Supporting Information

Dual-responsive polypseudorotaxanes based on block-selected inclusion between polyethylene-*block*-poly(ethylene glycol) diblock copolymers and 1,4-diethoxypillar[5]arene

Jianzhuang Chen, Nan Li, Yongping Gao, Fugen Sun, Jianping He and Yongsheng Li*

Laboratory of Low-Dimensional Materials Chemistry, School of Materials Science and Engineering, East China University of Science and Technology, Shanghai 200237, P. R. China; Fax and Tel: +86-21-6425-0740; Email address: ysli@ecust.edu.cn.

Content (14 pages)

1. ^{1}H NMR spectra and GPC traces of PE-*b*-PEGs

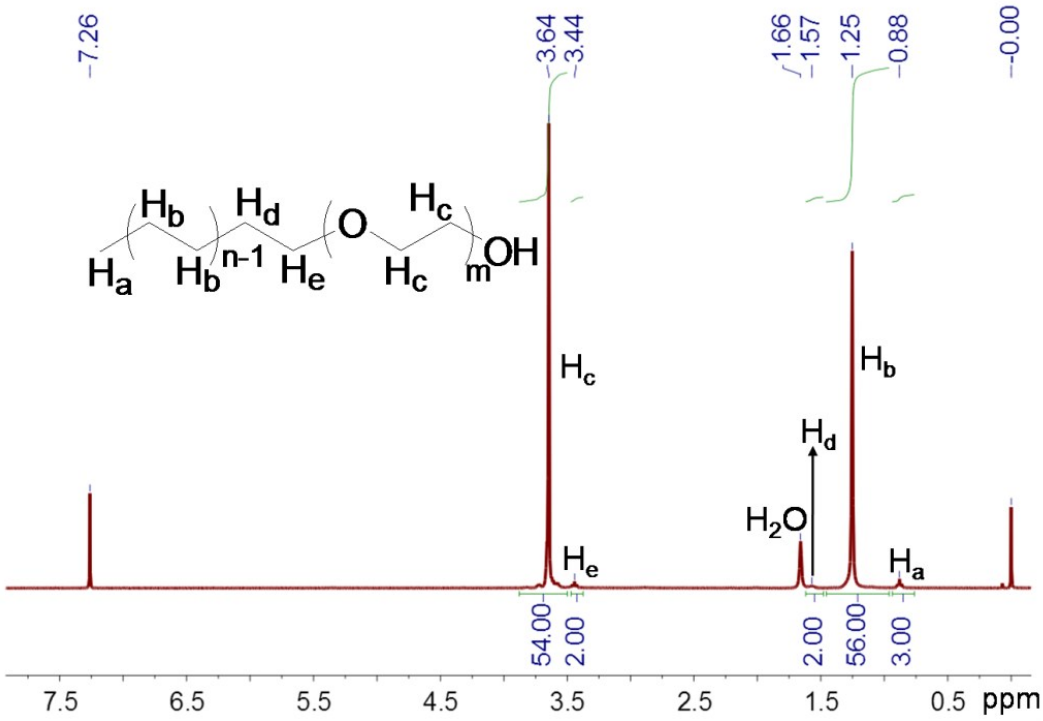

Fig. S1 ^{1}H NMR spectrum (500 MHz, $CDCl_3$, 20 °C) of PE-*b*-PEG_{1400} (10.0 mg/mL).

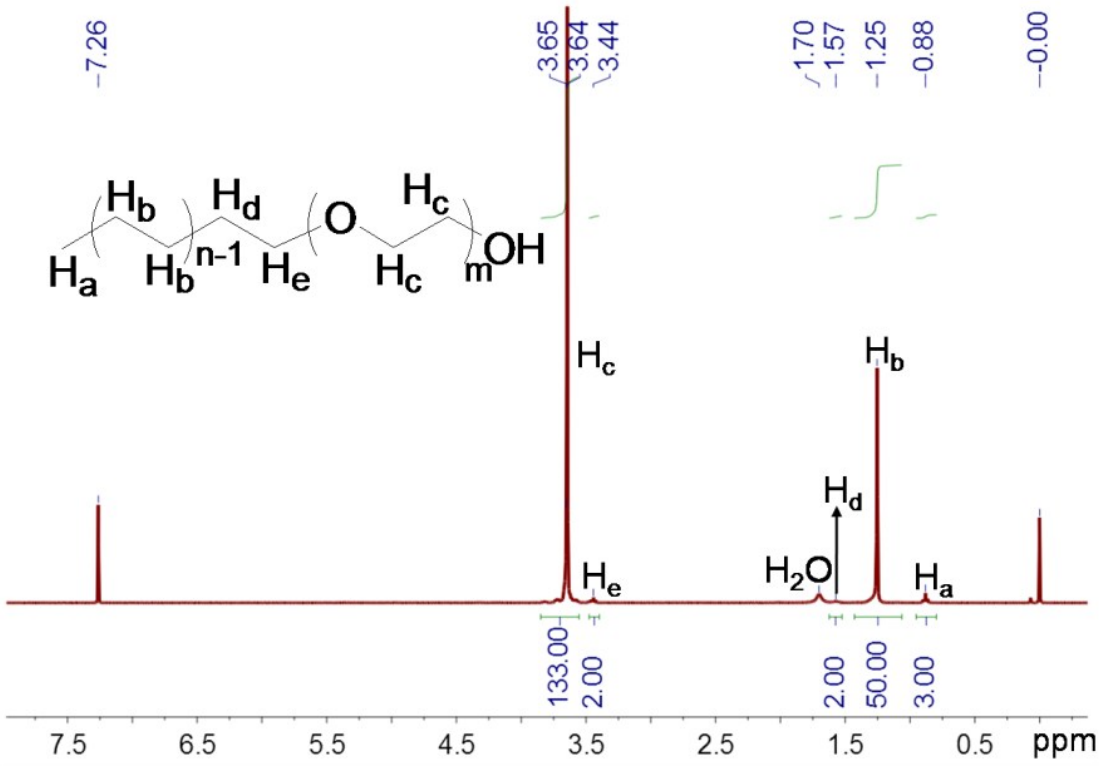

Fig. S2 ^{1}H NMR spectrum (500 MHz, $CDCl_3$, 20 °C) of PE-*b*-PEG_{2250} (10.0 mg/mL).

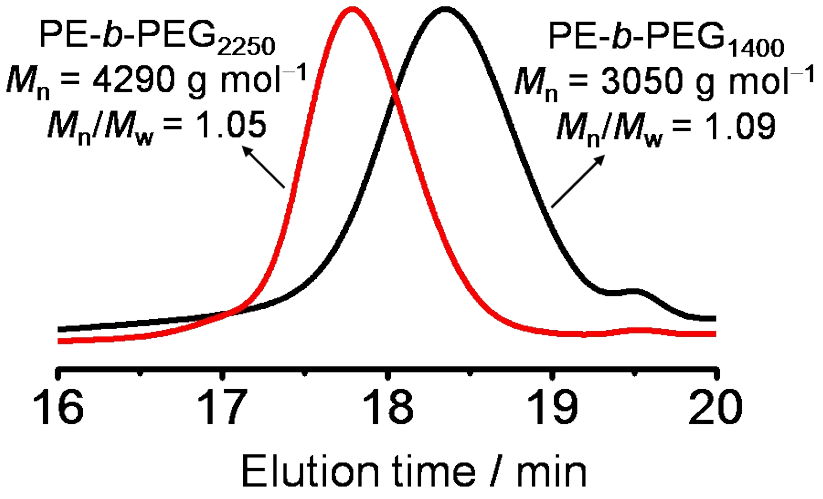

Fig. S3 GPC traces of PE-*b*-PEGs.

2. ^{1}H NMR spectrum of DEP5A

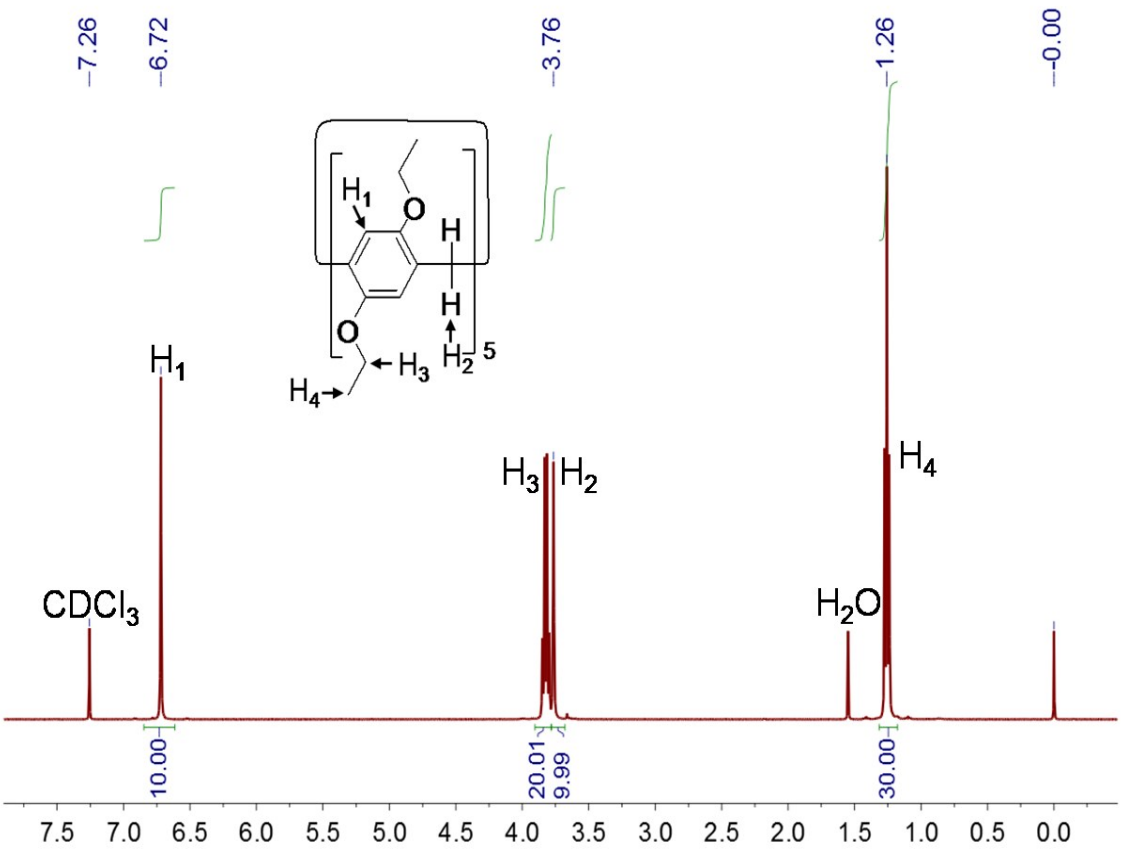

Fig. S4 ^{1}H NMR spectrum (500 MHz, $CDCl_3$, 20 °C) of DEP5A (12.0 mg/mL).

3. ^{1}H NMR titration of PE-*b*-PEG_{2250} with DEP5A

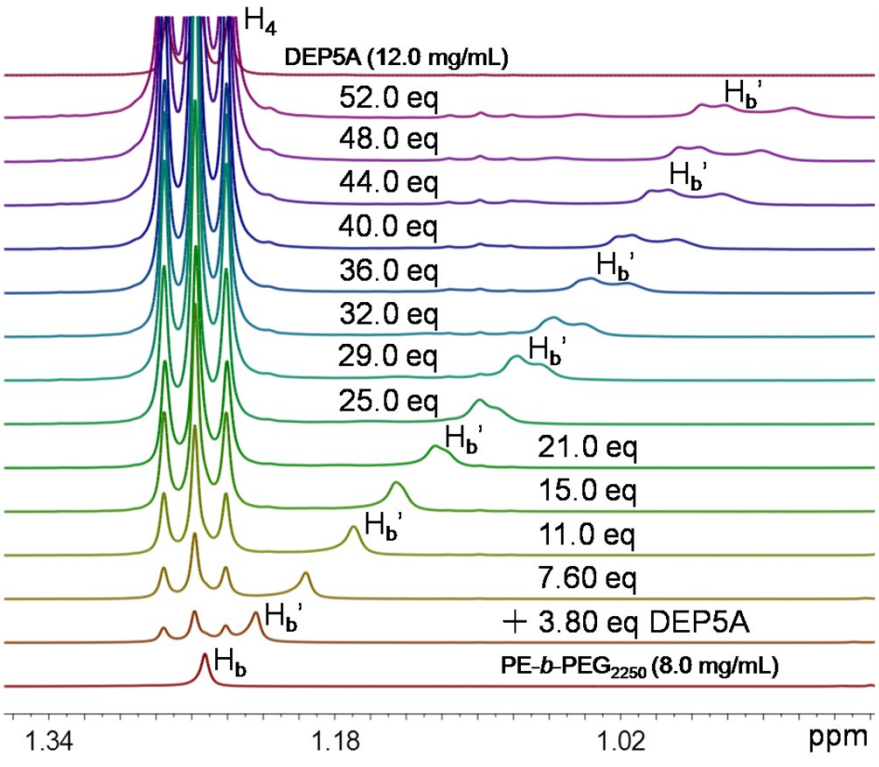

Fig. S5 Partial ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 ^{o}C) of PE-*b*-PEG_{2250} upon the addition of DEP5A.

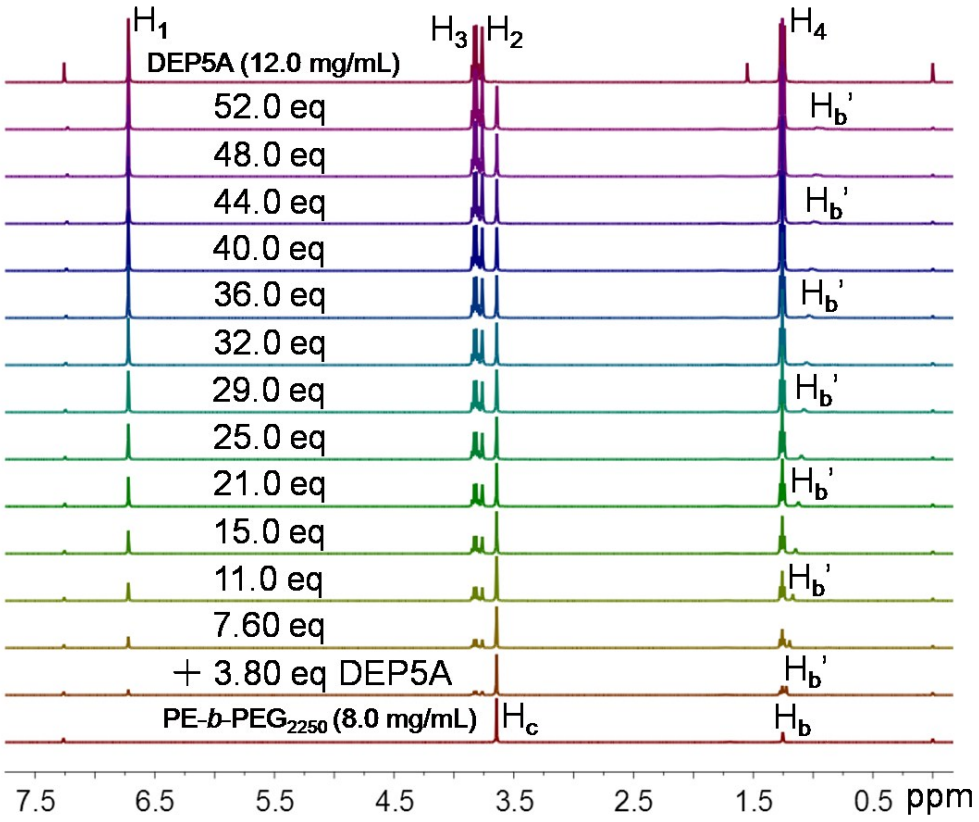

Fig. S6 ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 ^{o}C) of PE-*b*-PEG_{2250} upon the addition of DEP5A.

4. 2D NOESY NMR of PPR2

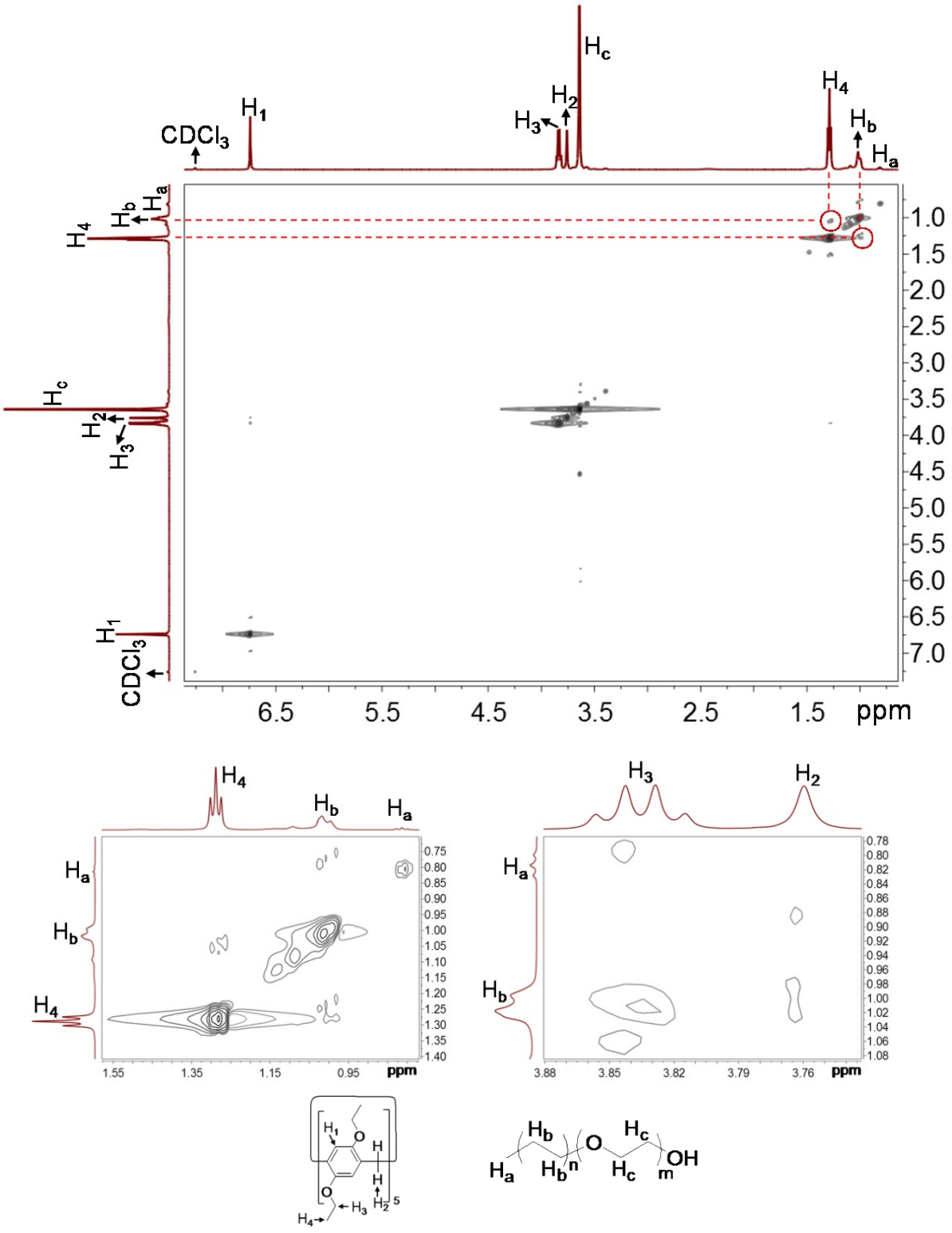

Fig. S7 2D NOESY study of PPR2 (DEP5A15.0 eq, PE-*b*-PEG_{2250} 8.0 mg/mL) (500 MHz, $CDCl_3$, 20 °C).

5. ^1H NMR spectra of PPR2 at different temperatures

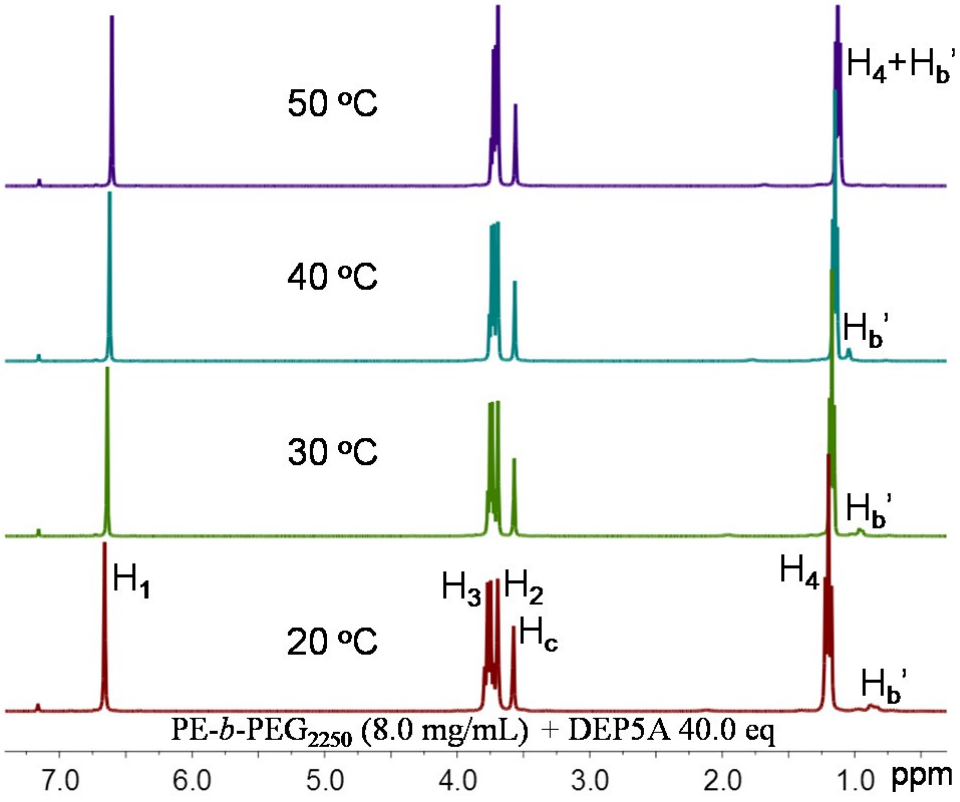

Fig. S8 ^{1}H NMR spectra (500 MHz, $CDCl_3$) of PPR2 at different temperatures.

6. Size distributions of PPR1 and PPR2 in $CHCl_3$ at different temperatures

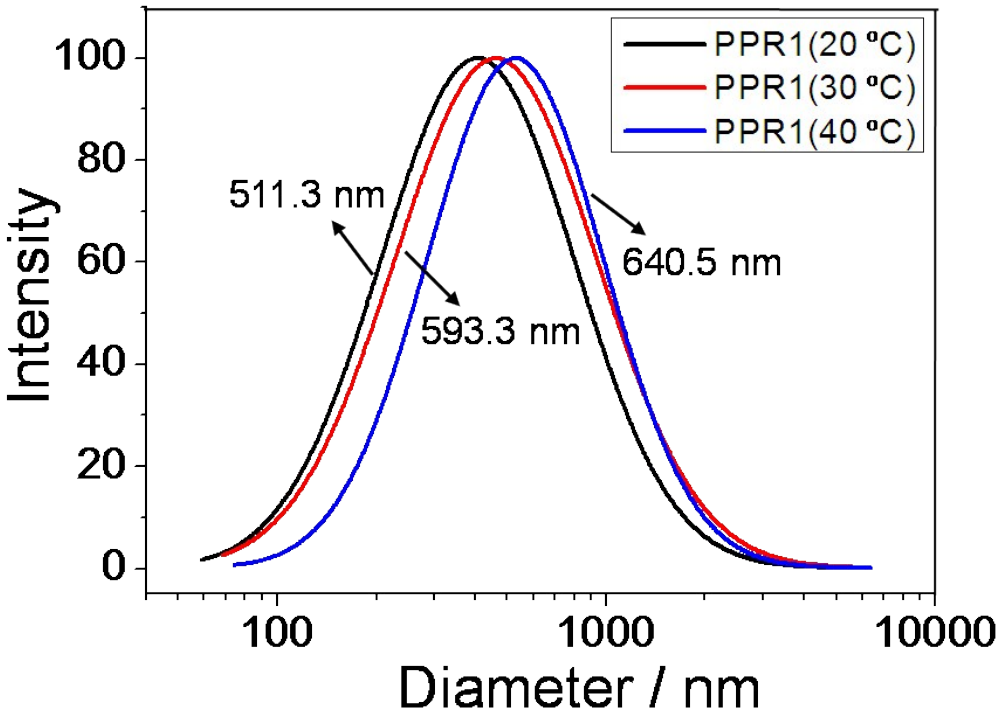

Fig. S9 Size distribution curves of PPR1 (DEP5A 40.0 eq, PE-*b*-PEG_{1400} 1.0 mg/mL) in $CHCl_3$ at different temperatures.

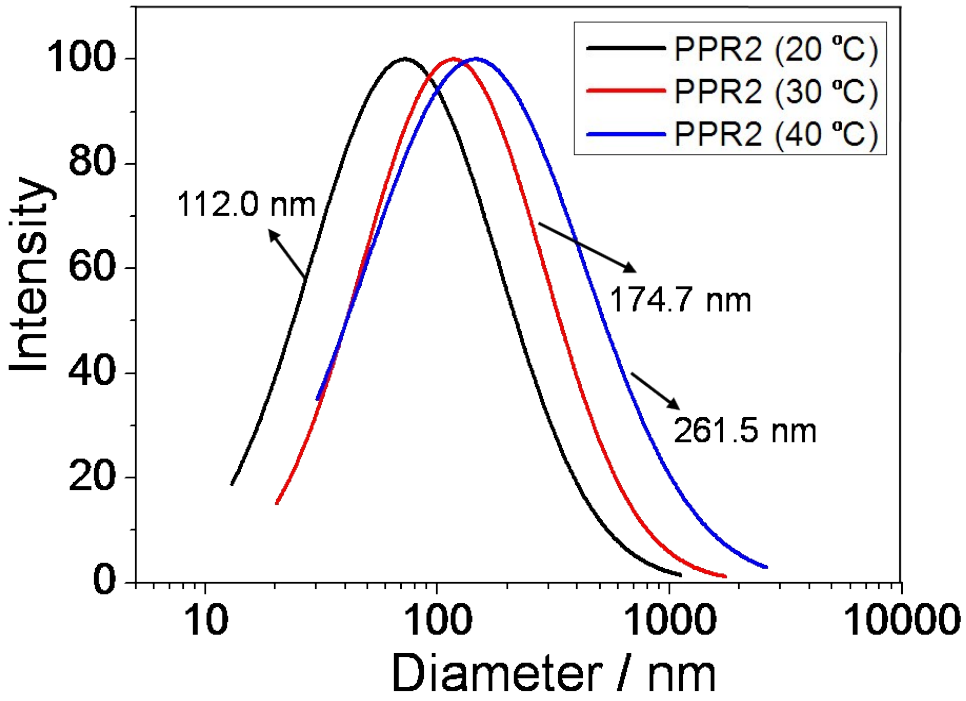

Fig. S10 Size distribution curves of PPR2 (DEP5A 40.0 eq, PE-*b*-PEG_{2250} 1.0 mg/mL) in $CHCl_3$ at different temperatures.

7. ^1H NMR titration of PPR2 with DBrBu and hexanedinitrile

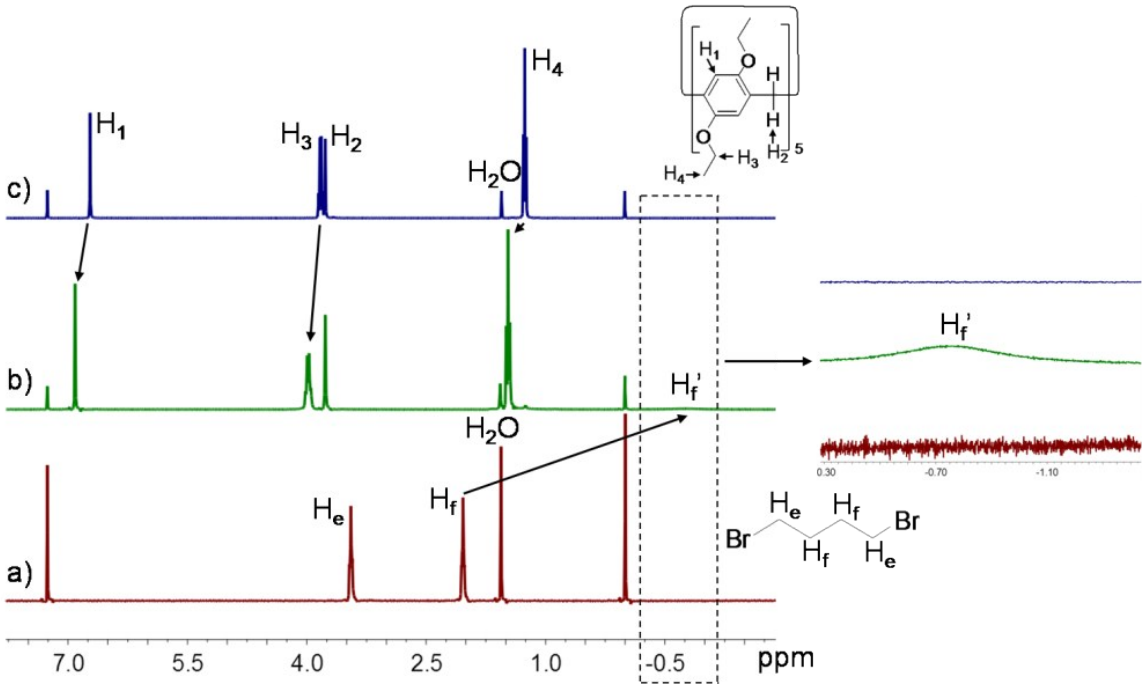

Fig. S11 ^1H NMR spectra (500 MHz, $CDCl_3$, 20 ºC) of DBrBu a), DEP5A c), and their complex (1:1 (mol/mol)) b).

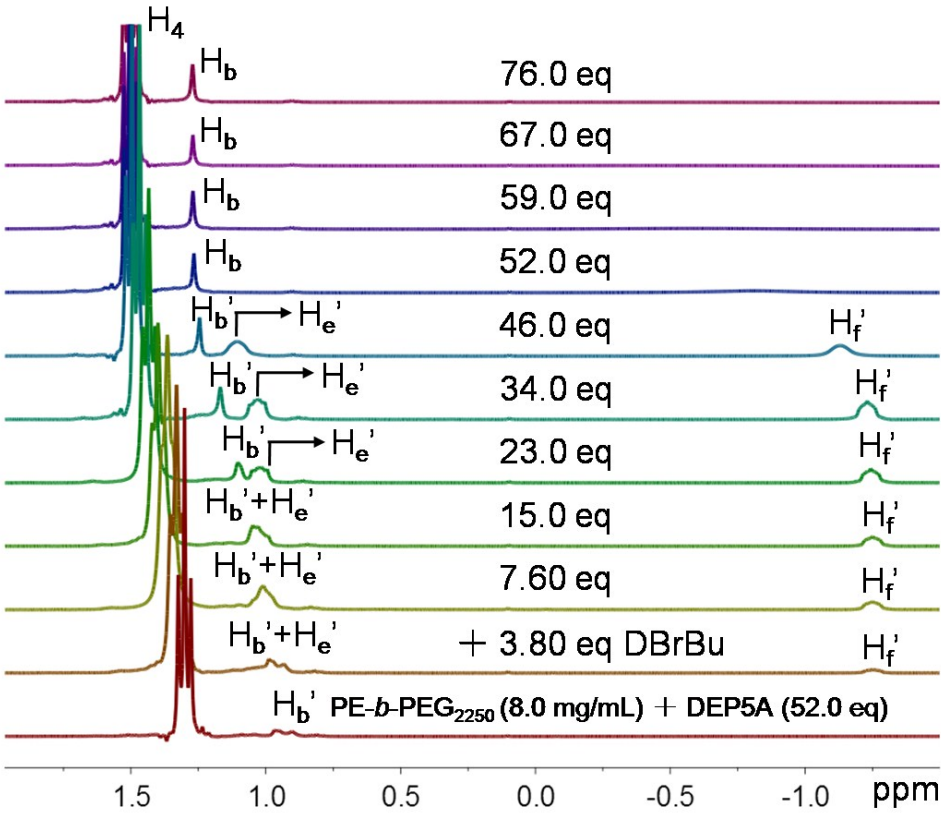

Fig. S12 Partial ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 °C) of PPR2 upon the addition of DBrBu.

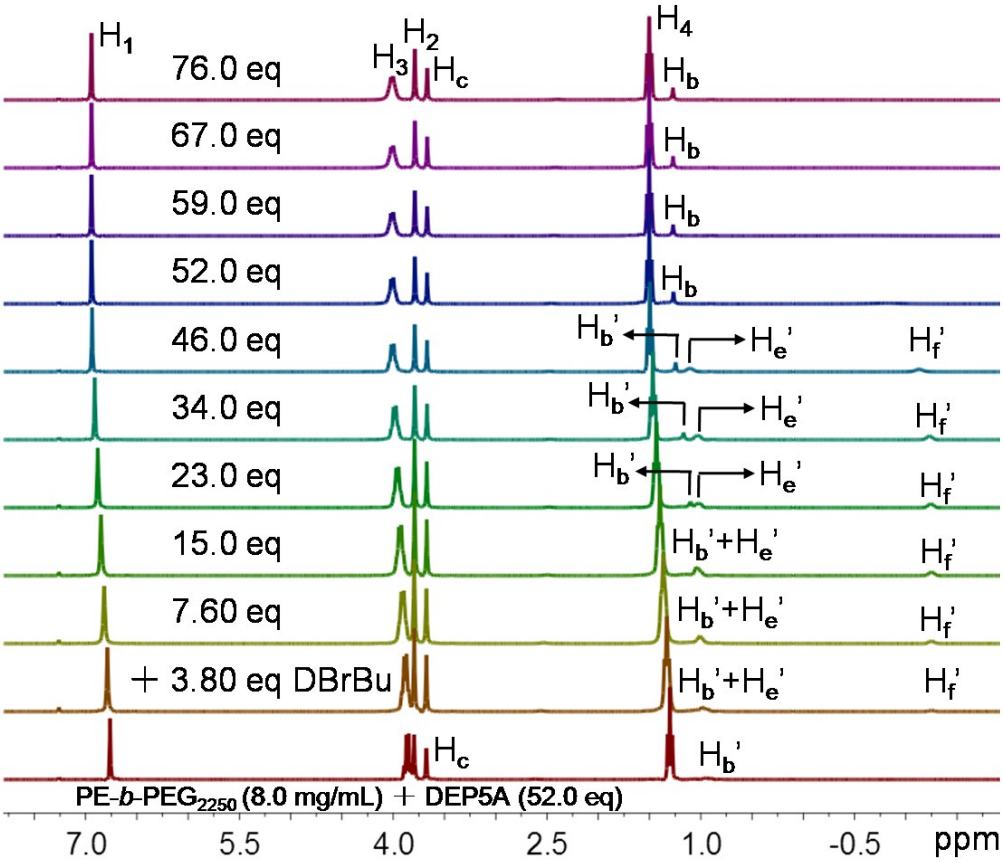

Fig. S13 ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 °C) of PPR2 upon the addition of DBrBu.

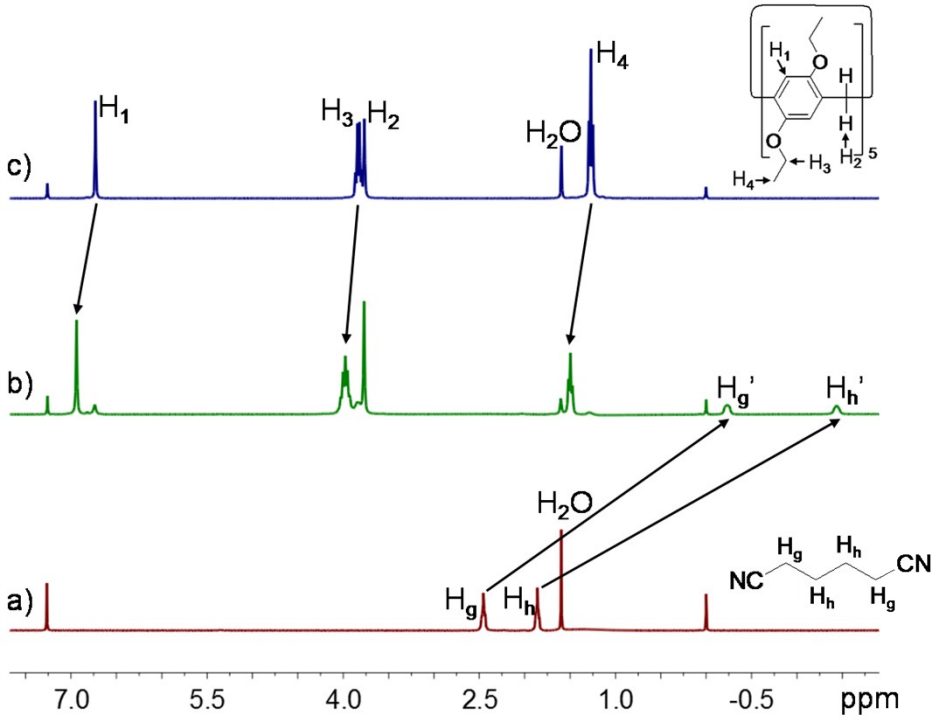

Fig. S14 ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 ^{o}C) of hexanedinitrile a), DEP5A c), and their complex (1:1 (mol/mol)) b).

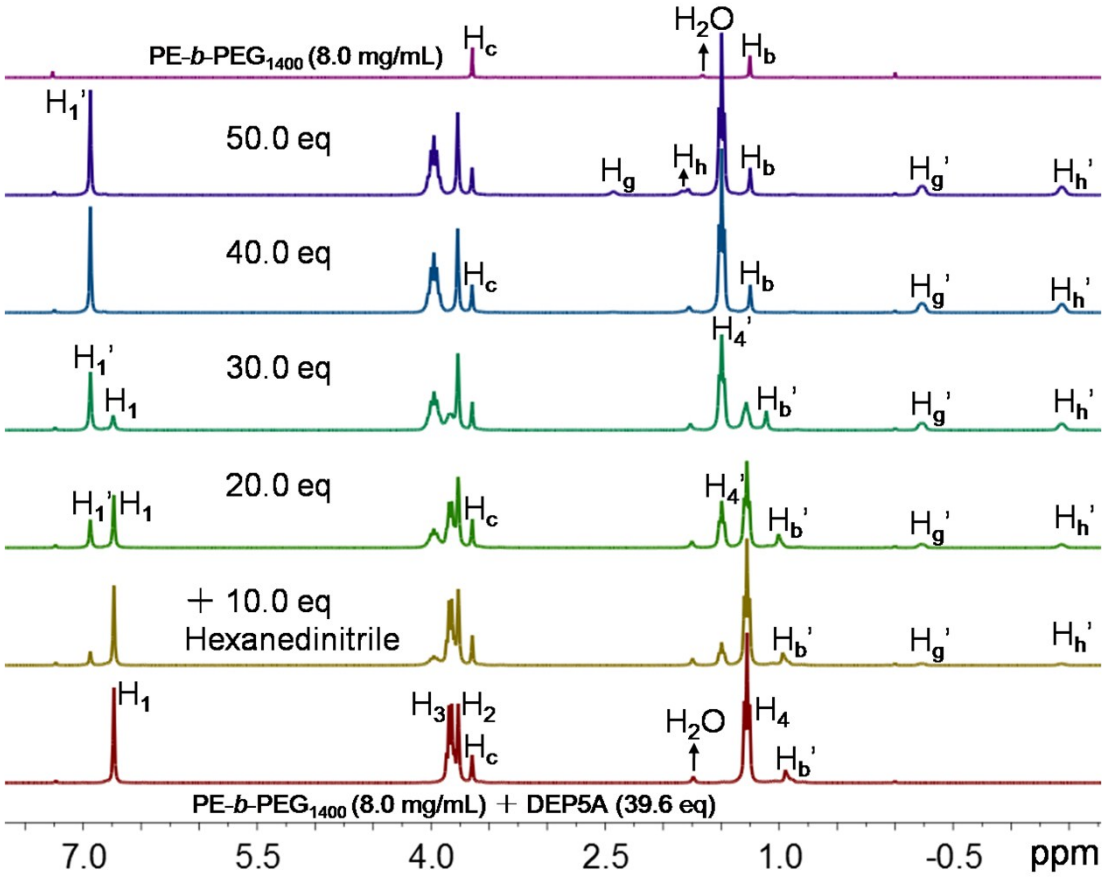

Fig. S15 ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 ^{o}C) of PPR1 upon the addition of hexanedinitrale.

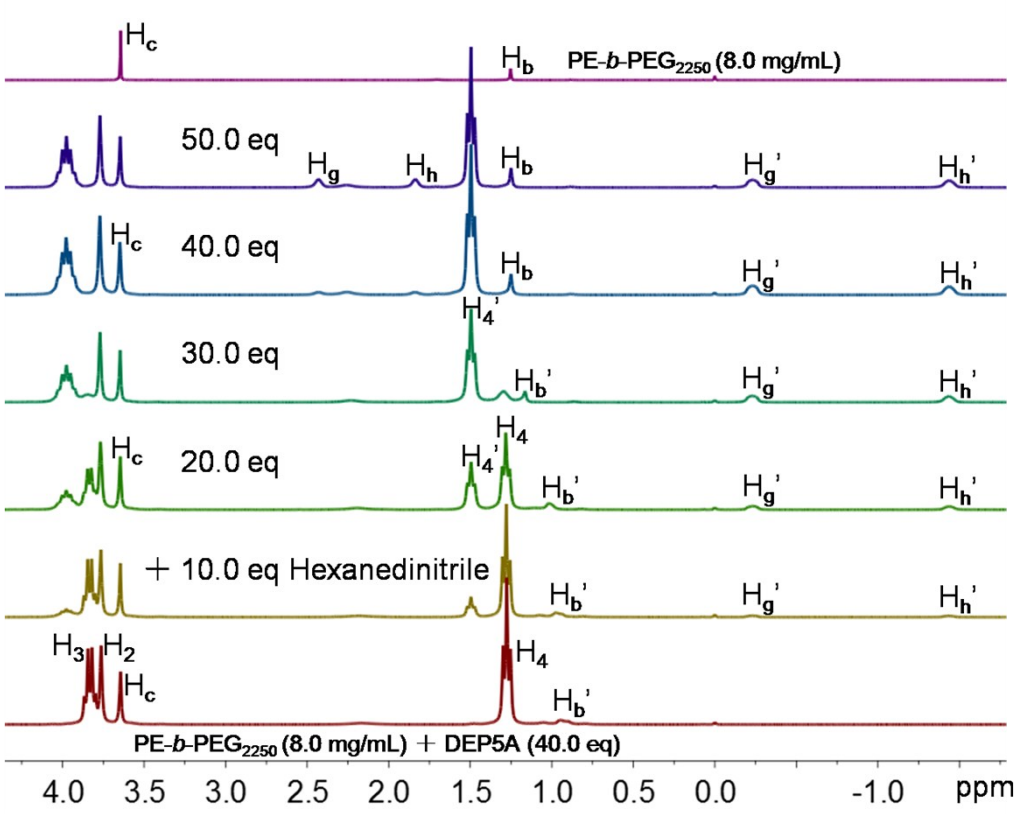

Fig. S16 Partial ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 ^{o}C) of PPR2 upon the addition of hexanedinitrale.

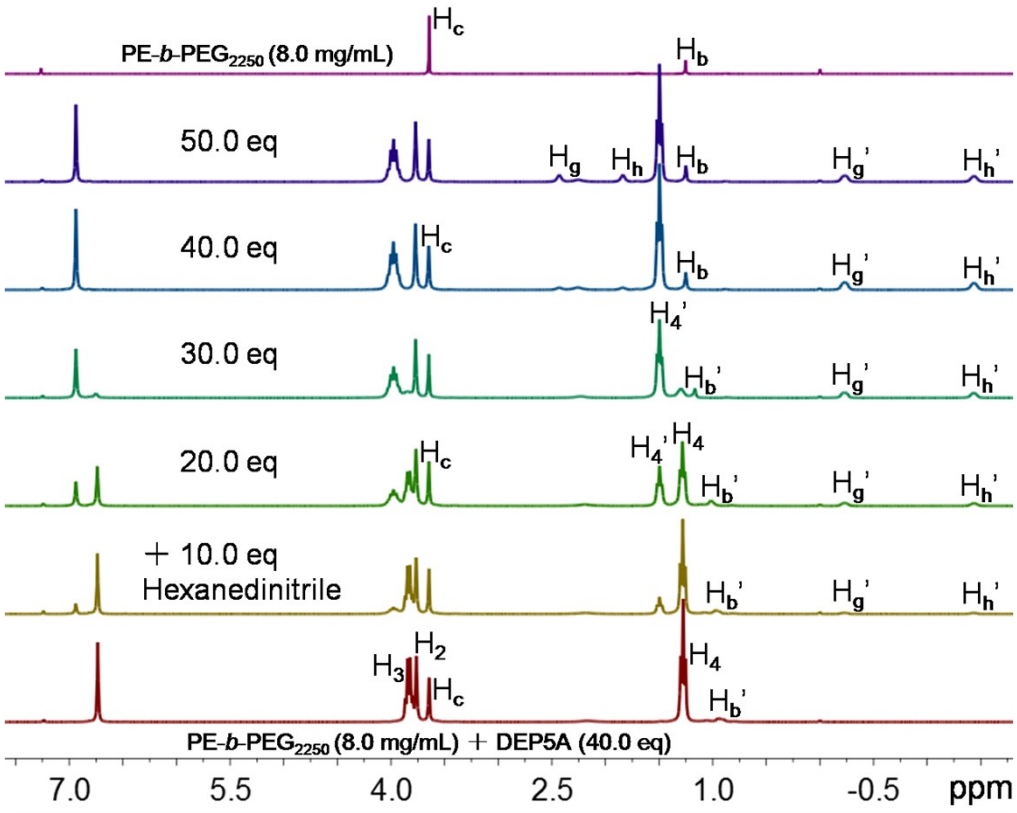

Fig. S17 ^{1}H NMR spectra (500 MHz, $CDCl_3$, 20 ^{o}C) of PPR2 upon the addition of hexanedinitrale.

8. FE-SEM images of self-assembled structures of PPRs and desassembled PPRs

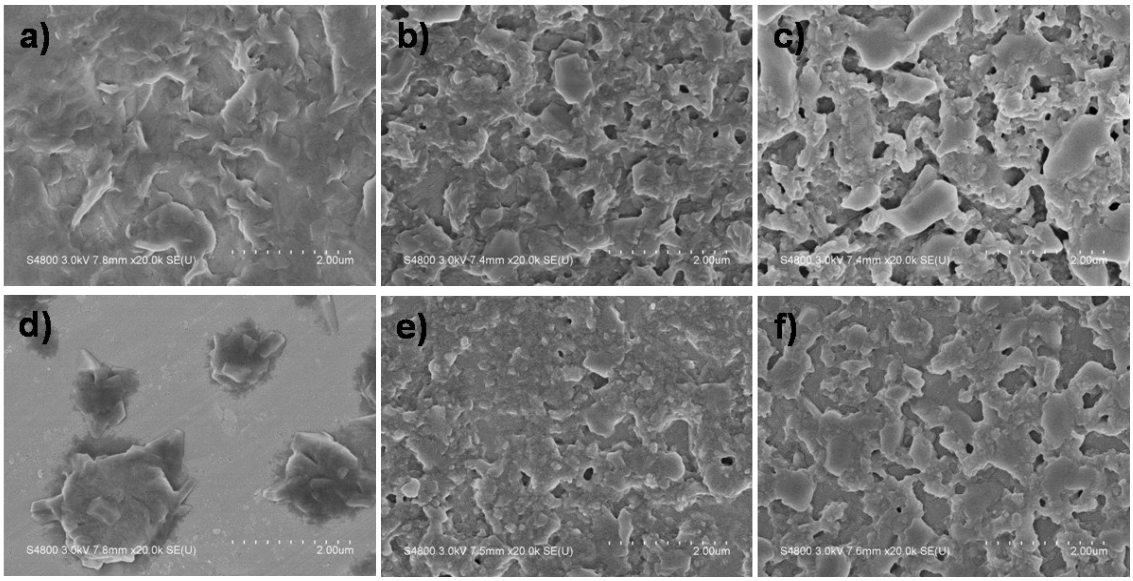

Fig. S18 SEM images of self-assembed structures in $CHCl_3$ at 20 °C: a) PPR1 (DEP5A 10.0 eq, PE-*b*-PEG_{1400} 1.0 mg/mL), b) PPR1 (DEP5A 20.0 eq, PE-*b*-PEG_{1400} 1.0 mg/mL), c) PPR1 (DEP5A 30.0 eq, PE-*b*-PEG_{1400} 1.0 mg/mL), d) PPR2 (DEP5A 10.0 eq, PE-*b*-PEG_{2250} 1.0 mg/mL), e) PPR2 (DEP5A 20.0 eq, PE-*b*-PEG_{2250} 1.0 mg/mL), f) PPR2 (DEP5A 30.0 eq, PE-*b*-PEG_{2250} 1.0 mg/mL). The scale bar of a)-f) is 2 μm.

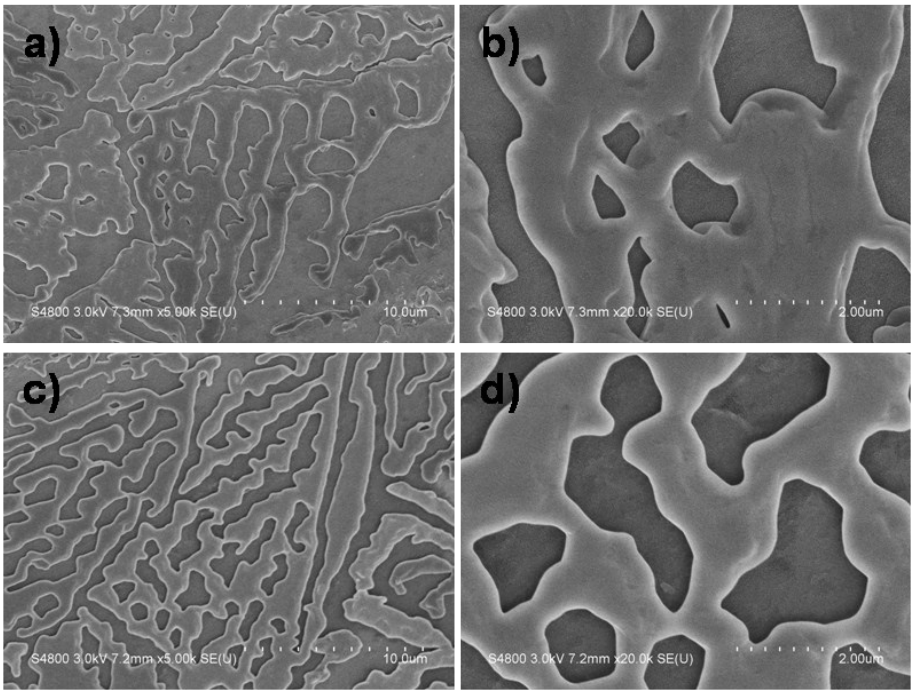

Fig. S19 SEM images of self-assembed structures in $CHCl_3$ at 20 °C: a) 40.0 eq hexanedinitrile was added to PPR1 (DEP5A 40.0 eq, PE-*b*-PEG_{1400} 1.0 mg/mL), c) 40.0 eq hexanedinitrile was added to PPR2 (DEP5A 40.0 eq, PE-*b*-PEG_{2250} 1.0 mg/mL), b) and d) are the magnified pictures of a) and c), respectively. The scale bar of a) and c) is 10 μm; The scale bar of b) and d) is 2 μm.

9. FE-SEM and TEM images of electrosprayed structures of PPRs, DEP5A and desassembled PPRs

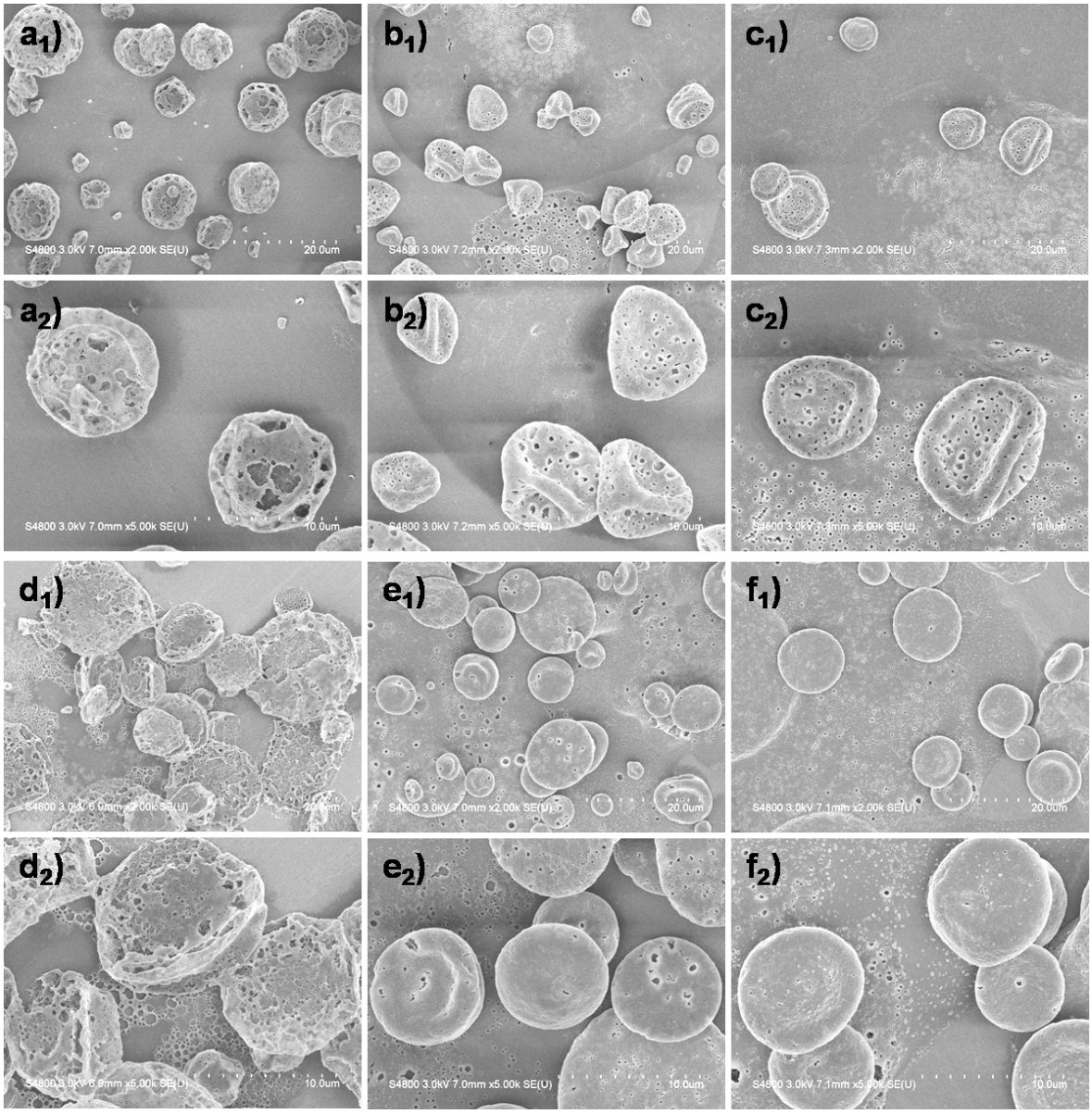

Fig. S20 FE-SEM images of electrosprayed structures: a_1) PPR1 (DEP5A 10.0 eq, PE-*b*-PEG_{1400} 5.0 mg/mL), b_1) PPR1 (DEP5A 30.0 eq, PE-*b*-PEG_{1400} 5.0 mg/mL), c_1) (DEP5A 40.0 eq, PE-*b*-PEG_{1400} 5.0 mg/mL), d_1) PPR2 (DEP5A 10.0 eq, PE-*b*-PEG_{2250} 5.0 mg/mL), e_1) PPR2 (DEP5A 30.0 eq, PE-*b*-PEG_{2250} 5.0 mg/mL), f_1) (DEP5A 40.0 eq, PE-*b*-PEG_{2250} 5.0 mg/mL). a_2), b_2), c_2), d_2), e_2) and f_2) are the magnified images of a_1), b_1), c_1), d_1), e_1) and f_1), respectively. The scale bar of a_1), b_1), c_1), d_1), e_1) and f_1) is 20 μm. The scale bar of a_2), b_2), c_2), d_2), e_2) and f_2) is 10 μm.

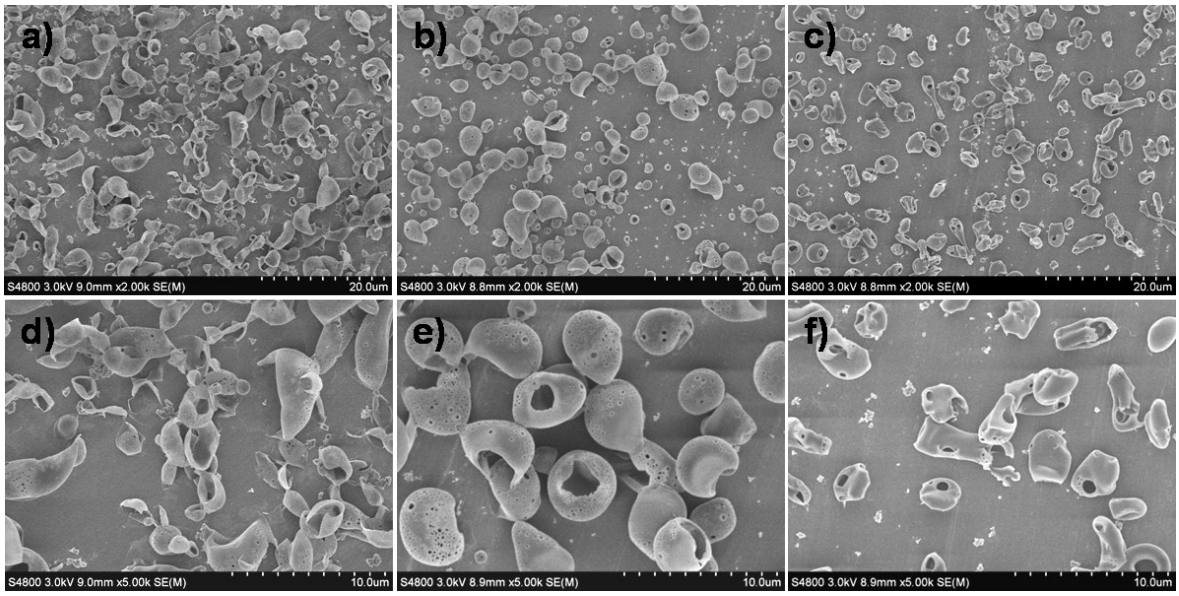

Fig. S21 FE-SEM images of electrosprayed structures of DEP5A at different concentrations: a) 10.0 mg/mL, b) 20.0 mg/mL, c) 30.0 mg/mL. d), e) and f) are the magnified images of a), b) and c), respectively. The scale bar of a), b) and c) is 20 μm. The scale bar of d), e) and f) is 10 μm.

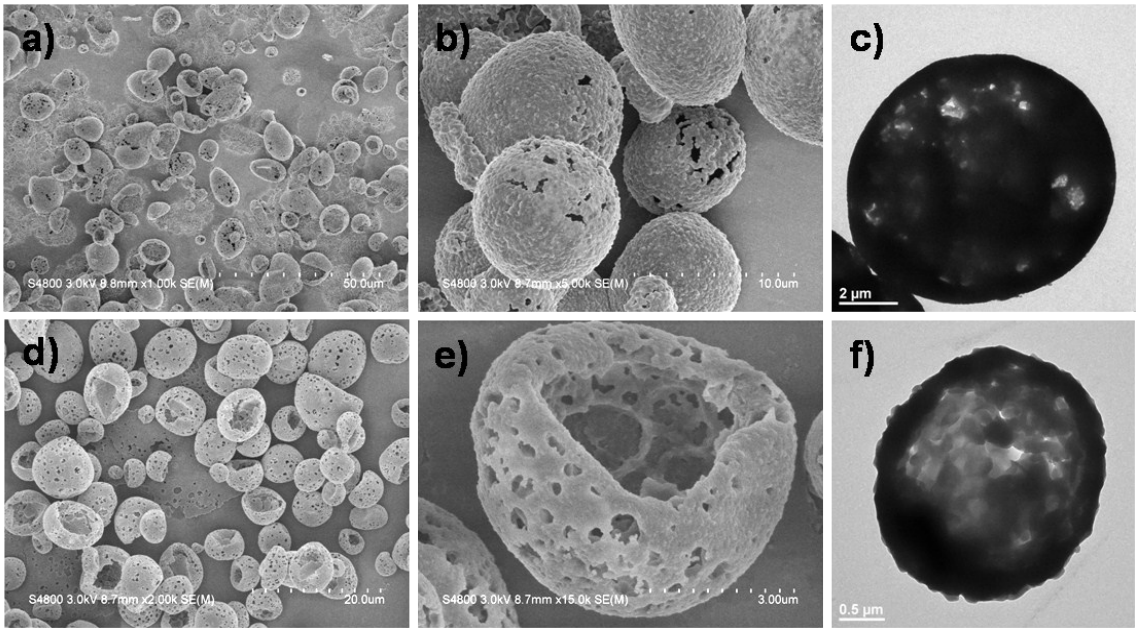

Fig. S22 FE-SEM images of electrosprayed structures: a) 20.0 eq DBrBu was added to PPR1 (PE-*b*-PEG_{1400} 5.0 mg/mL, DEP5A 20.0 eq) (scale bar: 50 μm), d) 20.0 eq DBrBu was added to PPR2 (PE-*b*-PEG_{2250} 5.0 mg/mL, DEP5A 20.0 eq) (scale bar: 20 μm), b) and e) (scale bars: 10.0 and 3.0 μm) are the magnified images of a) and d), c) and f) (scale bars: 2.0 and 0.5 μm) are the TEM images of b) and e).

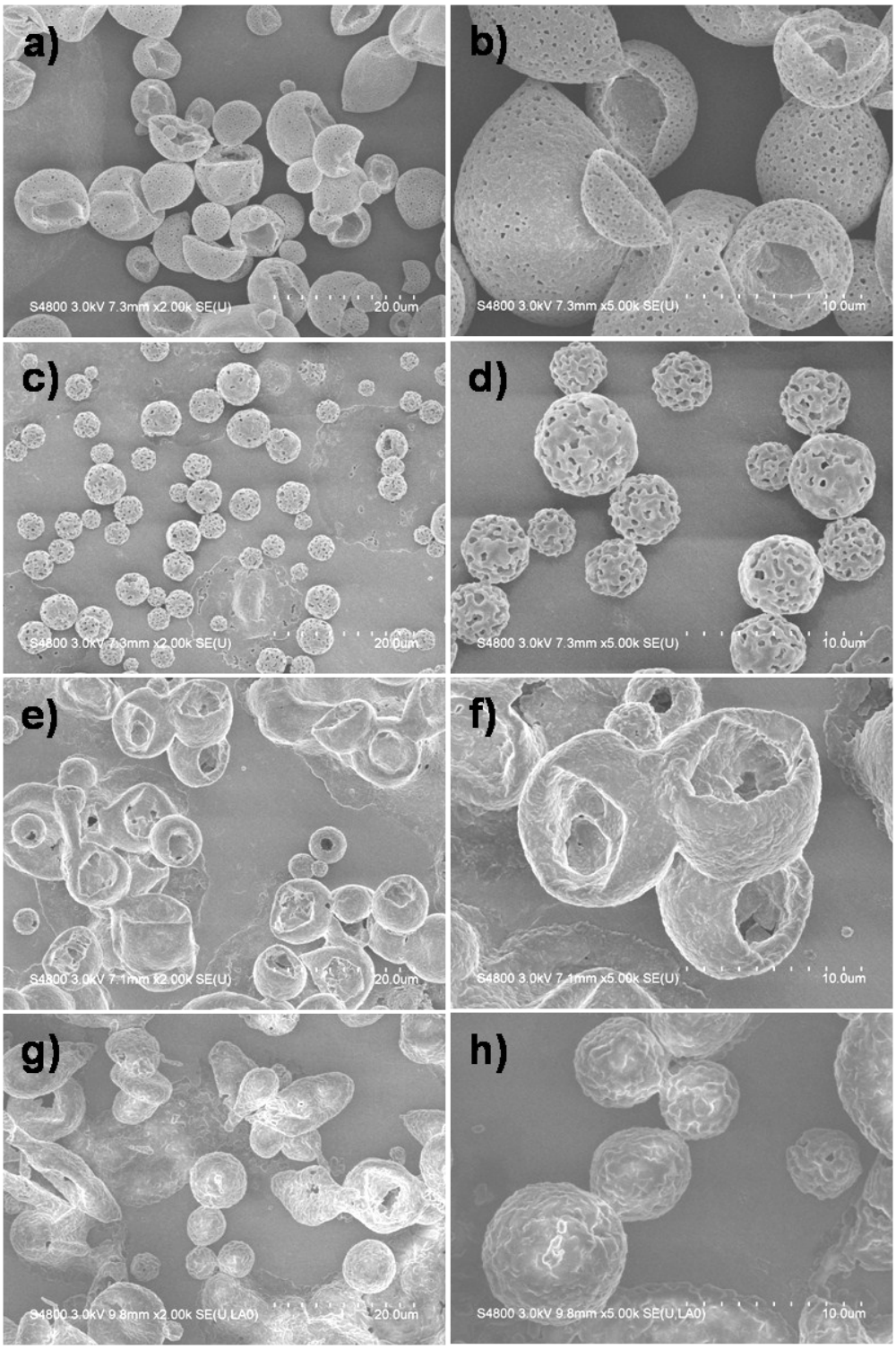

Fig. S23 FE-SEM images of electrosprayed structures: a) 40.0 eq DBrBu was added to PPR1 (DEP5A 40.0 eq, PE-*b*-PEG_{1400} 5.0 mg/mL), c) 40.0 eq hexanedinitrile was added to PPR1 (DEP5A 40.0 eq, PE-*b*-PEG_{1400} 5.0 mg/mL), b) and d) are the magnified images of a) and c), respectively. e) 40.0 eq DBrBu was added to PPR2 (DEP5A 40.0 eq, PE-*b*-PEG_{2250} 5.0 mg/mL), g) 40.0 eq hexanedinitrile was added to PPR2 (DEP5A 40.0 eq, PE-*b*-PEG_{2250} 5.0 mg/mL), b), d), f) and h) are the magnified images of a), c), e) and g), respectively. The scale bar of a), c), e) and g) is 20 μm. The scale bar of b), d), f) and h) is 10 μm.