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Cascade Catalytic Nanoplatform Constructed by Laterally-Functionalized Pillar[5]arenes for Antibacterial Chemodynamic Therapy

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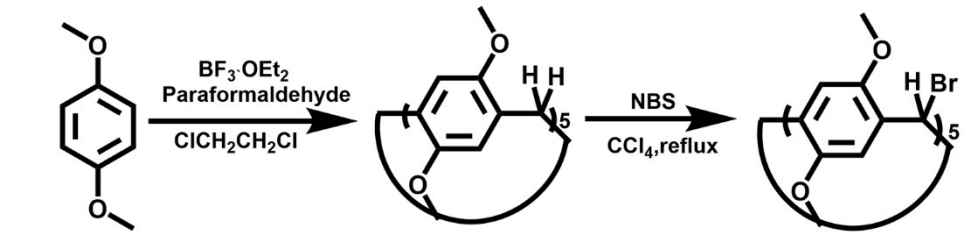
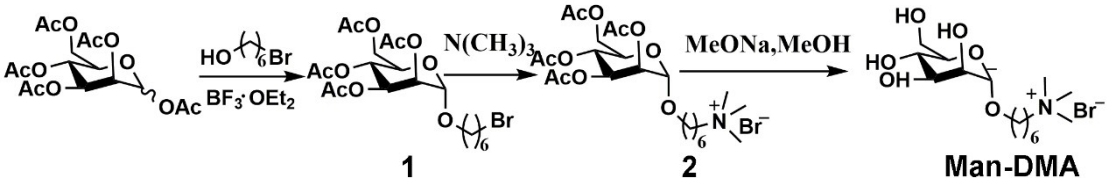
Experimental Section

Materials and Chemicals. 1,4-dimethoxybenzene, paraformaldehyde, boron trifluoride diethyl etherate, N-bromosuccinimide, 1,8-diamino-3,6-dioxaoctane, sodium methoxide, 6-bromohexanol, trimethylamine, iodomethane and glucose were obtained from Energy Chemical. Glucose oxidase was obtained from Sigma-Aldrich. Ferroferric oxide nanoparticle was obtained from Shanghai Macklin Biochemical Co., Ltd. 1,2,3,4,6-Penta-O-acetyl-α-D-mannopyranose was obtained from TCI. Glutaraldehyde, Hydrogen Peroxide Assay Kit and propidium iodide were purchased from Beijing Solarbio Science & Technology Co., Ltd. (Beijing, China). Fetal bovine serum (FBS), RPMI 1640 culture medium, and penicillin-streptomycin solution were obtained from Sangon Biotech (Shanghai) Co., Ltd.



Scheme S1. Synthesis route of BDMP5.



Scheme S2. Synthesis route of Man-DMA.

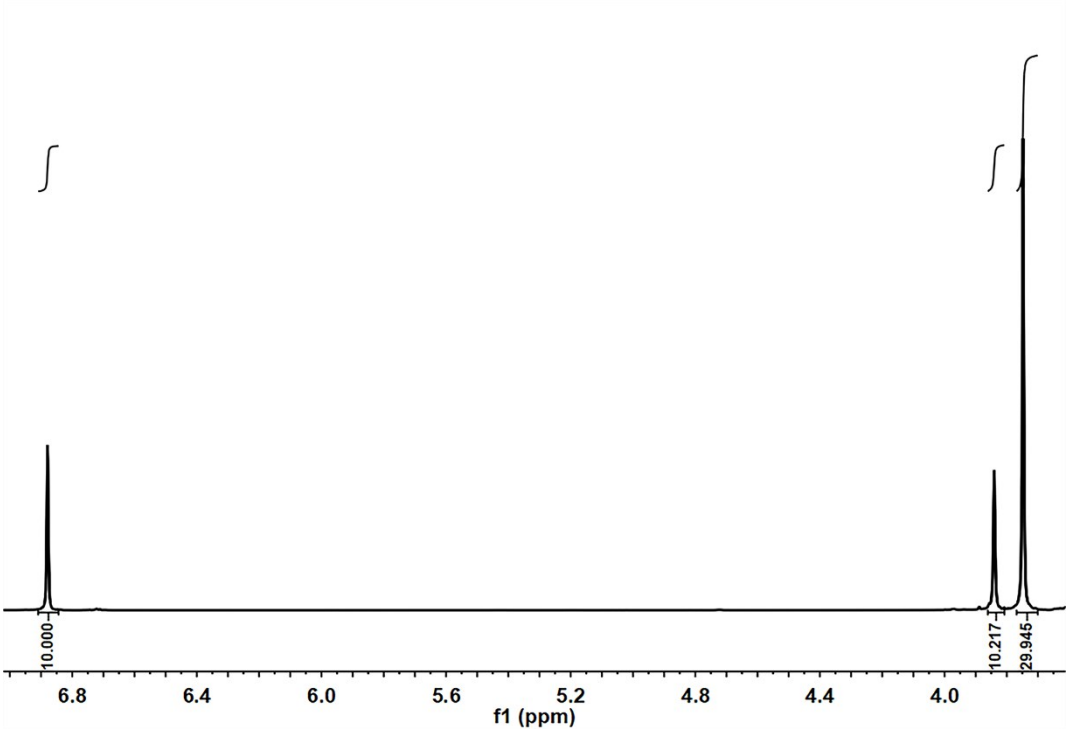


Figure S1 ^{1}H-NMR analysis of DMP5. ^{1}H-NMR (500 MHz, $CDCl_3$, 25 ℃, TMS): δ (ppm): 6.88 (s, 10H), 3.84 (s, 10H), 3.75 (t, 30H).

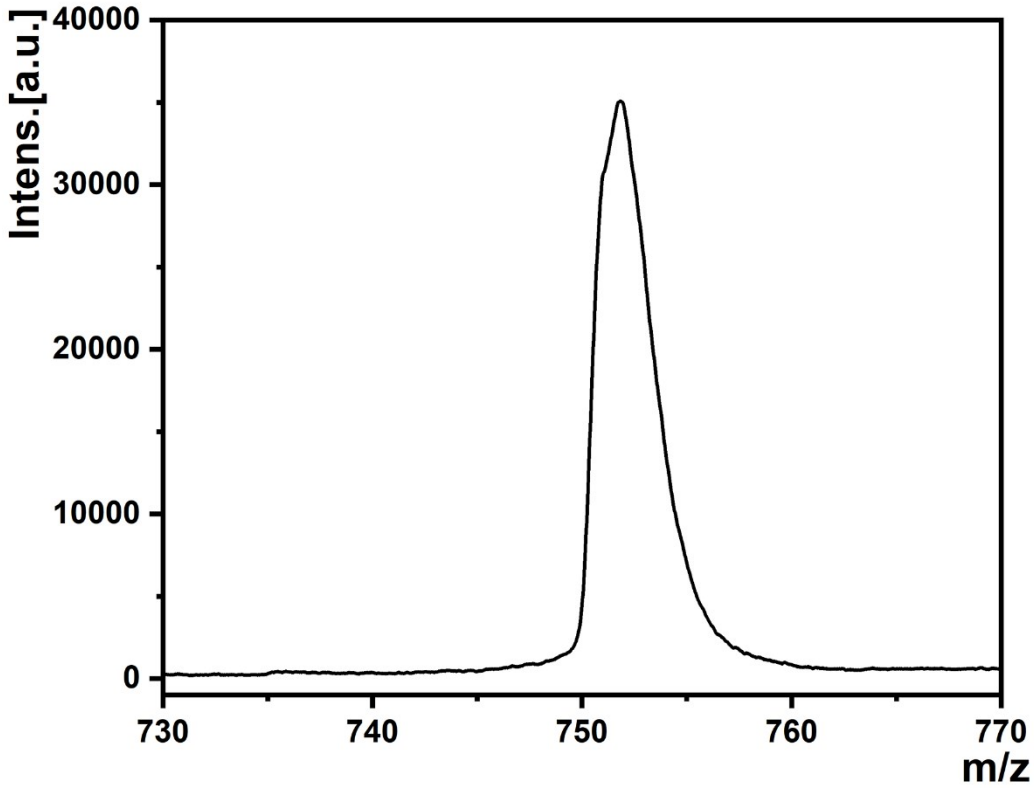


Figure S2 MALDI-TOF analysis of DMP5. m/z: 750.54.

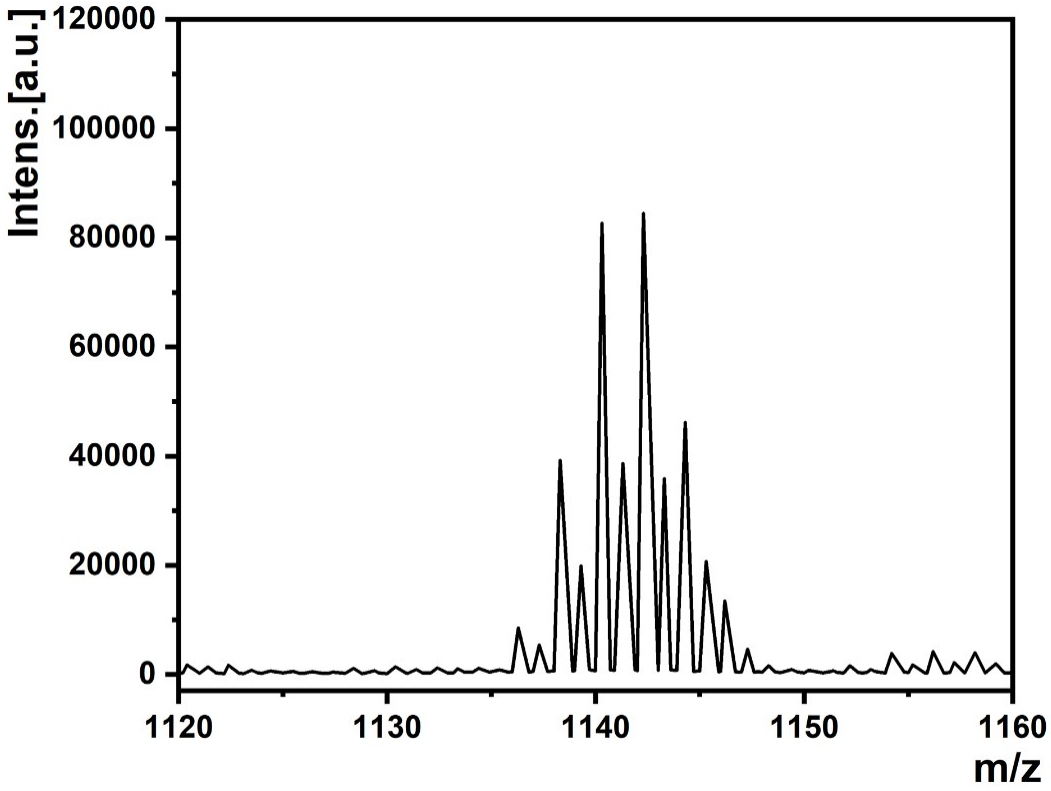


Figure S3 MALDI-TOF analysis of BDMP5. m/z: 1139.4-1150.4.

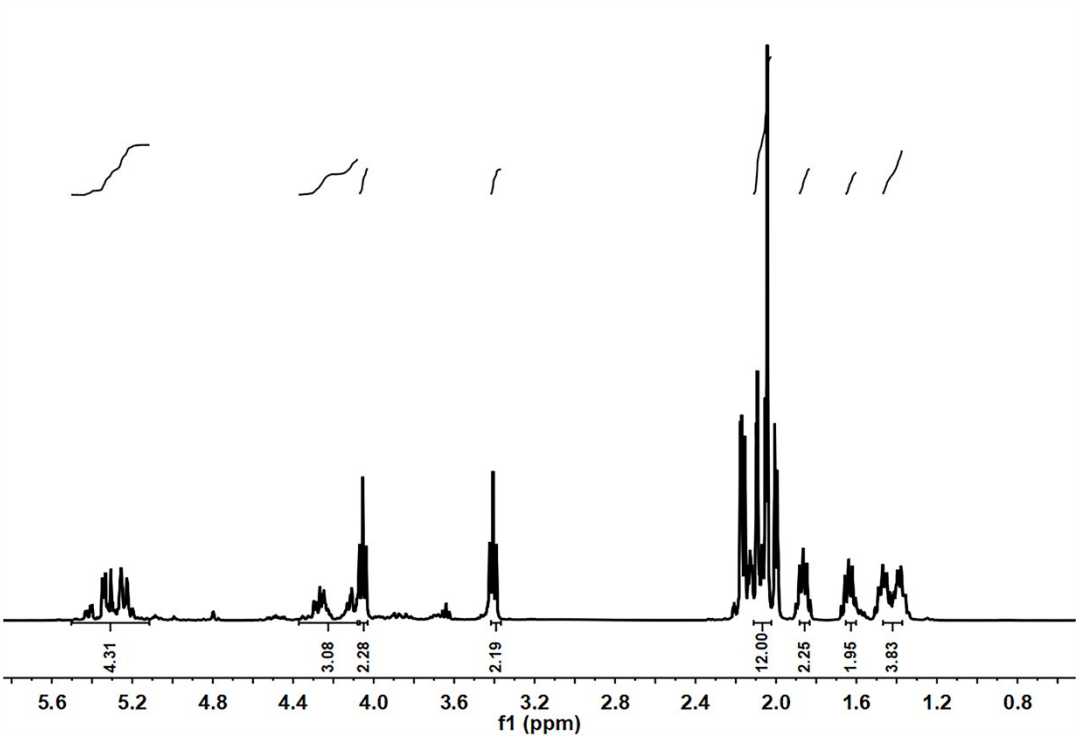


Figure S4 ^{1}H-NMR analysis of compound 1. ^{1}H-NMR (500 MHz, $CDCl_3$, 25 ℃, TMS): δ (ppm): 5.43-5.21 (m, 4H), 4.31-4.11 (m, 3H), 4.05 (t, 2H), 3.40 (t, 2H), 2.05 (s, 12H), 1.90-1.81 (m, 2H), 1.68-1.59(m, 2H), 1.48-1.36 (m, 4H).

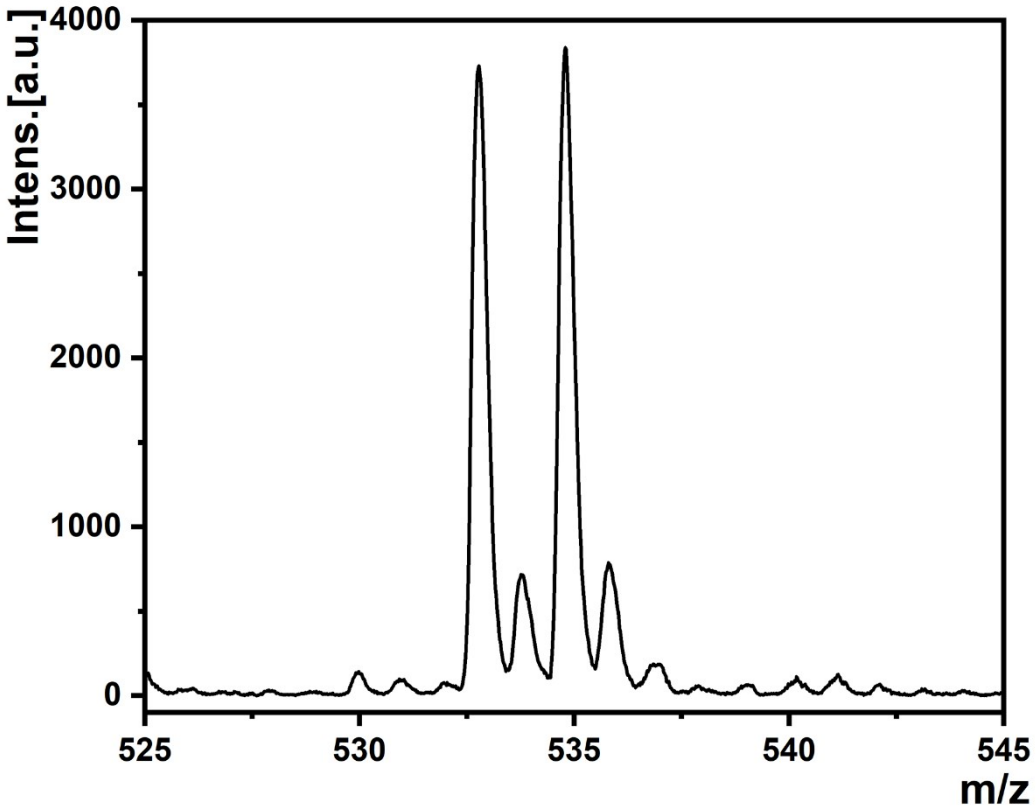


Figure S5 MALDI-TOF spectrum of compound 1. m/z: 532.78 ([M+Na^+]).

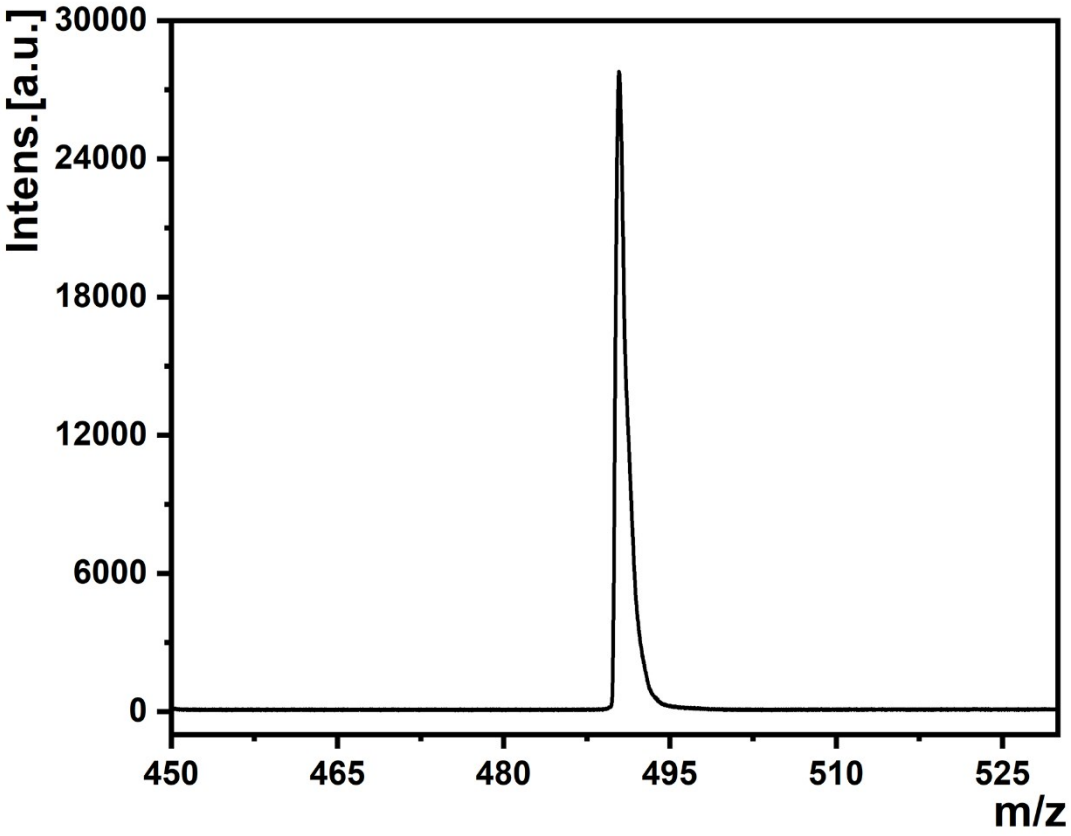


Figure S6 MALDI-TOF spectrum of compound 2. m/z: 490.44.

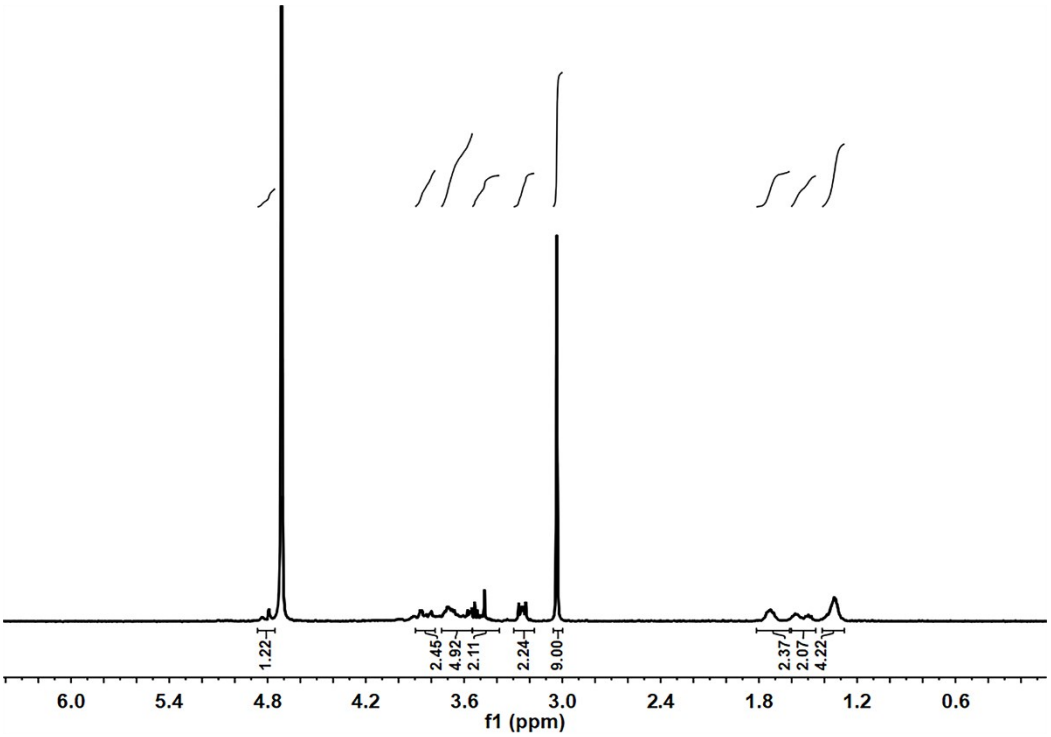


Figure S7 ^{1}H-NMR analysis of Man-DMA. ^{1}H-NMR (500 MHz, D_2O, 25 ℃, TMS): δ (ppm): 4.83-4.76 (m, 1H), 3.89-3.77 (m, 2H), 3.74-3.54 (m, 5H), 3.54-3.38 (m, 2H), 3.30-3.17 (m, 2H), 3.03 (s, 9H), 1.81-1.61 (m, 2H), 1.60-1.45 (m, 2H), 1.41-1.27 (m, 4H).

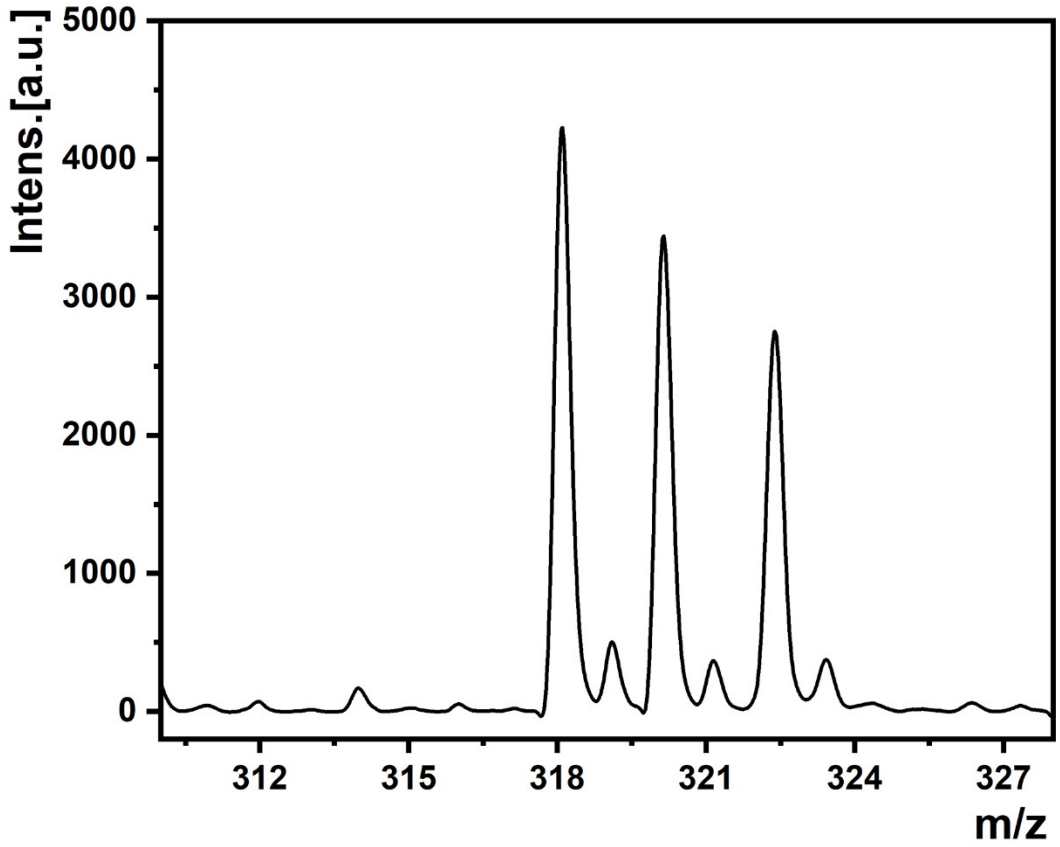


Figure S8 MALDI-TOF spectrum of Man-DMA. m/z: 322.22.

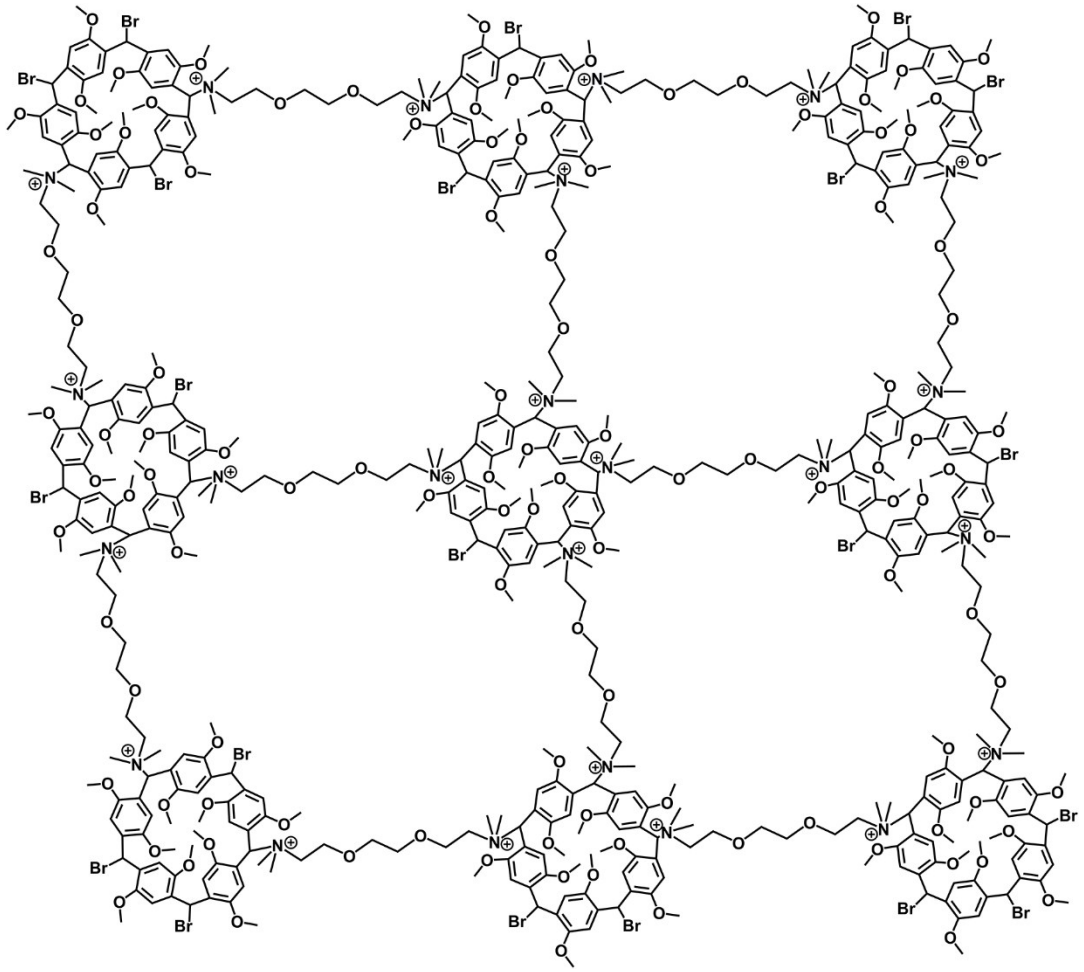


Figure S9 Partial chemical structures of polymer capsules.

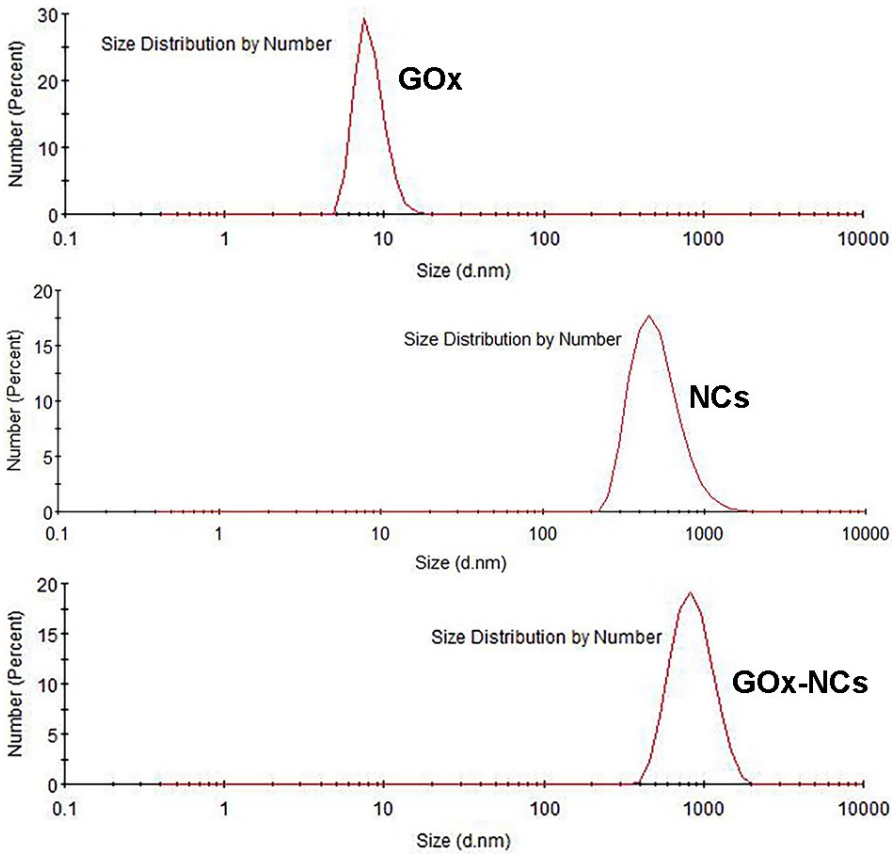


Figure S10 Hydrodynamic sizes of GOx, NCs and GOx-NCs.

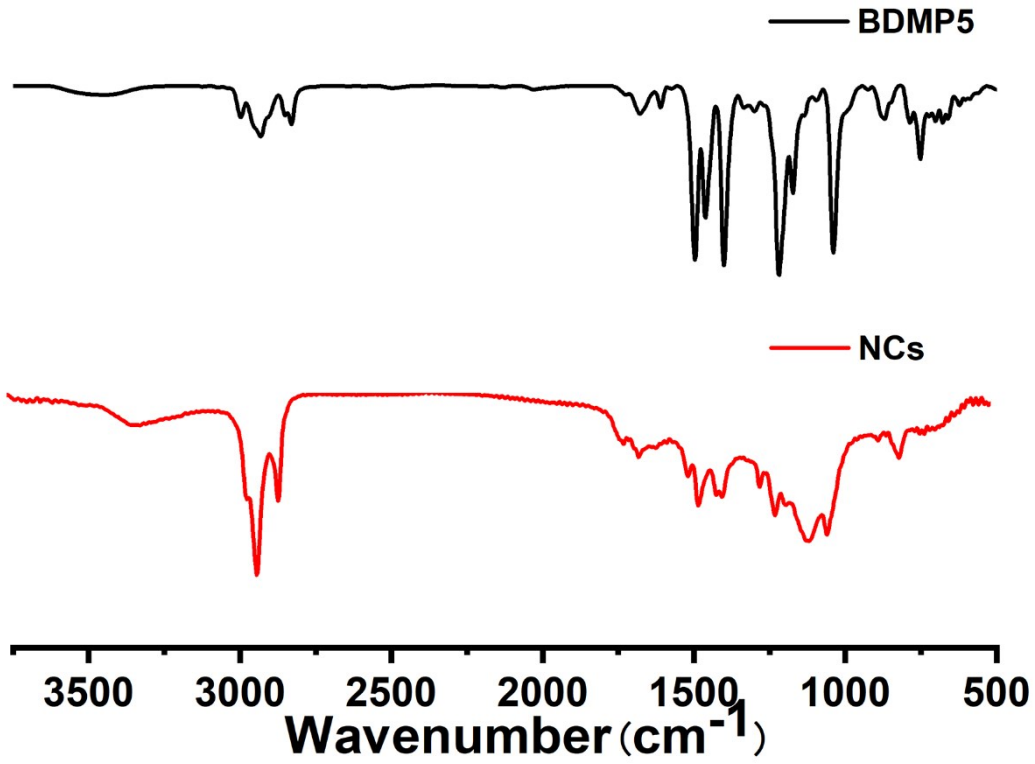


Figure S11 FTIR spectrum of BDMP5 and polymer capsules.

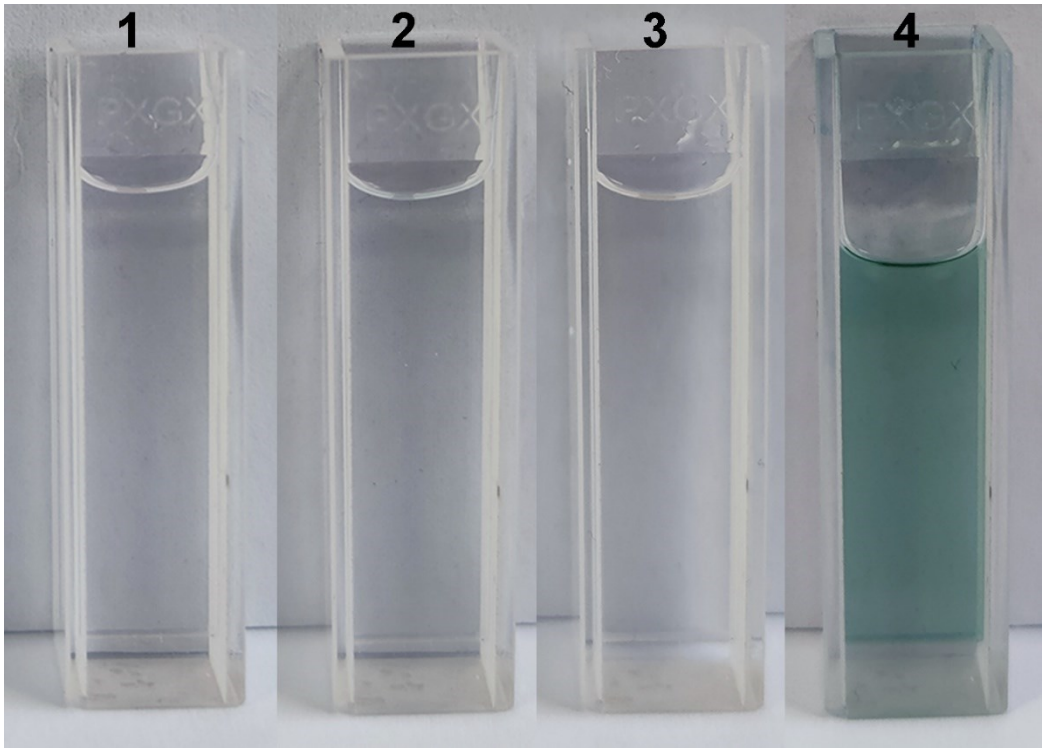


Figure S12 Pictures TMB solution after different treatment. 1: TMB solution; 2: TMB solution incubated with glucose; 3: TMB solution incubated with GOx-NCs complex; 4: TMB solution incubated with GOx-NCs complex and glucose.