

Copolymerization of Thiophene with Carbazole Derivative and Investigation of Its Electrochemical and Electrochromic Behavior

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Abstract – Polycarbazole (PAAC) and poly (thiophene) (PTH) are both highly stable polymers. But the conductivity of (PAAC) is much lower than PTH. When polycarbazole and polythiophene alternative copolymers are synthesized, it is aimed to increase the conductivity of PAAC and to obtain a copolymer with superior properties due to the interaction between both polymers. The interest in carbazole compounds is enhancing because of their excellent optical properties and their capability to transfer voids. Carbazole compounds are thoroughly used for electronic and photonic applications. Particularly used as charge transfer agents in LED technology. Also, it has been identified that carbazole and its derivatives demonstrate various biological activities. Inclusion of the carbazole thiophene unit also provides derivatives with both carbazole and thiophene advantages. In this study, the electrochemical polymer of copolymer electro-active thiophene and a carbazole using different monomer feed ratios was synthesized and deposited on an ITO–glass surface with help of electropolymerization. In 0.05 M AN/LiClO₄ solvent/electrolyte system was achieved the electrochemical synthesis of the copolymer solution containing between different potentials. The spectroelectrochemical and electrochromic properties of this the resulting copolymer films were also examined. The electrochromic properties of these copolymers formed by copolymerization was evaluated using spectro-electrochemistry. As a result, polymeric electrochromic devices can be formed by using the synthesized copolymers, and for applications of electrochromic is a promising good candidate.

Keywords –*copolymerization, electrochromic, electrochemical*