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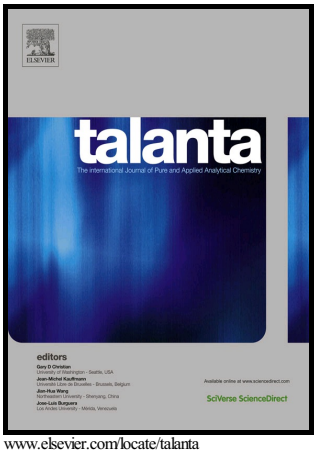

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A novel fluorescence "turn off−on" nanosensor for sensitivity detection acid phosphatase and inhibitor based on glutathione-functionalized graphene quantum dots

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Abstract

In this paper, we developed a label-free and sensitive fluorescence sensor for acid phosphatase (ACP) and its inhibitor parathion-methyl (PM) detection based on glutathione-functionalized graphene quantum dots (GQDs@GSH). Upon addition of MnO_2 nanosheets, the fluorescence of GQDs@GSH could be efficiently quenched via a fluorescence resonance energy transfer. ACP could easily catalyze the hydrolysis of L-Ascorbic acid-2-phosphate (AAP) to ascorbic acid (AA), which could reduce MnO_2 nanosheets to Mn^{2+} in acidic environment, leading to dramatically increase of the fluorescence intensity of GQDs@GSH. Quantitative detection of ACP in a broad range from 0.1 to 9 mU mL^{-1} with a detection limit of 0.027 mU mL^{-1} could be achieved. The feasibility of the proposed sensor in real samples analysis was also studied and satisfactory results were obtained. Furthermore, the fluorescence assay