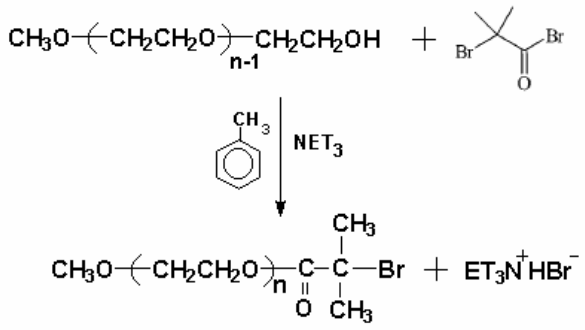
Electronic supplementary information for Soft Matter

Formation of Hybrid Micelles from Poly(ethylene glycol)-*block*-poly(4-vinylpyridinium) Cations and SO_4^{2-} Anions in an Aqueous Milieu

Kai Wu, Linqi Shi,* Wangqing Zhang, Yingli An, Xiao-Xia Zhu*, Xu zhang, Zhanyong Li [*]
K. Wu, Prof. L. Shi, W. Zhang, Y. An.
Institute of Polymer Chemistry, Nankai University, Tianjin, 300071, China
E-mail: shilinqi@nankai.edu.cn.

Prof. X.X. Zhu
Département de chimie, Université de Montréal, Pavillon Bombardier,C.P. 6128, succ. Centre-ville, Montreal, QC, H3C 3J7, Canada
E-mail: julian.zhu@umontreal.ca

Preparation of the Macroinitiator PEG_{112}-Br. 25.0 g CH_3O-PEG_{112}-OH was dissolved in 300 mL of toluene in a 500 mL three-neck flask. After azeotropic distillation of about 60 mL toluene at reduced pressure to remove traces of water, 2.5 mL triethylamine was added and the solution mixture was cooled to 0°C. Then 2.0 mL 2-bromoisobutyryl bromide was added dropwise via syringe over 1 hour, and the reaction mixture was stirred overnight at room temperature. The stirred solution was treated with charcoal, which was subsequently removed by filtration, and most of the toluene was removed by rotary evaporation prior to precipitation into a 10-fold excess of cold ether. The crude polymer was dried under vacuum, dissolved in water at pH 8-9, and then extracted with CH_2Cl_2. The organic layers were collected and dried over $MgSO_4$, and removal of the solvent under vacuum led to isolation of the purified macroinitiator (PEG_{112}-Br). The procedure can be seen in Scheme S1.



PEG-Br

Scheme S1 Preparation of the Macroinitiator PEG_{112}-Br

Supporting Figures

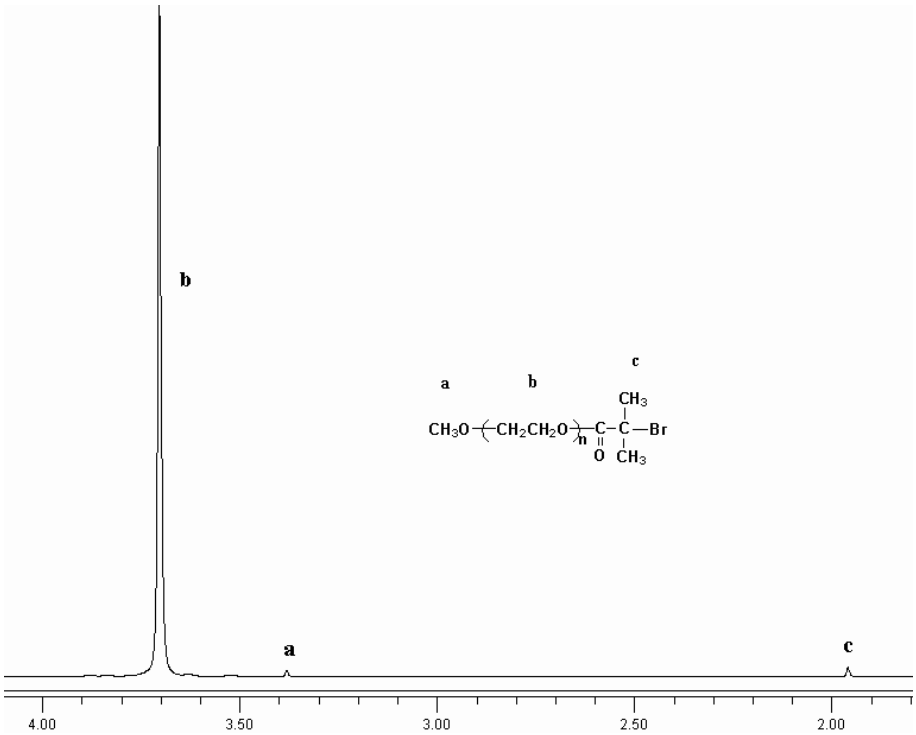


Figure S1. The ^{1}HNMR spectrum of PEG_{112}-Br.

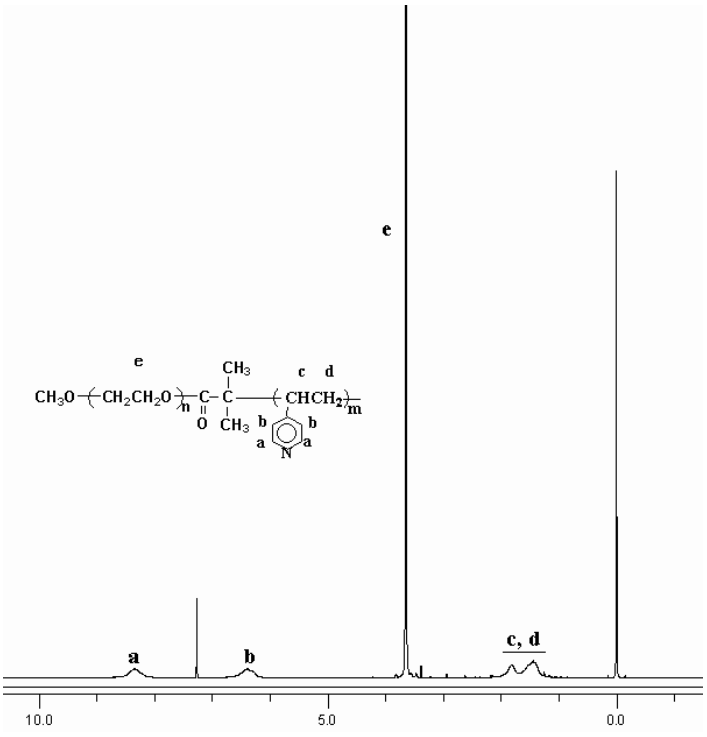


Figure S2. The ^{1}HNMR spectrum of PEG_{112}-*b*-P(4-VP)$_{55}$.

The composition of the block copolymer PEG_{112}-*b*-P(4-VP)$_{55}$ was determined by the ^{1}HNMR spectrum in Figure S2.

The following Figures S3 to S5 show the dependence of the hydrodynamic radius R_h (S3, circles), apparent radius of gyration R_g (S3, triangles), ratio of R_g/R_h (S4), and excess Rayleigh ratio at the scattering angle 90° R_{90} (S5) of the PEG_{112}-*b*-$P(4\text{-}VPH^+)_{55}/SO_4^{2-}$ micelles on the Na_2SO_4 concentration, where the PEG_{112}-*b*-$P(4\text{-}VP)_{55}$ concentration is 0.50 mg/mL.

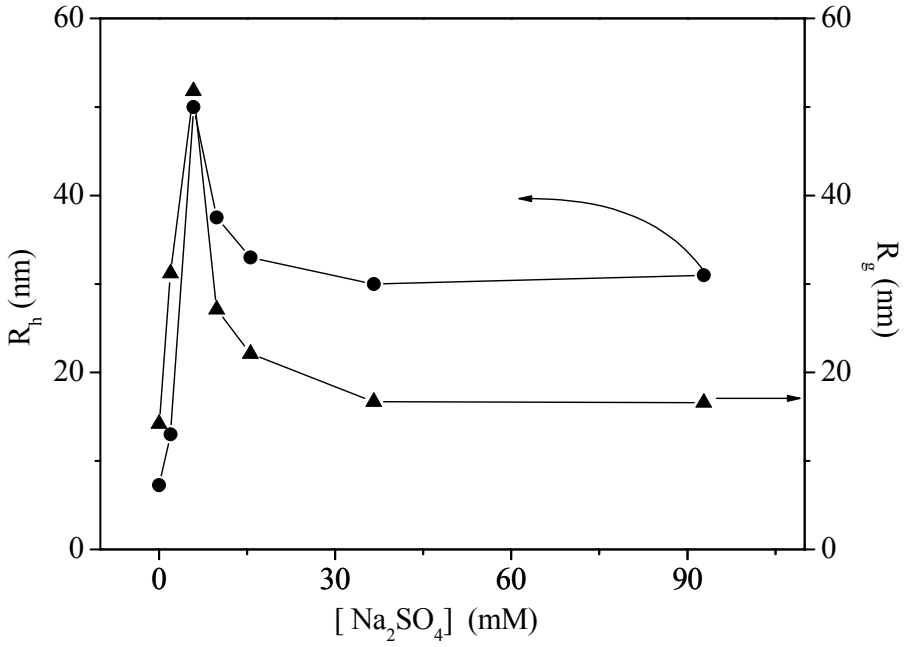


Figure S3

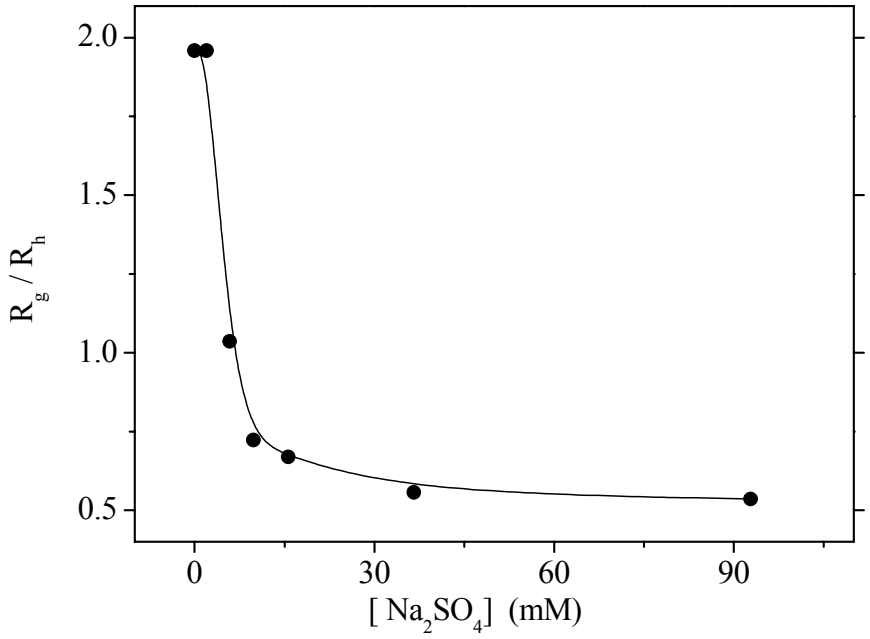


Figure S4

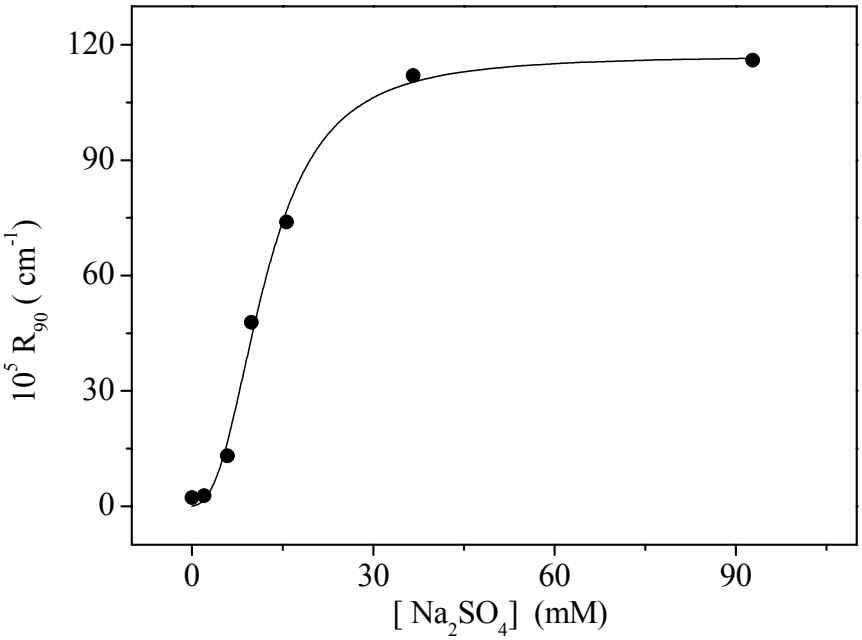


Figure S5