Supporting Information

Enzyme-Encapsulated Metal-Organic-Framework ZIF-8 mediated Biosensor for Ultrasensitive Detection of Urinary Prostatic Exosomal Protein Using a Glucose Meter

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Table S1. Calculation process of GOx loading rate.

Sample	ΔGlu
Precipitation (GOx@ZIF-8)	0.583 mM
Supernatant GOx	0.780 mM

$$Loading\ rate\ of\ GOx\ (\%) = \frac{\Delta Glu\ of\ GOx@ZIF-8}{\Delta Glu\ of\ GOx@ZIF-8\ +\ \Delta Glu\ of\ Supernatant\ GOx} \qquad Eq(1)$$

$$Loading\ rate\ of\ GOx\ (\%) = \frac{0.583}{0.583\ +\ 0.780} \times 100\% = 42.7\%$$

**Table S2.** Comparison of different methods for PSEP detection.

| Method	Detection Range (pg/mL)	LOD (pg/mL)	Time	Reference
ELISA	300-10000	-	75 min	Angke Biomedical Technology Co., Ltd.
ELISA	0-320	-	75 min	Tianjin Kevino Biotechnology Co., Ltd.
FMs-LFA*	1200-10000	300	15 min	Angke Biomedical Technology Co., Ltd.
PGM-based Immunoassay	0.375-48	0.23	45 min	Our work

* fluorescent microspheres lateral flow immunoassay (FMs-LFA).

Table S3. The repeatability experiments of PGM-based immunosensor for PSEP detection.
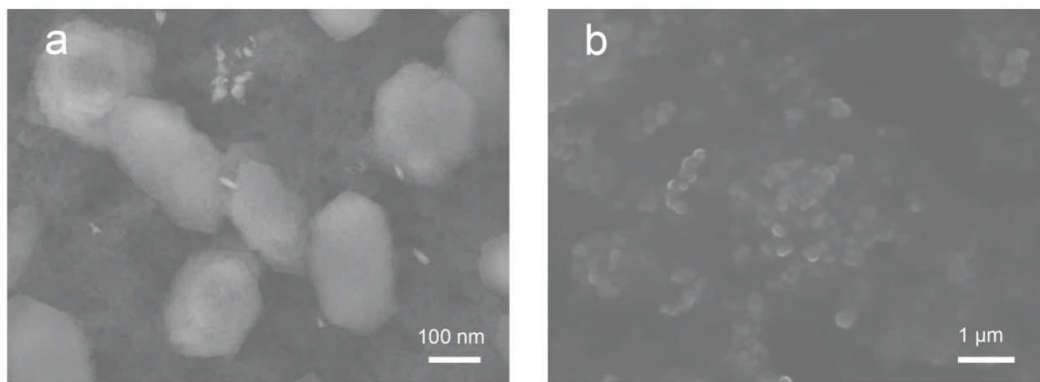
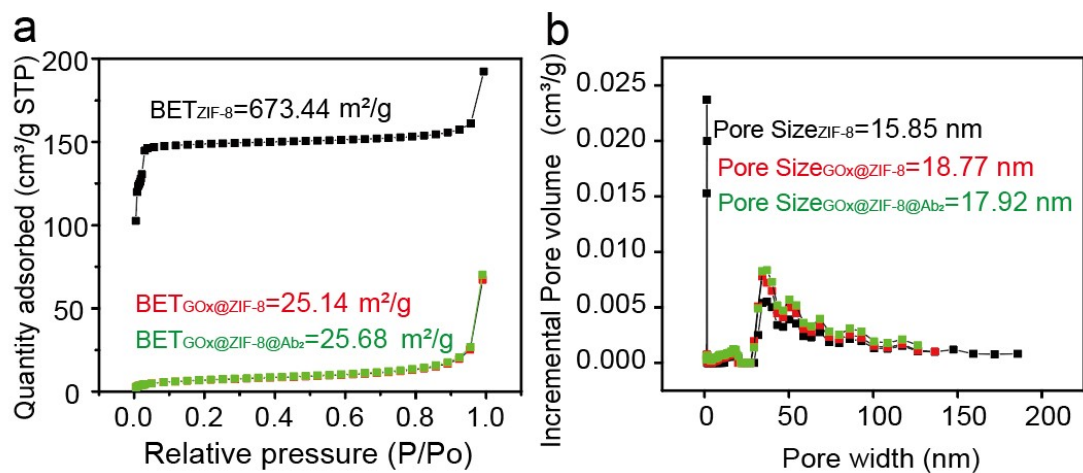| C_{PSEP}	1	2	3	4	5	RSD
48 pg/mL	3.2 mM	3.4 mM	3.2 mM	3.5 mM	3.1 mM	5%
6 pg/mL	1.8 mM	1.9 mM	1.7 mM	1.5 mM	2.2 mM	14%
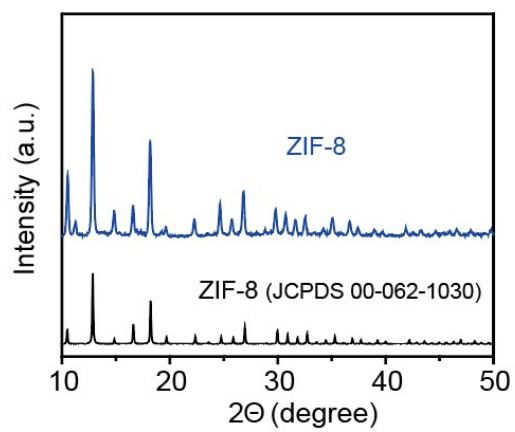
Figure S1. XRD patterns for simulated ZIF-8 (JCPDS 00-062-1030) and as-synthesized ZIF-8.
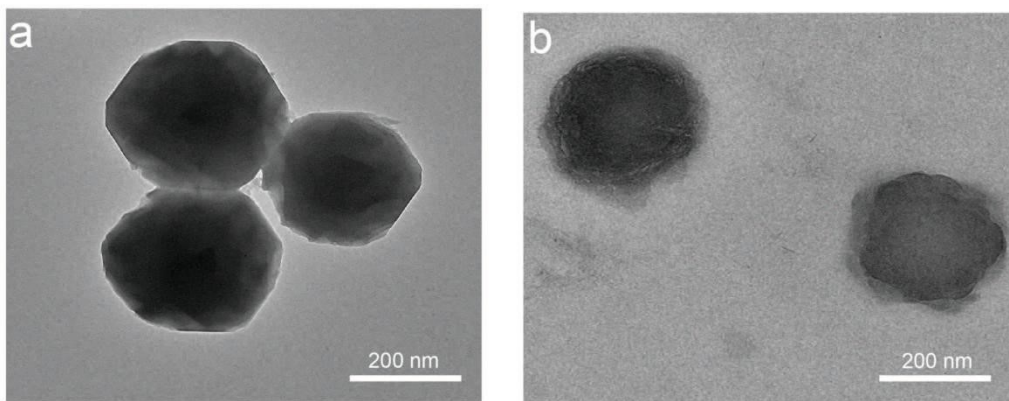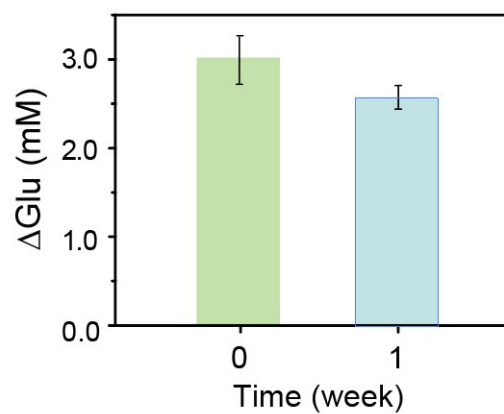
Figure S2. TEM images of pure ZIF-8 and GOx@ZIF-8.

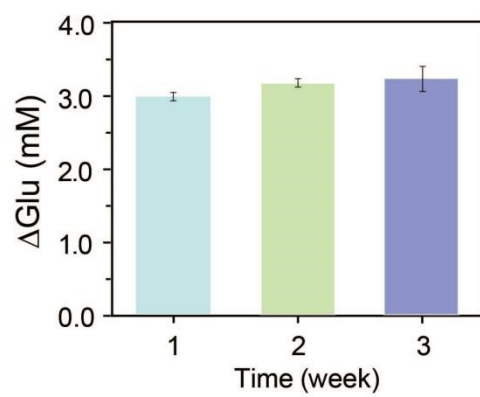**Figure S3.** SEM images of ZIF-8 at 100 nm scale and 1 μm scale.

Figure S4. Nitrogen adsorption isotherms(a) and pore size analysis (b) of pure ZIF-8, GOx@ZIF-8 and GOx@ZIF-8@Ab$_2$.

Figure S5. Stability of the fabricated immunosensor for PSEP (48 pg/mL) detection at room temperature.

Figure S6. Stability of the fabricated immunosensor for PSEP detection (48 pg/mL).

Calculation of LOD. A glucose consumption measurement for blank samples was implemented with five parallel tests previously, which exhibited a mean of 1.5909 and a standard deviation (SD) of 0.02. The slope (b) and intercept (a) of the linear regression equation for PSEP detection was 0.03 and 1.65, respectively. Therefore, to get more accurate LOD, we recalculated our LOD by change the S/N as follows[S1].

$$LOD = (y_0 + 3.3 \times SD - a)/b$$

Therefore, according to the new S/N, the LOD was estimated as 0.23 pg/mL.

References

S1 H. Moulahoum and F. Ghorbanizamani, *Biosens. Bioelectron.* 2024, **264**, 116670.