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Electrochemically active dopamine functionalized graphene for sensor applications

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Graphene is a one-atom-thick two-dimensional material consisting of sp^2-hybridized carbons and has drawn tremendous attention in the scientific community because of its large specific surface area, high-speed electron mobility, good mechanical strength, high electric and thermal conductivity, and good optical transparency [1,2]. Recently, graphene based materials have also shown promising potential for the construction of various sensors with high sensitivity, lower detection limit, reasonable selectivity and good stability[3]. The unique properties of dopamine (DA) allow to be used simultaneously as a reducing agent for GO reduction and as a capping ligand to stabilize and decorate the resulting reduced GO (RGO) surface for further functionalization. Moreover, as the dopamine moiety contains a redox couple, the hybrid material can be highly applicable to electrochemical sensing. For example, DA functionalized RGO is capable of immobilization of proteins and enzymes. If enzymes can be covalently immobilized on the DA-RGO nanocomposite, the construction of graphene-based electrochemical biosensors will be conveniently facilitated [4,5]. In addition, this kind of hybrid material could also be useful for pH sensing and other biosensing purposes. The poster presents a schematic illustration of research focus and some preliminary results regarding dopamine functionalized graphene oxide materials.

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