Supporting Information:

Can Molecules with Anionic Head and Poly(ethylene glycol) methyl ether Tail Self-assemble in Water? A Surface tension, Fluorescence Probe, Light Scattering, and Transmission Electron Microscopic Investigation

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Materials. Poly(ethylene glycol)methyl ether methacrylate (MW 300 and 1100), and 3-mercaptopropionic acid were obtained from Aldrich and were used without further purification. The fluorescence probes, 1-anilinonaphthalene (AN), 1,6-diphenyl-1,3,5-hexatriene (DPH), and pyrene (Py) were procured from Aldrich (Milwaukee, WI, USA) and were purified by repeated recrystallization from an ethanol-acetone mixture. Good quality organic solvents employed in this work were purified and dried whenever necessary. All aqueous solutions were prepared using Milli-Q water (~18 MΩ), pH 6.6.

Synthesis. Compound A was synthesized by thiol-ene "click" chemistry following a method reported in the literature.[1] Briefly poly(ethylene glycol)methyl ether methacrylate was first freed from inhibitor by passing through a SiO_2 column and elution by methanol. Pure poly(ethylene glycol)methyl ether methacrylate was then reacted with 3-mercaptopropionic acid in methanol at room temperature for 6 hours. The compound A_1 and A_2 were obtained as white solid after evaporation of the solvent and were then purified by column (Al_2O_3) chromatography using 5:1 (v/v) ethyl acetate/pet ether mixture. The compounds were characterized by FT-IR, ^{1}H NMR, and ^{13}C NMR spectroscopy. The reaction

of $NaHCO_3$ with A_1 or A_2 in THF-water mixture overnight gave the sodium salt, SA_1 or SA_2. The solid product thus obtained was purified by repeated precipitation from diethylether.

Chemical Identification

Amphiphile A_1. State. Solid, and hygroscopic, Yield 79%,FTIR (KBr cm-1).Peak at 3600 cm^{-1} (broad) shows the presence of O-H stretching, 1742 cm^{-1} shows presence of C=O stetching of ester group and 636 cm^{-1} shows presence of C-S stretching.1H NMR ($CDCl_3$, δ ppm): 1.45 (CH_3, t, 9H), 2.18 (CH_3-CH_2-N, m, 4H), 2.42 (2H, s, OH), 2.81 (6H, m, N-CH_2, S-CH_2-CH_2-N), 3.25 (5H, m, S(CH_2-$CHCH_3$)CH_2CH_2N), 3.88 (3H, s, CH_3-O), 4.10 (44 H, m, long chain glycolic CH_2, $CHCH_2OH$), 4.23 (2H, m, CH-CH_2-OH), 4.77 (2H, t, C(O)OCH_2). ^{13}C-NMR. ($CDCl_3$, 400 MHz) δ (ppm) 174.5 ($COOCH_2$), 169.1 (COOH), 68.7, 69.5, 70.5, 70.9, 73.6 (ether CH_2), 54.9 (OCH_3), 42.4 (SCH_2CH), 36.2 (SCH_2CH), 35.9 (SCH_2 CH_2COOH), 28.1 (SCH_2 CH_2COOH), 15.1 (CH_3).

Amphiphile A_2. State. Solid and hygroscopic, Yield 80%, FTIR (KBr cm^{-1}).Peak at 3600 cm^{-1} (broad) shows the presence of O-H stretching, 1741 cm^{-1} shows presence of C=O stetching of ester group and 637 cm^{-1} shows presence of C-S stretching.1H NMR ($CDCl_3$, δ ppm): 1.40 (CH_3, t, 9H), 2.127 (CH_3-CH_2-N, m, 4H), 1.92 (2H, s, OH), 2.31 (6H, m, N-CH_2, S-CH_2-CH_2-N), 2.75 (5H, m, S(CH_2-$CHCH_3$)CH_2CH_2N), 3.38 (3H, s, CH_3-O), 3.60 (m, long chain glycolic CH_2, $CHCH_2OH$), 3.73 (2H, m, CH-CH_2-OH), 4.27 (2H, t, C(O)OCH_2). ^{13}C-NMR. ($CDCl_3$, 400 MHz) δ (ppm) 176.3 ($COOCH_2$), 168.4 (COOH), 67.8, 68.6, 70.9, 71.5, 74.1 (ether CH_2), 55.9 (OCH_3), 43.4 (SCH_2CH), 36.5 (SCH_2CH), 36.4 (SCH_2CH_2COOH), 27.9 (SCH_2 CH_2COOH), 14.8(CH_3).

Refrences:

1 C. Rim, L.J. Lahey, G.P.H. Zhang and D.Y. Son *Tetrhedron Lett.* 2009, **50**, 745-747.