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Fabrication of a promising immobilization platform based on electrochemical synthesis of a conjugated polymer

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Since conjugated polymers are an important class of materials with remarkable properties in biosensor applications[1], in this study, a novel glucose biosensor based on a conjugated polymer was fabricated via the electropolymerization of the monomer 10,13-bis(4-hexylthiophen-2-yl)dipyridol[3,2-a:2',3'-c]phenazine onto a graphite electrode surface. Glucose oxidase (GOx) was used as the model biological recognition element. As a result of the enzymatic reaction between GOx and glucose, the glucose amount was determined by monitoring the change in the oxygen level associated with substrate concentration via amperometric detection technique.[2] The proposed system possessed superior properties with K_M^{app} value of 0.262 mM, 2.88×10^{-3} mM limit of detection and 105.12 $\mu A m M^{-1} cm^{-2}$ sensitivity. These results show that conjugated polymer film provides an effective and stable immobilization matrix for the enzyme. Finally, the biosensor was applied successfully to several commercially available beverage samples for glucose determination proving an inexpensive and high sensitive system applicable for real time analyses.

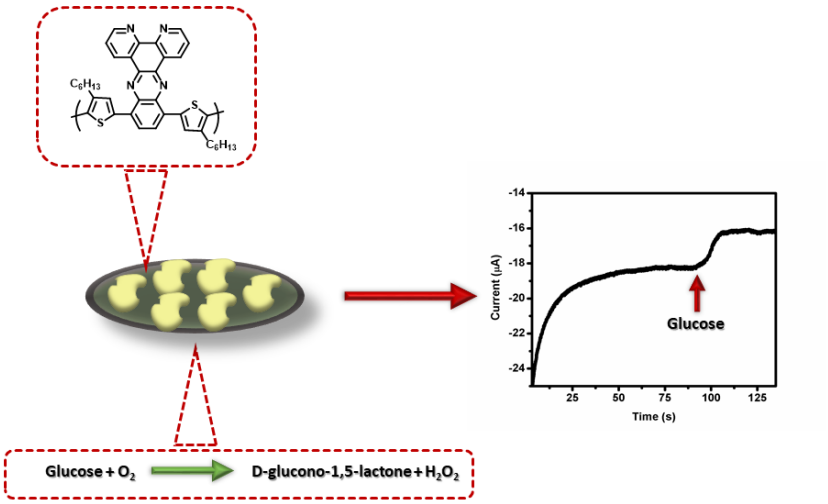

Figure. Schematic illustration of the proposed biosensor

Keywords: Amperometric biosensor, conjugated polymer, electropolymerization, glucose biosensor

References

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