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Turn-on fluorescent sensor for glucose detection using manganese dioxide–phenol formaldehyde resin nanocomposite

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A turn-on fluorescent detection method based on manganese dioxide (MnO2)-phenol formaldehyde resin (PFR) nanocomposite has been successfully constructed for rapid and sensitive detection of glucose. In the presence of MnO2 nanosheets, the green fluorescence of PFR was quenched by fluorescence resonance energy transfer. Interestingly, PFR fluorescence can make a recovery by the addition of H2O2, which can reduce MnO2 to Mn2+. The detection limit of 20 nM was obtained for H2O2. Further, the glucose was detected based on the enzymatic conversion of glucose by glucose oxidase to generate H2O2. A low detection of 1.5 M glucose was achieved. Because of the non-auto fluorescent assays offered by PFR, the developed method has been applied to monitor glucose levels in human serum samples with satisfactory results. The developed turn-on fluorescent sensor might hold great promise in nanomedicine and bioanalysis.

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