Versatile graphene oxide encapsulated Fe_3O_4 nanoparticles: Application to highly sensitive fluorescence turn-on biosensor

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Fe_3O_4@GO hybrids were synthesized by electrostatic force between amine functionalized Fe_3O_4 nanoparticles(NPs) and GO sheets. Negatively charged graphen oxide(GO) sheets readily attached onto the surface of positively charged magnetic NPs by electrostatic self-assembly. Fe_3O_4@GO NPs possess not only excellent ferromagnetic properties but also GO's unique properties. In this work, Fe_3O_4@GO NPs were used as fluorescent quenchers of aptasensors which show high sensitivity and selectivity. Fluorescent aptamers show high affinity to targets leading to turn on fluorescence and get easily adsorbed on the surface of Fe_3O_4@GO NPs via π-π interaction in the absence of targets, resulting in quenching of fluorescence. Magnetic separation of Fe_3O_4@GO NPs enables to increase the sensitivity of biosensors by removing non-binding aptamers and other residues from aqueous solution.