

## Supporting information

# Reusable and Universal Impedimetric Sensing Platform for Rapid and Sensitive Detection of Pathogenic Bacteria Based on Bacteria-Imprinted Polythiophene Film

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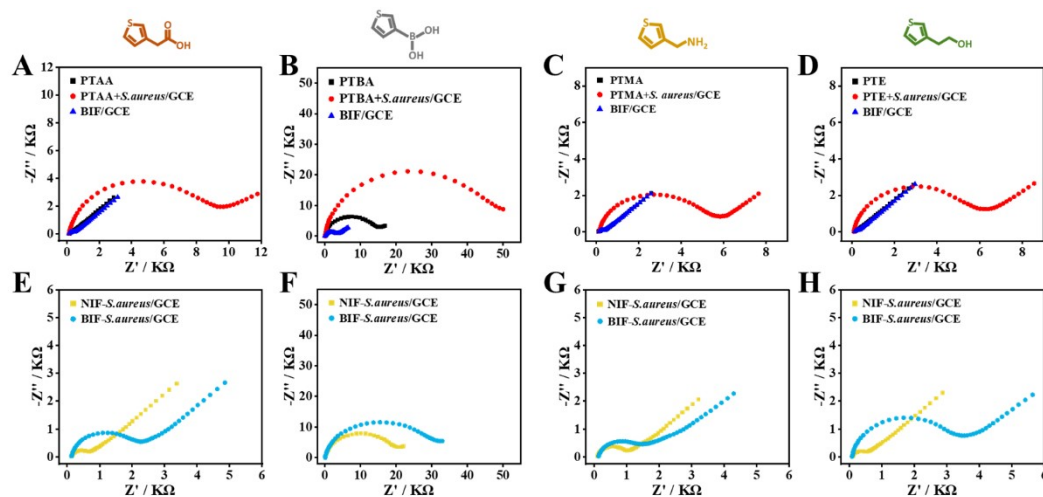
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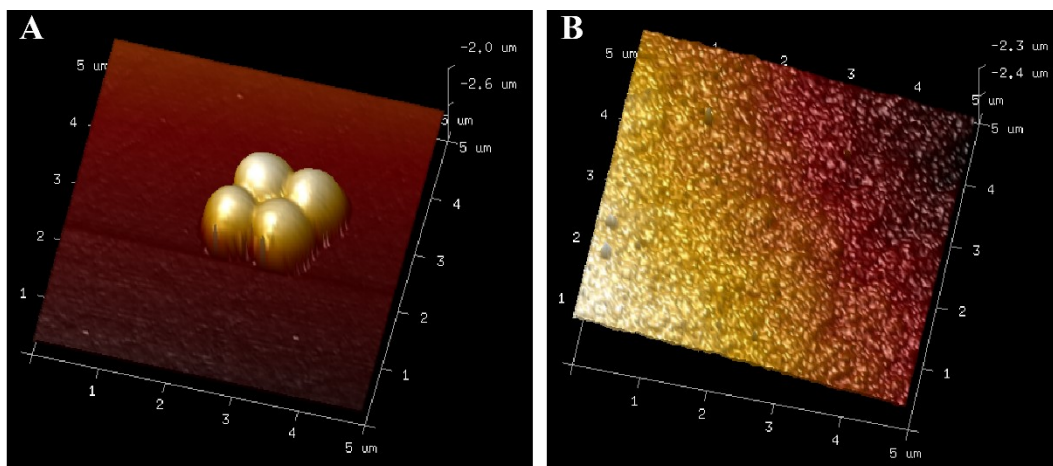
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### Summary:

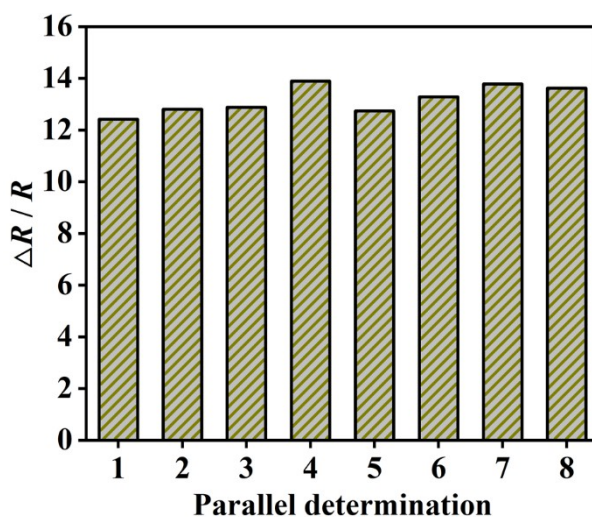


**Figure S1.** (A-D) Electrochemical impedance spectroscopy (EIS) for each electropolymerized 3-substituted thiophene in the presence and absence of *S. aureus* template, and the corresponding bacteria-imprinted polythiophene film (BIF) after template removal. (E-H) EIS response of each BIF and non-imprinted polythiophene film (NIF) towards target *S. aureus*.

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**Figure S2.** AFM images of (A) PTE+*S. aureus*/GCE and (B) BIF/GCE



**Figure S3.** EIS response of eight BIF/GCE electrodes towards *S. aureus* ( $10^5$  CFU/mL)

**Table S1.** Comparison of the proposed sensor with other reported label-free electrochemical sensors for the direct detection of *S. aureus* cells.

Sensor	Method	Sensor fabrication	Analysis time (min)	LOD (CFU mL <sup>-1</sup> )	Reference
BC/c-MWCNTs-PEI-phage	DPV	>7 days	30	3	1
Ab-HMS-GCE	EIS	>3 days	20	12	2
Apt-Ag-Cs-Gr QDs/NTiO <sub>2</sub> /SPCE	DPV	>24 h	90	3.3	3
Ab/GNRs/GCE	EIS	>12 h	50	$2.4 \times 10^2$	4
MIP-Apt-AuNPs@ Fe <sub>3</sub> O <sub>4</sub> /GCE	DPV	>12 h	45	1	5

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<i>Apt/AuNPs/Cu-MOFs/GCE</i>	DPV	>1.5 h	30	5.2	6
BICP/gold electrode	EIS	>2 h	10	2	7
BIF/GCE	EIS	15 min	10	4	This work

BC: bacterial cellulose; c-MWCNTs: carboxylated multiwalled carbon nanotubes; PEI: polyethyleneimine; Ab: antibody; HMS: hierarchical mesoporous silica; GCE: glassy carbon electrode; Apt: aptamer; Cs: chitosan; Gr QDs: graphene quantum dots; NTiO<sub>2</sub>: nitrogen-doped TiO<sub>2</sub> nanoparticles; SPCE: a screen-printed carbon electrode; GNR: gold nanorods; MIP: molecular imprinted polymer; *AuNPs*: gold nanoparticles; BICP: bacteria-imprinted conductive poly(3-thiopheneacetic acid); MOFs: metal-organic frameworks.

## References

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