Cysteine-functionalized Graphene quantum dots as fluorescent probes for highly selective and sensitive detection of Mercury ions

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An efficient strategy has been designed for sensing of Hg2+ based on the quenched fluorescence of Cysteine-functionalized graphene quantum dots (GQDs). The GQDs was synthesized by one-step hydrothermal methods with the quantum yield as high as 25.5%. Hg2+ ions can be selectively formed complexes with amino and carbonyl groups on surface of the GQDs, resulting in intensity quenching (81%) at 420 nm and high affinity to Hg2+ over other cations such as K+, Na+, Ca2+, Pb2+, Fe3+, and Cu2+. We have demonstrated that this compound is rapid and reliable detection of Hg2+ with a detection limit as low as 5 μM, suggesting the potential applications of this sensing system.