Electronic Supplementary Material (ESI) for Analytical Methods.

A fluorimetric and colorimetric dual-signal sensor for hydrogen peroxide and glucose based on the intrinsic peroxidase-like activity cobalt and nitrogen co-doped carbon dots and inner filter effect

Guo-Qi Zhang[a]; Yong-sheng Li[a*]； Wei-Ping Liu[b]; Xiu-Feng Gao[c**]

[a]: School of Chemical Engineering, Sichuan University, Chengdu 610065, China

[b]: Department of Clinical laboratory, Zigong First People's Hospital, Zigong 643000, China

[c]: West China School of Basic Medical Sciences & Forensic Medicine, Sichuan University, Chengdu 610041, China

*Corresponding author: E-mail: li-yongsheng@scu.edu.cn; **xiufengg@163.com

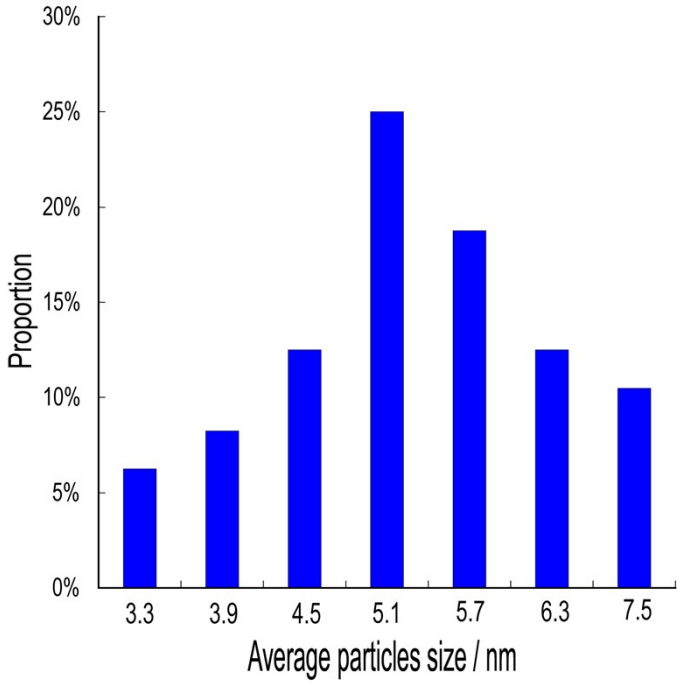

Fig. S1 the size distribution histogram of Co-N-CDs.

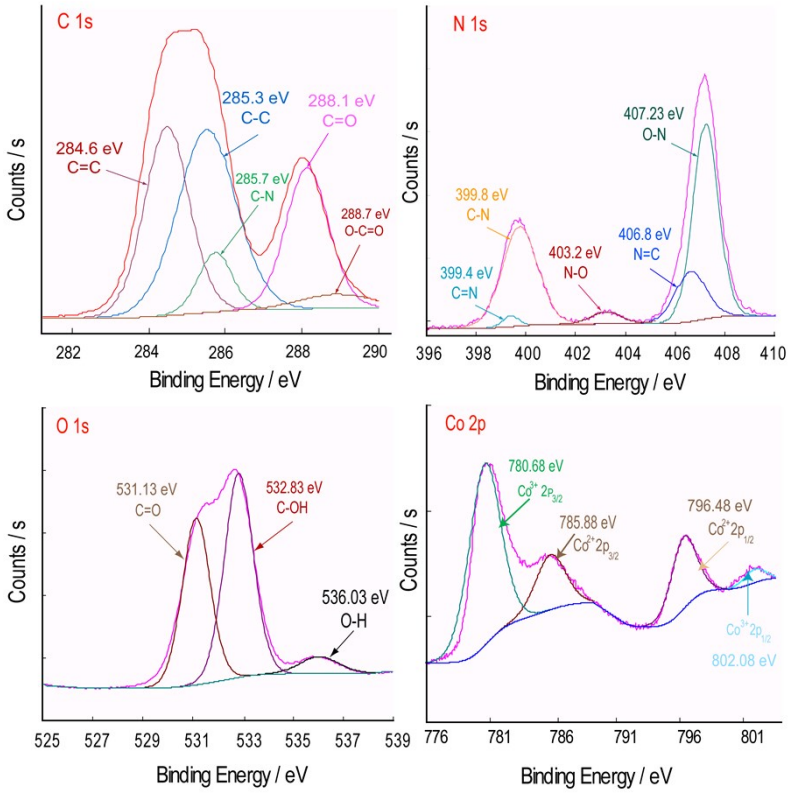

Fig. S2 the XPS high-resolution C1s, N1s, O1s and Co 2p curves of Co-N-CDs.

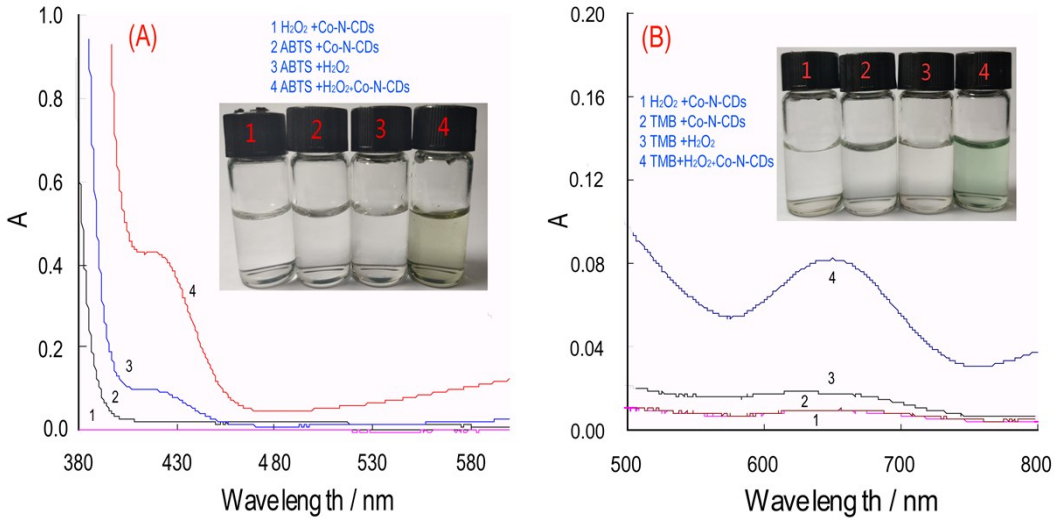

Fig. S3 the visible spectra scan curve of the oxidation of ABTS (A) or TMB (B) by H_2O_2 catalyzed by Co-N-CDs. The concentrations of TMB and ABTS are 100 mM. Other experimental conditions are the same as those described in "Peroxidase-like catalytic activity of Co-N-CDs".

Table S1. Comparison of the kinetic parameters (K_m and V_m) between Co-N-CDs and HRP.

Catalyst	Substrate	K_m (mM)	V_{max} (mM·min^{-1})
Co-N-CDs	H_2O_2	2.10	0.48
HRP	H_2O_2	6.78	0.15
Co-N-CDs	GA	31.98	0.031
HRP	GA	40.20	0.025

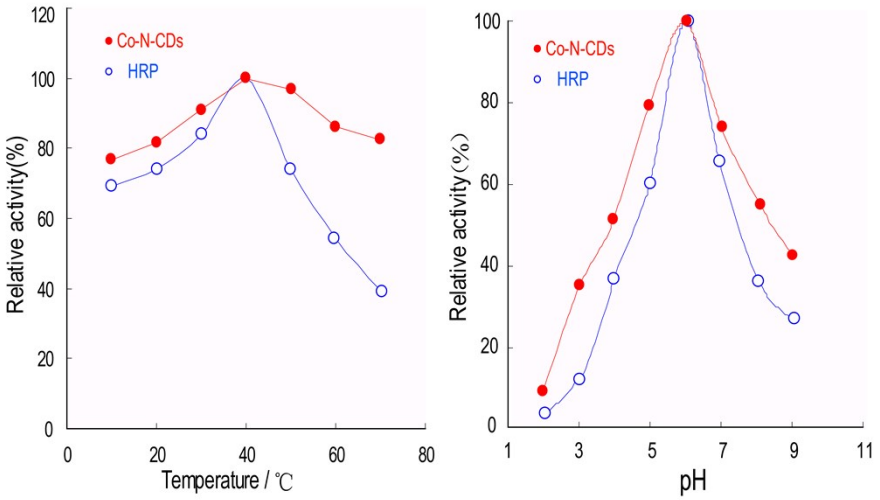

Fig. S4 Influences of temperature and pH on the catalytic performance of Co-N-CDs and HRP. The maximum point in each curve was set as 100%. The HRP concentration was 300 $U \cdot L^{-1}$.

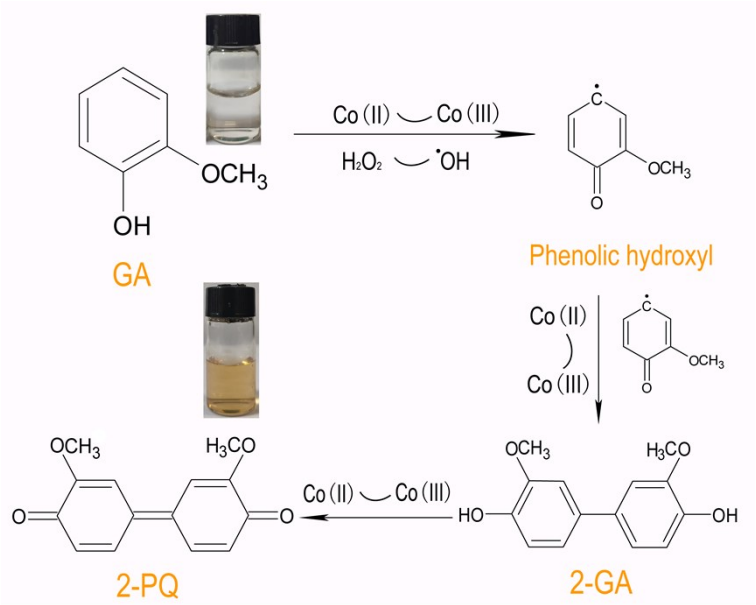

Fig. S5 Schematic of Co-N-CDs catalyzing H_2O_2 oxidation of GA to generate an amber product 2-PQ.

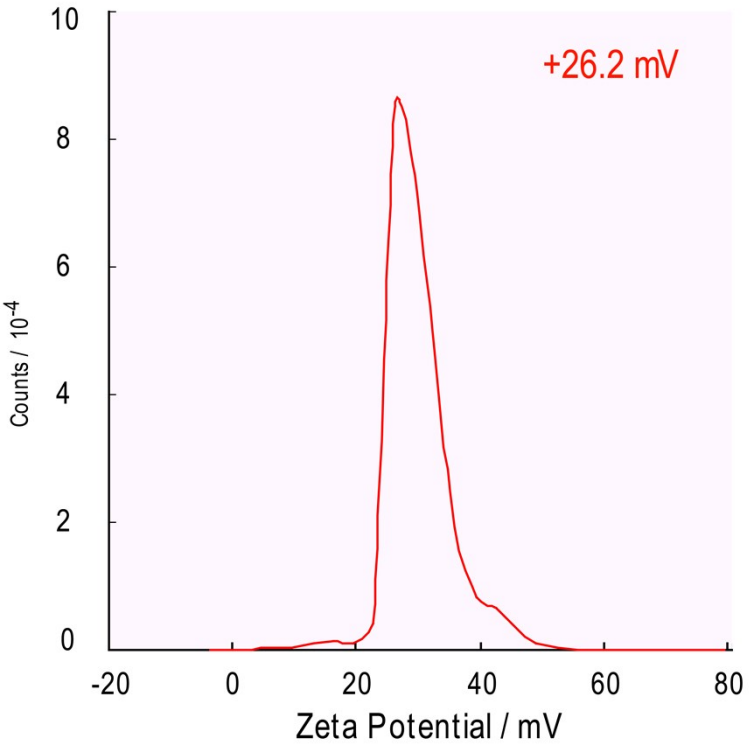

Fig. S6 The zeta potential of the Co-N-CDs.

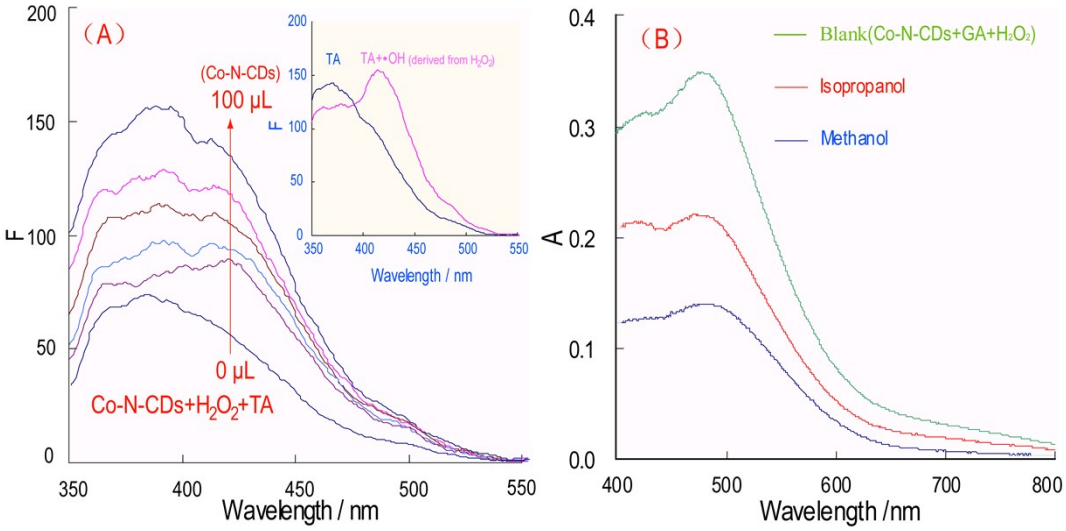

Fig. S7 (A) Verification that Co-N-CDs promote the decomposition of H_2O_2 to generate hydroxyl radicals; (B) Effect of different hydroxyl radical scavengers on the absorption spectra of the Co-N-CDs/H_2O_2/GA reaction system.

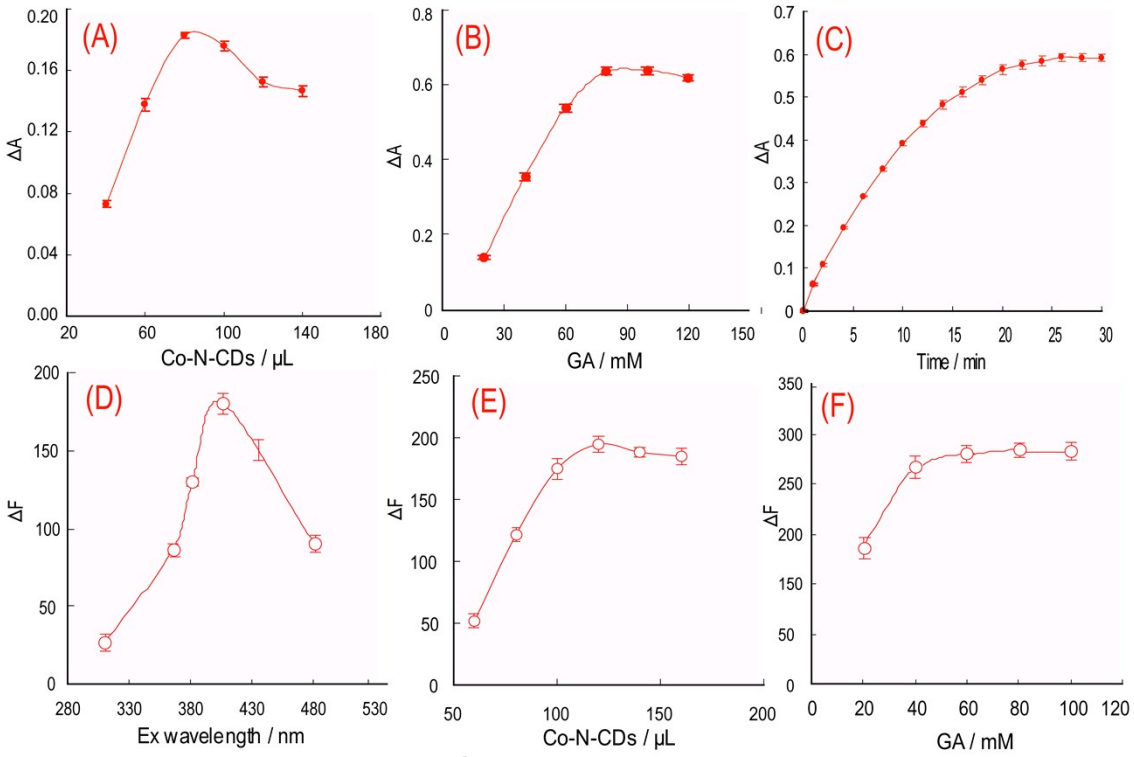

Fig. S8 Effects of (a) amount of Co-N-CDs, (b) concentration of GA and (c) reaction time for colorimetric method. The effects of (D) excitation wavelengths, (E) amount of Co-N-CDs and (F) concentration of GA for fluorescence method.

Table S2. Comparison of the analytical performance for the determination of glucose by the different nanozymes.

nanozymes	Method	Linear range (μM)	LOD (μM)	Refs.
CDs	colorimetry	1-500	0.4	6
$ZnFe_2O_4$-CNTs	colorimetry	0.8-250	0.58	8
B-CDs	fluorometry	8-80	8	9
V_2O_5	colorimetry	200-5000	80	14
Ni-Pd	colorimetry	5-500	4.2	16
Au-Ni-C_3N_4	colorimetry	0.5-30	1.7	18
Ag_2WO_4	colorimetry	27.7-330	2.6	20
N-CDs	colorimetry	25-375	16	40
CuO-CDs	colorimetry	2-100	0.59	42
Fe-CDs	fluorometry	0-300	2.5	52
Cu-CDs	colorimetry	100-2000	100	53
Co-N-CDs	colorimetry	2-100	1.16	this work
	fluorometry	0.4-40	0.18	