Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supplementary Information:

Chain dynamics of surfactant in mesoporous silica

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S1. Pulse sequences for SLF spectroscopy

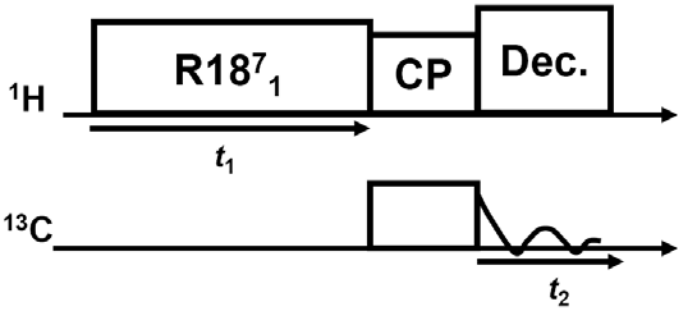

Fig. S1a. Proton Detected (encoded) Local Field spectroscopy with R-type recoupling (R-PDLF).[1] Proton magnetization evolves during the time period t_1 under the effect of the heteronuclear recoupling sequence R18$^7_1$.[2] This magnetization, modulated by the ^{1}H–^{13}C dipolar interaction, is transferred via cross polarization (CP) to the ^{13}C spins for detection during t_2 in the presence of the heteronuclear proton decoupling.

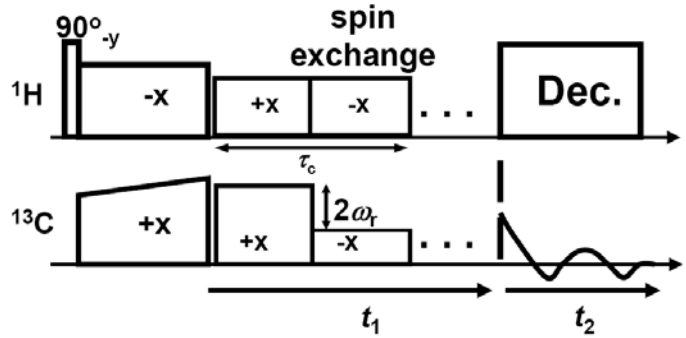

Fig. S1b. Amplitude- and Phase-Modulated Cross-Polarization (APM-CP).[3,4] After the CP signal enhancement, the dipolar evolution period is initiated by inverting the phase of the ^{1}H spin-lock field. The CP fields during t_1 period are phase- and amplitude-modulated to achieve the ^{1}H-^{13}C heteronuclear dipolar recoupling. Finally, the ^{13}C signal is detected in the presence of the heteronuclear ^{1}H decoupling.

S2. ^{1}H MAS NMR spectrum of CTAB/MCM41 sample

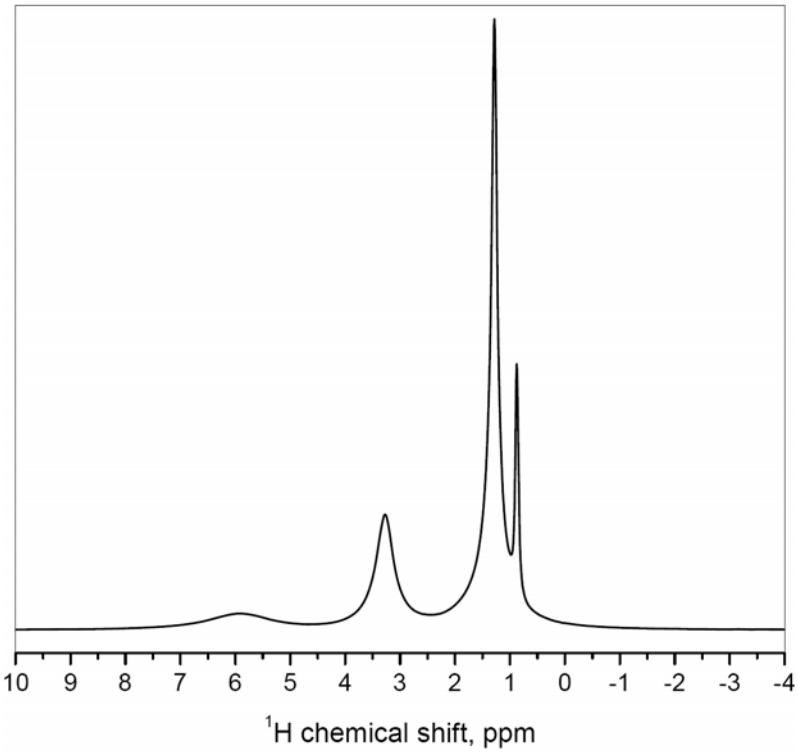

Fig. S2. Proton 500 MHz MAS NMR spectrum of the CTAB/MCM41 sample. The spinning speed is 15 kHz. Peak assignment is as following: -CH_3 0.9 ppm; -CH_2- 1.3 ppm; -CH_2-N$(CH_3)_3$ 3.3 ppm; water 5.8 ppm.[5]

S3. Order parameter profiles in hexagonal lyotropic phase

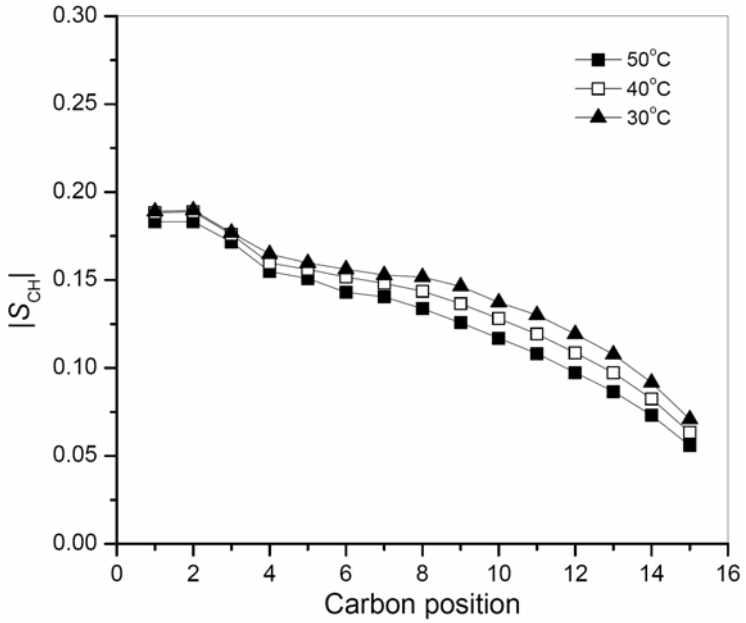

Fig. S3. Order parameters profiles in CTAB/D_2O (28wt%) lyotropic hexagonal phase. The profiles are measured in the homogeneously aligned sample under the static condition and using low power PDLF spectroscopy.[6]

S4. Dipolar spectra of CTAB/D2O and CTAB/MCM41 samples

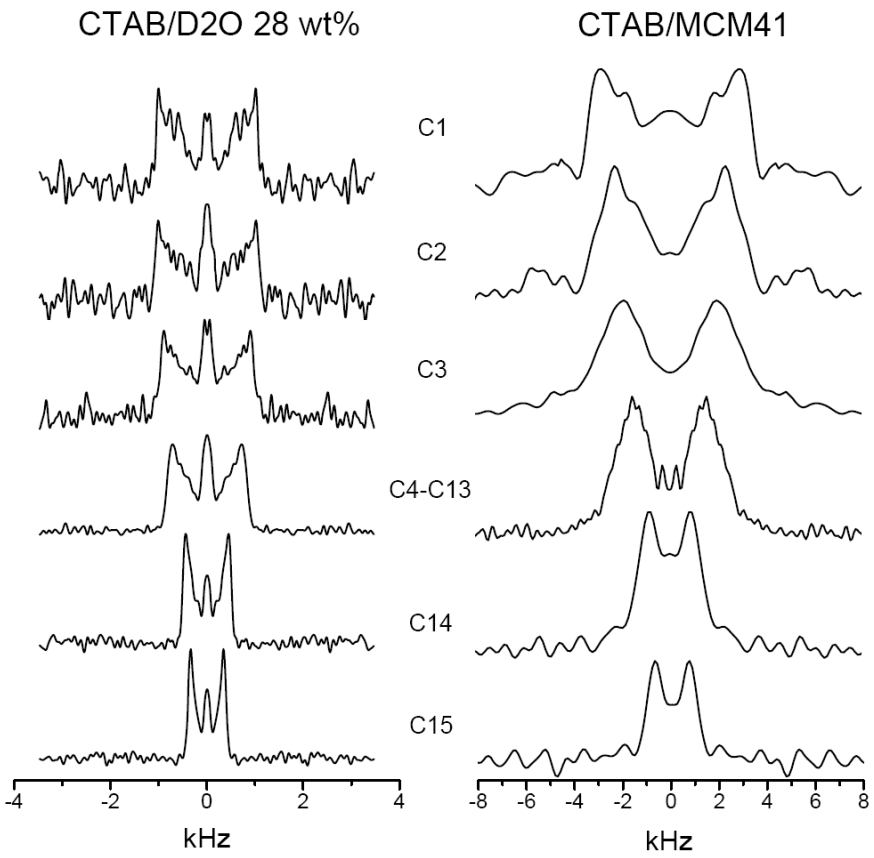

Fig. S4. A comparison of the ^{1}H-^{13}C dipolar spectra for the selected carbon positions. The cross-sections are taken from the 2D APMCP spectra collected at the spinning speed of 5 and 10 kHz for the CTAB/D_2O and CTAB/MCM41 samples, respectively.

References

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6. B. B. Kharkov, V. I. Chizhik and S. V. Dvinskikh, *J. Magn. Reson.*, 2012, **223**, 73–79.