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Supporting Information

The photosensitizer system based on cationic COF carrier with the loading tetraminoporphyrin and its combined antibacterial effect

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Experimental drugs and reagents

4-nitrobenzaldehyde (analytical pure, ≥99.5%) was purchased from Sinopharm Chemical Reagent Co., Ltd.; acetic anhydride (99%), $SnCl_2 \cdot 2H_2O$ (≥99.99%) were purchased from Sigma-Aldrich; propionic acid (≥99.5%), pyrrole (≥99.7%), pyridine (anhydrous grade, 99.8%) were purchased from Aladdin; methanol (analytical pure), hydrochloric acid (analytical pure), ammonia (analytical pure, 25%), dimethyl sulfoxide (analytical pure), absolute ethanol, N,N-dimethylacetamide, acetone were purchased from Beijing Chemical plant.

Preparation of 5,10,15, 20-tetri (4-nitrophenyl) porphyrin (THPP)

22 g (1.45×10^{-1} mol) 4-nitrobenzaldehyde was accurately weighed by an analytical balance and added to a 1 L two-port round-bottom flask, then 24 mL (2.54×10^{-1} mol) acetic anhydride and 600 mL propionic acid were added, and then the condensation reflux device was connected after magnetic stirring. Then the temperature was gradually raised to 138 ℃, and 10 mL (1.44×10^{-1} mol) of newly steamed pyrrole was slowly added to it. After reflux for 30 min, the mixture was cooled to room temperature, and the precipitate was collected through filtration, washed with H_2O and methanol three times respectively, and dried at 60 ℃ in a vacuum drying oven. The obtained powder was dissolved in 160 mL pyridine, which was reflow at 138 ℃ for 1 h, cooled to room temperature, filtered to collect the precipitate, and washed with acetone, and finally obtained 5,10,15, 20-tetri (4-nitrophenyl) porphyrin with a deep purple yield of 14%.

Preparation of 5,10,15,20-tetrakis(4-aMinophenyl) porphyrin (TAPP)

4.13 g (5.19×10^{-3} mol) tetranitrophenyl porphyrin was dissolved in 500 mL hydrochloric acid solution at 70 ℃, and 18.0 g (7.97×10^{-2} mol) $SnCl_2\cdot2H_2O$ was added to the solution. The resulting mixture was stirred at 70 ℃ for 30 min, and then cooled to 0 ℃. Finally, it is neutralized with ammonia solution, collected by filtration and so on to obtain gray crystal product and dissolve it in acetone, rotate evaporation solution, and then vacuum drying to obtain TAPP, purple crystal powder.

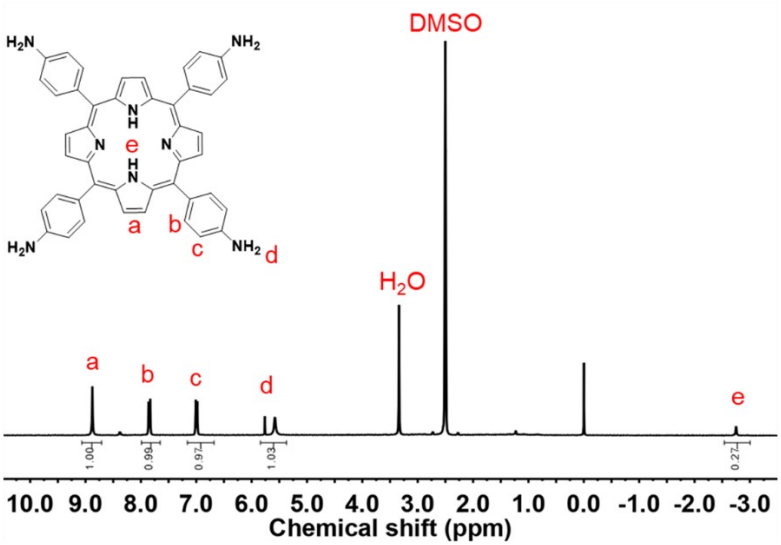

Fig. S1. ^{1}H NMR of TAPP.

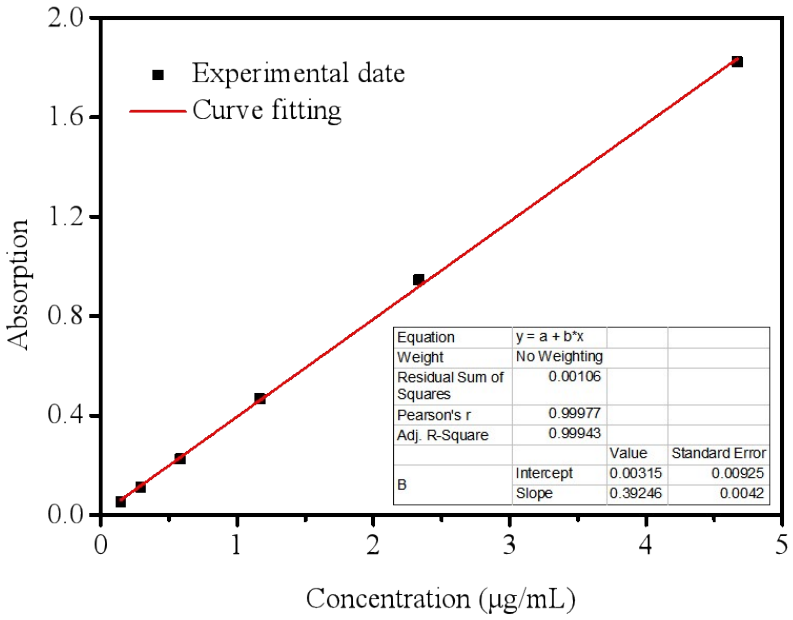

Fig. S2. UV absorption and concentration curves of TAPP at 438 nm.

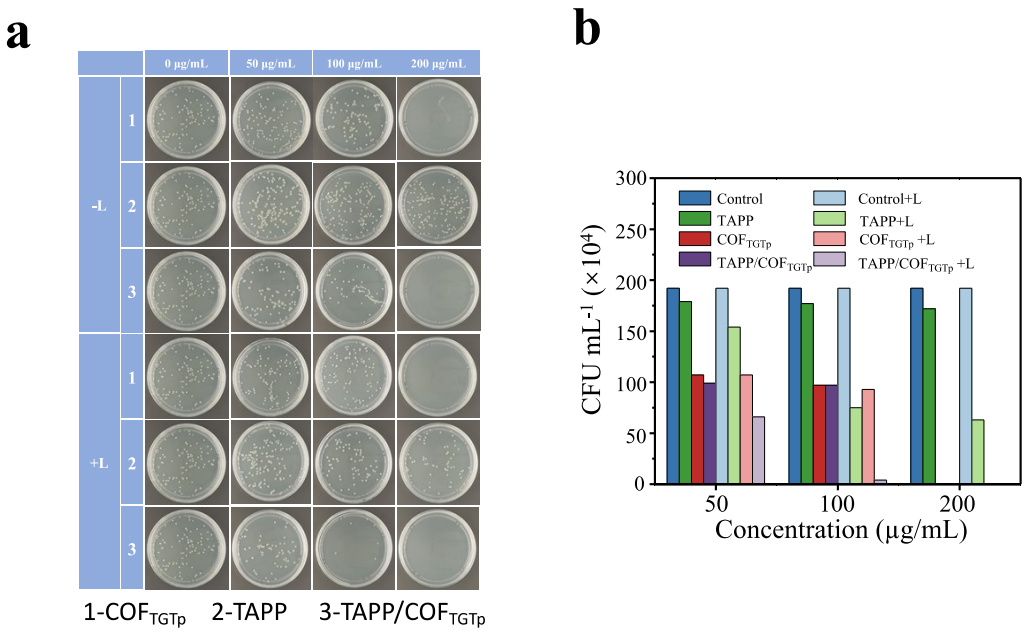

Fig. S3. COF_{TGTp}, TAPPand TAPP/COF_{TGTp} *E. coli* plate counting experiment both under dark and light (10 mW/cm^2) irradiation; (a) Optical photo of antibacterial agar plate; (b) Bar graph of colony number.

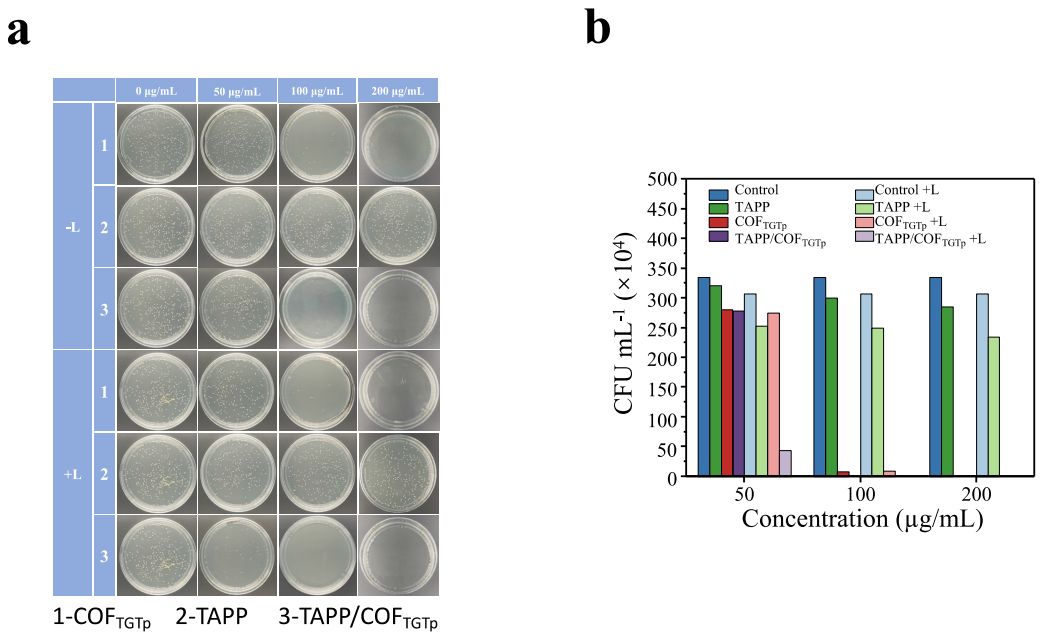

Fig. S4. COF$_{TGTp}$, TAPPand TAPP/COF$_{TGTp}$ *S.aureus* plate counting experiment both under dark and light (10 mW/cm^2) irradiation; (a) Optical photo of antibacterial agar plate; (b) Bar graph of colony number.

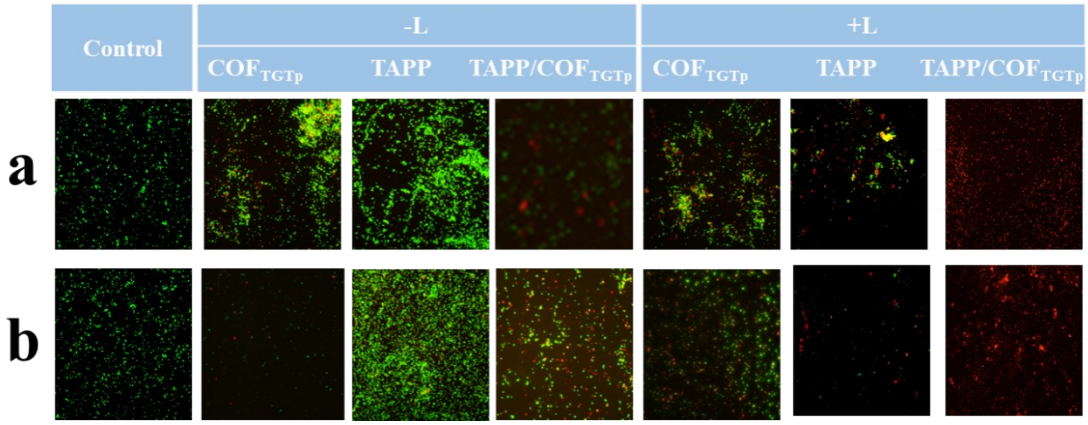

Fig. S5. Live and dead staining of bacteria treated with COF$_{TGTp}$, TAPP and TAPP/COF$_{TGTp}$ both under dark and light (10 mW/cm^2) irradiation; (a) *E. coli*; (b) *S. aureus* (Scale bars, 25 μm, green represents live bacteria, red represents dead bacteria).