Supporting information

One-step analysis of glucose and acetylcholine based on intrinsic peroxidase-like activity of Ni/Co LDHs microspheres in water

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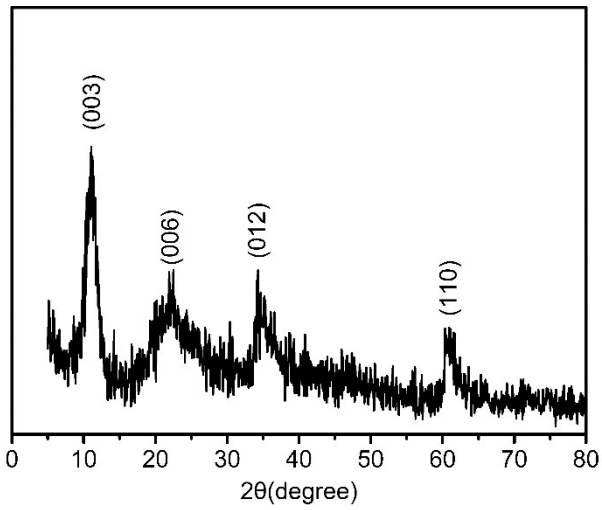

Figure S1. XRD pattern of Ni/Co LDHs.

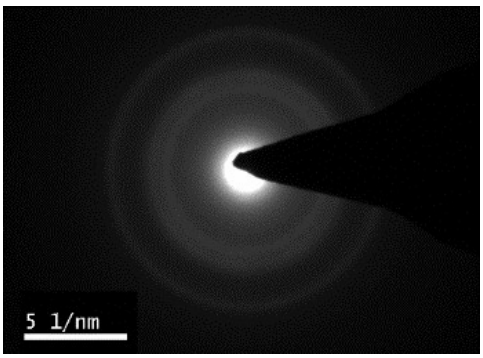

Figure S2. SAED pattern of Ni/Co LDHs.

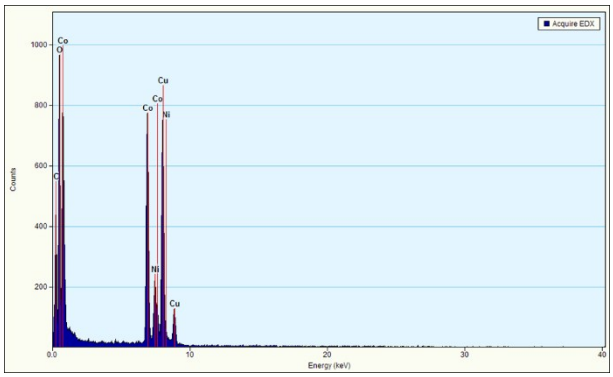

Figure S3. EDX spectrum of Ni/Co LDHs.

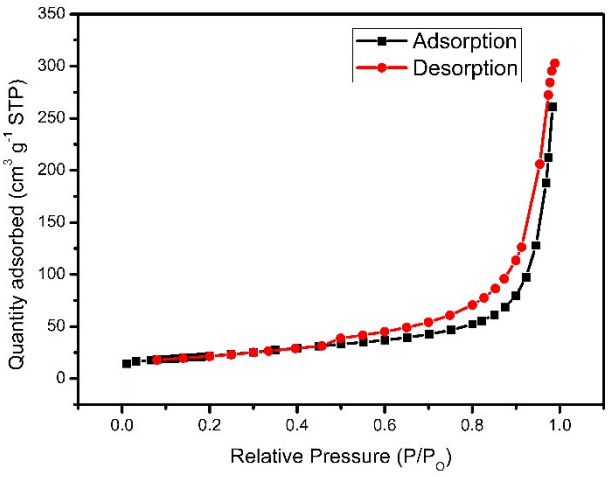

Figure S4. Nitrogen adsorption−desorption isotherm of Ni/Co LDHs.

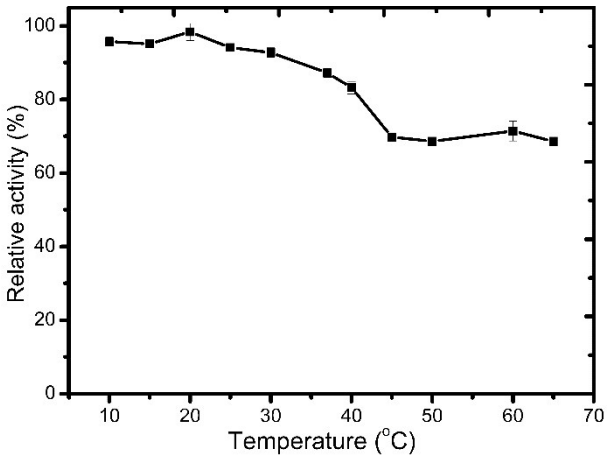

Figure S5. The peroxidase-like activity of Ni/Co LDHs is dependent on temperature. The error bars represent the standard deviation of three measurements. The maximum point in each curve was set as 100%.

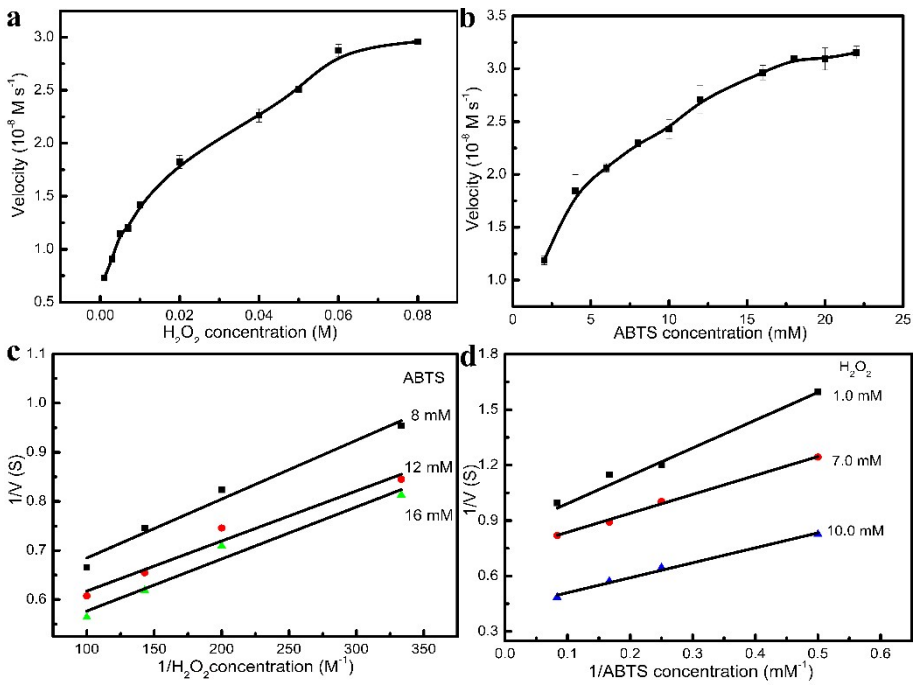

Figure S6. Steady-state kinetic assay and catalytic mechanism of Ni/Co LDHs (a–d). The velocity (v) of the reaction was measured using 0.1 mL 1.0 mg mL^{-1} Ni/Co LDHs in 2.7 mL deionized water at 37 °C. The error bars represent the standard error derived from three repeated measurements. The concentration of ABTS was 0.53 mM and H_2O_2 concentration was varied (a). The concentration of H_2O_2 was 1.67 mM and ABTS concentration was varied (b). Double reciprocal plots of activity of Ni/Co LDHs with the concentration of one substrate (ABTS or H_2O_2) fixed and the other varied (c, d).

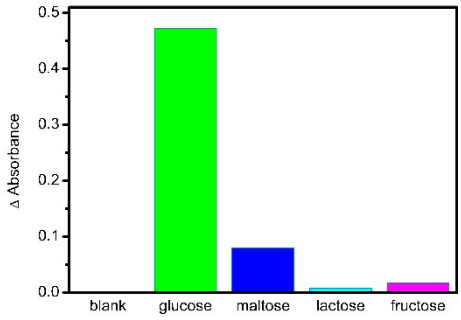

Figure S7. Determination of the selectivity of glucose detection (from left to right: blank, 0.5×10^{-3} mol L^{-1} glucose, 3.3×10^{-3} mol L^{-1} maltose, 3.3×10^{-3} mol L^{-1} lactose, and 3.3×10^{-3} mol L^{-1} fructose) at 417 nm ($\Delta A = A_{total} - A_{blank}$).

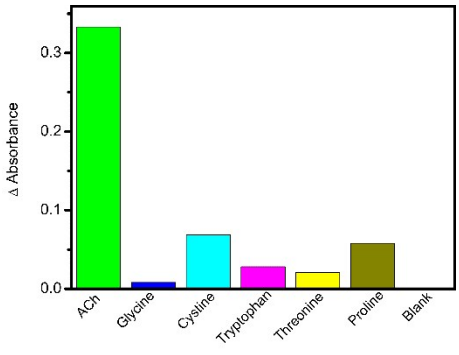

Figure S8. Selectivity analysis for ACh detection. (from left to right: 2.0×10^{-4} mol L^{-1} ACh, 8.0×10^{-4} mol L^{-1} Glycine, 8.0×10^{-4} mol L^{-1} Cystine, 8.0×10^{-4} mol L^{-1} Tryptophan, 8.0×10^{-4} mol L^{-1} Threonine, 8.0×10^{-4} mol L^{-1} Proline and Blank) at 417 nm ($\Delta A = A_{total} - A_{blank}$).

Table S1. Michaelis-Menten parameters of Ni/Co LDHs.

Catalyst	Substance	K_m/mM	V_{max}/10^{-8} M·s^{-1}
HRP [1]	ABTS	1.56	-
	H_2O_2	0.24	-
Ni/Co LDHs	ABTS	3.43	3.29
	H_2O_2	13.2	3.24

Sample	Spiked (μM)	The proposed method		The GOD-PAP method	
		Found (μM)	Recovery (%)	Found (μM)	Recovery (%)
Human serum 1	5.0	4.8	96.0	5.1	102.0
	25.0	24.6	98.4	24.9	99.6
	50.0	51.4	103.0	50.8	101.6
Human serum 2	5.0	5.3	106.0	5.1	102.0
	25.0	26.1	104.4	25.4	101.6
	50.0	48.4	96.8	49.1	98.2
Human serum 3	5.0	4.7	94.0	5.2	104.0
	25.0	24.2	96.8	24.8	99.2
	50.0	52.4	104.8	51.3	102.6

Table S2. Determination of glucose in real samples.

Table S3. Determination of ACh in milk sample.

Milk sample	Added (μM)	Found (μM)	Recovery (%)
1	25.0	23.8±0.82	95.2
2	75.0	78.6±0.75	104.8
3	125.0	112.8±0.61	90.2

References

1. H. Gallati, *Clinical Chemistry and Laboratory Medicine*, 1979, **17**, 1-8.