Supplementary Materials

Polydopamine-Coated Co_3O_4 Nanoparticles as an Efficient Catalase Mimic for Fluorescent Detection of Sulfide Ion

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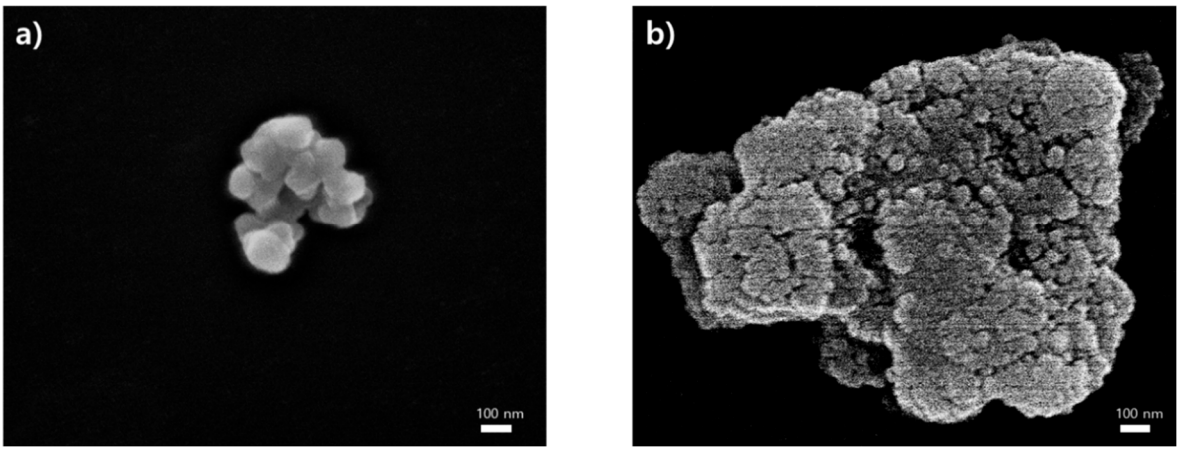

Figure S1. SEM images of a) bare Co_3O_4 NPs and b) PDA@Co_3O_4 NPs. Scale bar: 100 nm.

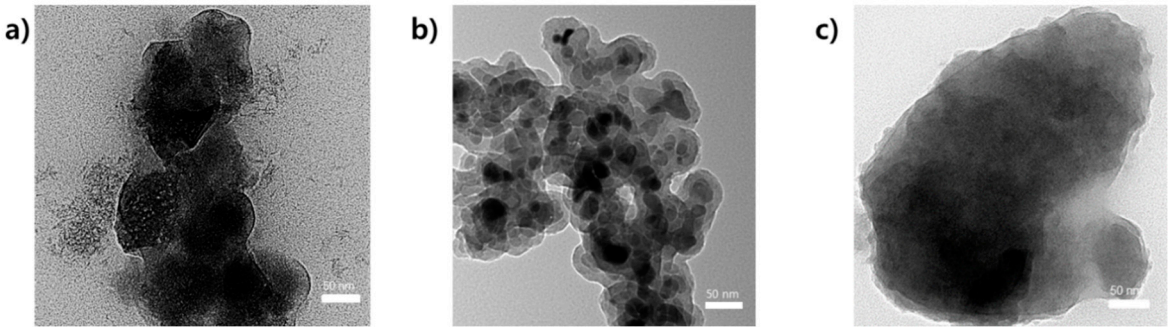

Figure S2. TEM images of a) 0.5-PDA@Co_3O_4 NPs, b) 1-PDA@Co_3O_4 NPs, and c) 2-PDA@Co_3O_4 NPs. Scale bar: 50 nm.

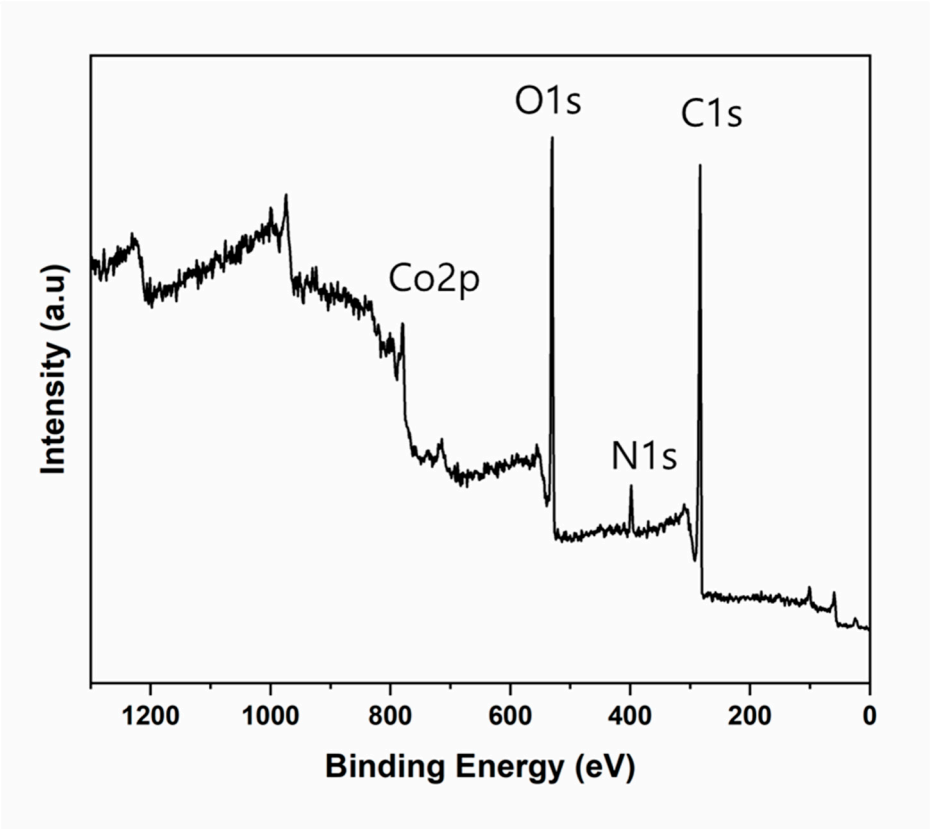

Figure S3. XPS spectra of PDA@Co_3O_4 NPs.

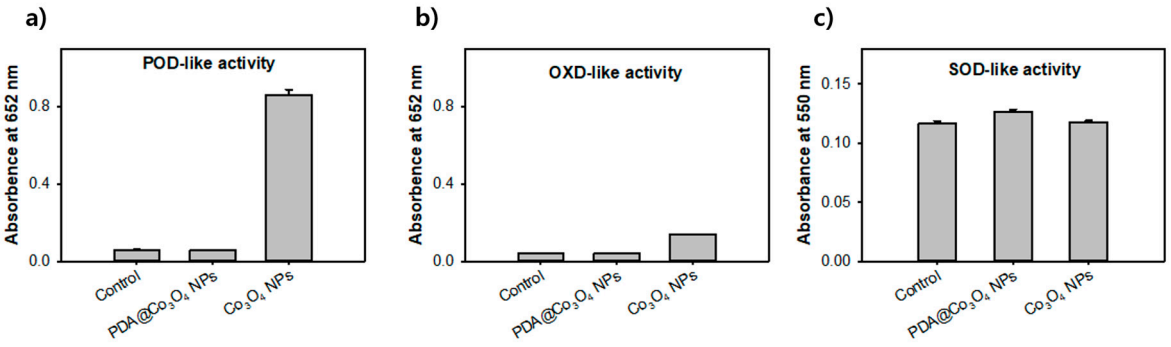

Figure S4. Evaluations for the other oxidoreductase-like activities of PDA@Co_3O_4 NPs and bare Co_3O_4 NPs. a) POD-, b) OXD- and c) SOD-like activities.

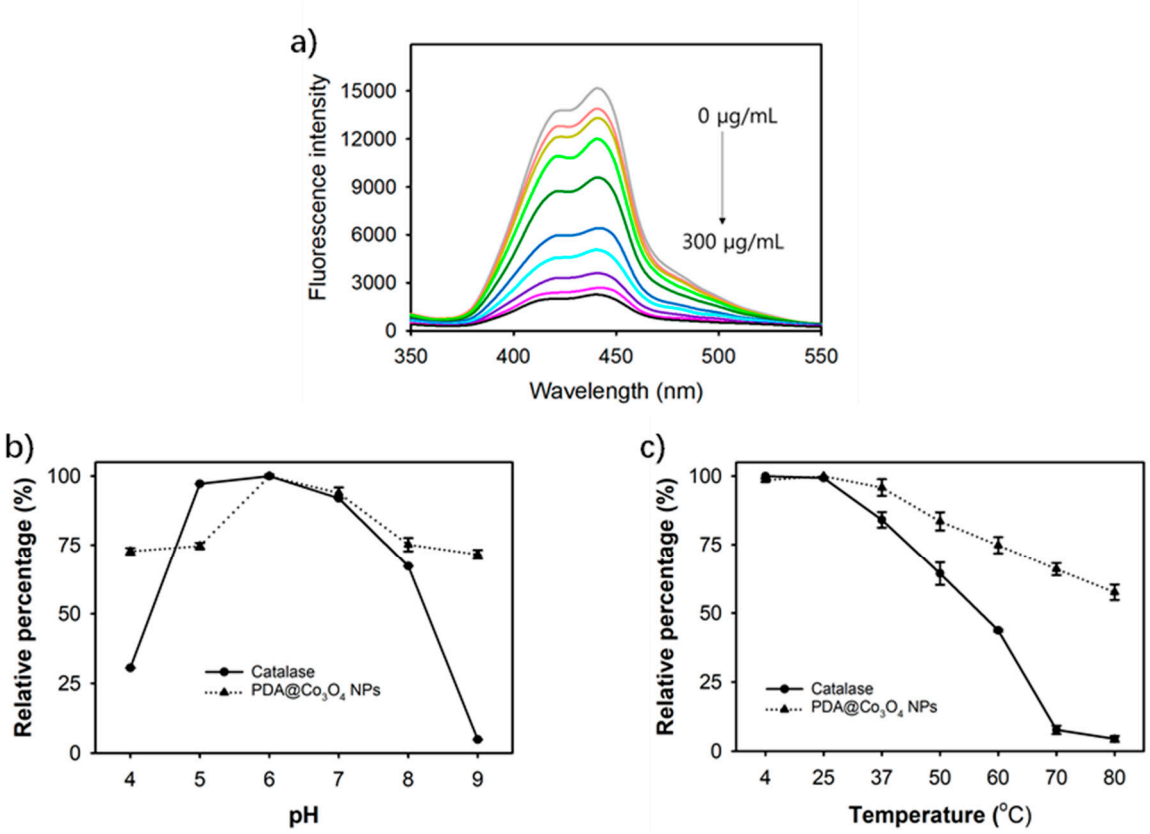

Figure S5. Effects of a) concentrations of PDA@Co_3O_4 NPs, b) pH, and c) temperature on the catalase-like activity of PDA@Co_3O_4 NPs. Effects of pH and temperature on the activity of natural catalase were compared.

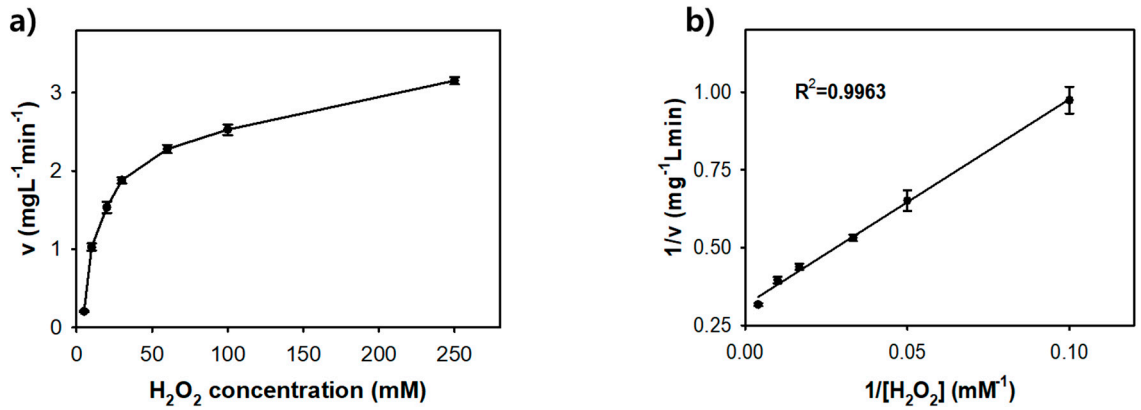

Figure S6. a) Michaelis-Menten curve for the catalase-like activity of PDA@Co_3O_4 NPs at diverse concentrations of H_2O_2 and b) their corresponding Lineweaver-Burk plots (n=3).

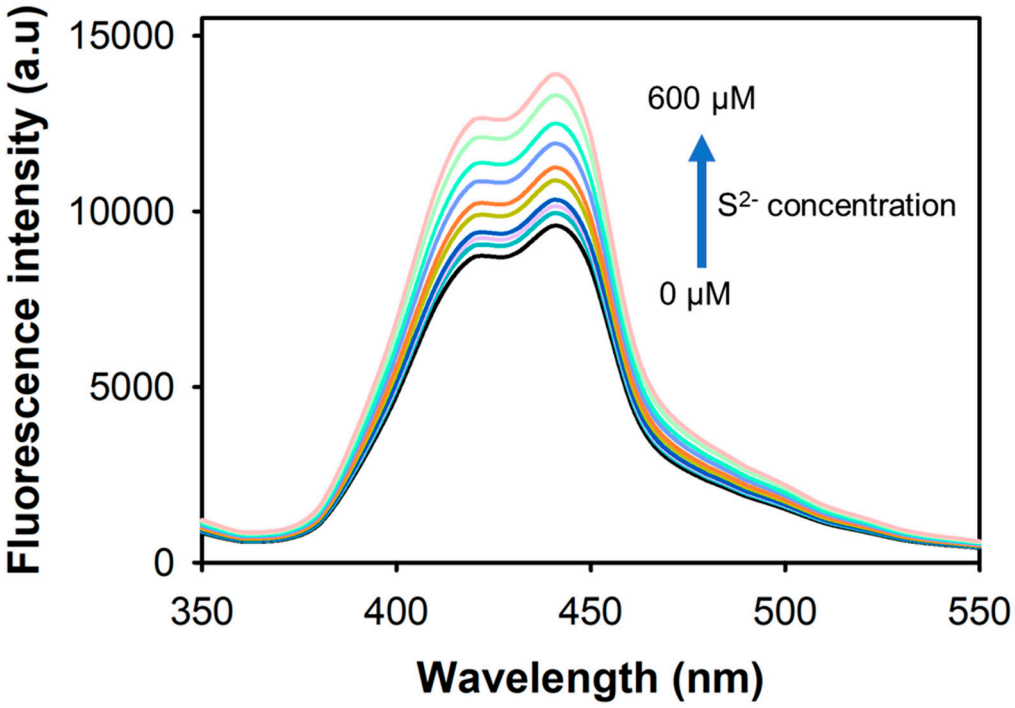

Figure S7. Fluorescence spectra of PDA@Co_3O_4 NPs-based biosensor toward diverse concentrations of S^{2-}.

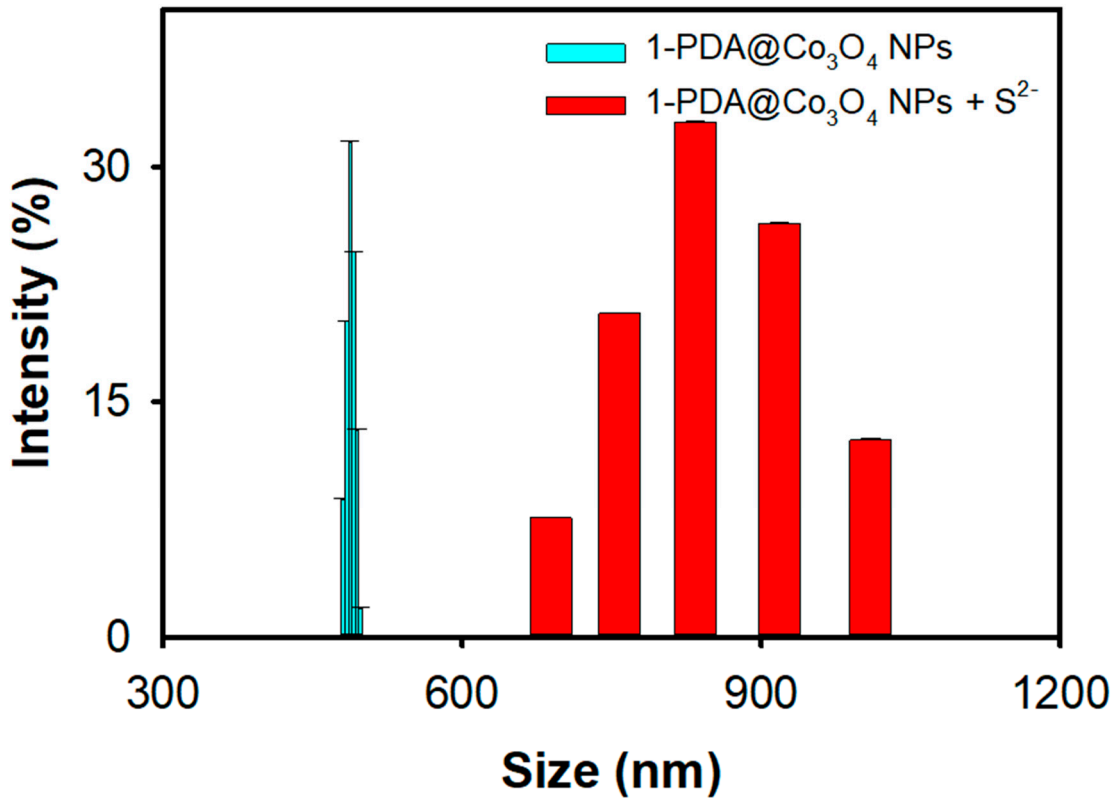

Figure S8. Particle size distributions of PDA@Co_3O_4 NPs in the absence and presence of S^{2-} (1 mM).

Table S1. Elemental composition ratio of PDA@Co_3O_4 NPs.

Element	Weight %	Atomic %
C	36.68	57.90
N	3.39	4.59
O	21.10	25.01
Co	38.83	12.50

Table S2. Comparison of the kinetic parameters of catalase-like PDA-Co_3O_4 NPs with those of natural catalase and previously reported Co_3O_4-based nanozymes.

Catalyst	K_m (mM)	V_{max} (10^{-5} M/s)	References
Co_3O_4 NPs	34.3	1.12	[1]
Catalase	54.3	1.62	
Co_3O_4 nanoplates	24.7	0.24	[2]
Co_3O_4 nanorods	4.82	0.19	
Co_3O_4 nanocubes	63.9	0.12	
PDA@Co_3O_4 NPs	22.1	0.67	**This work**

References

[1] Mu, J.; Zhang, L.; Zhao, M.; Wang, Y. Co3O4 nanoparticles as an efficient catalase mimic: Properties, mechanism and its electrocatalytic sensing application for hydrogen peroxide, *J. Mol. Catal. A-Chem*. **2013**, *378*, 30-7.

[2] Mu, J.; Zhang, L.; Zhao, M.; Wang, Y. Catalase mimic property of Co3O4 nanomaterials with different morphology and its application as a calcium sensor, *ACS Appl. Mater. Interfaces*. **2014**, *6*, 7090-8.