Application of functionalised graphene to electrochemical sensing

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Reduced graphene oxide (rGO) is often used in electrochemical sensing due to its physical and chemical properties. Its ability of easy functionalisation with various compounds serves for signal enhancement and adjustable biocompatibility in biosensors. Functionalisation with N is possible due to atomic similarity to C atom. N can replace C atoms in defect sites or form amino or oxy-species.

Modified Hummer's method was used to prepare graphene oxide (GO) [1] and further doped with N via addition of ammonia during thermal reduction of GO at 850 and 950 °C [2]. Other fuctionalisation with N compounds was performed via chemical reaction of rGO with diazo dye – Bismark brown (BB). Functionalisation of rGO with azo dyes has both high surface area and faster electron transfer properties.

Electrodes modified with N compounds were applied to sensitive and selective detection of dopamine, in the case of BB functionalised rGO. The sensitivity depends on the amount of BB used for functionalisation of rGO. Other application of ammonia doped rGO was for sensors to hydrogen peroxide and glucose. It was found that the best conditions for rGO functionalisation with NH_3 at 950 °C [2]. Sensitivity and stability will be presented and discussed.

References:
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