Novel turn-on fluorescent sensor paper based on functionalized graphene quatum dots for detecting glucose

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Fluorescent test paper for colorimetric determination of glucose that has a capacity of reuse can provide a new strategy of saving resource and toxic chemicals into environment. In this paper, we demonstrate glucose turn-on fluorescent probe based on aniline-functionalized graphene quantum dots (A-GQDs) and phenyl boric acid (PBA). Through π-π stacking interaction, photo induced electron can be transferred from A-GQDs to PBA that causes the quenching in fluorescence. In presence of glucose, PBA molecules are reattached from the GQDs surface due to strong bonding between cis diol of glucose and boronic acid group of PBA, thus leading to recovery of emission. The as-fabricated probe show linear detection ranging from 0 to 40 mM as well as low detection limit of 0.004mM. Then, the A-GQDs solution was printed onto paper as fluorescent test paper. The as-obtained test paper exhibits good sensitive performance in tear and blood serum with a good reproducibility.