VOLTAMMETRIC SENSORS BASED ON BORON-DOPED DIAMOND AND BORON-DOPED DIAMOND/GRAPHENE NANOWALL ELECTRODES

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Electrochemical sensors have attracted increasing interest due to their low cost, high sensitivity of detected analytes, and the possibility of sensor miniaturization, which allows for portable and field applications. These devices provide information about the system composition in real-time by combining a chemically selective layer with an electrochemical transducer. Thereby, the chemical energy of the specific interaction between the chemical substances and the sensor is converted into an analytically useful signal.

In this study, we show electrochemical, voltammetric sensors using boron-doped diamond-based electrodes: *i)* boron-doped diamond electrodes (B:DD) [1], *ii)* boron-doped diamond electrodes synthesised in a deuterium rich plasma (B:DD_D) [1], *iii)* boron-doped diamond/graphene nanowall (B:DGNW) electrodes [2–4]. The electrodes were fabricated in a one-step growth process using chemical vapor deposition without any additional modifications. A B:DGNW electrode is a hybrid electrode, which combines the extraordinary features of boron-doped diamond and a graphene nanowall on the same surface. B:DGNW is a sp^2-rich phase material with multilayered graphene walls oriented vertically to the substrate. Moreover, the presence of the boron-doped diamond phase enhances the electrochemical performance and kinetics of the electrode surface when compared with typical carbon nanowalls.

The sensing platforms will be used for persistent pollutants (nitroaromatic explosive compounds) and pharmaceuticals (carbamazepine, paracetamol) determination.

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