Electronic Supplementary Material (ESI) for Polymer Chemistry.


**Supporting information**

# Silica/Polymer Microsphere and Hollow Polymer Microsphere as Scaffolds for Nitric Oxide Release in PBS Buffer and Bovine Serum

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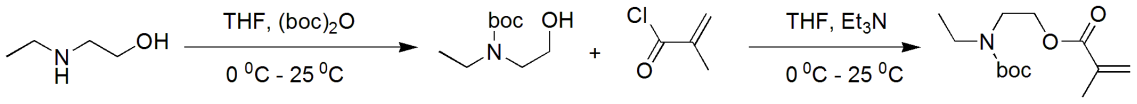
## 1. Materials.

Tetraethyl orthosilicate ($Si(OEt)_4$, TEOS)) was purchased from Aldrich and used without any further purification. 3-(Methacryloxy) propyltrimethoxysilane (MPS) was available from Aldrich and distilled under vacuum. Ethylene glycol dimethacrylate (EGDMA, Alfa Aesar, 98 %) was purified by distillation under vacuum. Benzoyl peroxide (BPO) (analytical grade from Chemical Factory of Nankai University) was recrystallized from methanol.. Acetonitrile (analytical grade, Tianjin Chemical Reagents II Co.) was dried over 4 Å molecular sieves and purified by distillation. Tetrahydrofuran (THF, Tianjin Jiangtian Chemicals, 99%) was refluxed over sodium and then distilled. 2-(Ethylamino)ethanol (Tianjin Heowns Biochemical Technology Co., Ltd., China, 98 %). Di-*tert*-butyl dicarbonate (Tianjin heowns Biochemical Technology Co., Ltd., China, 95 %). Methacryloyl chloride (Tianjin Heowns Biochemical Technology Co., Ltd., China, 95 %). Griess reagent (Shanghai Beyotime Institute of Biotechnology, S0021). Trifluoroacetic acid (TFA, Tianjin Heowns Biochemical Technology Co., Ltd., China, 98 %). Hydrofluoric acid (Tianjin Guangfu chemical Co., Ltd., China). Standard FBS (Bovine serum, Beijing Solarbio Science & Technology).

## 2. Synthesis of Monomer Compound.




1 2 3

**Scheme S1.** Synthesis of AmEMA precursor **2** and bocAmEMA monomer **3**.

### 2.1 Synthesis of 2-(Ethyl(boc)amino)ethanol (AmEMA).

To a vigorously stirred solution of 0.1 mol of amine alcohol in 60 mL of dry THF, 0.11 mol of di-*tert*-butyl dicarbonate was added dropwise at 0 °C. After stirred overnight

at 25 °C, the reaction mixture was washed with ethyl acetate and water. The organic phase was dried with sodium sulfate and evaporated in vacuo. The residue was used without any further purification for the next step of the reaction.

**2.2 Synthesis of monomer 2-(Ethyl(boc)amino)ethyl methacrylate (bocAmEMA).**

A solution containing the boc-protected 2-(ethyl(boc)amino)ethanol and 0.1 mol of triethylamine was prepared in dry THF at 0 °C. Then, 0.1 mol of methacryloyl chloride was added dropwise maintaining the temperature below 5 °C. After stirred overnight at 25 °C, the reaction mixture was filtered, and the filtrate was washed with ethyl acetate and water. After removal of solvent, the crude product was purified by column chromatography on silica gel using a mixture of ethyl acetate and petroleum ether (1:5) as eluant to afford the monomer compound **bocAmEMA** as a white oil. $^1$H NMR ($CDCl_3$ , 400 MHz): 6.13 (s, 1H), 5.59 (s, 1H), 4.25 (s, 2H), 3.50 (t, 2H), 3.24 (q, 2H), 1.95 (s, 3H), 1.46 (s, 9H), 1.12 (s, 3H).

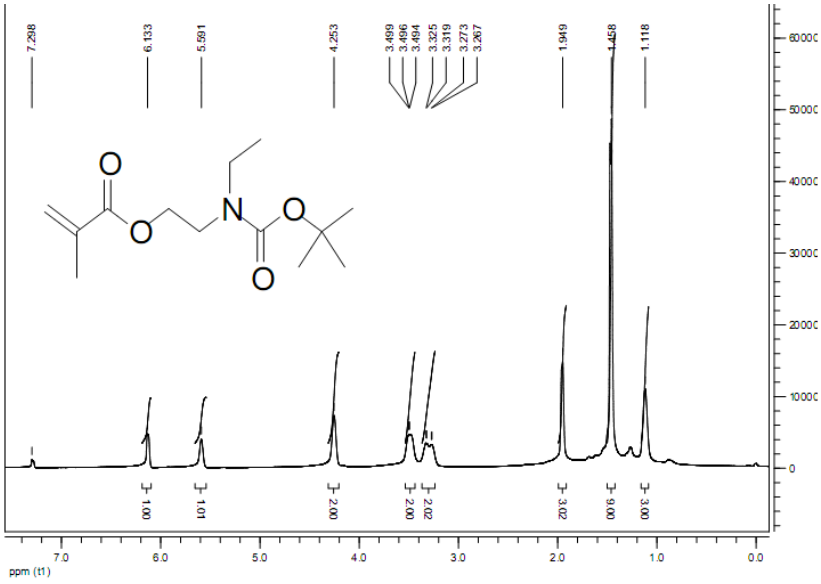
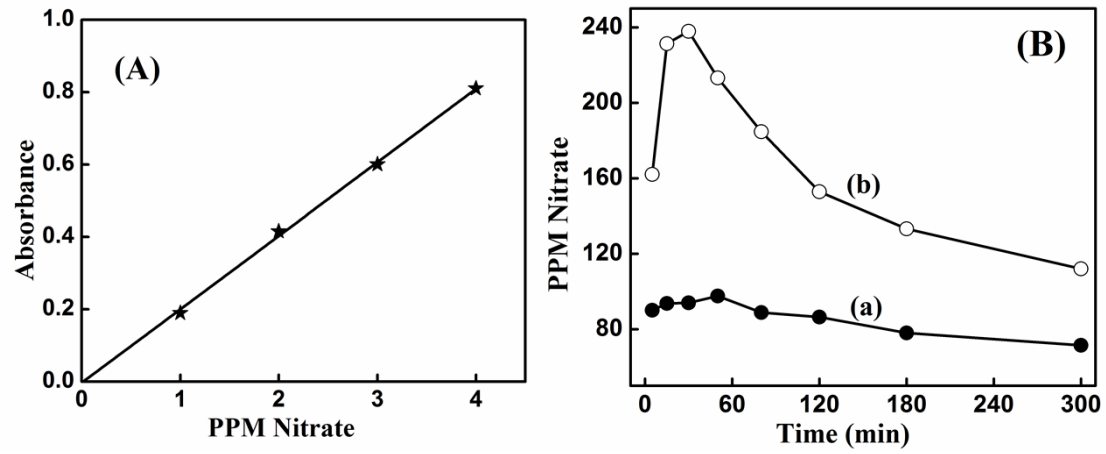



**Figure S1.** The $^1$H spectrum of the monomer compound **bocAmEMA.**

## 3. Synthesis of MPS-modified silica microspheres

Silica microspheres were prepared according to the classical Stober method: 12 mL of TEOS was added to the mixture of 200 mL ethanol, 20 mL de-ionized water and 15 mL aqueous solution of 25% ammonium with vigorous stirring at room temperature and the reaction was continued further for 24 h with stirring. The MPS-modified silica microspheres were afforded by coupling silica alcosol particles according to the literature: excess MPS (1.0 g, 4.0 mmol) was introduced into 20 mL of the silica mixture under stirring in a 50 mL round-bottom flask. Coating of silica particles with MPS was achieved by stirring the mixture of alcosol silica particles and MPS for 48 h at room temperature. The resultant MPS-modified silica particles were purified by three cycles of centrifugation, decantation, and resuspension in ethanol with ultrasonic-bathing. The MPS-modified silica particles were dried in a vacuum oven at 50 °C till constant weight.



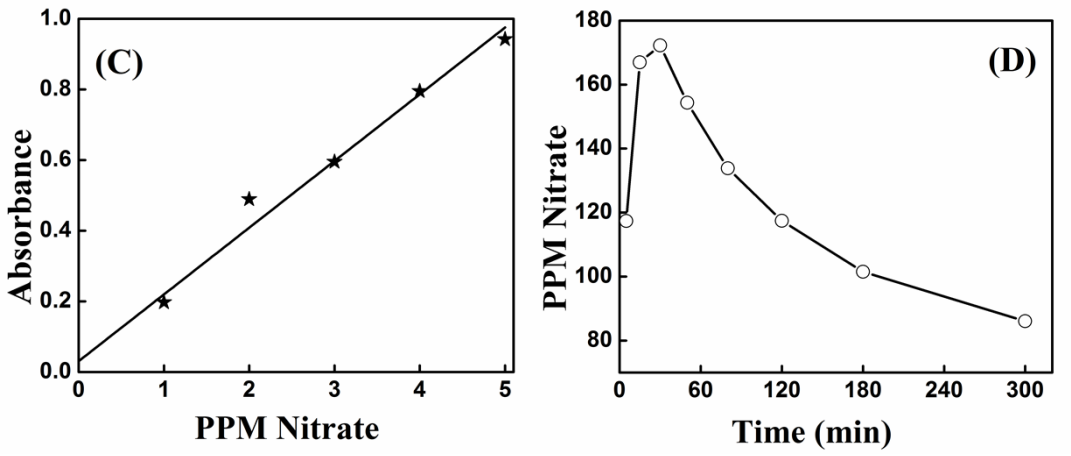



**Figure S2.** The standard working curve (**A**) and concentration of released NO *vs* time (**B**) ((a) Hollow P(AmEMA-*co*-EGDMA) core-shell microspheres; (b) $SiO_2$/P(AmEMA-*co*-EGDMA) nanospheres) in PBS buffer (pH 7.4, 37 $^oC$); And the standard working curve (**C**) and concentration of released NO vs time (**D**) in bovine serum (pH 7.2, 37 $^oC$)