CONDUCTING POLYMERS CONTAINING BENZOTHIADIAZOLE AND BENZOSELENADIAZOLE UNITS FOR BIOSENSOR APPLICATIONS

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Poly(4,7-di(2,3)-dihydrothienol[3,4-b][1,4]dioxin-5-yl-benzo[1,2,5]thiadiazole) (PBDT) [1] and poly(4,7-di(2,3)-dihydrothienol[3,4-b][1,4]dioxin-5-yl-2,1,3-benzoselenadiazole) (PESeE) [2] were electrochemically deposited on graphite electrodes and used as immobilization matrices for biosensing studies. After electrochemical deposition of the polymeric matrices, glucose oxidase (GOx) was immobilized on the modified electrodes as the model enzyme. In the biosensing studies, the decrease in oxygen level as a result of enzymatic reaction was monitored at -0.7 V vs Ag/AgCl and correlated with substrate concentration. Possible π-stacking between enzyme’s aromatic residues and polymers’ aromatic moieties enables the adhesion of enzyme on top of the polymer coated surface and the conservation of crucial structure of the protein during reactions without leaching out from the surface of the electrode. A perfect harmony was achieved in biosensors.

The biosensor was characterized in terms of several parameters such as operational and storage stabilities, kinetic parameters (Km and Imax) and surface morphologies. The biosensor was tested on real human blood serum samples. Our results were in good agreement with those measured in the hospital (Celal Bayar University). The recoveries were in the range 0.06-2.83 % and we suggested that these biosensors are qualified and reliable in real sample measurements.

Figure 1. General construction of the biosensors.

References