Supplementary Information

# Functional covalent organic framework $H_2S$ sensor for periodontitis monitoring and antibacterial treatment

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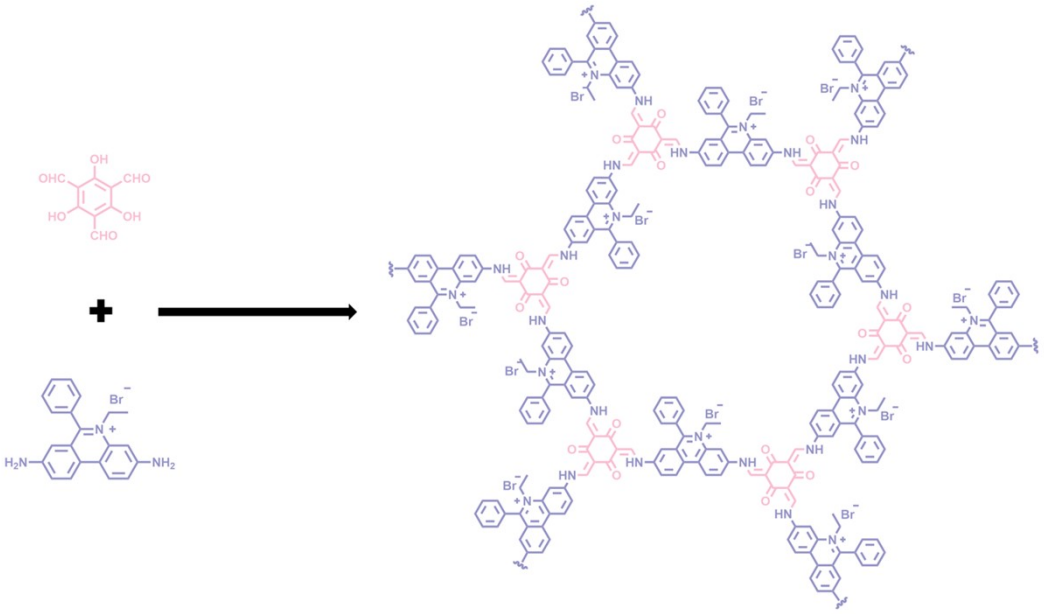

**Scheme S1** Schematic representation for synthesis EB-TFP.

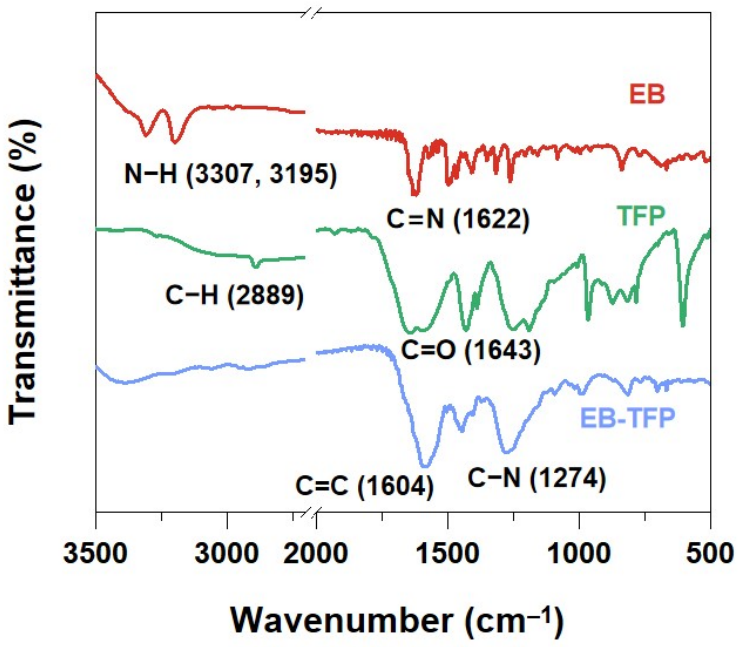


**Fig. S1** FTIR analysis of EB-TFP and its raw materials (TFP and EB).

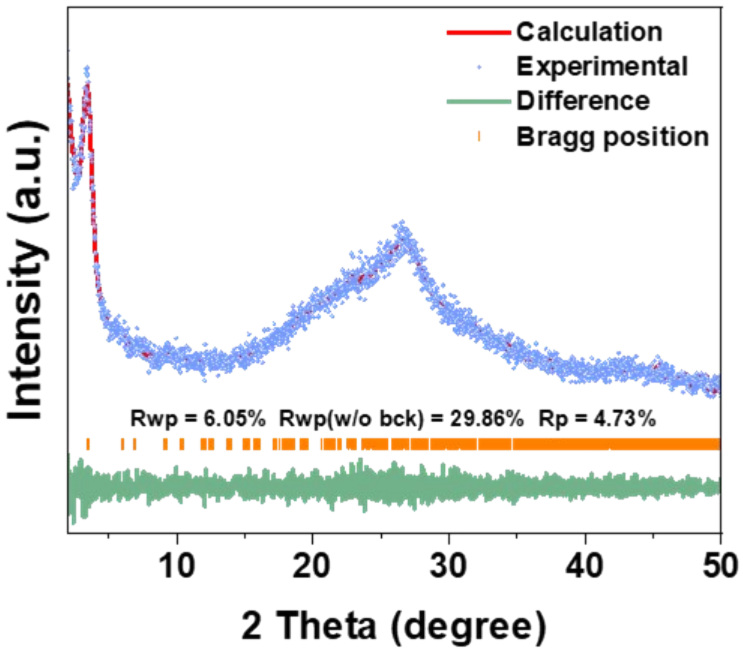


**Fig. S2** PXRD profiles of EB-TFP: the experimental pattern (blue), the Pawley refined pattern (red), the Bragg positions (orange), and the refinement differences (green).

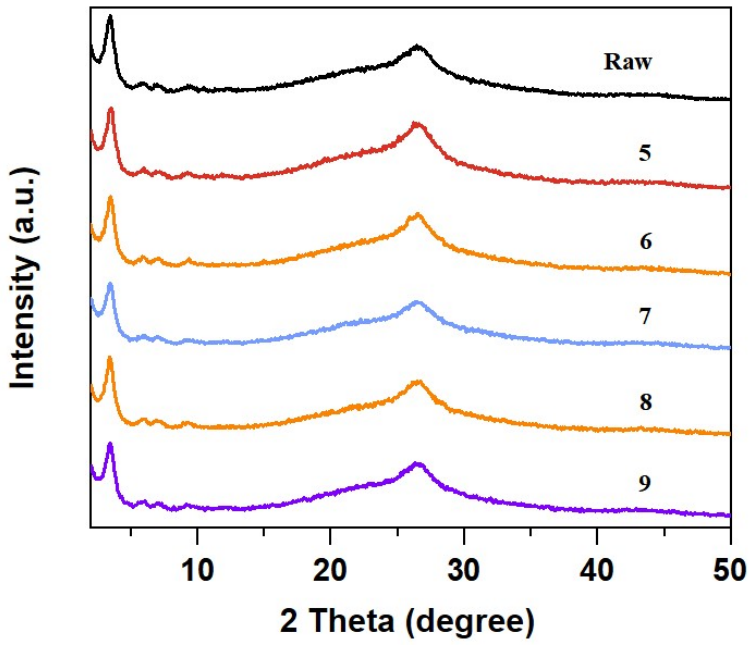


**Fig. S3** PXRD of EB-TFP@PB soaked in different pH solutions.

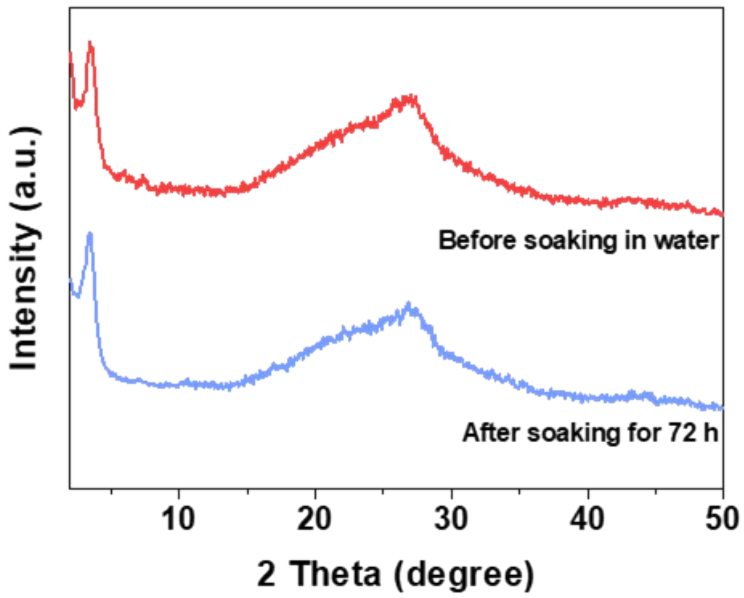


**Fig. S4** PXRD pattern of EB-TFP@PB before and after soaking in water.

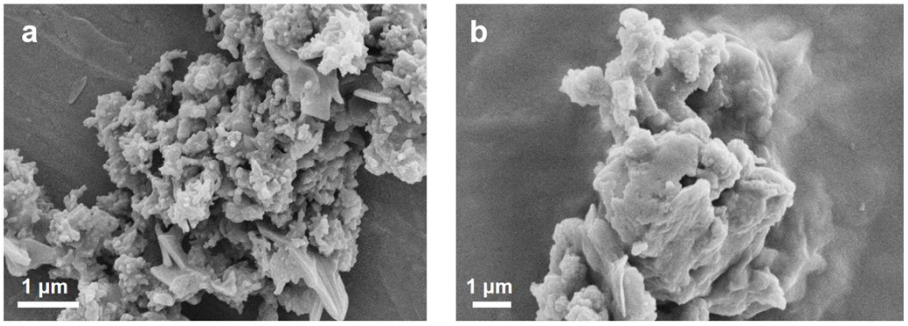


**Fig. S5** SEM images of EB-TFP (a) and EB-TFP@PB (b)

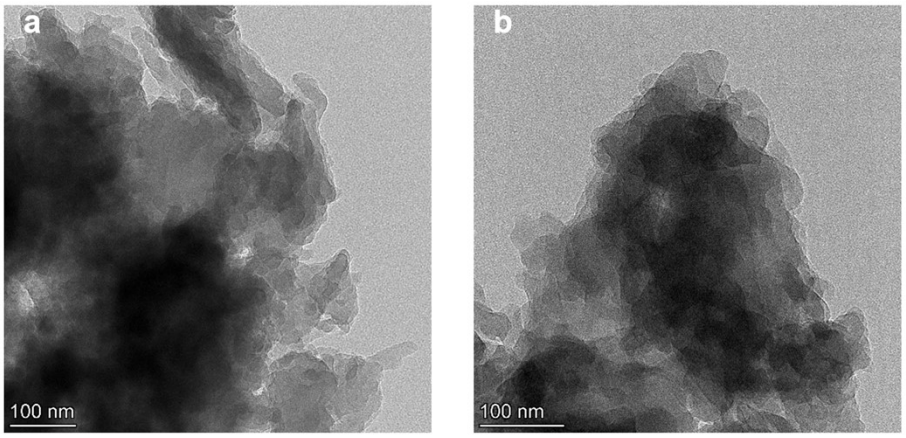


**Fig. S6** TEM images of EB-TFP (a) and EB-TFP@PB (b).

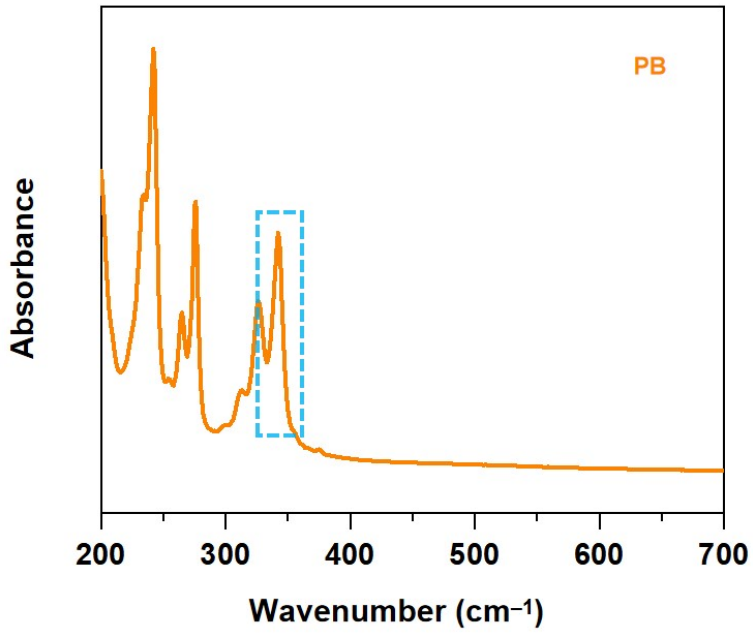


**Fig. S7** UV-Vis absorption spectrum of PB in aqueous solution.

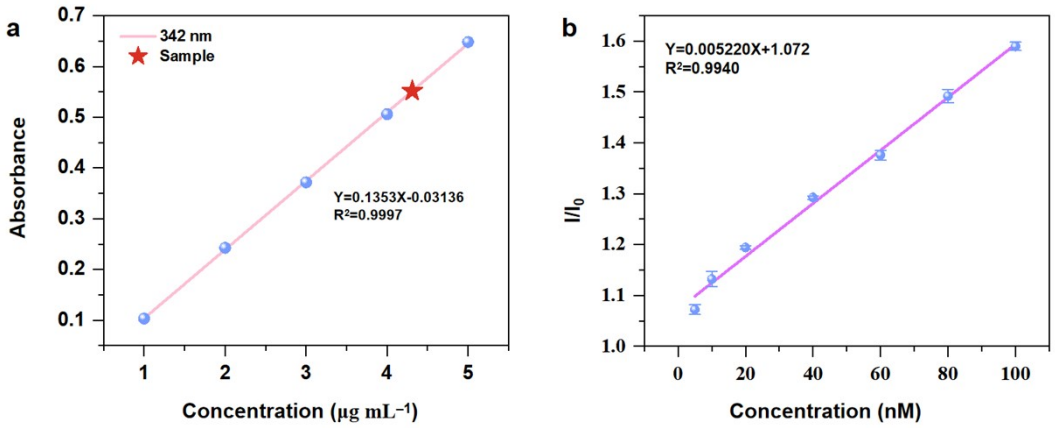


**Fig. S8** (a) Concentration-dependent absorbance of PB and PB in the supernatant after preparing EB-TFP@PB. (b) Calibration curves of EB-TFP@PB in the presence of 0–100 nM $H_2S$.

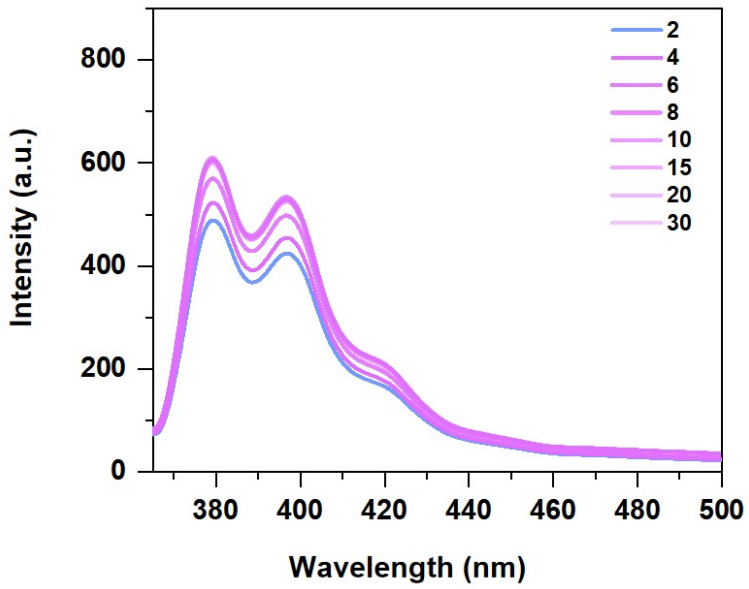


**Fig. S9** Emission spectra of EB-TFP@PB with different incubation time (2-60 min).

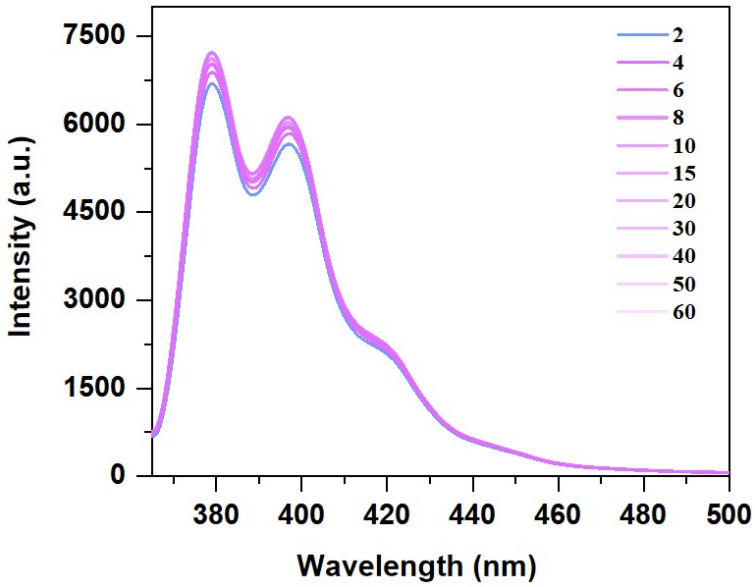


**Fig. S10** Emission spectra of EB-TFP@PB added $H_2S$ ($10^{-4}$ M) with different incubation time (2-60 min).

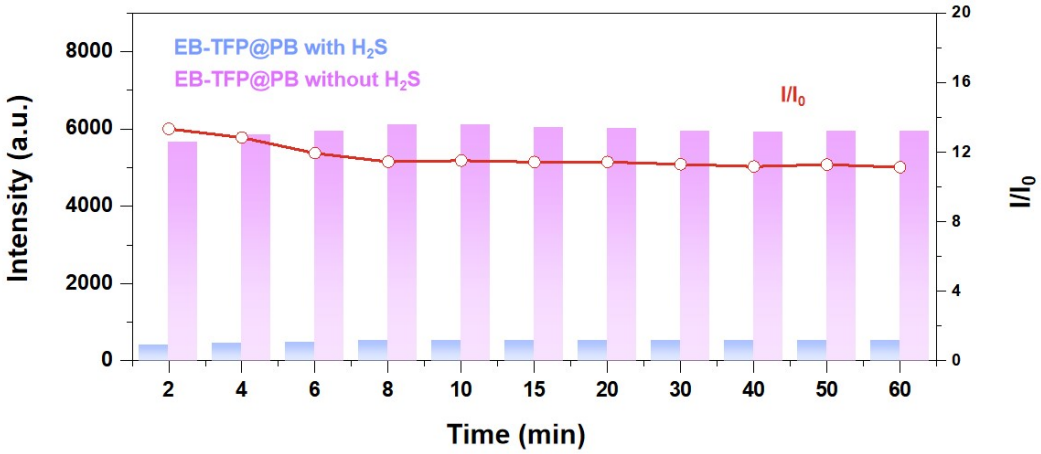


**Fig. S11** Fluorescence intensity of EB-TFP@PB with and without $H_2S$ ($10^{-4}$ M) with different incubation time, and the fluorescence enhancement factor under corresponding conditions.

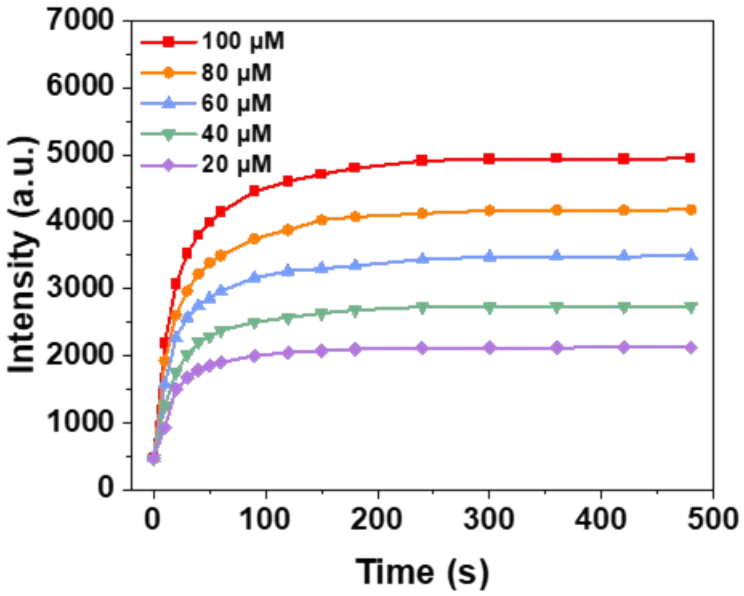


**Fig. S12** The variation of fluorescence intensity with time at different concentrations.

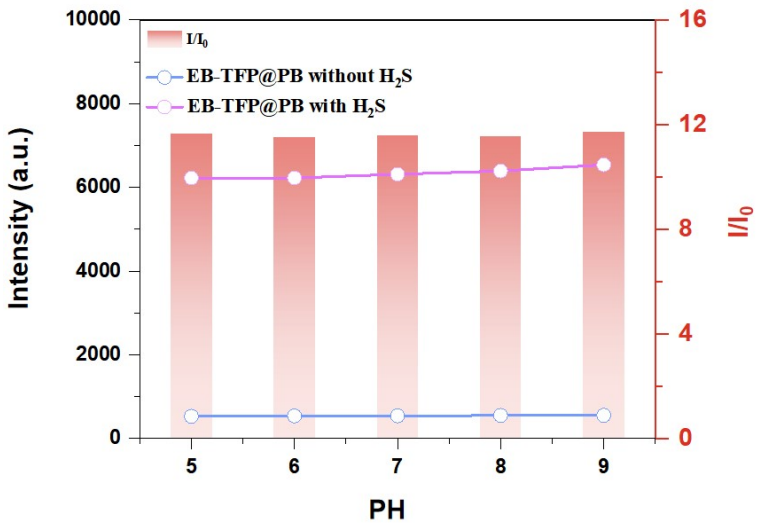


**Fig. S13** Fluorescence intensity of EB-TFP@PB with and without $H_2S$ ($10^{-4}$ M) with different pH solutions, and the fluorescence enhancement factor under corresponding conditions.

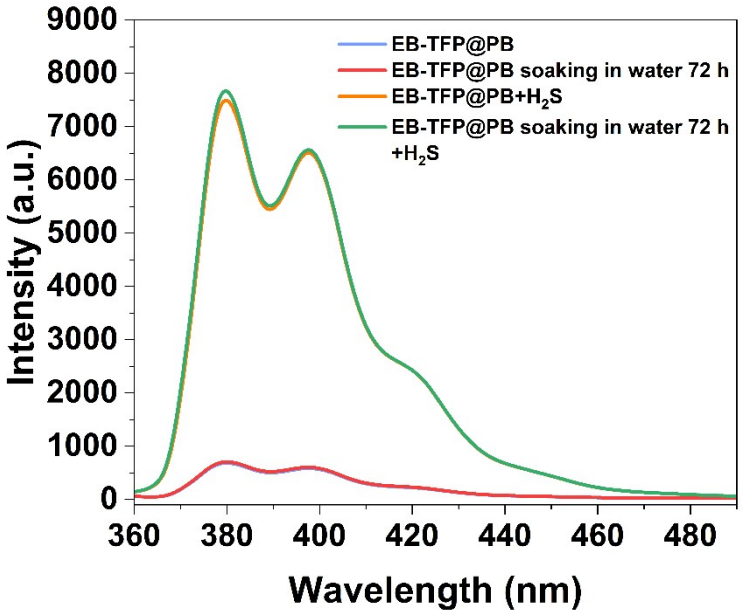


**Fig. S14** Fluorescence intensity of EB-TFP@PB before and after soaking in water.

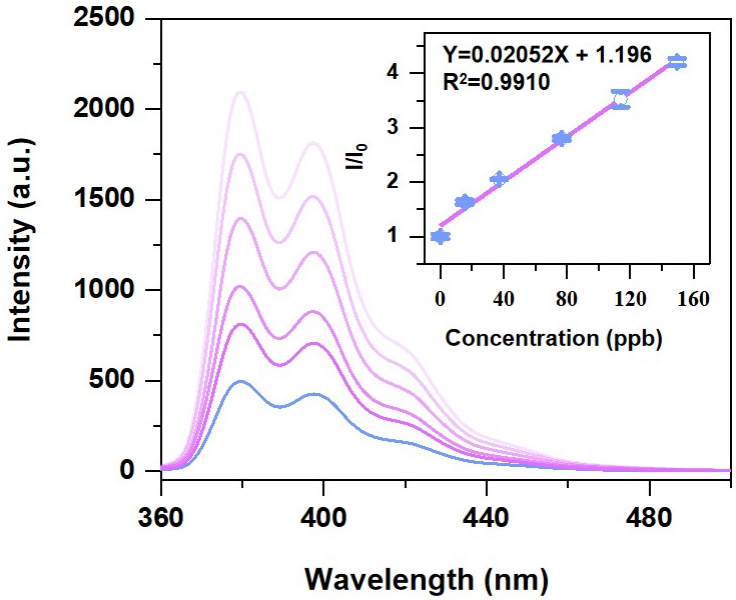


**Fig. S15** Fluorescence spectra of EB-TFP@PB sensing $H_2S$ gas with different concentrations (0–160 ppb).

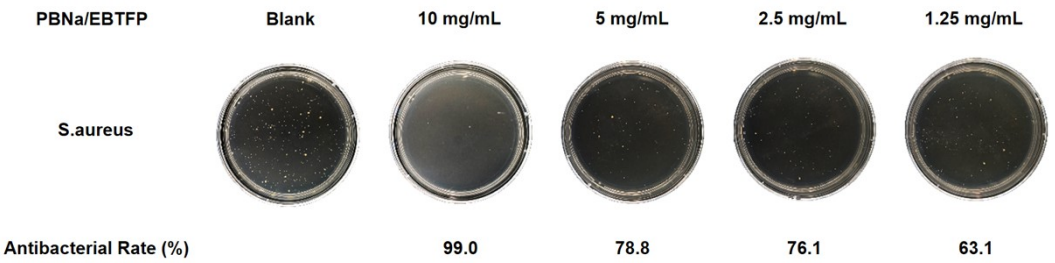


**Fig. S16** Antibacterial rate of EB-TFP@PB with different concentrations against S. aureus.

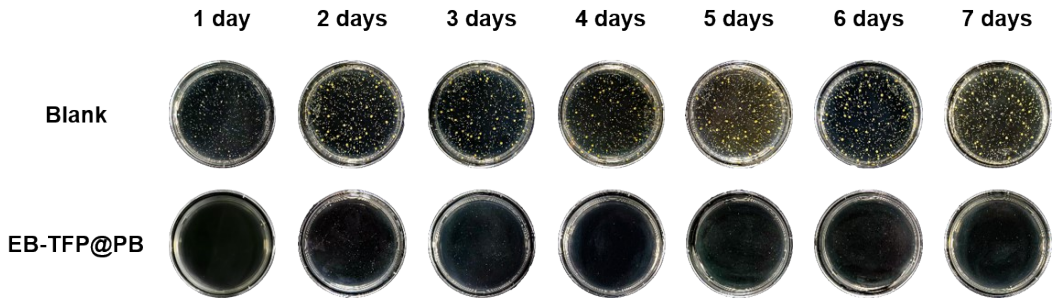


**Fig. S17** The long-term antibacterial experiment of EB-TFP@PB.

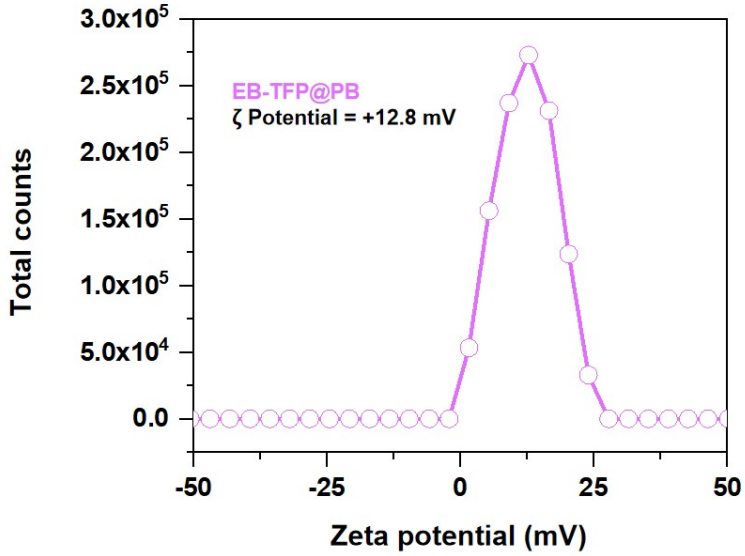


**Fig. S18** ζ-Potential analysis of EB-TFP@PB in aqueous solution.

**Table S1** The mass percentage of all elements in EB-TFP@PB determined by XPS.

| Element | Percentage by mass |
|---|---|
| **C** | 78.86 |
| **N** | 8.13 |
| **O** | 12.00 |
| **Na** | 1.01 |