Supplementary Information (SI) for Analytical Methods.
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Supporting Information for:

Turn-On Fluorescence Detection of Carbon Monoxide in Plant Tissues Based on Cu^{2+} Modulated Polydihydroxyphenylalanine Nanosensors

Xiqiong Mu,[a, b] Yinquan Wang,[b] Jian Xu [a,*] and Fankui Zeng [a,c,d,*]

[a] Research Center for Natural Medicine and Chemical Metrology, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou 730000, China.

[b] College of Pharmacy, Gansu University of Chinese Medicine, Lanzhou 730101, China.

[c] Yantai Zhongke Research Institute of Advanced Materials and Green Chemical Engineering, Yantai 264006, China.

[d] Qingdao Center of Resource Chemistry & New Materials, Qingdao 266100, China.

[*]Corresponding author, E-mail: xujian1980@licp.cas.cn; zengfk@licp.cas.cn

Preparation of PDOA nanoparticles

Firstly, 19.9 mL dihydroxyphenylalanine solution (1 mmol/L) was mixed with 0.1 mL NaOH solution (1 mol/L). The above solution was stirred for 3 h atroom temperature (25 ℃). Then, an HCl solution (1 mol/L) was applied to terminate the polymerization reaction. The pH of the final solution was adjusted to about 7.0. Subsequently, the solution was dialyzed

for 24 h to obtain the purified PDOAs nanoparticles. After dialysis, the as-prepared PDOAs solution (20 mL) was concentrated and freeze-dried to afford the desired PDOAs as a solid powder (0.068 g). Thus, the concentration of the PDOAs matrix solution was determined to be 3.4 mg/mL. In the following experiments, the PDOAs solution was diluted 10 times to 0.34 mg/mL for all the spectrometric analysis and CO detection.

XPS spectrum of the PDOAs

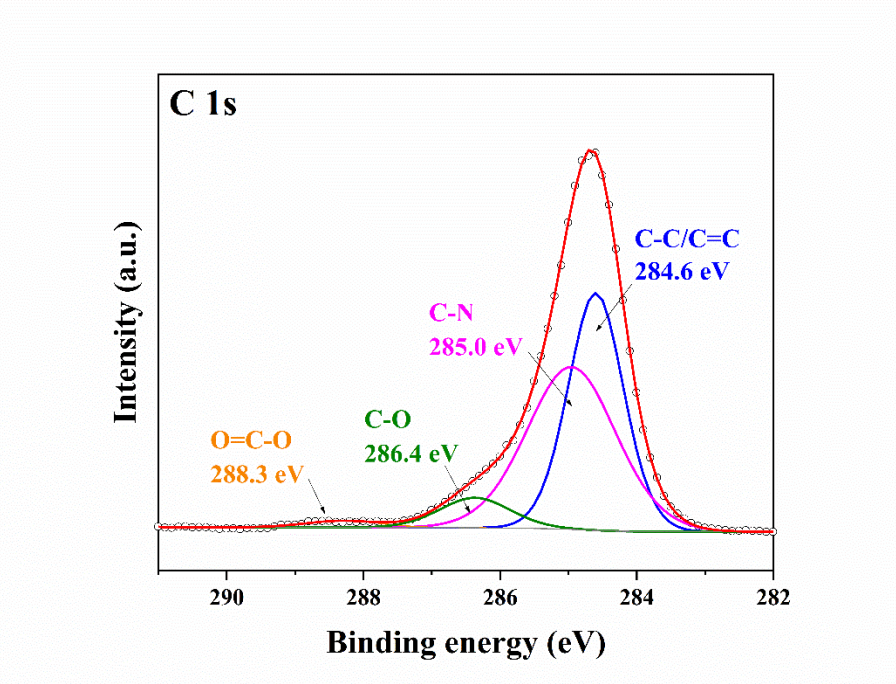

Figure S1. The high-resolution C1s spectrum of PDOAs.

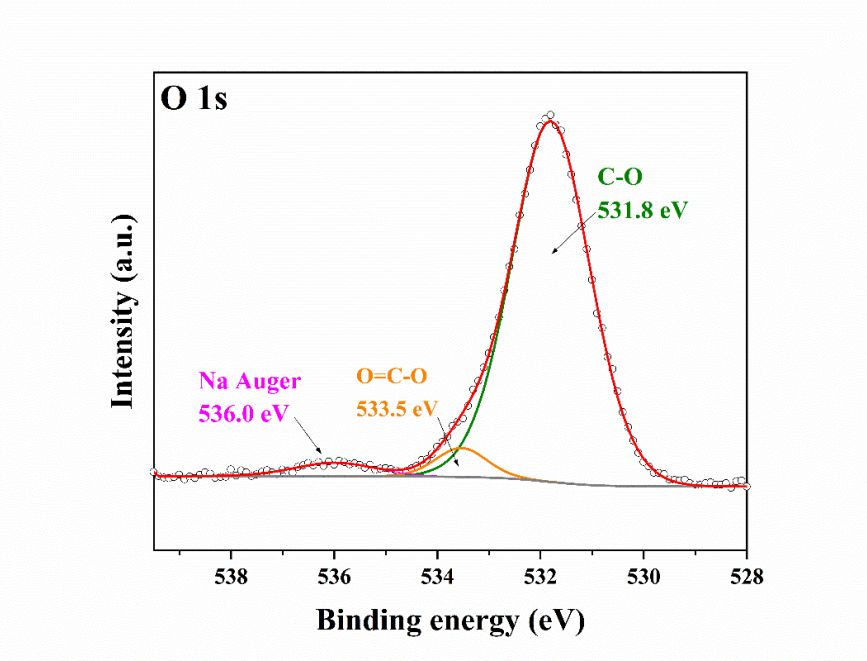

Figure S2. The high-resolution O1s spectrum of PDOAs.

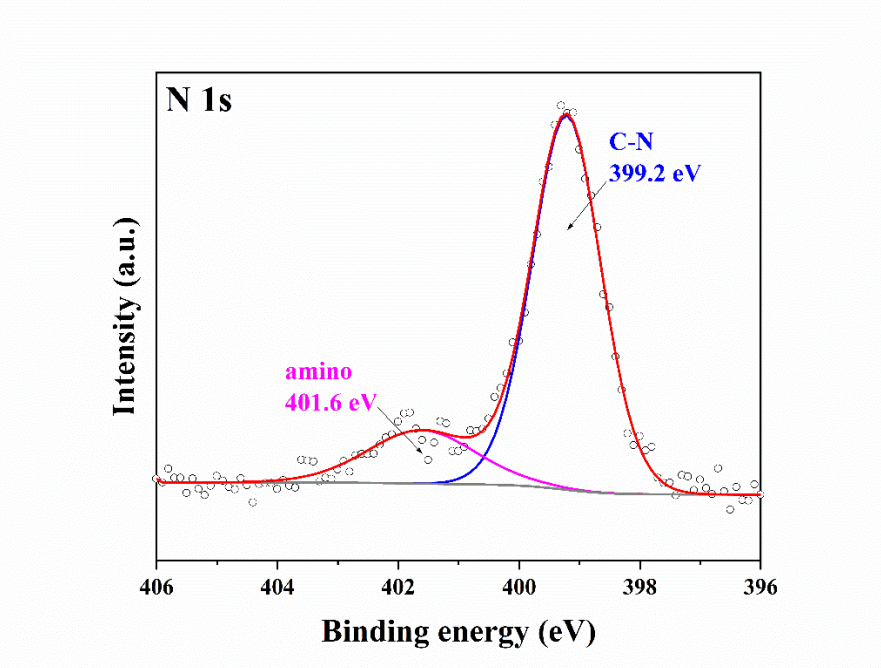

Figure S3. The high-resolution N1s spectrum of PDOAs.

Excitation-dependent fluorescence of PDOAs

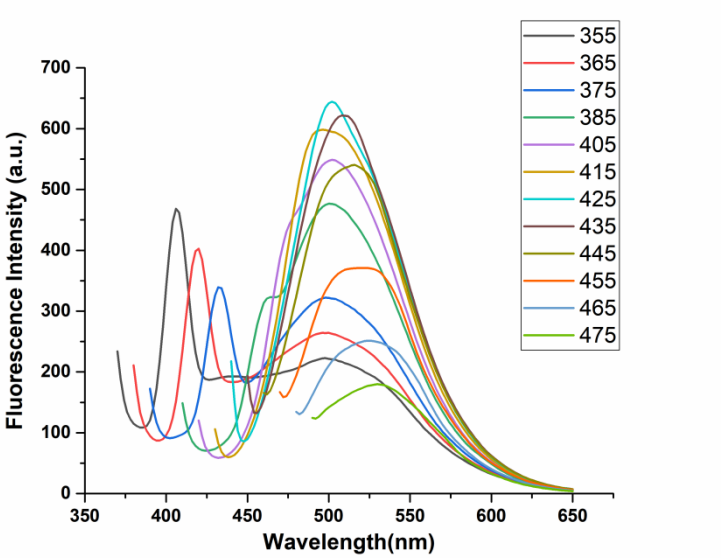

Figure S4. The fluorescence emission spectra of 0.34 mg/mL PDOAs with different excitation wavelength.

Effects of interfering species and pH

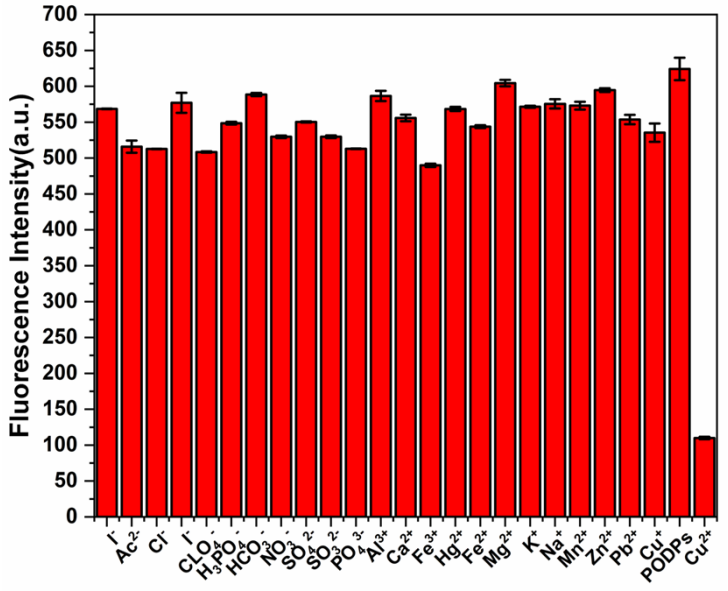

Figure S5. Fluorescence intensity response of the PDOAs toward 5.0 μM Cu^{2+} and other interferents.

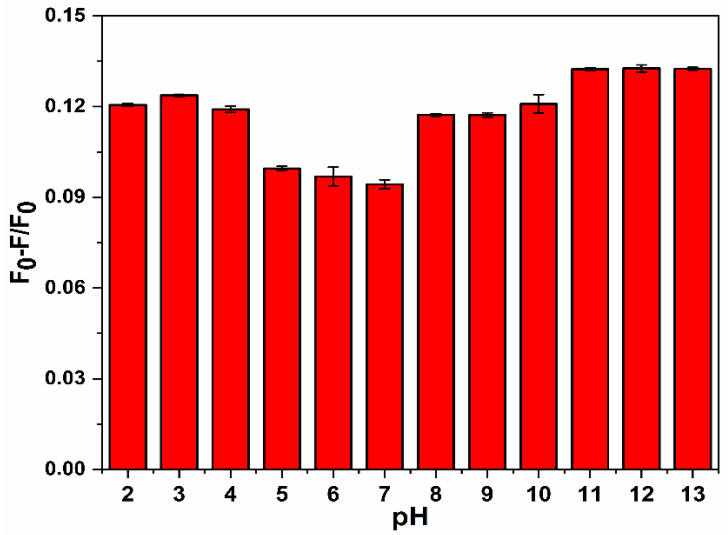

Figure S6. The fluorescence intensity ratio histogram of 0.34 mg/mL PDOAs in the presence of 3.6 μM Cu^{2+} with different pH values.

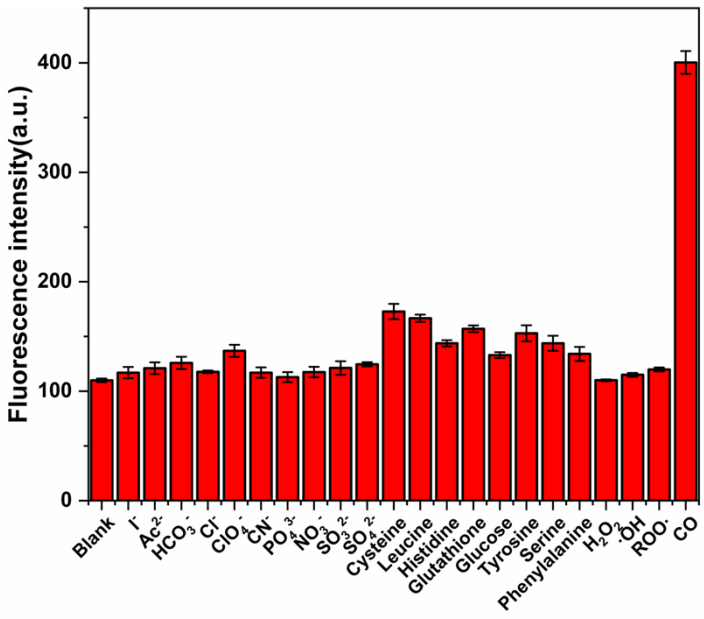

Figure S7. Fluorescence intensity response of the PDOAs-Cu^{2+} toward 10 μM CO and other interfering species.

Table S1

Comparison of various CO probes.

Method/ probe	Response time (min)	Detection limit (μM)	Reference
Fluorescein derivative/Pd^{2+}	15	0.037	*Anal. Chem.* 2016, 88, 10648.
Borondipyrromethene/Pd^{2+}	20	0.72	*Anal. Chem.* 2016, 88, 11154.
3-nitro naphthalimide	45	0.60	*Anal. Chem.* 2018, 90, 2933.
Nitronaphthalimide derivative	45	0.18	*Chem. Res. Toxicol.* 2020, 33, 651.
CORM3-NIR	20	0.07	*ACS Sens.* 2021, 6, 1312.
BODIPY/Pd^{2+}	60	0.5	*J. Am. Chem. Soc.* 2012, 134, 15668.
Nitro-quinazolinone derivative	30	0.73	*Molecules.* 2023, 28, 3654.
Salicylaldehyde/Cu^{2+}	2	0.86	*Anal. Chem.* 2022, 94, 11298.
Benzoxadiazole derivative	30	0.026	*Tetrahedron. Lett.* 2016, 57, 2927.
PDOAs/Cu^{2+}	5	0.072	this work

Reference

(1) Qu, Z.; Na, W.; Nie, Y.; Su, X. *Anal. Chim. Acta.* **2018**, *1039*, 74-81.

(2) Zhang, L.; Zhang, X.; Hu, B.; Shen, L.; Chen, X.; Wang, J. *Analyst* **2012**, *137*, 4974-4980.