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Electrochemical sensing of 4-nitrochlorobenzene based on carbon nanohorns/graphene oxide nanohybrids

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Abstract

Owing to the harmful nature of 4-nitrochlorobenzene (4-NCB, one toxic organic pollutant) and the low cost, high sensitivity and ease of operation of electrochemical method, it is highly desirable to develop effect electrochemical sensor for the detection of 4-NCB. Herein, by partially unzipping carbon nanohorns (CNHs) via a simple wet-chemistry method, CNHs and graphene oxide (GO) (CNHs/GO) nanohybrids were produced for sensing 4-NCB with synergistic properties. While the retained CNHs offer a path for rapid electron transport, the GO sheets formed by partially unzipping CNHs provide abundant active sites, further increase in surface area as well as improved dispersibility of the CNHs/GO. Our results show that the CNHs/GO modified electrode has excellent sensitivity to 4-NCB with a wide linear response range and a detection limit as low as 10 nM.

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