Electronic Supplementary Information

Ratiometric Fluorescent Paper Sensor for Consecutive Color Change-based Visual Determination of Blood Glucose in Serum

Lei Su,ab Liang Yang,*ac Qin Sun,ab Tingting Zhao,a Bianhua Liu,ac Changlong Jiang,*ac and Zhongping Zhangad

aInstitute of Intelligent Machines, Chinese Academy of Science, Hefei, Anhui 230031, China, E-mail: yangliang@iim.ac.cn, cljiang@iim.ac.cn.

bDepartment of Chemistry, University of Science and Technology of China, Hefei, Anhui 230026, China

cState Key Laboratory of Transducer Technology, Chinese Academy of Science, Hefei, Anhui 230031, China

dSchool of Chemistry and Chemical Engineering, Anhui University, Hefei, Anhui 230601, China

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**Fig. S1.** (A) The UV absorption (red line) and fluorescent emission (blue line) spectra of the as-prepared BSA stabilized Au NCs dissolved in PBS (10mM, pH=7.0). Photos inserted were taken under a 365 nm UV lamp. (B) FT-IR spectra of the Au NCs. (C) TEM photo of the Au NCs.

**Fig. S2.** (A) The fluorescent spectra of the BSA-Au NCs with the addition of different concentration of H$_2$O$_2$. The photographs inserted display colors varying resulting from fluorescence quenching of red emission from BSA-Au NCs under a 365 nm UV lamp. (B) Fluorescent spectra of FGO adding different concentration of H$_2$O$_2$. The inserted photographs shows fluorescent stability against H$_2$O$_2$ of FGO under a 365 nm UV lamp.
Fig. S3. The fluorescent intensity stability of (A) the fluorescent graphene oxide of blue fluorescence, (B) the BSA-Au NCs of red fluorescent emission, (C) and the colorimetric probes consisted of the two components at the fluorescent intensity ratio of 2:1. All the fluorescent intensity (or relative intensity, I_{650}/I_{440}) shows no significant change in 2 hours.

Fig. S4. (A) Time-dependent relative fluorescent intensity (I/I_0) of the as-prepared BSA-Au NCs after adding 10mM H_2O_2. (B) Time-dependent relative intensity (I_{650}/I_{440}) of the colorimetric sensors after adding 10mM H_2O_2. All the experiments were repeated three times.
**Fig. S5.** The diagrams of different fluorescent intensity ratio of FGO and BSA-Au NCs, (A) 1:2, (B) 1:1, (C) 2:1, (D) 3:1. The photographs inserted were taken under a 365 nm UV lamp.
**Fig. S6.** The color variation resulted from adding hydrogen peroxide displayed on the CIE diagram for colorimetric sensors composed different fluorescent intensity ratio of (A) 1:2, (B) 1:1, (C) 2:1, (D) 3:1. The concentration of H$_2$O$_2$ is varying from 0 to 10 mM.
**Fig. S7.** The fluorescence quenching of the ratiometric probe versus the concentrations of glucose oxidase. $I_{650}/I_{440}$ is the ratio of fluorescence intensities of BSA-Au NCs to FGO, and the intensity ratio is 1:2.

**Fig. S8.** (A) The scatter diagram of fluorescent intensity ratio, $\ln(I_{440}/I_{650})$, versus H$_2$O$_2$ concentration, (B) The scatter diagram of fluorescent intensity ratio, $\ln(I_{440}/I_{650})$, versus glucose concentration. The error bar resulted from three separated measurements and linear relationship is at 1-10 mM range.
Table S1. Compared to reported methods

<table>
<thead>
<tr>
<th>Nanomaterial</th>
<th>Linear Range</th>
<th>Limit of Detection</th>
<th>Paper Sensors</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHPMA@PMAETMA</td>
<td>0.1 mM-1 mM</td>
<td>0.1 mM</td>
<td>\</td>
<td>1</td>
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<tr>
<td>ZnS:Mn2+</td>
<td>\</td>
<td>0.6 mM</td>
<td>\</td>
<td>2</td>
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<tr>
<td>g-C3N4</td>
<td>0.005-0.1 mM</td>
<td>0.4 μM</td>
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<td>3</td>
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<tr>
<td>dual-emission carbon nanodots</td>
<td>0.1-30 μM</td>
<td>0.03 μM</td>
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<td>4</td>
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<tr>
<td>Rox-DNA-CdZnTeS QDs</td>
<td>0.33-5.0 μM</td>
<td>0.042 μM</td>
<td>\</td>
<td>5</td>
</tr>
<tr>
<td>Au NCs@FGO</td>
<td>1-10 mM</td>
<td>0.16 mM</td>
<td>Directly detect H₂O₂</td>
<td>Our work</td>
</tr>
</tbody>
</table>

References