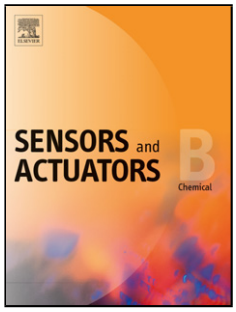

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Fluorescence Resonance Energy Transfer from $NaYF_4$:Yb,Er to Nano Gold and Its Application for Glucose Determination

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Highlights

- A "turn-on" fluorescent sensor based on NaYF-conA and AuNPs-CS was described.
- NaYF was altered from hydrophobic to hydrophilic by adjusted to pH= 4.
- The "turn-on" fluorescent biosensor has high selective detection for glucose.

Abstract

This manuscript proposes a fluorescence resonance energy transfer (FRET) system which could be used for the rapid, selective, and sensitive detection of glucose levels. In this system, chitosan modified gold nanoparticles (AuNPs-CS) serve as a quencher. Because concanavalin A (conA) and chitosan (CS) have specific binding sites, FRET could occur between conA modified $NaYF_4$:Yb, Er (NaYF-conA) and CS modified gold nanoparticles (AuNPs-CS), and lead to the fluorescence quenching of $NaYF_4$:Yb, Er (NaYF). The system switches to the "off" state. However, glucose have stronger binding energy with conA than CS with conA. When glucose is added into the AuNPs-CS and NaYF-conA system, the AuNPs-CS detaches from NaYF-conA, the fluorescence of NaYF is recovered, and the system switches to the "on" state. Thus, a new method for determining glucose levels is proposed by measuring the fluorescence intensity. This method shows a linear response to glucose in the range of 0.40 - 1.87 μmol/L, with good linear relationship