Electronic Supplementary Material (ESI) for Analyst.

Aptasensors with palladium nanoparticles-modified hemin-containing metal-organic frameworks as signal marker for detection of exosomes

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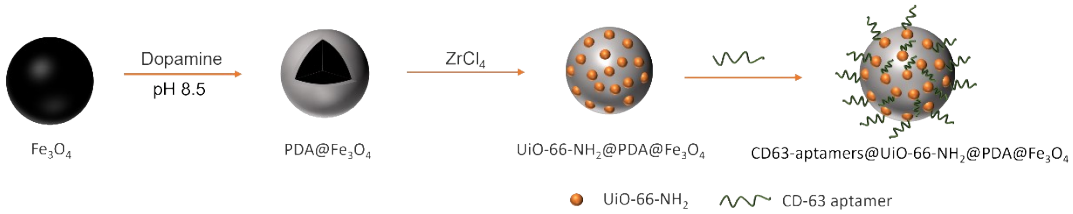

Scheme S1. Schematic illustration of the synthesis of the CD63-aptamers@UiO-66-NH_2@PDA@Fe_3O_4 capture probe.

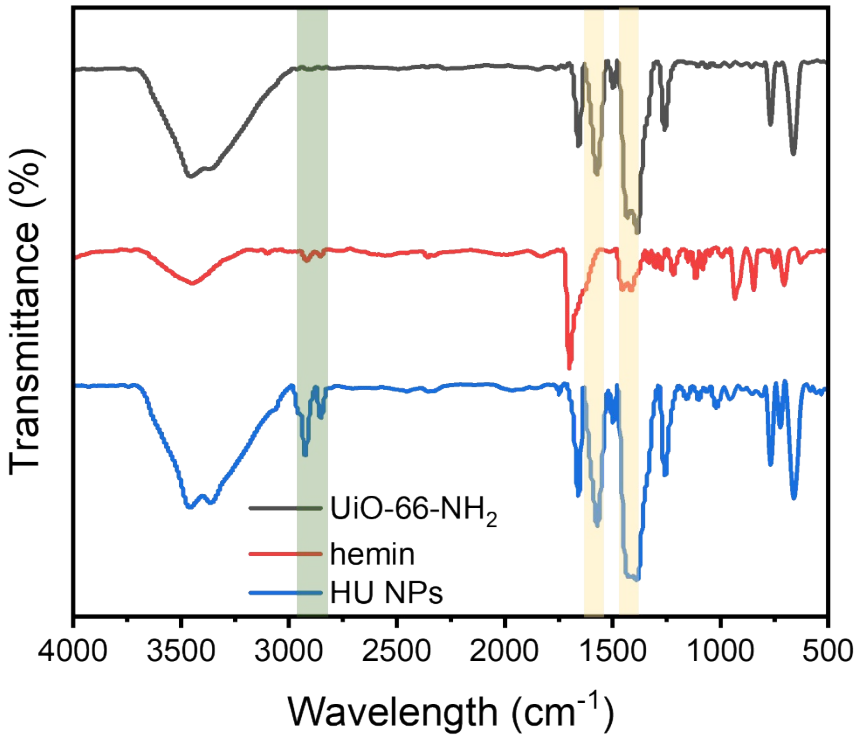

Fig. S1. FT-IR spectra of UiO-66-NH_2 (black line), hemin (red line) and the HU NPs (blue line).

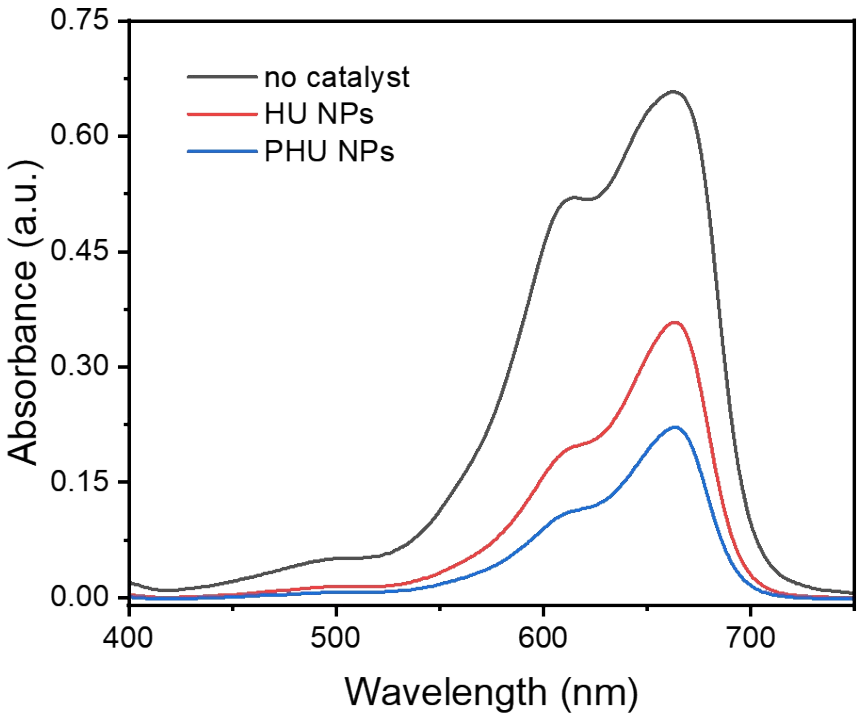

Fig. S2. UV-vis absorption spectra of MB (black line) with its oxidation to indicate ·OH production via H_2O_2 decomposition by the HU NPs (red line) and the PHU NPs (blue line), respectively.

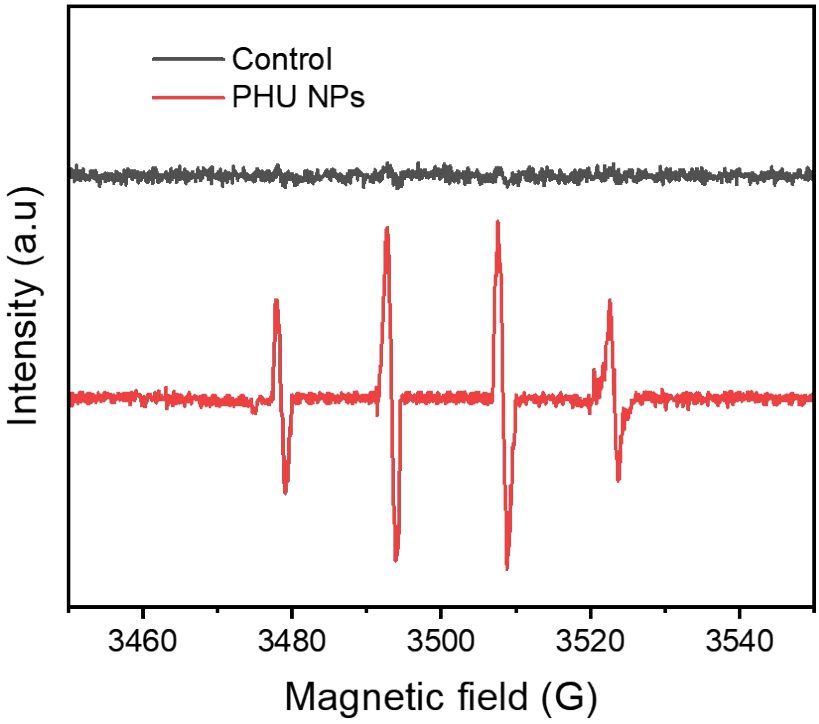

Fig. S3. Typica spin-adduct EPR of ·OH of DMPO in phosphate buffer at pH 7.4.

Table S1 Comparison of the apparent Michaelis-Menten constant (Km) and maximum reaction rate (Vmax).

Catalysts	K_m (mM)		V_{max} (10^{-8} M/s)	
	TMB	H_2O_2	TMB	H_2O_2
Fe_3O_4 [1]	0.098	154.0	3.440	9.780
HRP [1]	0.434	3.700	10.00	8.710
Hemin@MIL-101(Al)-NH_2 [2]	0.068	10.90	6.070	8.980
PHU NPs, this work	0.11	0.09	12.05	7.65

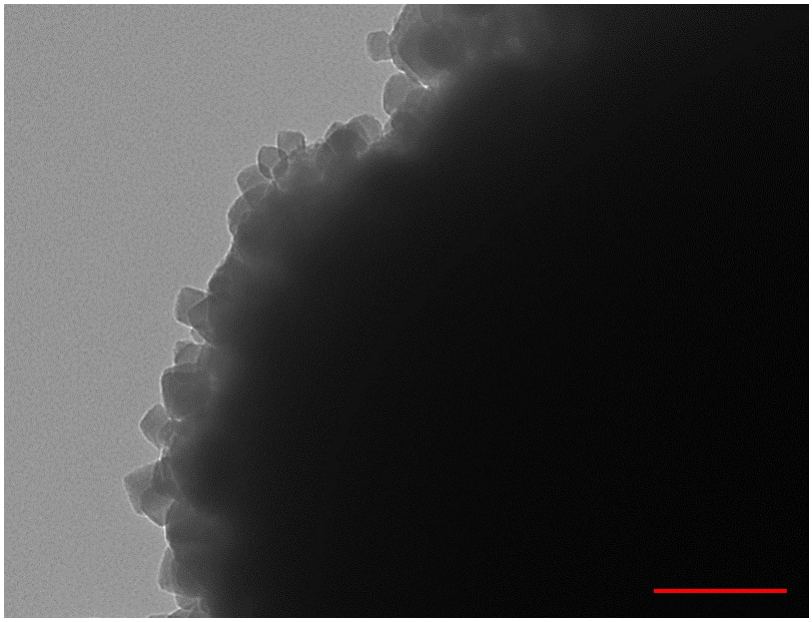

Fig. S4. Typical TEM image of the aptamer@UiO-66-NH_2@PDA@Fe_3O_4 particles. Scale bar: 200 nm.

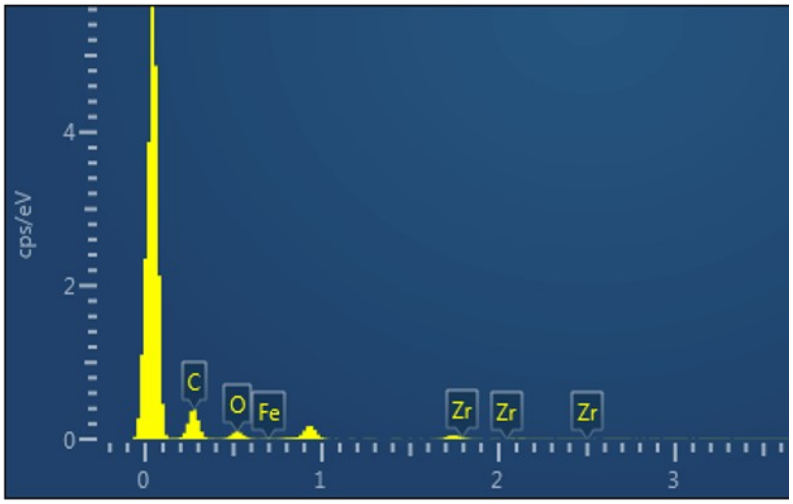

Fig. S5. Energy-dispersive X-ray (EDX) elemental mapping analysis of the aptamer@UiO-66-NH_2@PDA@Fe_3O_4 particles.

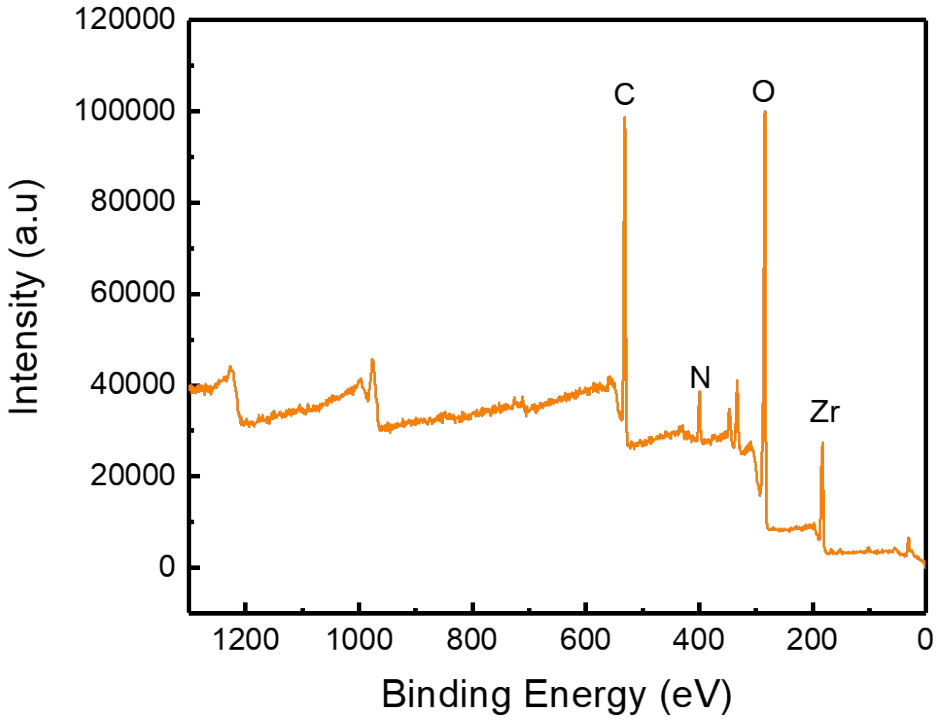

Fig. S6. XPS of the aptamer@UiO-66-NH_2@PDA@Fe_3O_4 particles.

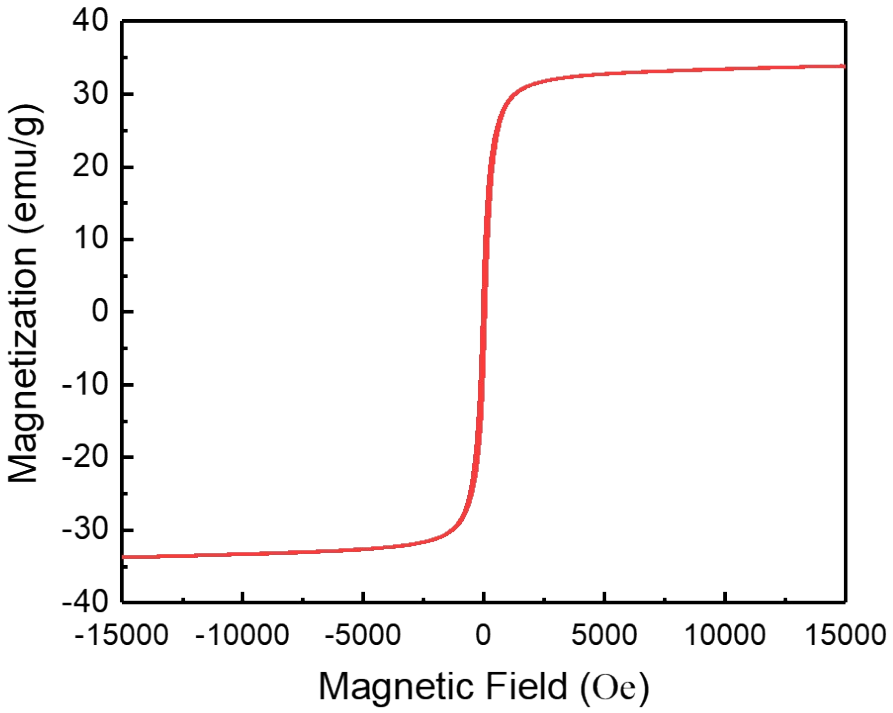

Fig. S7. Magnetic hysteresis curves of the aptamer@UiO-66-NH_2@PDA@Fe_3O_4 particles.

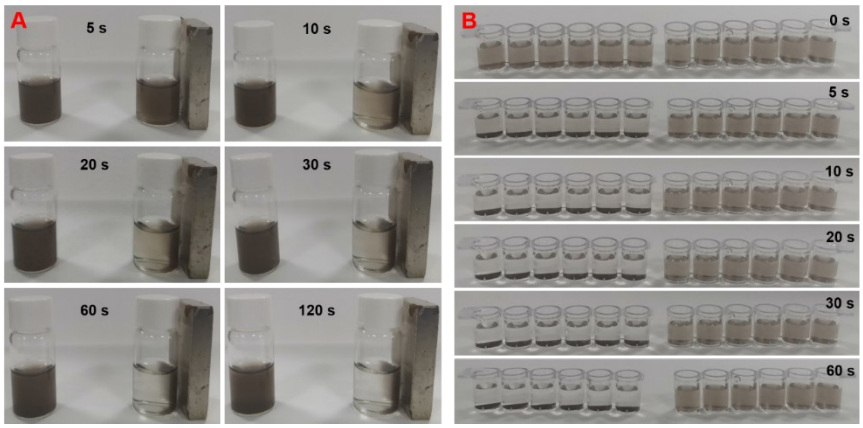

Fig. S8. Separation performance of the aptamer@UiO-66-NH_2@PDA@Fe_3O_4 particles under a magnet in a glass bottle (A) and in 96-well plate (B).

Table S2. Comparison of LOD and detection time of currently available methods for the colorimetric detection of exosomes.

Analytical method	LOD (particles/μL)	Linear range (particles/μL)	References
g-C_3N_4 nanozyme	1.352×10^6	0.19×10^7-3.38×10^7	[3]
single-walled carbon nanotubes nanozyme	5.2×10^5	1.84×10^6-2.21×10^7	[4]
TdT-aided signal amplification	6.7×10^3	9.75×10^3 -1.95×10^6	[5]
HRP-accelerated dopamine polymerization	7.7	1-10^8	[6]
$CuCo_2O_4$ nanozyme	4.5×10^3	5.6×10^4 - 8.9×10^5	[7]
HRP-GNPs	100		[8]
Dual functional Zr-MOF nanozyme	82.6	4.28×10^2 - 4.28×10^5	This work

TdT: terminal deoxynucleotidyl transferase. HRP-GNPs: HRP modified gold nanoparticles.

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Table S3. Comparation with commercial ELISA kits

Products	LOD (particales/μL)	Linear range (particales/μL)
Human Total Exosome Capture & Quantification Kit	1×10^5	6.09×10^5-1.95×10^6
This work	86.2	4.28×10^2-4.28×10^5

- not found