

**EFFECT OF ELECTRIC FIELD ON THE OPTICAL PROPERTIES
OF CONJUGATED POLYMER FILMS DOPED WITH COORDINATION
COMPLEXES AND GRAPHENE OXIDE**

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Electrochromism is the phenomenon related to persistent but reversible optical changes induced in selected materials by electrochemical process. In some cases, multiple color states are observed upon different electrochemical potential. Within the development of organic electronic devices, electrochromic devices provide new opportunities for industrial applications. Conjugated polymers began to stand out among others due to the ease of manipulation of properties through structural modifications, facile preparation, flexibility and low cost [1]. In terms of their electrochromic performance, conductive polymers present high color versatility, large optical contrasts, rapid response times, and require low power consumption during operation [2]. Meanwhile, organic/inorganic electrochromic nanocomposites can combine the advantages of organic and inorganic electrochromic materials and provide further enhanced electrochromic performances, wide working temperature range, good chemical and electrochemical stabilities [3]. The electrochemical polymerization offers several advantages, particularly because it is capable of optimizing the characteristics of the polymer films. In fact, by controlling the conditions involved in the electrodeposition process, the thickness, electrical and physico-chemical properties, morphology of the polymer film can be easily modified.

So, in this work, the influence of an electric field on optical properties and morphology of poly-*o*-anisidine and poly-3,4-ethylenedioxythiophene thin films have been studied. Samples were obtained on the surface of optical-transparent semi-conducting SnO₂ electrode by the method of electrochemical polymerization at different modes. It has been established that under the influence of current (or potential), both optical absorption and the color of studied polymers can be controlled, that indicates the ability of these films to electrochromic transitions.

To enhance the structural and functional properties due to synergistic effect, especially contrast of electrochromic changes, the doping of conjugated polymers with complex inorganic compound - Potassium ferricyanide and Graphene oxide is carried out. The shift of the absorption maxima and changes of their intensity, which is accompanied by changes in the color of samples, was revealed. The electrochemical efficiency and contrast of electro-optical transitions for obtained thin films are calculated.

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3. Xiong S., Yin S., Wang Y., et al. Organic/inorganic electrochromic nanocomposites with various interfacial interactions: A review. *Mater. Sci. Eng. B.* 2017. 221. 41-53.