Interfacial Engineering of Carbon Dots with Benzenediboronic Acid for Fluorescent Biosensing

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Figure S1. XRD pattern of the CDs
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Figure S2. FTIR spectra of critic acid (a) and CDs (b).
Figure S3. (A) XPS spectrum of CDs. (B) O 1s spectra of the CDs. (C) C 1s spectra of the CDs.
**Figure S4.** AFM image of CDs (A), and BDBA-associated CDs before (B) and after (C) H$_2$O$_2$ incubation. Inset: Cross-section analysis of each sample.
Figure S5. Fluorescence intensity changes of 3-hydroxybutyrate-derived CDs in the absence (a) and presence (b) of BDBA, in the presence of BDBA and in the absence of H$_2$O$_2$ (c), and in the absence of both BDBA and H$_2$O$_2$ (d).
Figure S6. Stern–Volmer plot or the interaction of BDBA-conjugated CDs and $\text{H}_2\text{O}_2$. 
Figure S7. Fluorescence lifetime decay of the CDs (a), BDBA-conjugated CDs in the absence (b) and presence (c) of H$_2$O$_2$. 
Figure S8. Optimization of reaction conditions for H$_2$O$_2$ assay using the sensing platform. Both the concentration of BDBA and H$_2$O$_2$ are 75 µM. (A) Dependence of reaction pH on the fluorescence intensity of CDs. (B) Effect of reaction time on the fluorescence intensity of the system. (C) Effect of BDBA concentration on the fluorescence intensity changes of CDs. ΔF= F$_0$− F, F$_0$ and F represent the fluorescence intensity in the absence and presence of the H$_2$O$_2$, respectively. Error bars were derived from n = 5 experiments.
### Supporting Information

**Table S1.** Analysis of glucose by different sensing procedures.

| Method        | System                                                                 | Detection limit ($\mu$M) | Reference |
|---------------|------------------------------------------------------------------------|---------------------------|-----------|
| colorimetric  | Pt nanoclusters                                                        | 0.28                      | [1]       |
| colorimetric  | in situ growth of silver nanoparticles on graphene quantum dots       | 0.17                      | [2]       |
| electrochemical | gold nanoparticle/nitrogen-doped graphene                              | 12                        | [3]       |
| electrochemical | bimetallic Pt–Au nanocatalysts                                         | 7.7                       | [4]       |
| fluorescence  | CdS quantum dots assembled on silver nanoparticles                     | 1860                      | [5]       |
| fluorescence  | graphene quantum dots with boronic acid appended bipyridinium salt     | 1000                      | [6]       |
| fluorescence  | B-doped carbon quantum dots                                            | 8                         | [7]       |
| fluorescence  | MnO$_2$ nanosheet-modified upconversion nano system                    | 3.7                       | [8]       |
| fluorescence  | carbon nanodots supported on silver nanoparticles                      | 1.39                      | [9]       |
| fluorescence  | BDBA-mediated fluorescence changes of CDs                              | 0.4                       | This work |

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Reference

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