Campinas-SP.
3 – Loughborough University, Department of Chemistry, LE11 3TU, Leicestershire, United Kingdom.

Results and Discussion

Poly(TTh-co-DNBP) films were electrodeposited onto ITO/glass by potentiodynamic (0.00 ≤ E ≤ 0.73 V vs. Ag/Ag+) or potentiostatic (E = 0.80 V) methods using Pt as counter electrode and an Ag/Ag+ (CH3CN) electrode as reference in 0.1 mol L−1 (C6H5)4NBF4/CH3CN. UV-vis-NIR spectra were acquired simultaneously to the cyclic voltammograms (0.00 ≤ E ≤ 0.60 V). xy chromaticity coordinates were acquired using a Microsoft® Excel® spreadsheet developed by Mortimer and Varley [4].

The spectroelectrochemical characterisation of the P(TTh-co-DNBP) is shown in Figure 1. The cyclic voltammogram of the copolymer film presents a broad redox couple with an anodic peak (Epcα) at 0.46 V and a cathodic peak (Epcβ) at 0.30 V. Spectra of the copolymer film exhibited a band with λmax ± 448 nm in the neutral state (0.00 V). With increasing potential the peak intensity of this band decreases and is displaced to shorter wavelengths. It is possible to observe the formation of a new broad band in the NIR region (> 800 nm). The copolymer film is reddish orange (x = 0.480, y = 0.421) in the neutral state (E = 0.00 V) and greyish blue (x = 0.388, y = 0.400) in the oxidised state.

Conclusions

Copolymerisation of TTh and DNBP leads to an interesting combination of the properties observed in the corresponding homopolymers and is an excellent tool for the fine-tuning of colour, as well as maintaining the fluorescence inherent to the PTTh. Therefore, the combination of DHQT and DNBP make these structures useful for promising applications as electrochromic and fluorescent materials.

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4 Mortimer, R.J.; Varley, T.S., Displays 2011, 32, 35.