

OPTICAL DETECTION OF GLUCOSE BY CDSE/ZNS QUANTUM DOTS

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Semiconductor quantum dots (QDs) attract substantial recent research interest as luminescence probe for sensing or biosensing processes.¹ While fluorescent QDs were used as luminescent labels of biorecognition events², systems of higher complexity utilized FRET³ or electron transfer⁴ quenching as photophysical routes to probe the dynamics of biocatalytic transformations or biorecognition events were developed.

In order to show the versatility of QD-biomolecule hybrids for biosensing, we show three different routes for glucose sensing based on fluorescence changes of the QDs. By the first route, in the presence of glucose, the enzyme glucose oxidase generates H₂O₂, which quenches the fluorescence of the QDs.⁵ In the second route, a displacement assay using boronic acid and fluorophore functionalized glucose was used. The third route employs the enzyme glucose dehydrogenase, and its glucose dependant NADH production for the control of the QD fluorescence.

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