A-11
POLYPYRROLE/GRAPHENE COMPOSITES AS NOVEL PLATFORM FOR AMPEROMETRIC GLUCOSE BIOSENSORS

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Because of the unique properties including fast electron transportation, excellent thermal conductivity, high specific surface area and good biocompatibility, graphene and its nanocomposites have demonstrated attractive application in electrochemical bio-sensing [1]. Conducting polymers have showed promising application in supercapacitors and sensor applications, due to the excellent mechanical strength and electrical conductivity [2]. As one of the most popular conducting polymers, the PPy possesses good electrical conductivity, environmental stability and good biocompatibility. Recently, also the composites of PPy and graphene oxide (GO) revealed an enhanced electrical conductivity and demonstrating excellent sensing performance for H_2O_2 [3].

In the present work, we have tested and compared different strategies to create novel polypyrrole (PPy)/graphene based amperometric biosensors and the specific advantages that each preparation procedure can provide in terms of detection and related electrochemical properties were emphasized. Glucose oxidase (GOx) served as the model enzyme due to its being inexpensive, stable, and of practical use. All biosensors showed good analytical performances in terms of high sensitivity and wide linear range. In addition, the effects of applied potential, the electroactive interference and the stability of the biosensor were discussed. Futhermore, the facile procedure of immobilizing GOx used in the present work can promote the development of other oxidase-based biosensors which could have a practical application in clinical, food and environmental analysis.

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References

1. Z. Zhu, L. Garcia-Gancedo, A.J. Flewitt, H. Xie, F. Moussy, W.I. Milne, Sensors, 12 (2012), 5996–6022.

2. M Raicopol, A Prună, C Damian, L Pilan, Nanoscale Research Letters 8 (2013), 1 – 8.

3. C. Bora, S.K. Dolui, Polymer, 53 (2012), 923–932.