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Supporting Information

Polymethacrylic Acid Encapsulated TiO₂ Nanotubes for Sustained Drug Release and Enhanced Antibacterial Activities

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Table S1. Effects of different anodization parameters on the fabrication of TiO₂ nanotubes.

| Number | NH ₄ F (wt %) | H ₂ O (vol %) | Voltage (V) | Time (h) | Length (μm) | Diameter (nm) |
|--------|-----------------------------|-----------------------------|----------------|-------------|----------------|------------------|
| (a) | 0.5 | 3 | 80 | 2 | 34.7 | 106 |
| (b) | 0.5 | 5 | 80 | 2 | 19.4 | 119 |
| (c) | 0.5 | 10 | 80 | 2 | 7.89 | 171 |
| (d) | 0.5 | 10 | 60 | 2 | 7.0 | 114 |
| (e) | 0.5 | 10 | 40 | 2 | 4.7 | 98 |
| (f) | 0.5 | 10 | 60 | 1 | 4.5 | 105 |
| (g) | 0.5 | 10 | 60 | 3 | 16.9 | 117 |

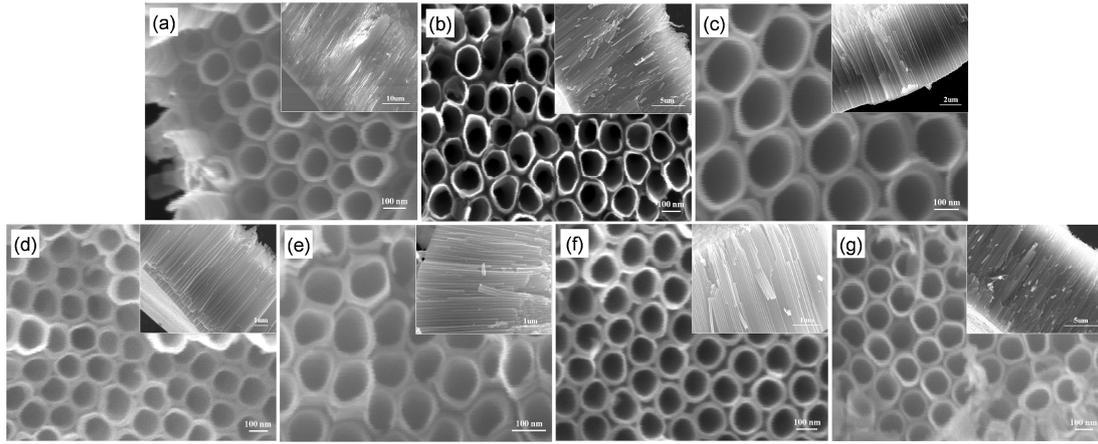


Figure S1. SEM images of TiO₂ nanotubes fabricated under 80 V for 2 h with different water content (a) 3% (b) 5% (c) 10%. SEM images of TiO₂ nanotubes fabricated with the water content of 10% for 2 h under different anodization voltage (d) 60 V (e) 40 V. SEM images of TiO₂ nanotubes fabricated with the water content of 10% under 60 V for (f) 1 h (g) 3 h.

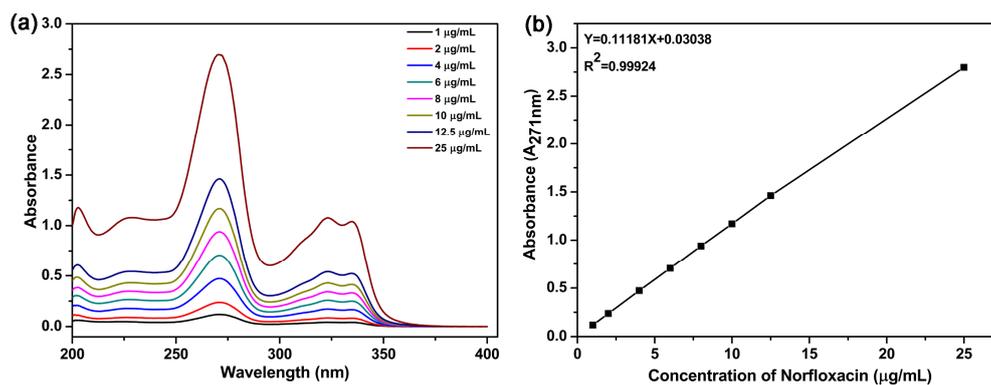


Figure S2. (a) The broad spectra of norfloxacin solutions with different concentrations and (b) the obtained calibration curve.

Table S2. The minimization energy of NOR and the four monomers.

| Compounds | Minimization Energy (10^5 kJ mol ⁻¹) |
|-----------|---|
| NOR | -29.15 |
| AA | -7.01 |
| MAA | -8.05 |
| AM | -6.49 |
| MAM | -7.53 |

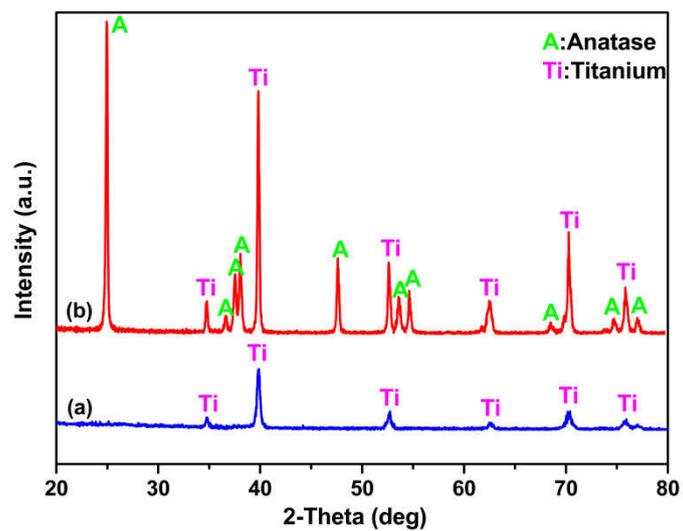


Figure S3. XRD patterns of TNTs (a) before and (b) after annealing at 450 °C for 2 h.

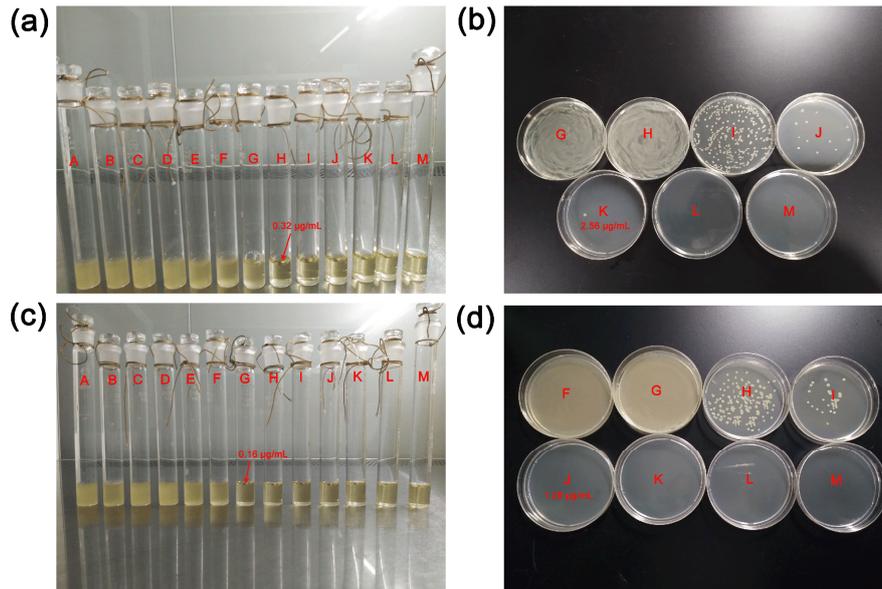


Figure S4. (a) Minimum inhibitory concentration and (b) minimum bactericidal concentration of norfloxacin against *S.aureus*. (c) Minimum inhibitory concentration and (d) minimum bactericidal concentration of norfloxacin against *E.coli*. (Concentrations ($\mu\text{g mL}^{-1}$): A=0, B=0.005, C=0.01, D=0.02, E=0.04, F=0.08, G=0.16, H=0.32, I=0.64, J=1.28, K=2.56, L=5.12, M=10.24.)

Minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were examined using broth dilution method. Generally, norfloxacin solution with an initial concentration of $20.48 \mu\text{g mL}^{-1}$ was diluted to 11 times by means of 2-fold dilution; then, 1 mL of bacteria solution with density of $1 \times 10^5 \text{ CFU mL}^{-1}$ was added respectively into 1 mL of each of the NOR solutions with different concentration. After incubation at 37°C for 24 h, the NOR concentration initially resulting to no visible turbidity was considered as MIC. Then, the other solutions without visible turbidity were inoculated onto Mueller Hinton agar (MHA) and cultured at 37°C for 24 h, and the concentration initially resulting to almost no bacterial survival was considered as MBC. Against these two different strains, MIC and MBC of norfloxacin were obtained, respectively. It can be clearly seen that MIC and MBC of norfloxacin against *S.aureus* are about $0.32 \mu\text{g mL}^{-1}$ and $2.56 \mu\text{g mL}^{-1}$, respectively (Figure S4a, b). And MIC and MBC against *E.coli* are about $0.16 \mu\text{g mL}^{-1}$ and $1.28 \mu\text{g mL}^{-1}$, respectively (Figure S4c,d).