Supporting information for

ABC triblock Copolymers Antibacterial Materials Consisting of Fluoropolymer and Polyethyleneglycol Antifouling Block and Quaternary Ammonium Salt Sterilization Block

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KEYWORDS: antibacterial; quaternary ammonium salt; fluoropolymer; block copolymers; antifouling

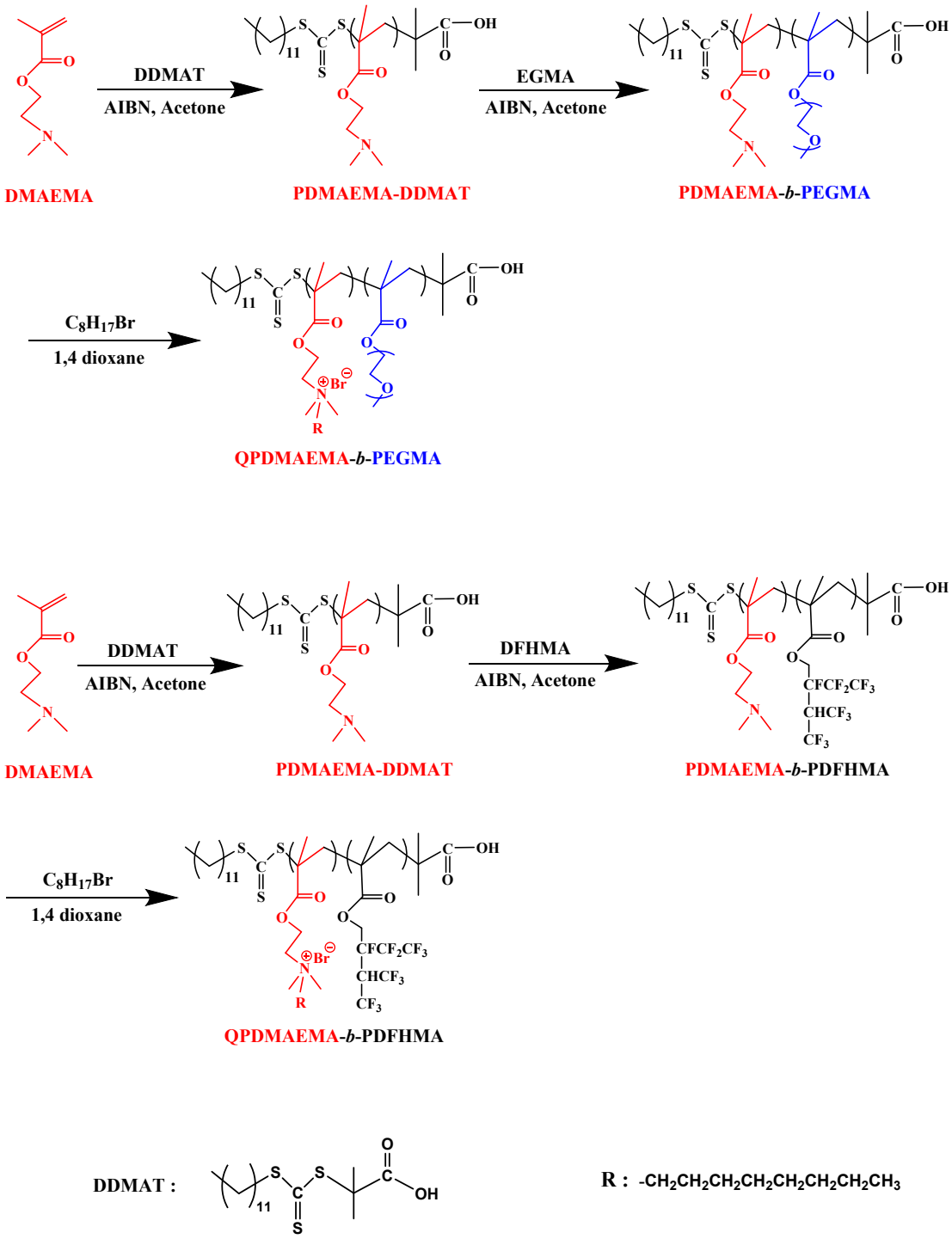

Figure S1. The synthetic route for the preparation of QPDMAEMA-*b*-PEGMA and QPDMAEMA-*b*-PDFHMA diblock copolymers.

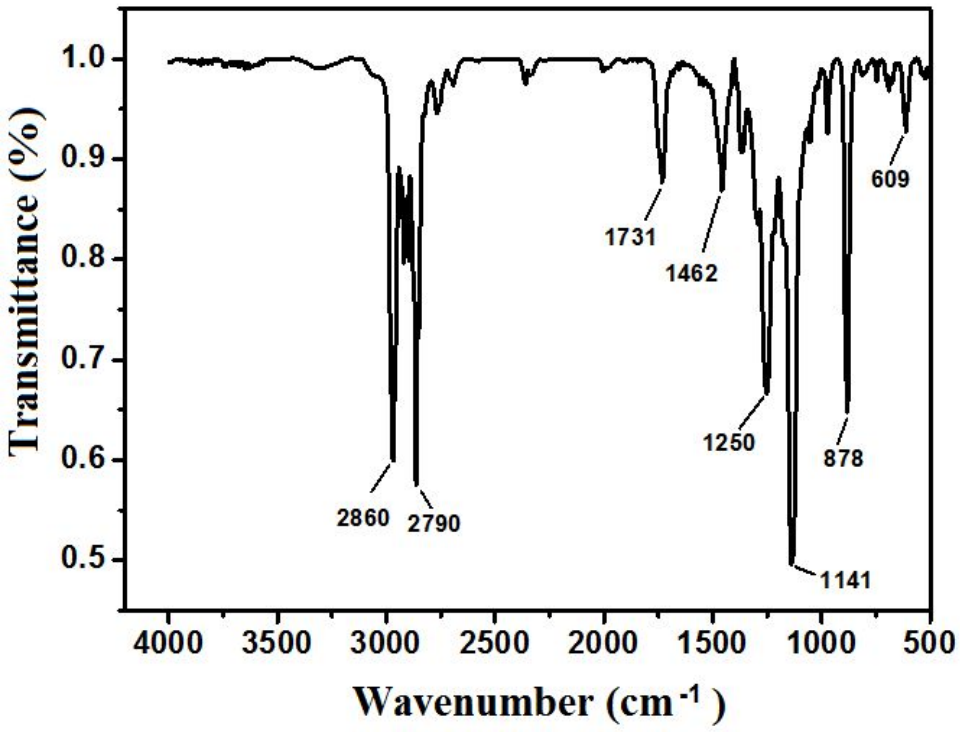

Figure S2. The FTIR spectrum of PDMAEMA-*b*-PDFHMA diblock copolymers.

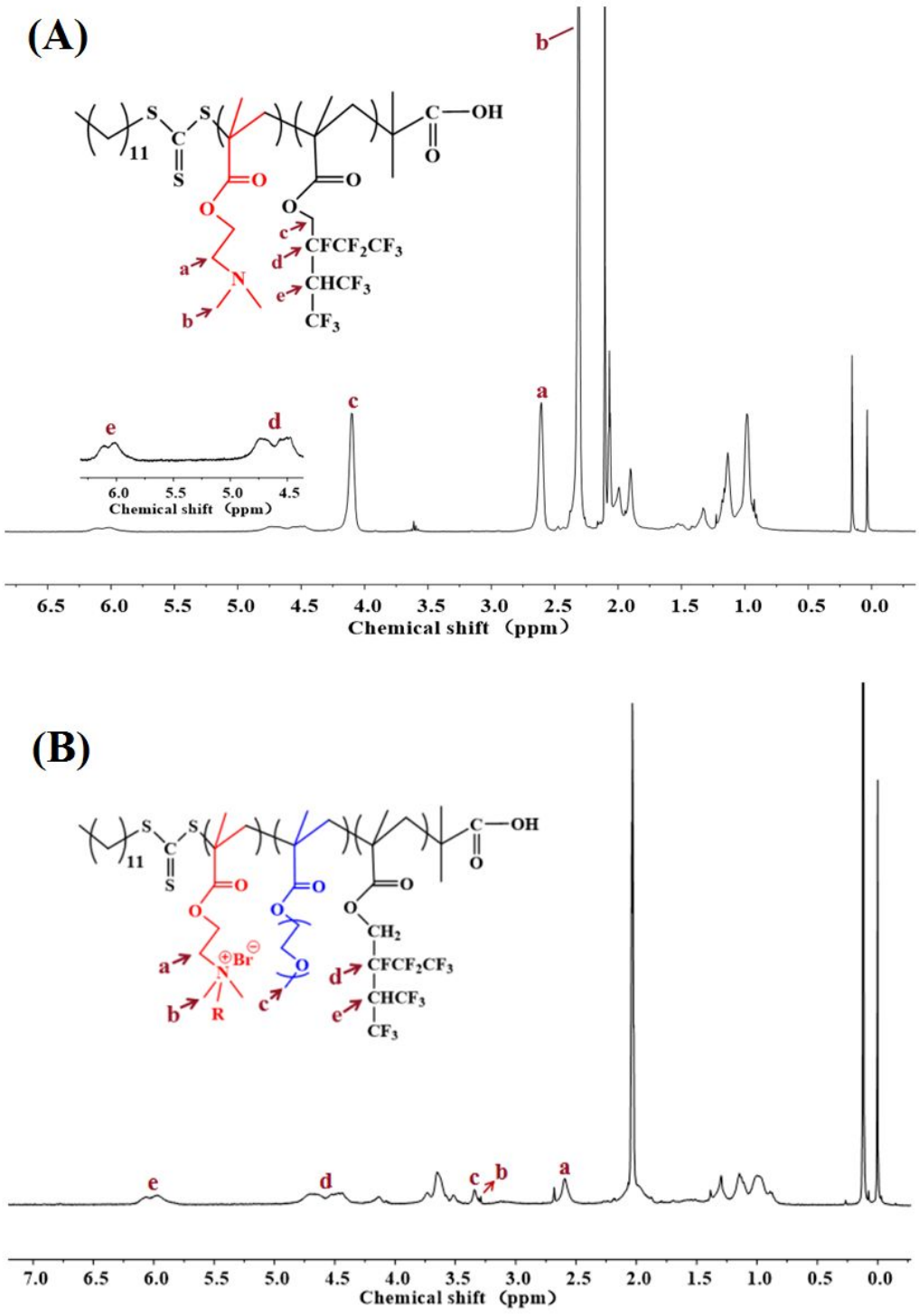

Figure S3. (A) The ^{1}H NMR spectra of PDMAEMA-*b*-PDFHMA diblock copolymers, (B) The ^{1}H NMR spectra of QPDMAEMA-*b*-PEGMA-*b*-PDFHMA

triblock copolymer. The peaks at 3.29 ppm in (B) corresponded to $-N^{+}(CH_3)_3$ groups of QPDMAEMA segments.

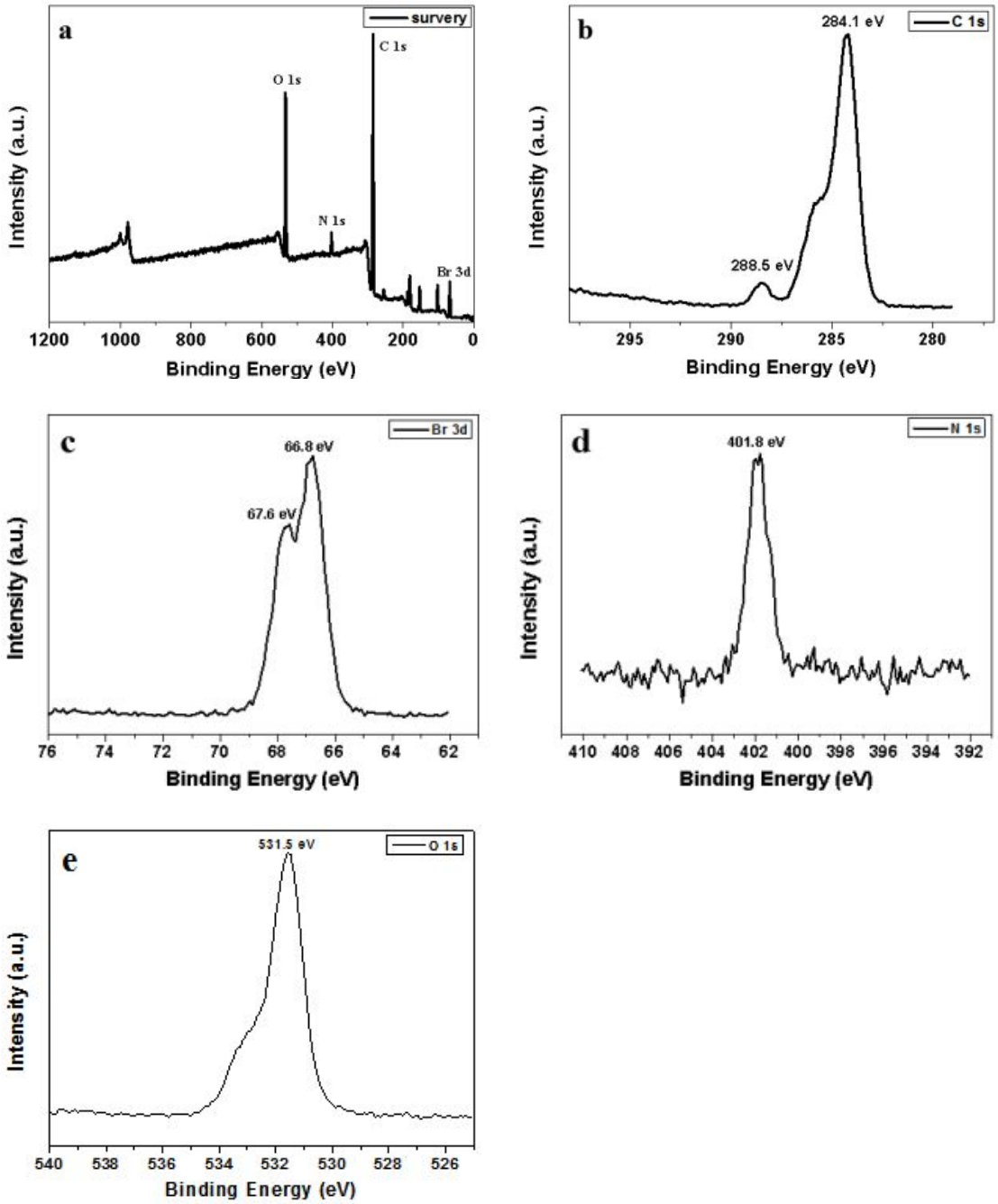

Figure S4. XPS spectra of QPDMAEMA-*b*-PEGMA. (a) survery, (b) C 1s, (c) Br 3d, (d)

N 1s, (e) O 1s.

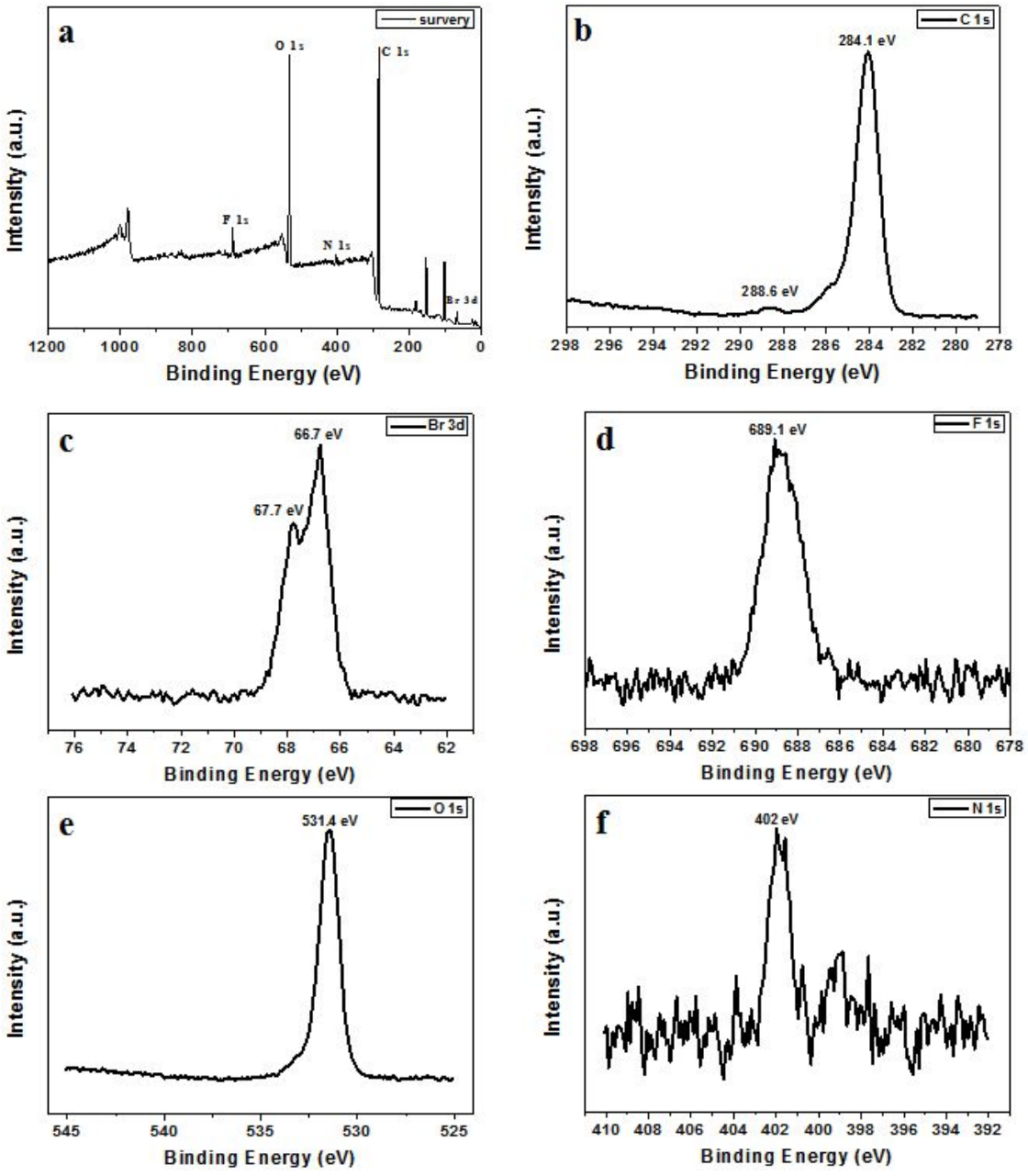

Figure S5. XPS spectra of QPDMAEMA-*b*-PDFHMA diblock copolymers. (a) survery, (b) C 1s, (c) Br 3d, (d) F 1s, (e) O 1s, (f) N 1s.

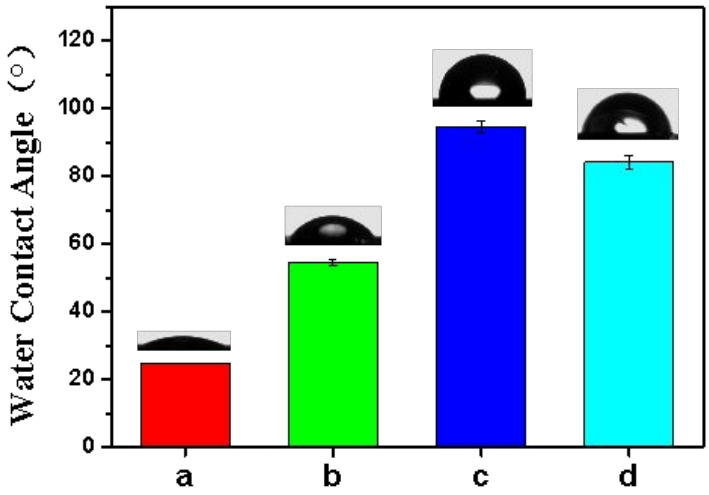

Figure S6. Contact angles of the (a) silicon wafer, (b) QPDMAEMA-*b*-PEGMA, (c) QPDMAEMA-*b*-PDFHMA, (d) QPDMAEMA-*b*-PEGMA-*b*-PDFHMA.

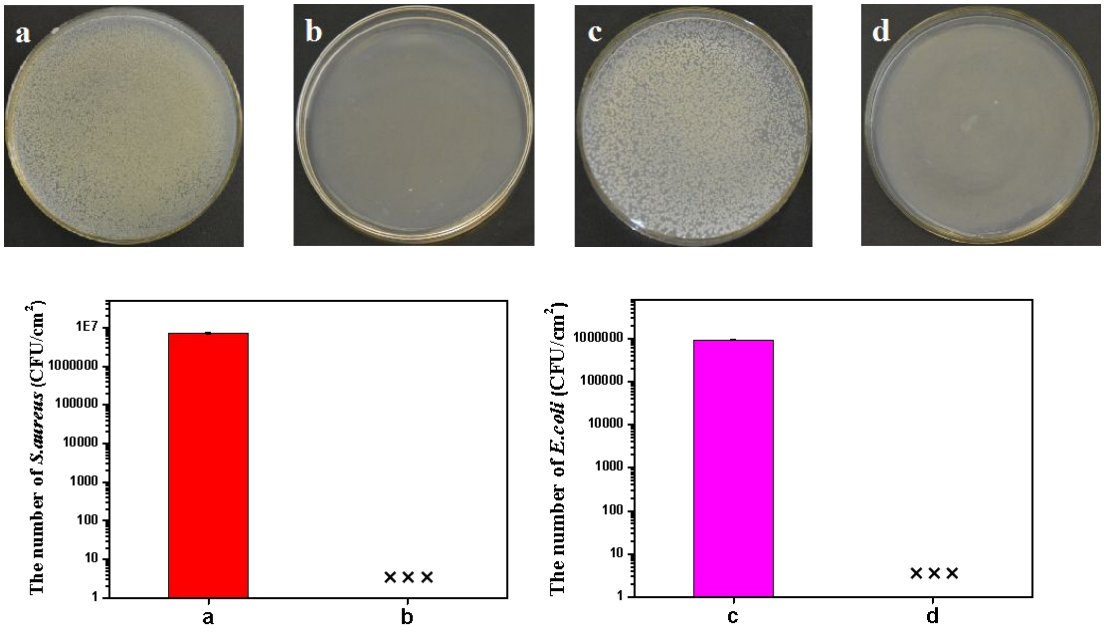

Figure S7. Anti-adhesion assay of the PEGMA-*b*-PDFHMA diblock copolymer coatings against *S. aureus* (a, b) and *E. coli* (c, d). Among them: (a, c) Silicon wafer, (b, d)

PEGMA-*b*-PDFHMA.

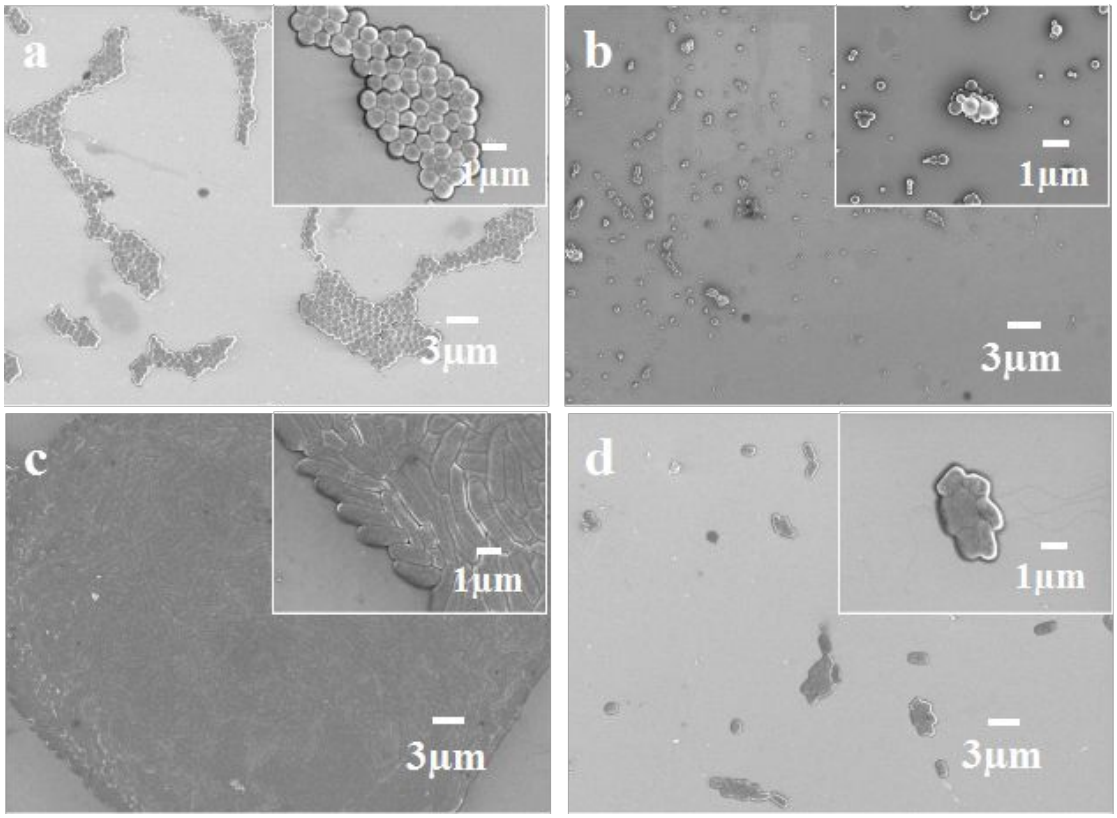

Figure S8. SEM images of *S. aureus* (a, b) and *E. coli* (c,d) on the PEGMA-*b*-PDFHMA diblock copolymer coatings after 4 h of adhesion study. (a, c) Silicon wafer, (b, d) PEGMA-*b*-PDFHMA.

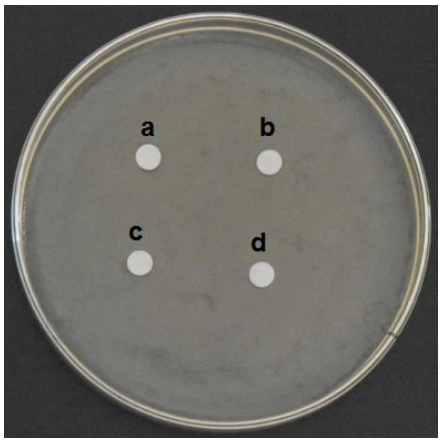

Figure S9. The inhibition zones of the samples against *S. aureus*. (a) Xinhua No.1

qualitative filter paper, (b) Qualitative filter paper coated with QPDMAEMA-*b*-PEGMA, (c) Qualitative filter paper coated with QPDMAEMA-*b*-PDFHMA, (d) Qualitative filter paper coated with QPDMAEMA-*b*-PEGMA-*b*-PDFHMA.

The experimental details of 2.10–2.13

2.10 Bacteria Adhesion Assay of the QPDMAEMA-*b*-PEGMA-*b*-PDFHMA Coatings

The anti-bacterial adhesion performance of QPDMAEMA-b-PEGMA-b-PDFHMA coating was evaluated by colony counting method. According to the previously reported protocol, two types of bacteria (E. coli, S. aureus) were chosen as model gram-negative and gram-positive bacteria, respectively. Before the anti-bacterial adhesion test, S. aureus and E. coli strains were incubated in LB broth on a shaker for 12 hours, and then the bacterial suspension was centrifuged at 3000 rpm for 10 minutes. The re-suspended bacteria suspension using PBS was centrifuged again and then re-suspended in PBS, the process was repeated once. Dilute a portion 10 times, take 200 microliters and place it in a 96-well plate to measure the OD value, By adjusting the volume of PBS, the final concentration of the bacteria suspension was 1×10^8 CFU/mL.

2.11 Scanning electron microscopy (SEM) examination

For scanning electron microscopy (SEM) examination, all samples (1 cm × 1 cm) were transferred to the 24-well plate and were then incubated with bacterial suspension (1 mL, 1×10^8 CFU/mL) at 37 °C. After 4h, the samples were moved to a new 24-well plate and

rinsed with 2 mL of PBS buffer for 3 times to eliminate the loosely adherent bacteria. Then the adherent bacteria on the samples were fixed with polyoxymethylene (4 wt%, 1 mL) for 30 min and dried in a vacuum oven. Eventually, the morphologies and the numbers of the adhered bacterial cells were observed by SEM.

2.12 Antibacterial Properties of the QPDMAEMA-b-PEGMA-b-PDFHMA Coatings

The operation of antibacterial activity was similar to bacteria adhesion assay. The bacteria suspension (1 mL, 1×10^8 CFU/mL) was diluted using LB to the final concentration of 1×10^6 CFU/mL. For SEM examination, all samples (1 cm × 1 cm) were incubated with bacterial suspension (1 mL, 1×10^6 CFU/mL) for 24 h at 37 °C. The other procedure is same to bacteria adhesion assay.

2.13 Platelet and red blood cell adhesion Assay of the QPDMAEMA-*b*-PEGMA-*b*-PDFHMA Coatings

Fresh blood was obtained from the veins, or eyeballs of healthy BALB/C female mice aged 7-8 weeks. Before measuring the adhesion of platelets and red blood cells (RBC), the original sample (1 cm × 1 cm) was equilibrated with PBS on a cell culture plate for 2 h. Fresh blood was mixed with a 3.8% by weight sodium citrate solution at a dilution ratio of 9:1. The upper layer of platelet-rich plasma (PRP) was received by centrifuging the fresh blood at 1000 rpm for 15 minutes. The RBC obtained from the lower layer was washed for 3 times with 2 mL PBS at 3000 rpm for 5 minutes each time. Add 20 μL PRP or RBC dropwise and spread it on the surface of the

QPDMAEMA-*b*-PEGMA-*b*-PDFHMA coating sample, and then incubate the sample at 37 °C for 1 h. The sample was washed for 3 times with 1 mL PBS to remove non-adherent platelets or RBC. Then the platelets or RBC attached to the surface were fixed with 1 mL of glutaraldehyde (2.5 wt %) in PBS solution at 4 °C for 10 h. Subsequently, the sample was rinsed for 3 times with 1 mL of PBS. The samples were then immersed in a series of ethanol/water solutions and dehydrated with 10%, 30%, 50%, 70%, 90% and 100% ethanol. Finally, the number and morphology of platelets and red blood cells adhering to the surface of the sample were observed by SEM.

All animal experiments were conducted in accordance with the guidelines of the Animal Care and Ethics Committee of Changchun Institute of Applied Chemistry, Chinese Academy of Sciences.