Immobilization strategy on printed graphene electrodes for glucose biosensing

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Glucose levels in blood or other body fluids can be related to diabetes, a disorder with a high prevalence. For this reason, the healthcare industry is rapidly moving to the development of fast detection systems for such type of biomarkers. Printable graphene inks based on electrochemically exfoliated graphene (EEC) are very attractive for the development of electrochemical biosensors, mostly due to their low cost, biocompatibility, chemical stability and flexibility [1]. Glucose oxidase (GOx) immobilization on EEC is one of the most important challenges for the demonstration of highly sensitive and specific enzymatic glucose sensors. The efficiency of the GOx immobilization depends on different variables such as enzyme concentration, use of cross-linkers and environment affinity [2].
In this work, we study the use of a chitosan biopolymer, as cross-linker with variable thickness, to provide a suitable environment for the GOx immobilization on EEG printed electrodes. In order to increase the device sensibility, we explore the use of a charge mediator for the glucose oxidation, such as ferrocene, and its capability to be integrated into the final device [3]. Electrochemical techniques as cyclic voltammetry (CV) and potentiostatic impedance electrochemical spectroscopy (PEIS) have been used to assess the device performance, while glucose detection is investigated by means of chronoamperometry (CA).

References

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Figures

i) ii)

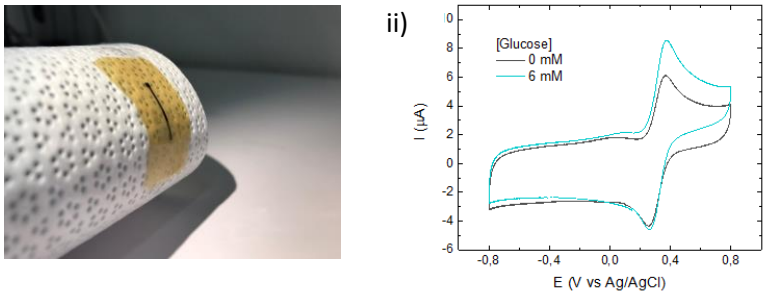

Figure 1: i) Flexible printed graphene electrode, ii) CV of glucose sensing in ferrocene at 50 mV/s

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