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Controlled modification of electrochemical microsystems with polyethylenimine/reduced graphene oxide using electrophoretic deposition: Sensing of dopamine levels in meat samples

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Abstract

Microsystems play an important role in many biological and environmental applications. The integration of electrical interfaces into such miniaturized systems provides new opportunities for electrochemical sensing where high sensitivity and selectivity towards the analyte are requested. This can be only achieved upon controlled functionalization of the working electrode, a challenge for compact microsystems. In this work, we demonstrate the benefit of electrophoretic deposition (EPD) of reduced graphene oxide/polyethylenimine (rGO/PEI) for the selective modification of a gold (Au) microelectrode in a microsystem comprising a Pt counter and a Ag/AgCl reference electrode. The functionalized microsystem was successfully applied for the sensing of dopamine with a detection limit of 50 nM. Additionally, the microsystem exhibited good performance for the detection of dopamine levels in meat samples.

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