Dual-Functional PCN-242 (Fe_2Co) MOF for Sensitive Bacterial Endotoxin Detection

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Table S1: The ICP-MS data validation for Fe_2Co cluster before and after MOF synthesis.

	Fe (wt%)	Co (wt%)	Fe: Co ratio in the cluster
$[Fe_2Co(\mu_3\text{-}O)\ (CH_3COO)_6]$ cluster	15.50	8.568	1.81: 1
PCN-242 (Fe_2Co) MOF	11.40	4.467	2.55: 1

Table S2: Comparison of steady-state kinetics of PCN-242(Fe_2Co) with HRP and other iron-based MOFs for POD-like enzymatic activity.

Substrate	Samples	Km (mM)	Vmax (10^{-8} M S^{-1})	References
H_2O_2	HRP enzyme	3.7	8.71	[1]
	Fe-MOF-GOx	1.3	2.5	[2]
	hemin@MIL-53(Al)-NH_2	10.90	8.98	[3]
	NH_2-MIL-88B(Fe)	0.91	-	[4]
	Fe/Co-MIL-88(NH_2)	0.71	-	[4]
	Fe/Co-TPY-MIL-88(NH_2)	0.69	9.8	[5]
	PCN-242 (Fe_2Co) MOF	0.607	7.01	This work

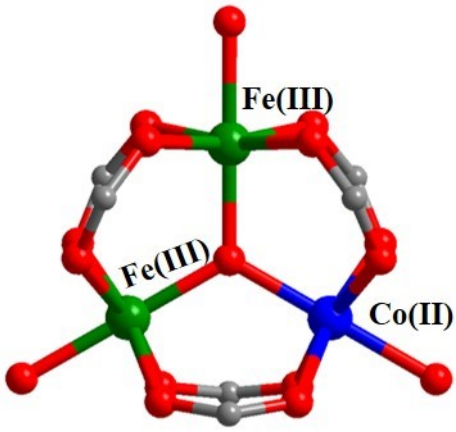

Figure S1: The schematic structure of the premade [$Fe_2Co(\mu_3\text{-}O)$] cluster is used as the starting material for PCN-242 (Fe_2Co) MOF.

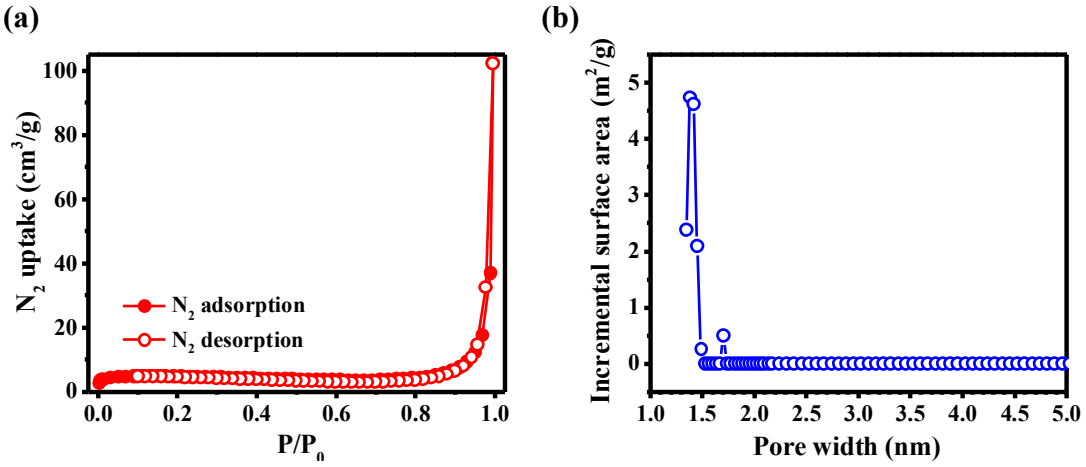

Figure S2: (a) Nitrogen adsorption-desorption isotherm of PCN-242(Fe_2Co) MOF. (b) Incremental pore surface area distribution from NLDFT, highlighting pore structure characteristics.

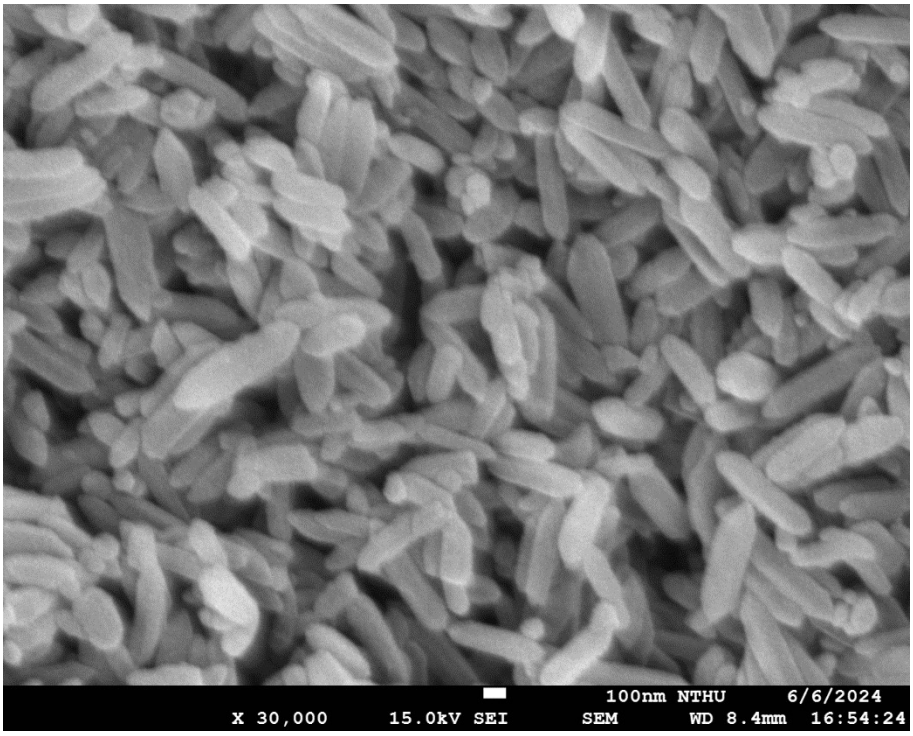

Figure S3: The synthesized PCN-242 (Fe_2Co) MOF FE-SEM image.

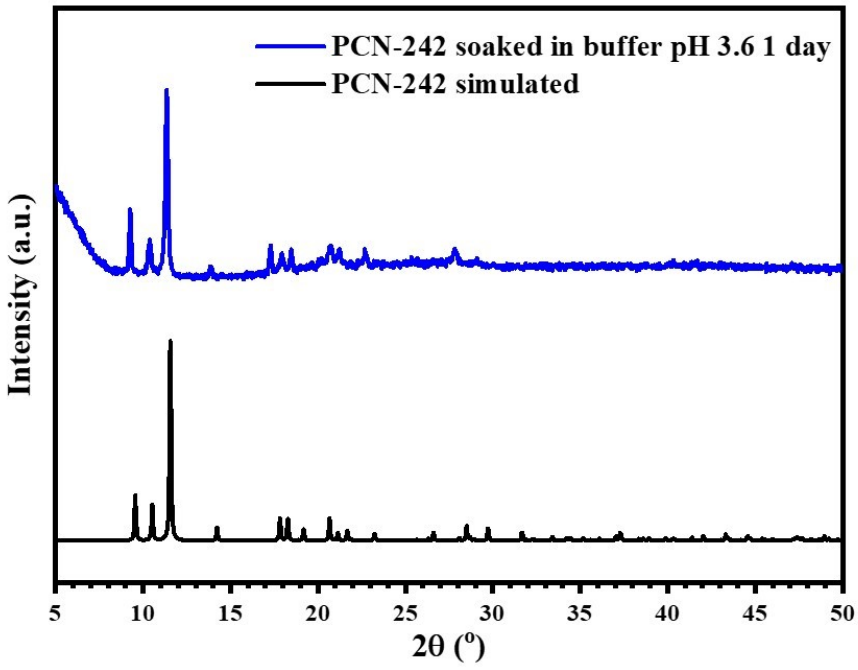

Figure S4: The PXRD pattern of PCN-242 (Fe_2Co) MOF soaked in an acidic buffer one day at pH 3.6.

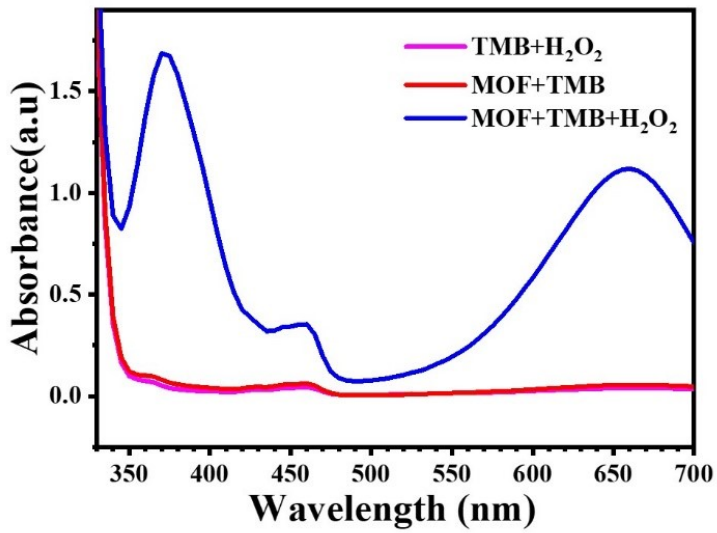

Figure S5: The various reaction systems used to assess the peroxidase-like catalytic activity of PCN-242 (Fe_2Co).

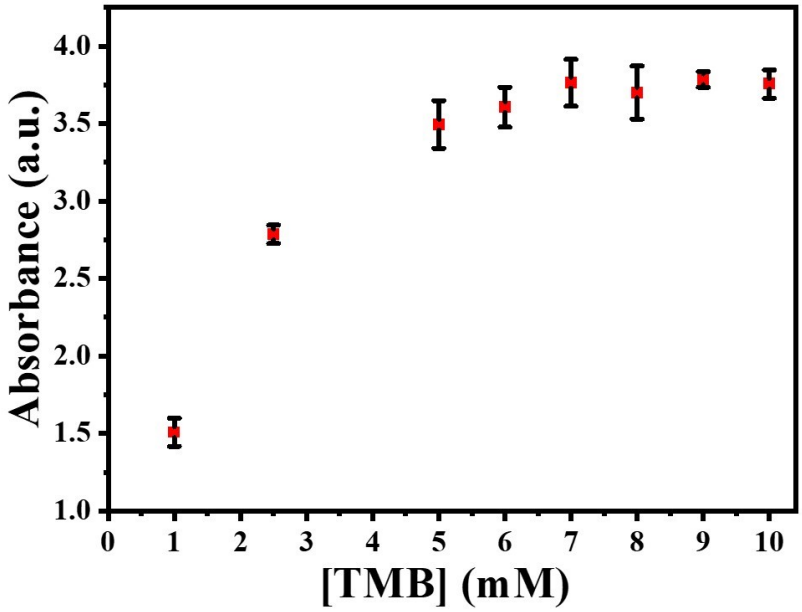

Figure S6. The peroxidase-like catalytic activity of PCN-242 (Fe_2Co) was optimized by varying the concentration of TMB.

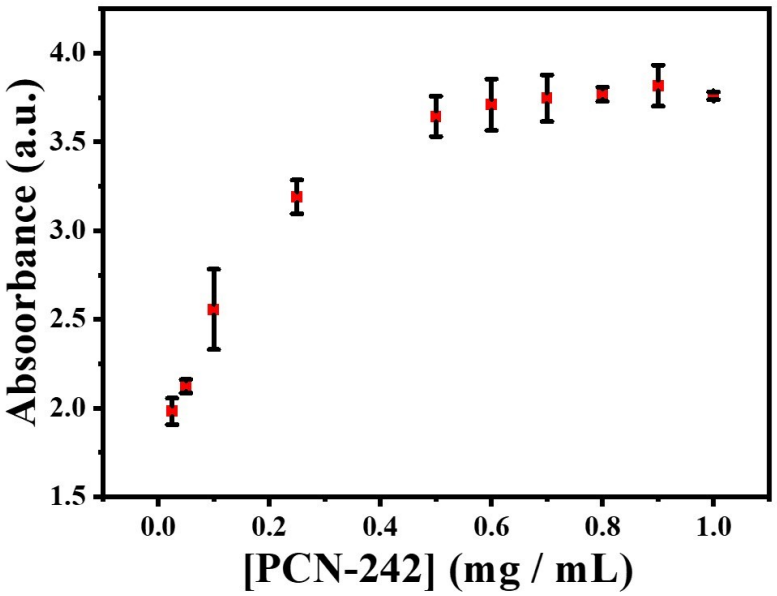

Figure S7. The peroxidase-like catalytic activity of PCN-242 (Fe_2Co) was optimized by varying the concentration of MOF in the solution.

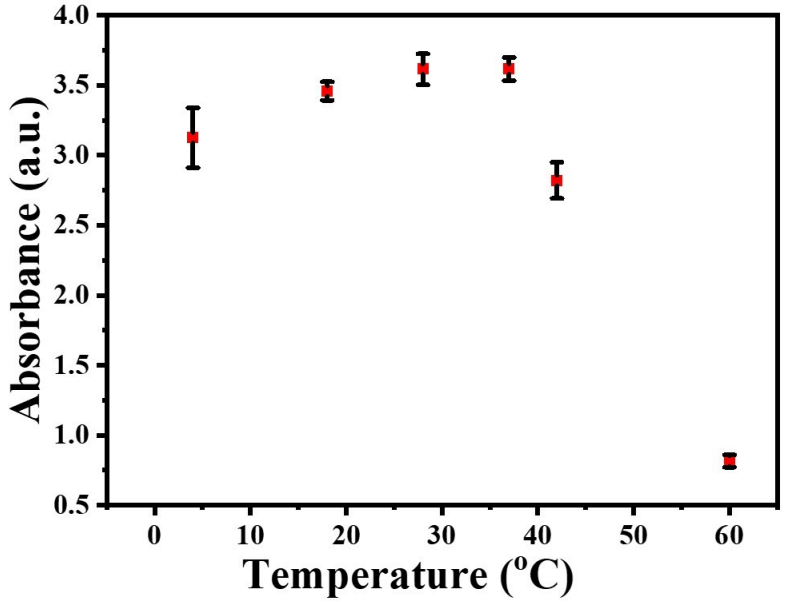

Figure S8. The peroxidase-like catalytic activity of PCN-242 (Fe_2Co) was conducted at various temperatures.

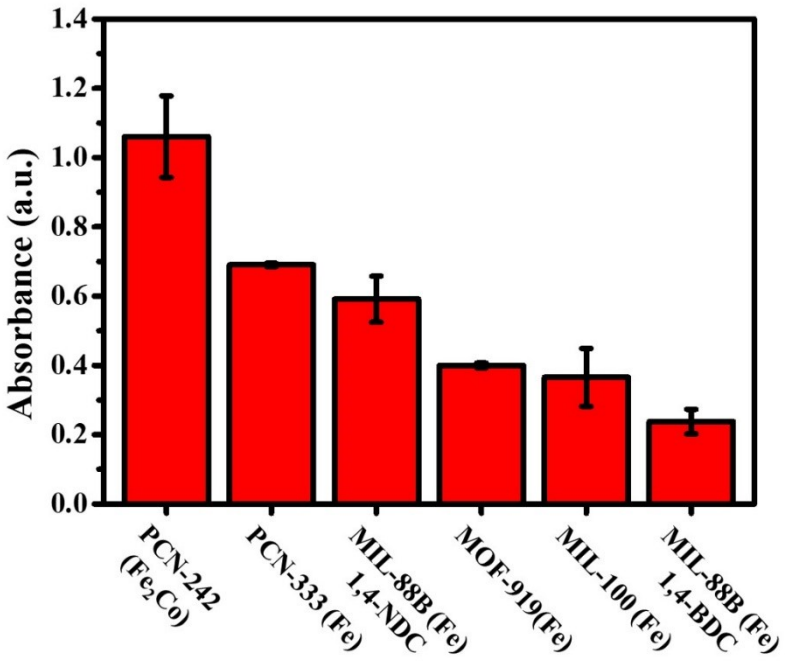

Figure S9. Peroxidase-like catalytic activity comparison of various iron-based MOFs. From left to right: 1) PCN-242(Fe_2Co), 2) PCN-333(Fe), 3) MIL-88B(Fe) (1,4-NDC), 4) MOF-919(Fe), 5) MIL-100(Fe), and 6) MIL-88B(Fe) (1,4-BDC).

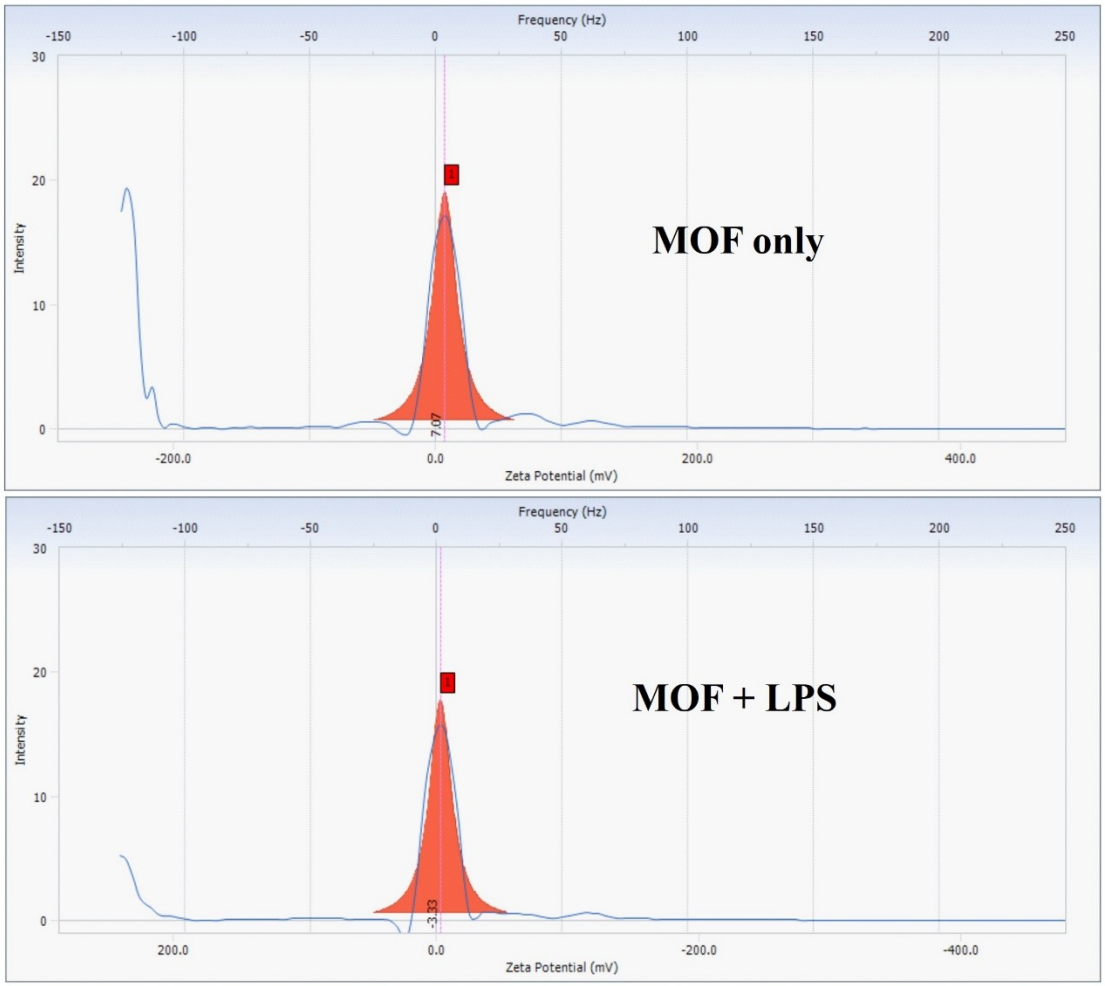

Figure S10. The zeta potential analysis of PCN-242 (Fe_2Co) MOF before and after LPS addition.

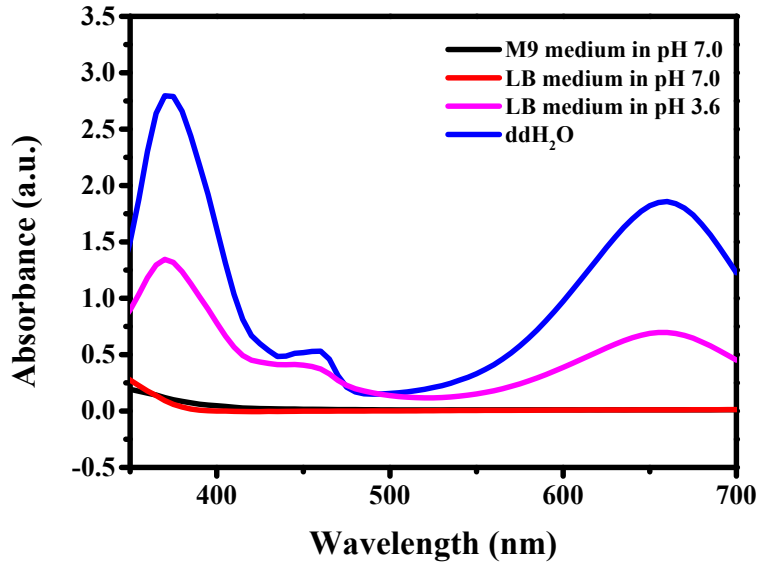

Figure S11. Evaluation of PCN-242 MOF peroxidase activity across different reaction media, highlighting the impact of varying conditions on catalytic performance.

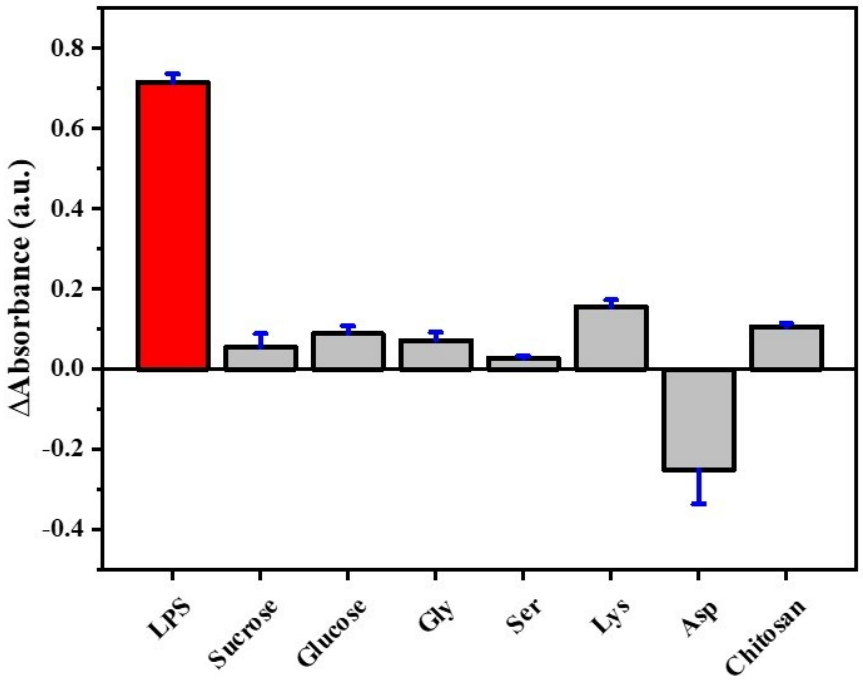

Figure S12. The potential interference compounds test for LPS selectivity analysis.

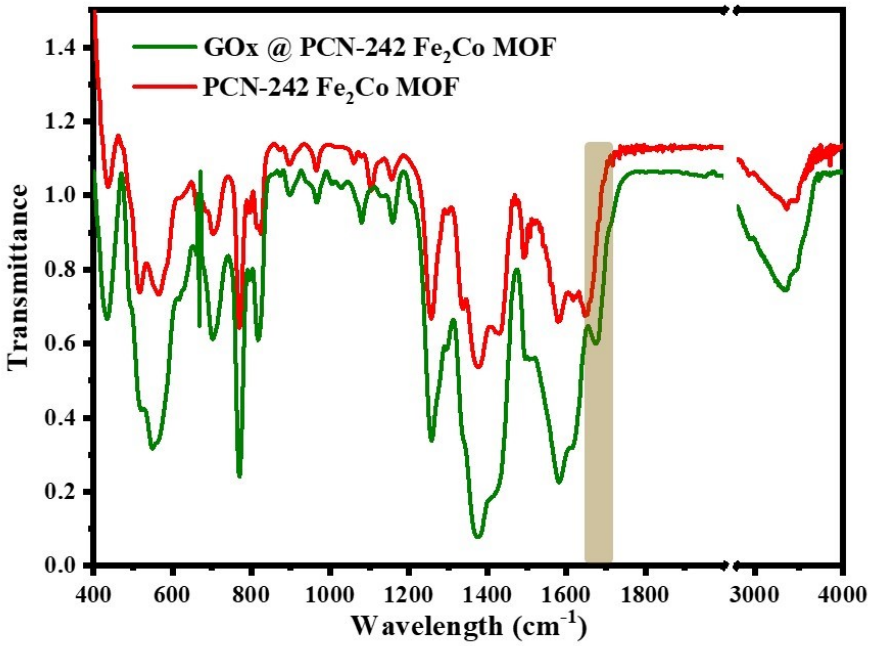

Figure S13. FT-IR spectra showing the characteristic vibrational modes of PCN-242(Fe_2Co) MOF before and after modification with GOx.

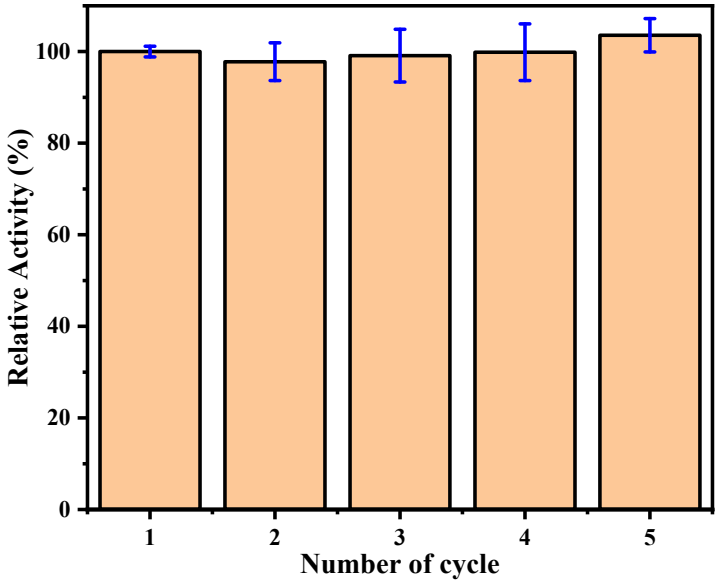

Figure S14. GOx@PCN-242 (Fe_2Co) was utilized for glucose detection and for recycling the enzyme-MOF composite.

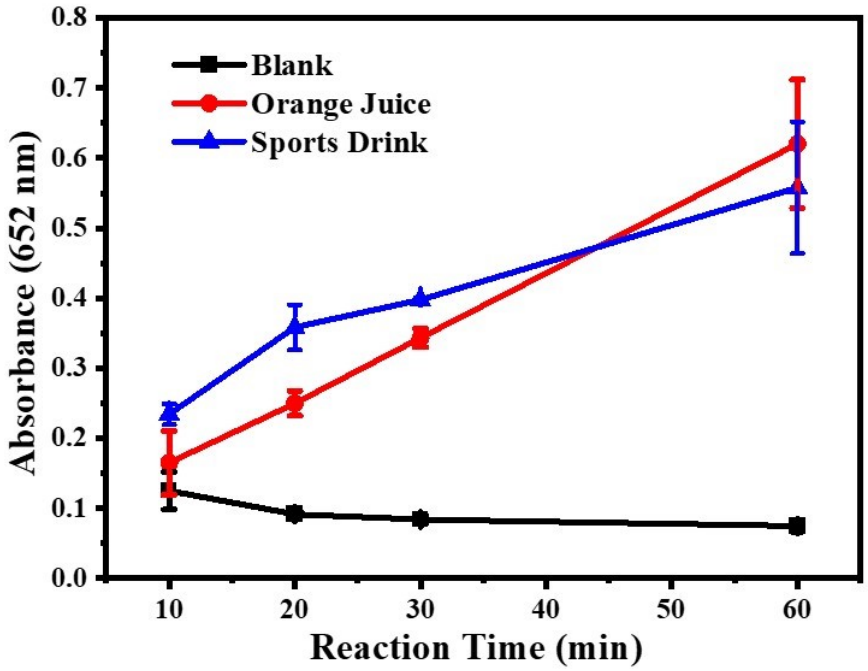

Figure S15. Glucose detection in diluted orange juice and sports drinks using the GOx@PCN-242 Fe_2Co MOF cascade reaction.

References:

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