

Electronic Supplementary Information (ESI)

**Hydrophobic study of increasing alkyl chain length of platinum surfactant complexes:
Synthesis, characterization, micellization, thermodynamic, thermogravimetric and
surface morphology**

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Figure S1. Increasing alkyl chain effect on % Yield and reaction time of SMMSs.

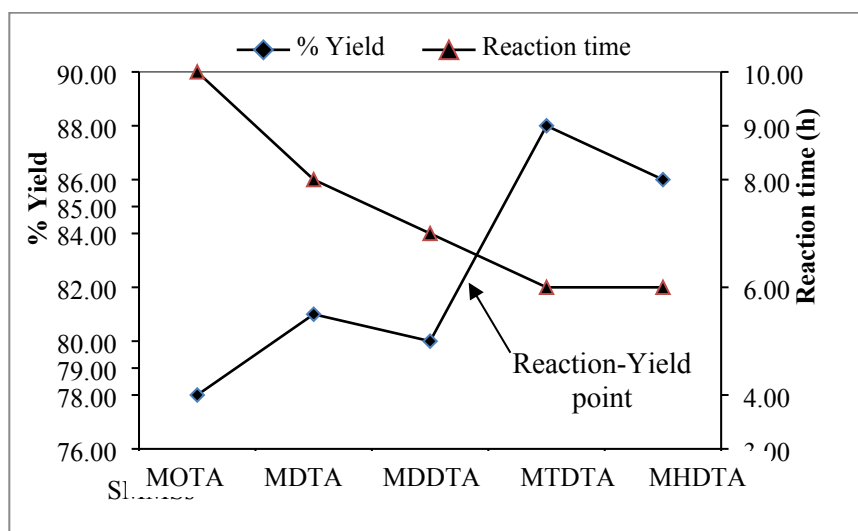


Figure S2. ^1H proton NMR of OTAB in DMSO-d₆.

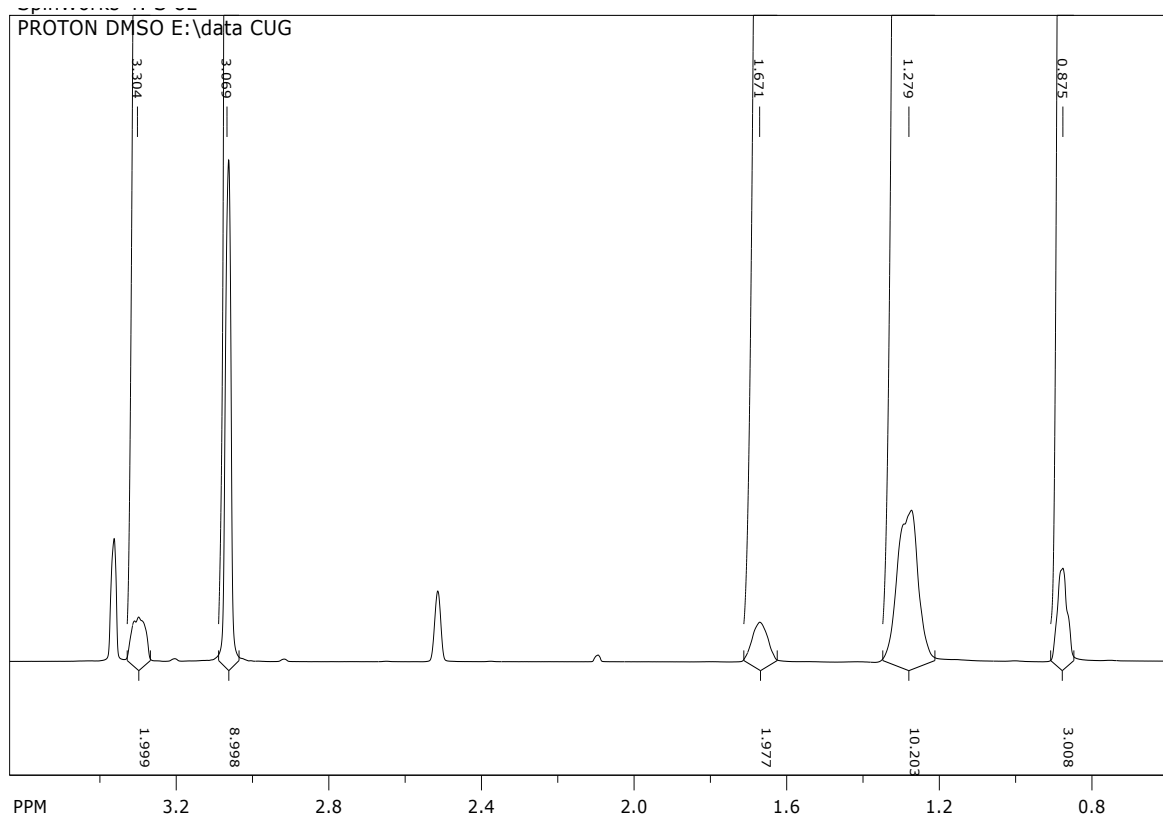


Figure S3. ^1H proton NMR of MOTA in D₂O.

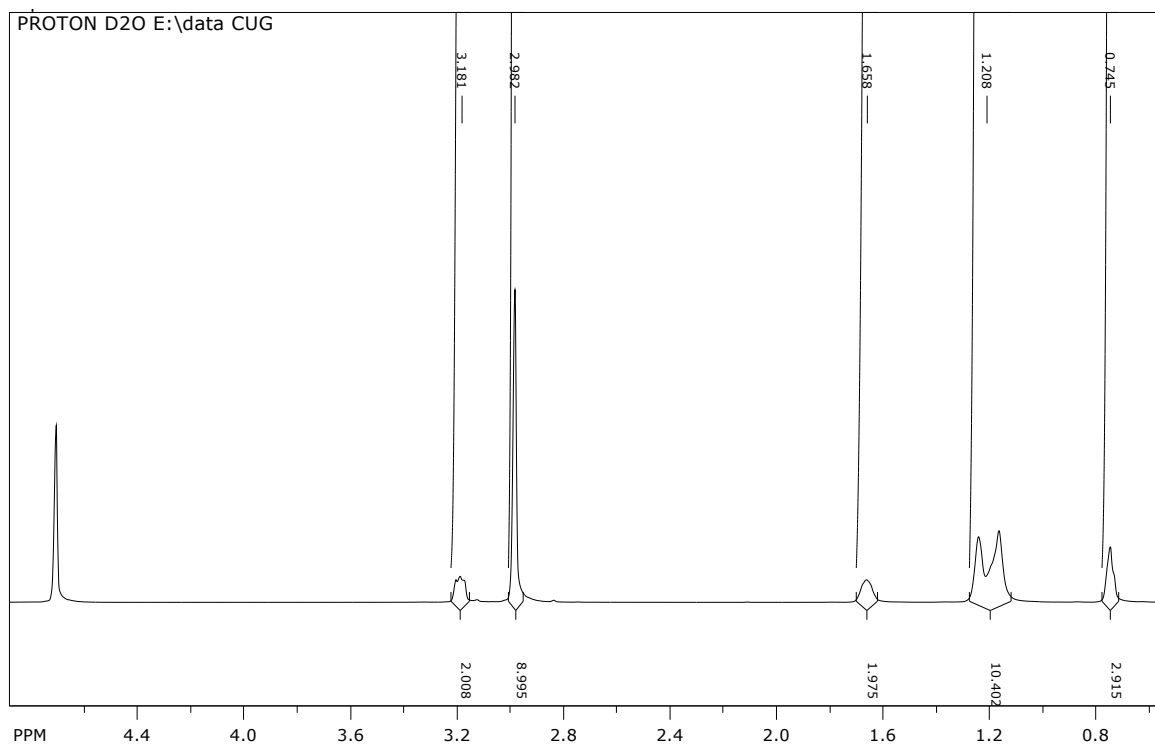


Figure S4. ^1H proton NMR of DTAB in DMSO-d₆.

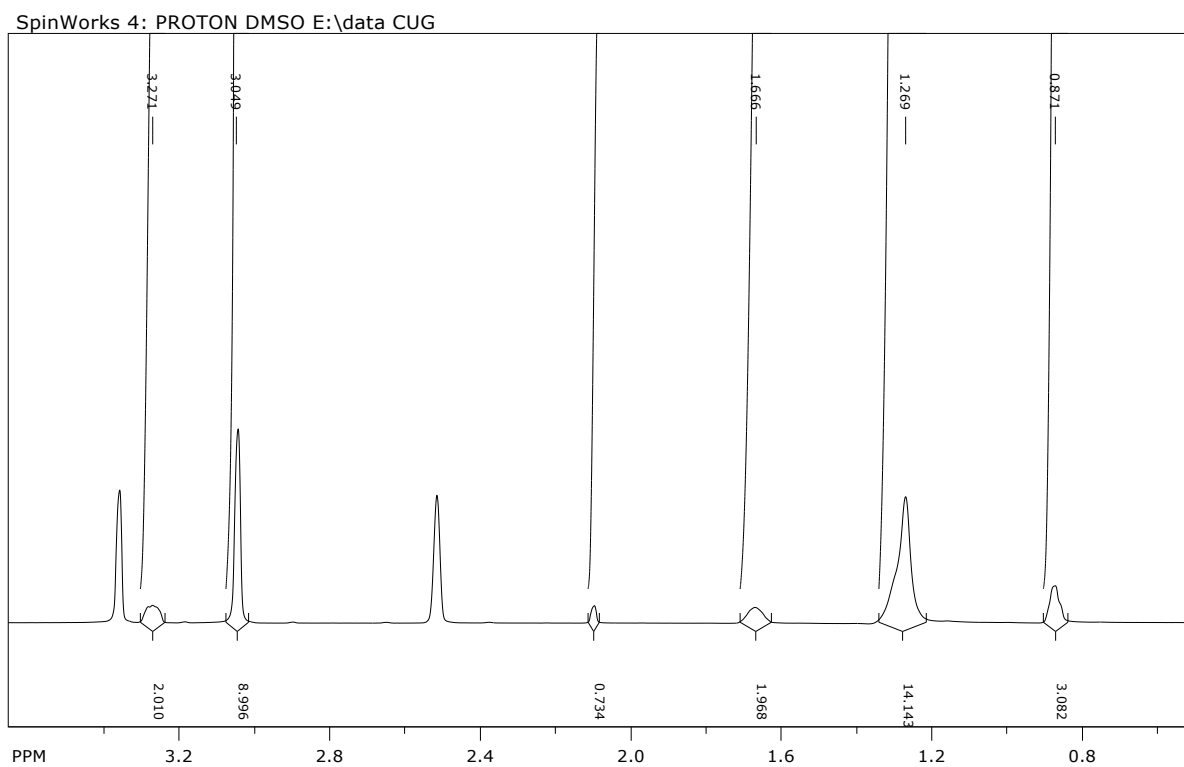


Figure S5. ^1H proton NMR of MDTA in DMSO-d₆.

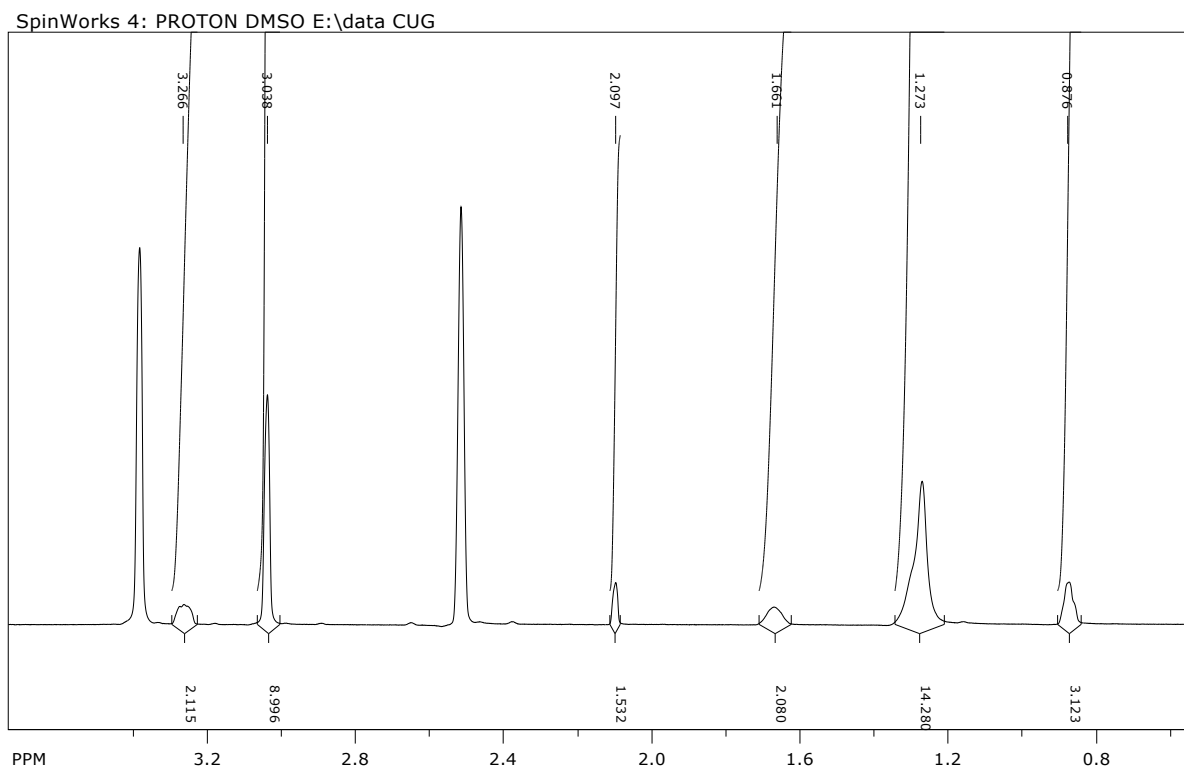


Figure S6. ^1H proton NMR of DDTAB in DMSO-d₆.

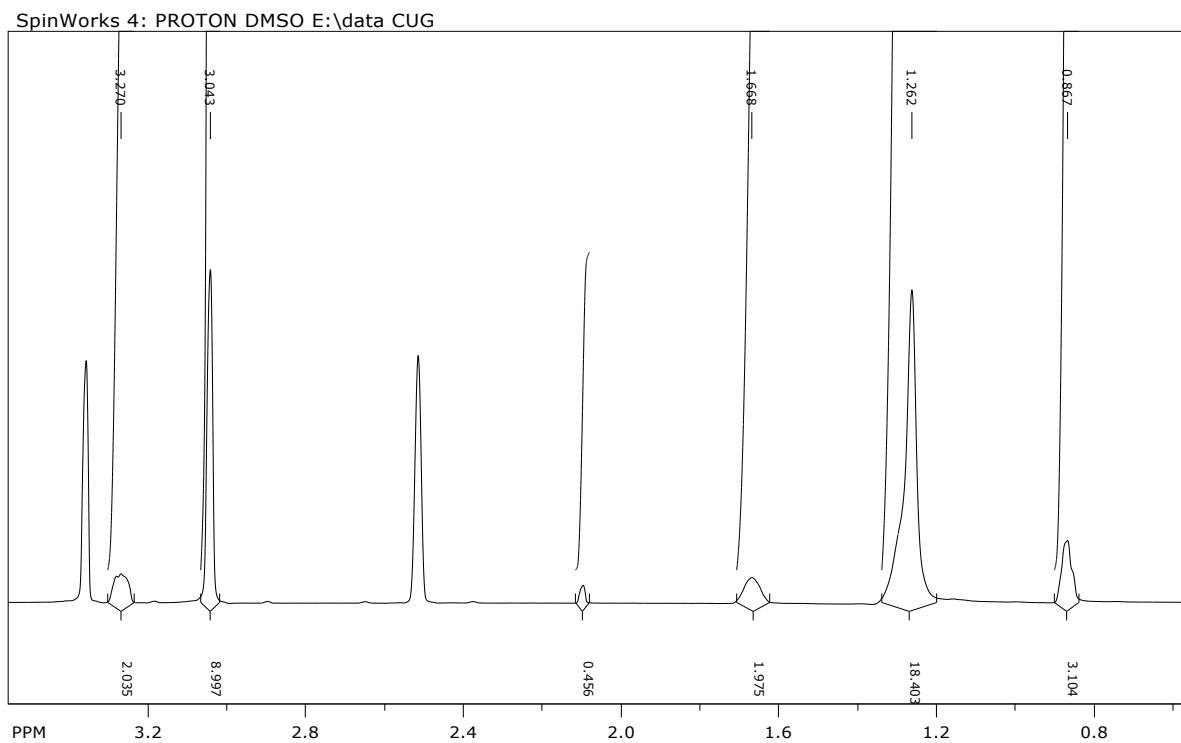


Figure S7. ^1H proton NMR of MDDTA in DMSO-d₆.

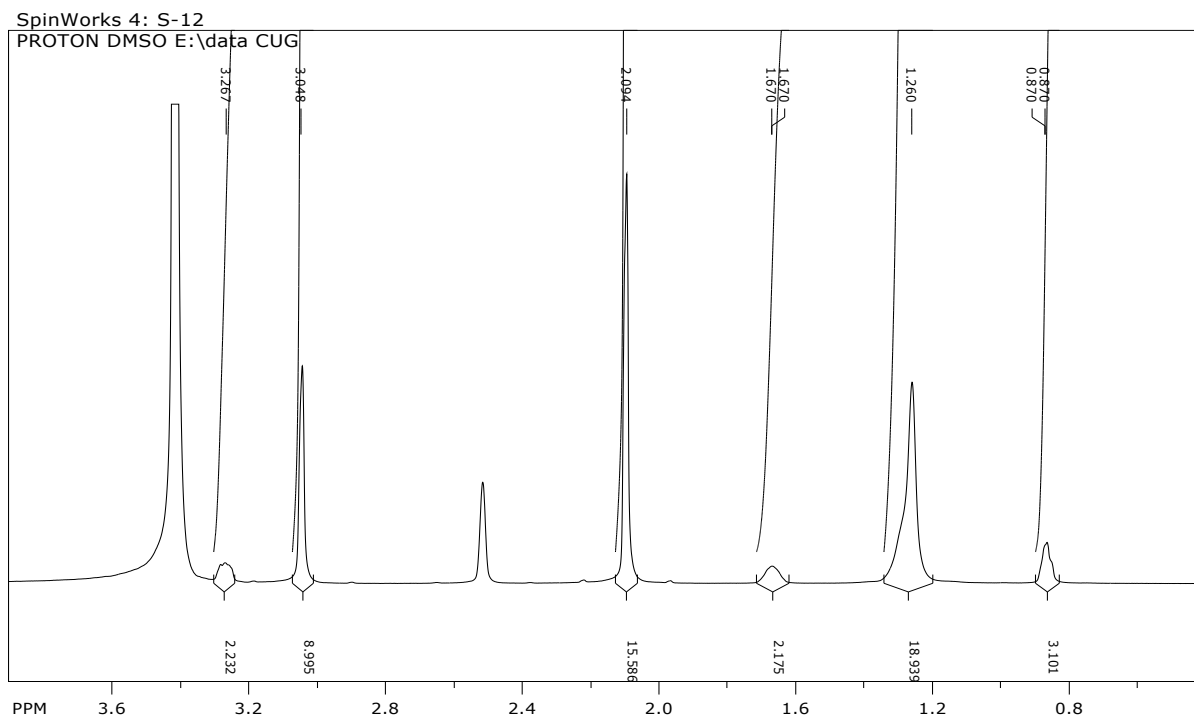


Figure S8. ^1H proton NMR of TDTAB in DMSO-d₆.

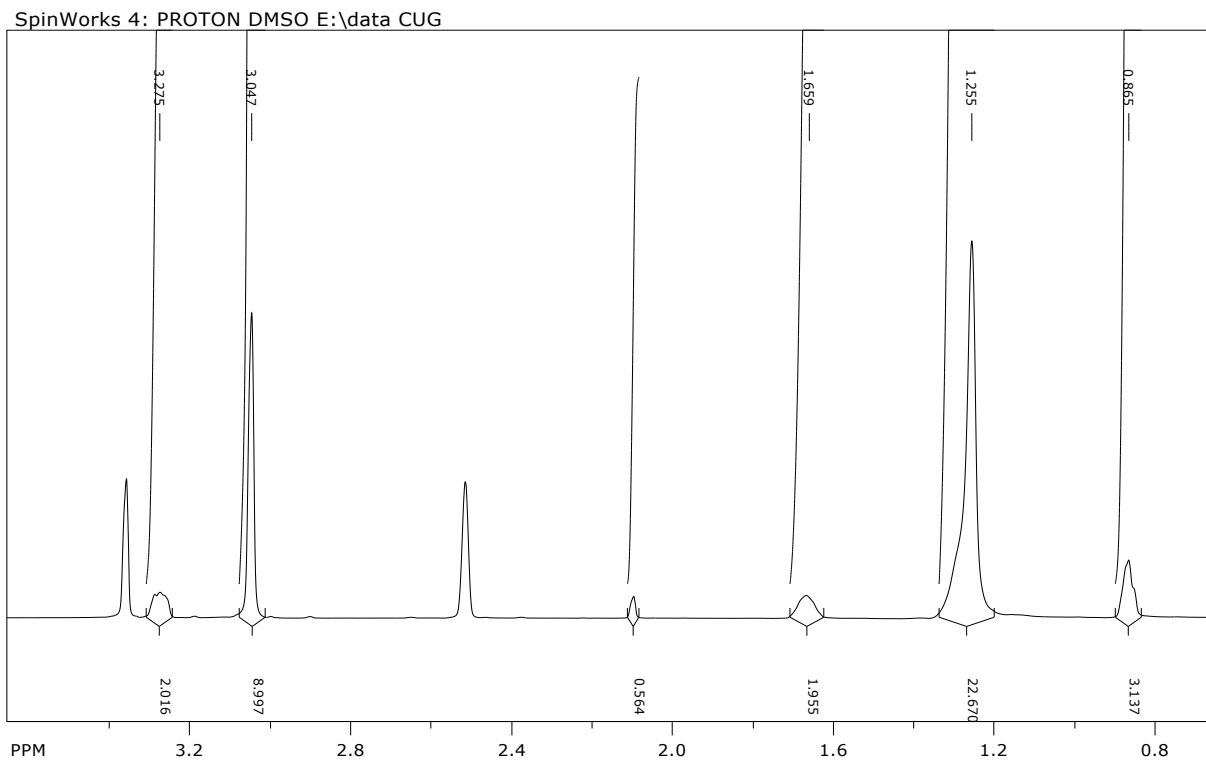


Figure S9. ^1H proton NMR of MTDTA in DMSO-d₆.

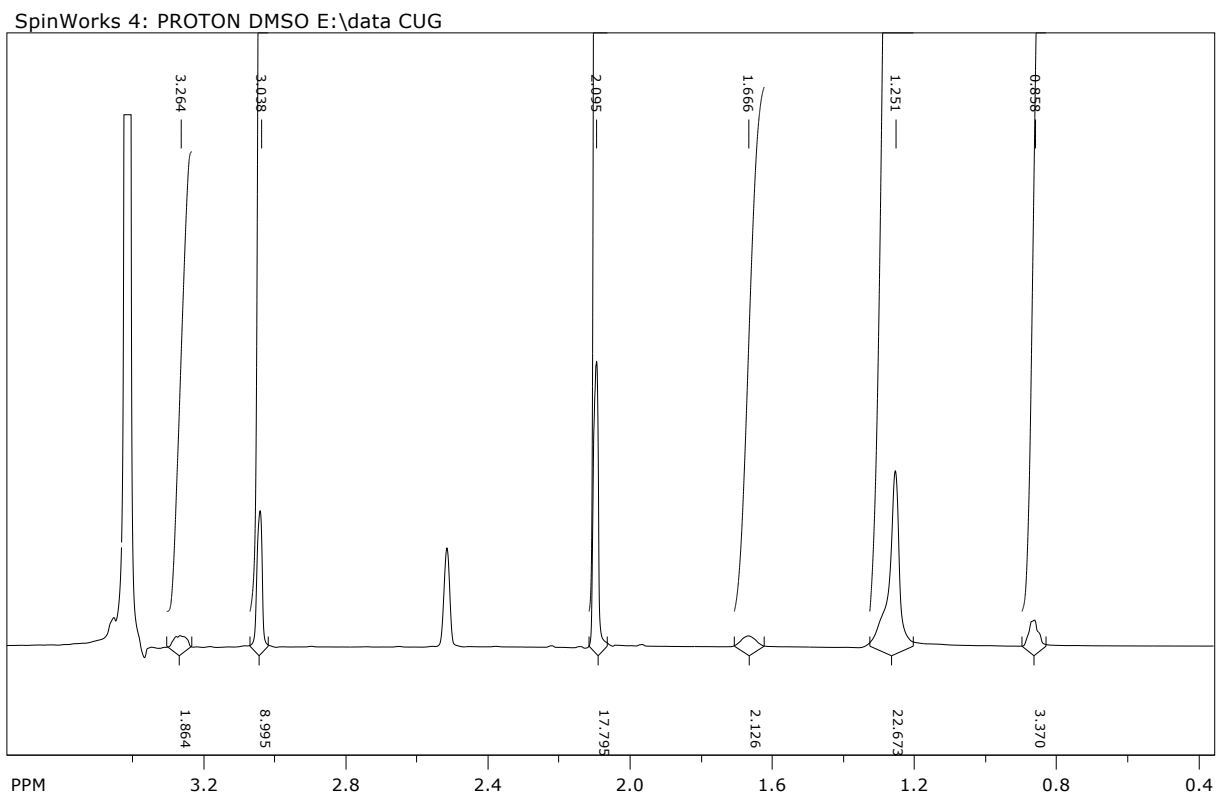


Figure S10. ^1H proton NMR of HDTAB in DMSO-d₆.

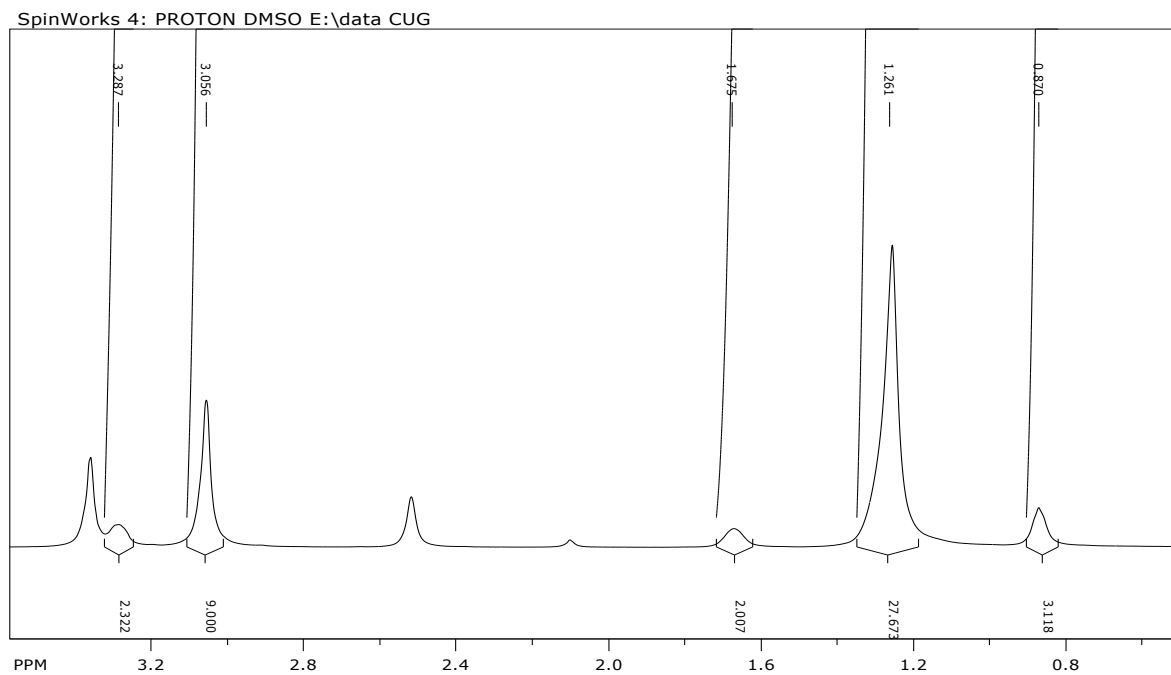


Figure S11. ^1H proton NMR of MHDTA in DMSO-d₆.

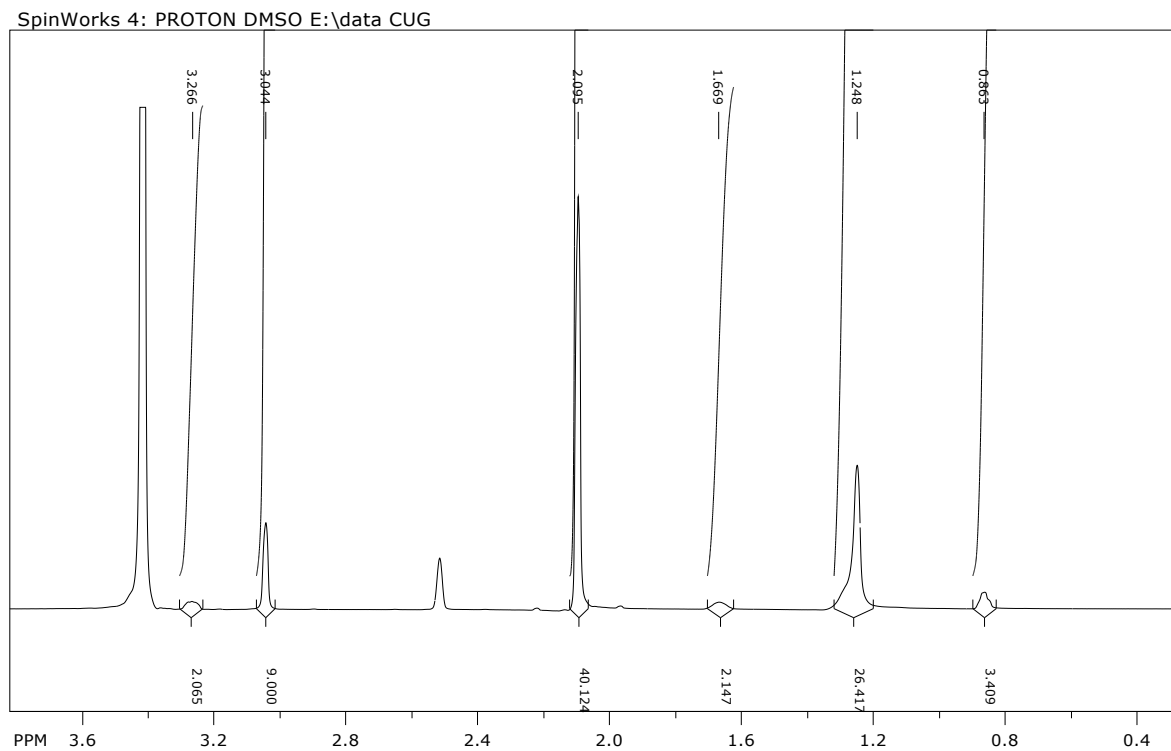


Figure S12. Variation of CMC of SMMSs in 0.2 volume fraction of DMSO in DMSO- water mixed solvent media at 308.15 K.

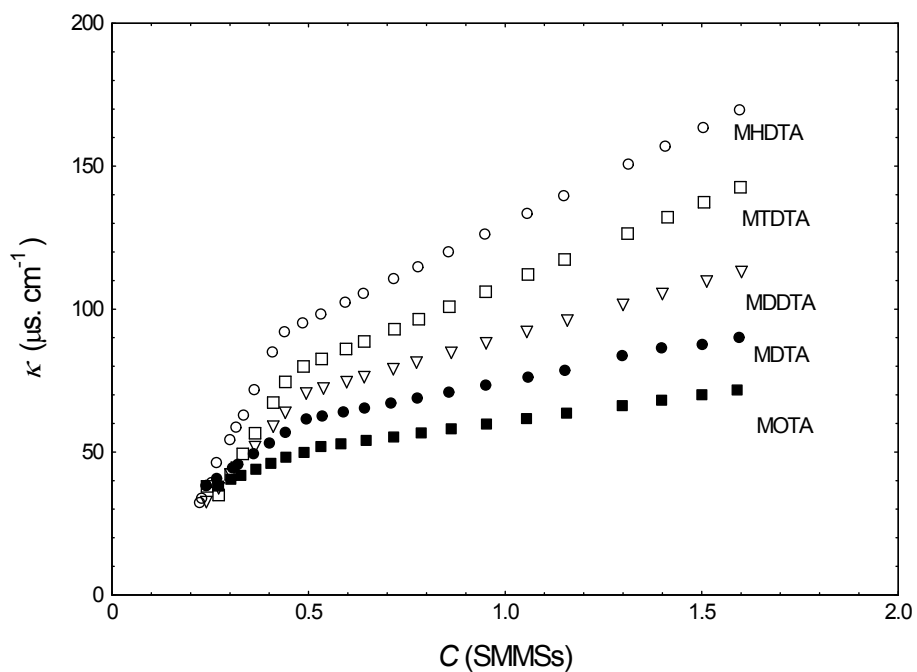


Figure S13. Variation of CMC of SMMSs in 0.2 volume fraction of DMSO in DMSO- water mixed solvent media at 318.15 K.

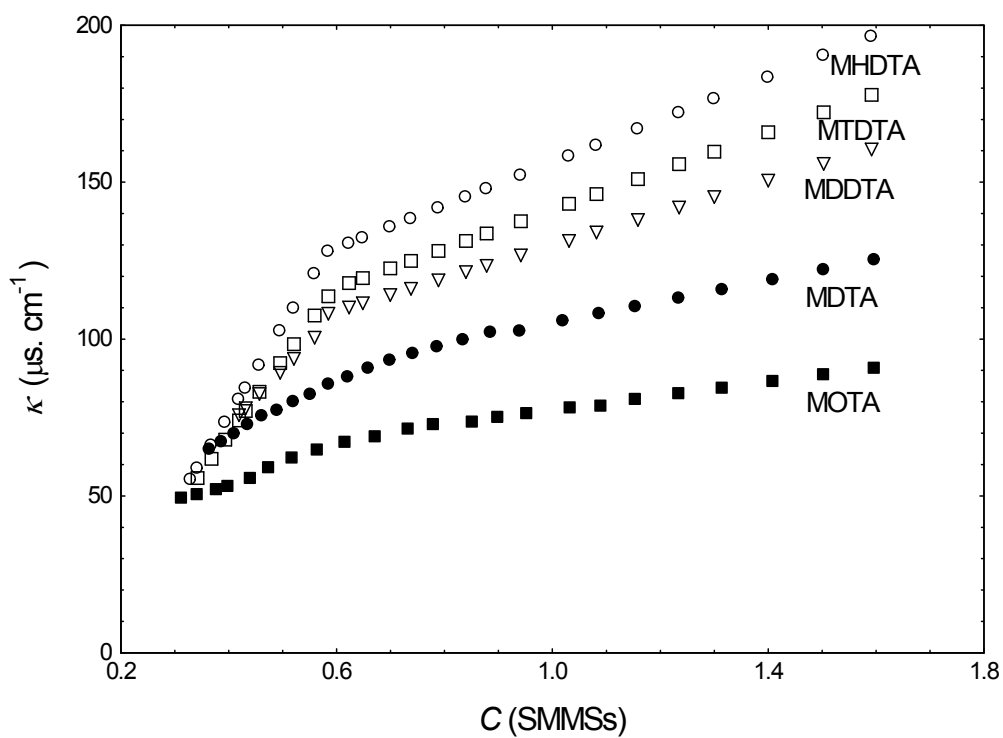


Figure S14. Linearization curves of SMMSs obtained by Coats–Redfern (CR) method.

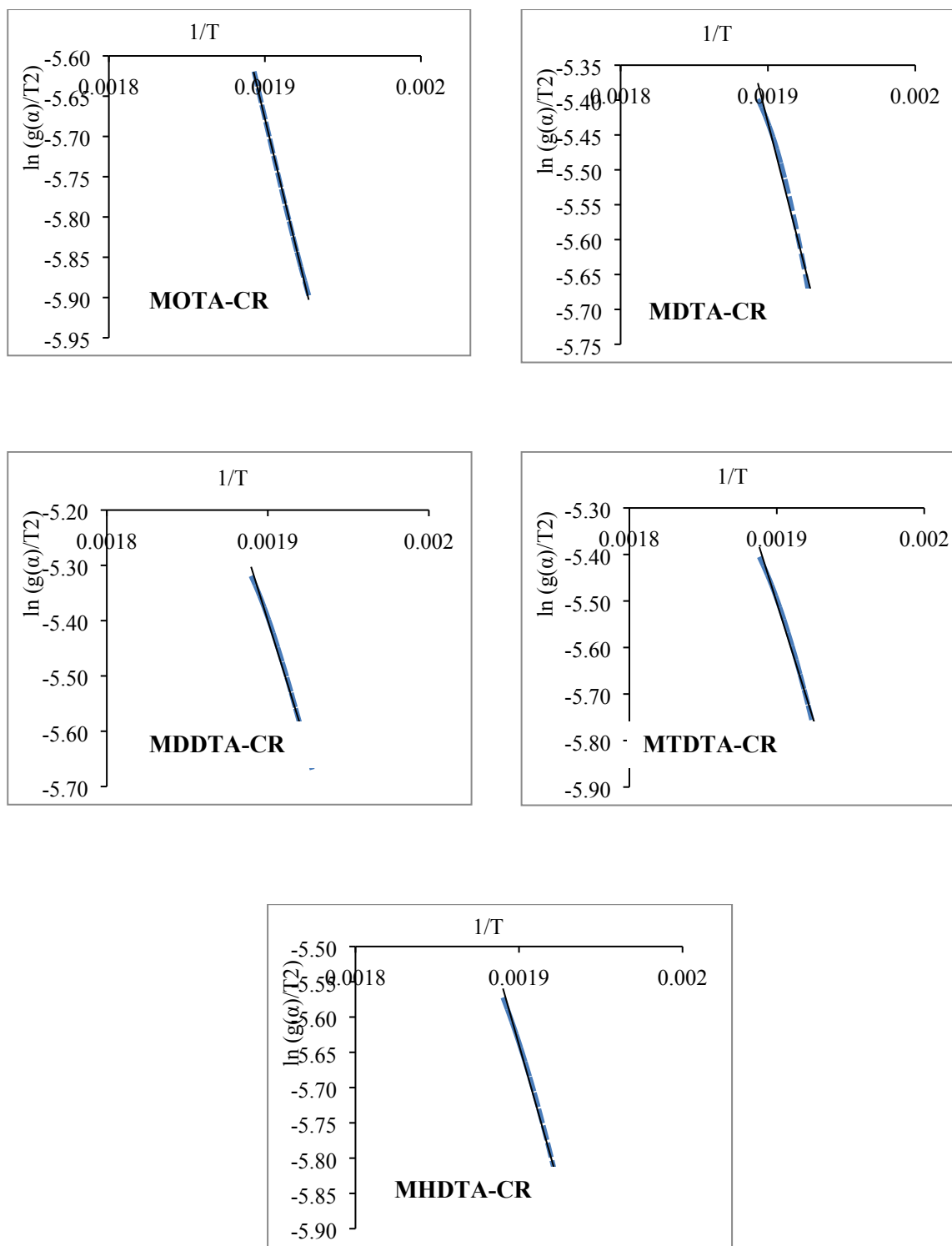


Figure S15. Linearization curves of SMMSs obtained by Madhusudanan–Krishnan–Ninan (MKN) method.

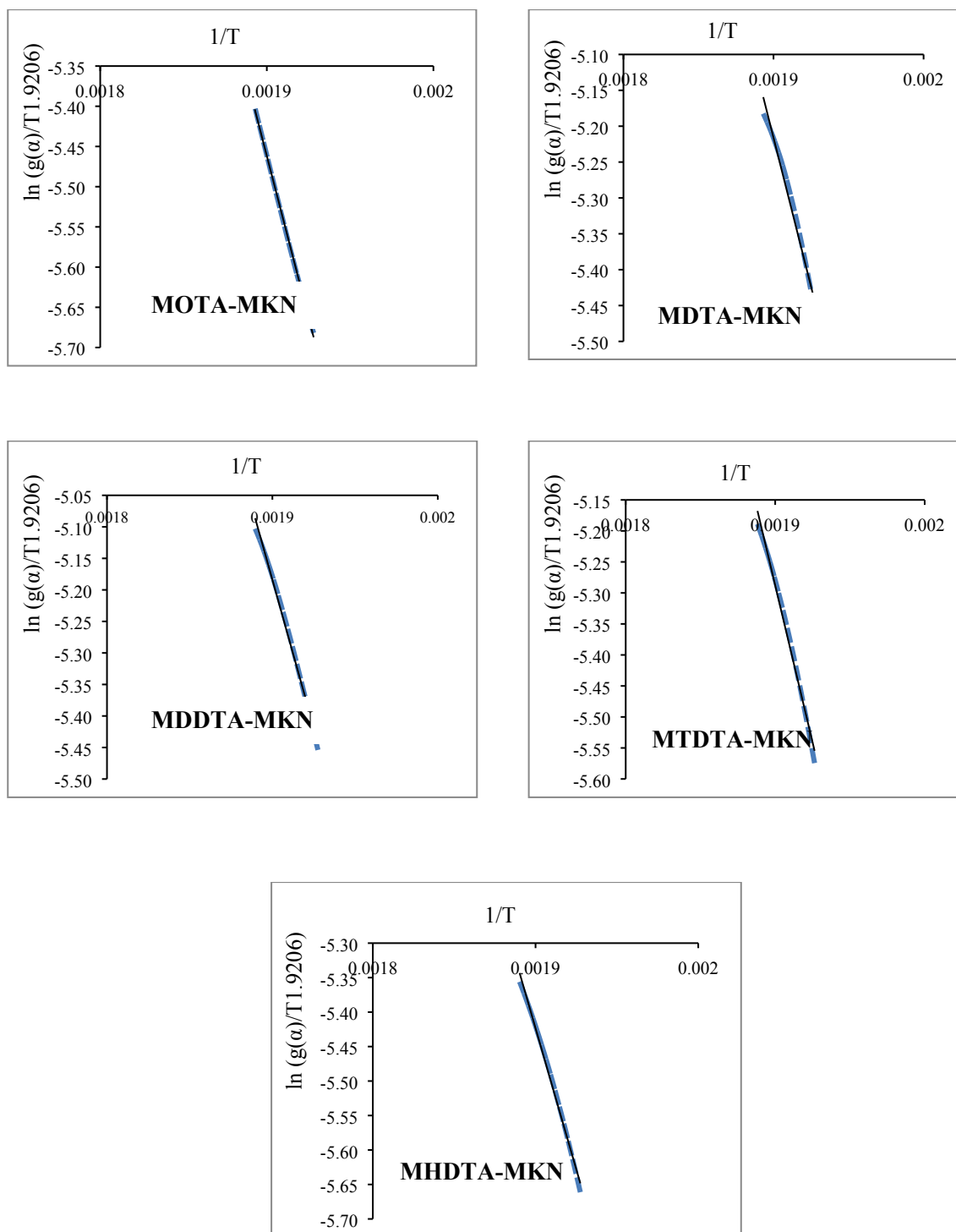


Figure S16. Linearization curves of SMMSSs obtained by Wanjun–Yuwen–Hen–Cunxin (WYHC) method.

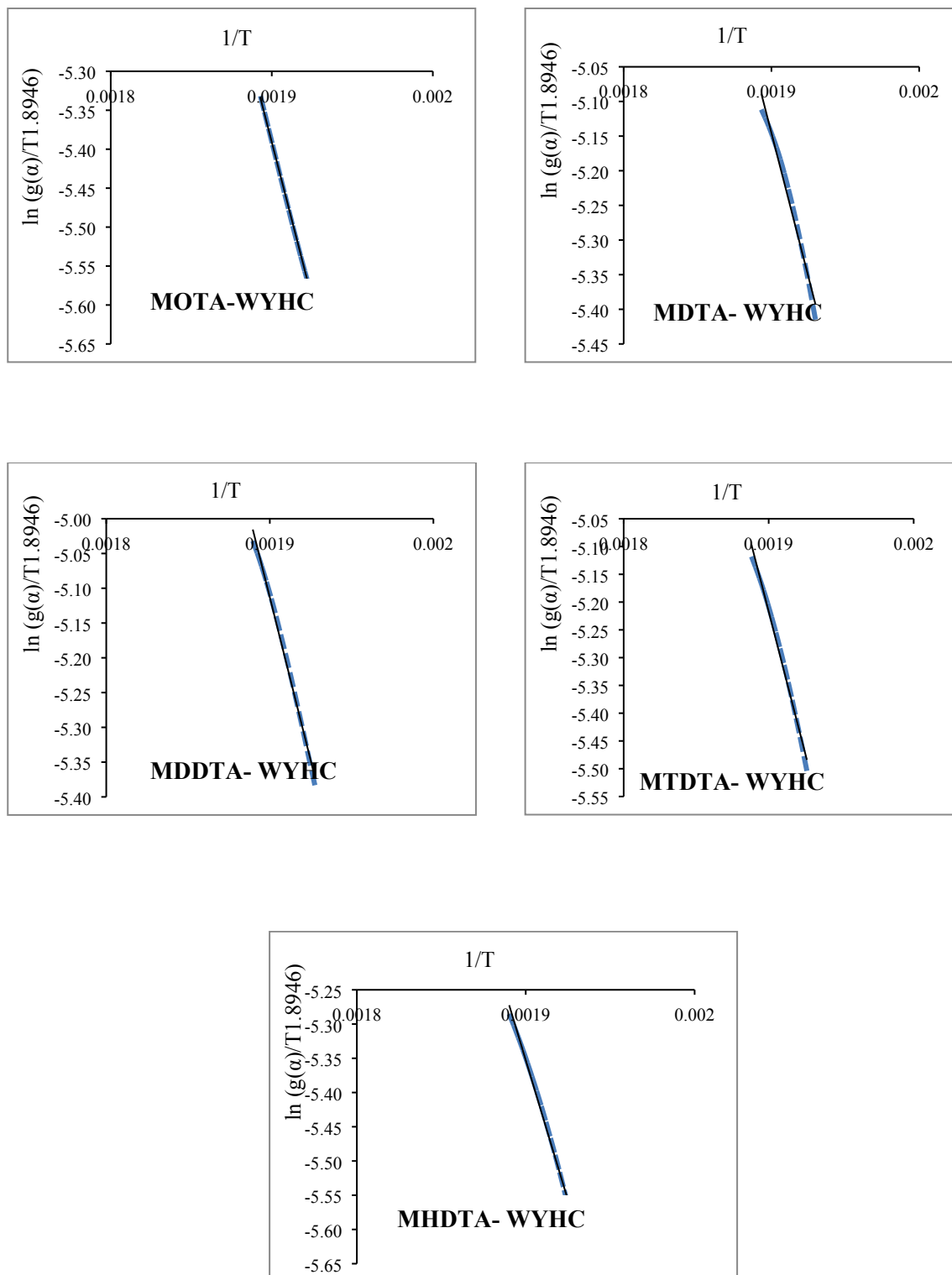


Figure S17. Linearization curves of SMMSs obtained by Van Krevelen (VK) method.

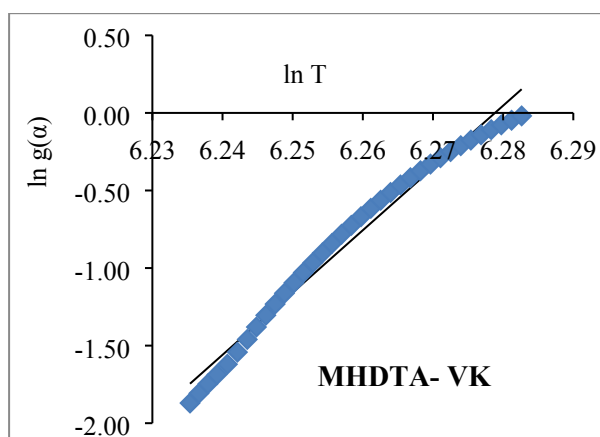
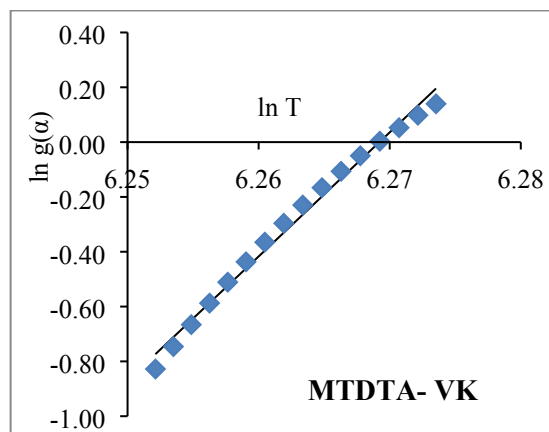
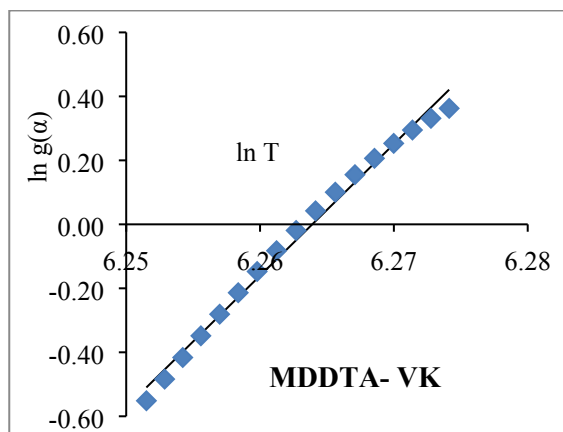
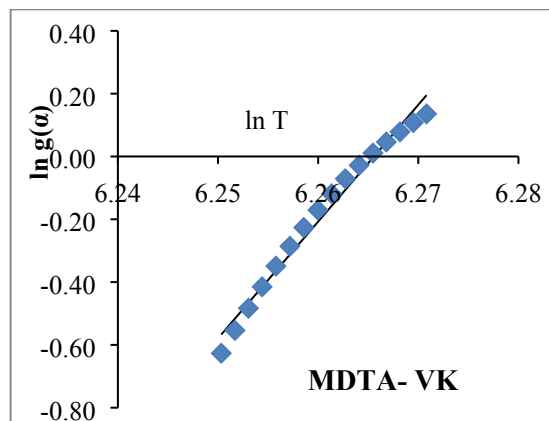
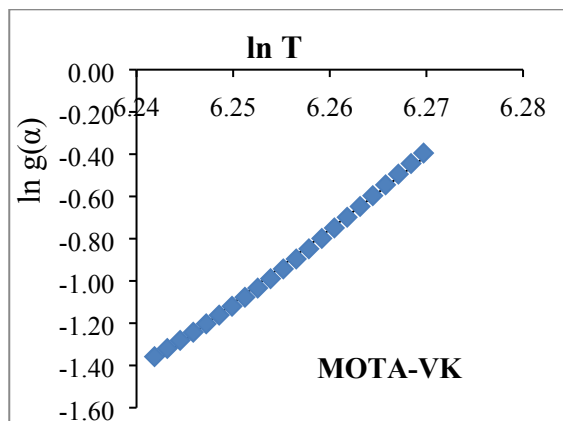


Figure S18. Linearization curves of SMMSs obtained by Horowitz–Metzger (HM) method.

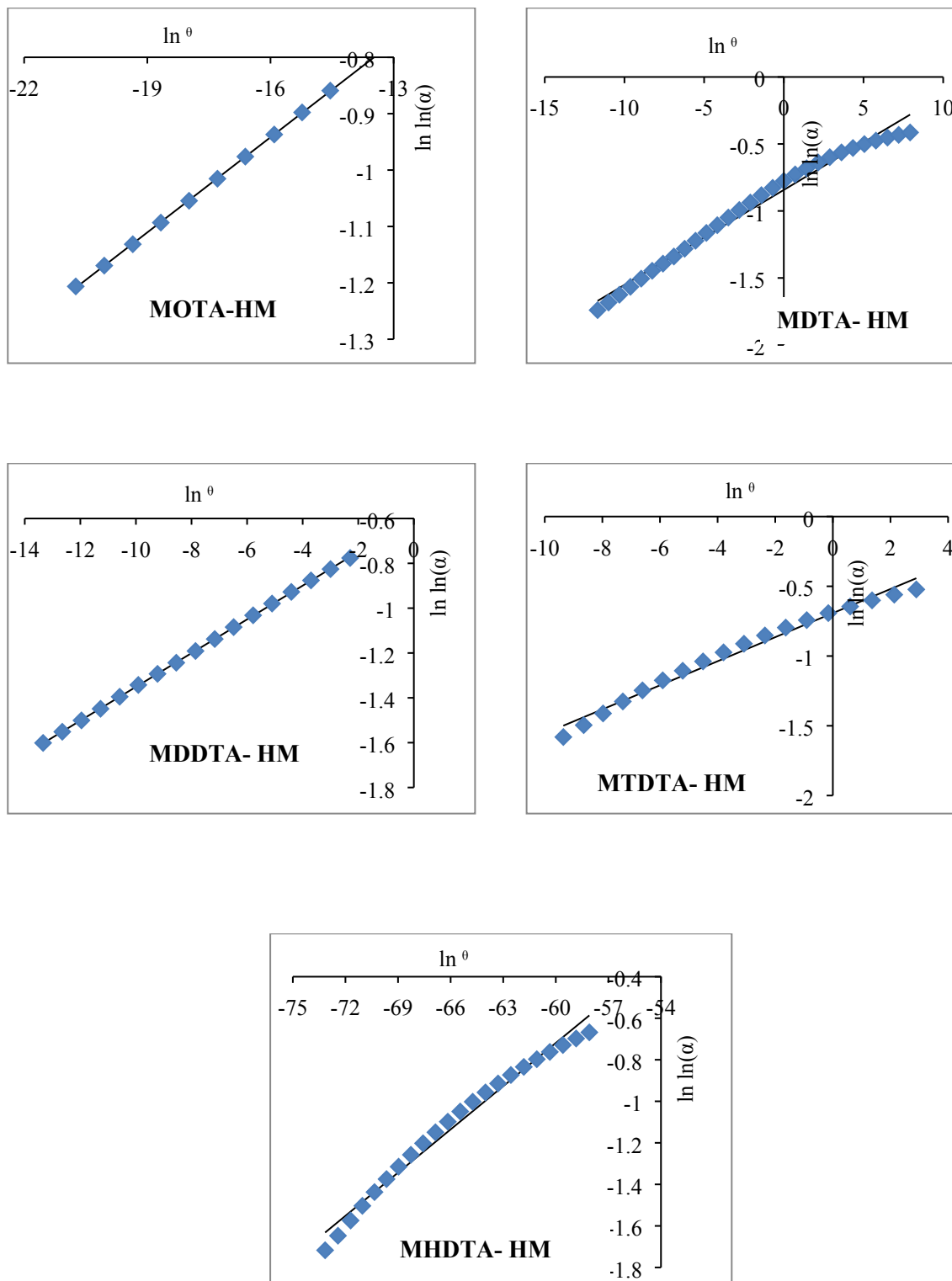


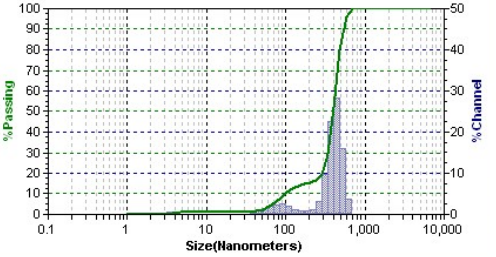
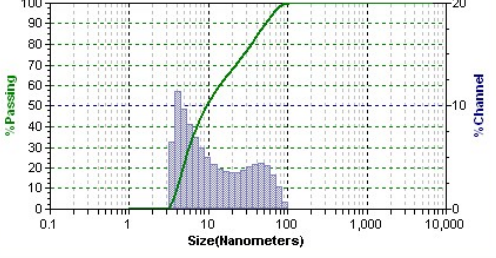
Table S1. Details of chemicals used in this work.

| S. No. | Product name | Country | Provenance | Mass fraction purity ^a | Purification method | Molecular weight (Kg/mole) | Molecular Formula |
|--------|---|---------------|---------------|-----------------------------------|---------------------|----------------------------|--|
| 1 | Potassium tetrachloroplatinate (II) | USA | Sigma Aldrich | 0.99 | None | 0.41509 | K ₂ PtCl ₄ |
| 2 | Octyltrimethylammonium Bromide (OTAB) | England | Alfa Aser | 0.97 | None | 0.25224 | CH ₃ (CH ₂) ₆ CH ₂ N(CH ₃) ₃ Br |
| 3 | Decyltrimethylammonium Bromide(DTAB) | United states | Alfa Aser | 0.98 | None | 0.2803 | CH ₃ (CH ₂) ₁₀ CH ₂ N(CH ₃) ₃ Br |
| 4 | Dodecyltrimethylammonium Bromide(DDTAB) | United states | Sigma Aldrich | 0.99 | None | 0.30834 | CH ₃ (CH ₂) ₁₂ CH ₂ N(CH ₃) ₃ Br |
| 5 | Tetradecyltrimethylammonium bromide (TDTAB) | England | Alfa Aser | 0.98 | None | 0.3364 | CH ₃ (CH ₂) ₁₄ CH ₂ N(CH ₃) ₃ Br |
| 6 | Hexadecyltrimethylammonium bromide (HDTAB) | England | Alfa Aser | 0.98 | None | 0.36446 | CH ₃ (CH ₂) ₁₆ CH ₂ N(CH ₃) ₃ Br |
| 7 | Dimethyl Sulfoxide (DMSO) | India | Rankem Merck | 99.8 | None | 0.07813 | (CH ₃) ₂ SO |
| 8 | Distilled water (18.2 MΩ.cm at 25°C) | India | MilliQ, USA | Ultrapure | Ultrapurified | 18.00 | H ₂ O |

^aMass fraction Purity as mentioned by supplier

Table S2. DLS data of MDTA, MDDTA, MTDTA and MHTDA

| SMMSs | Size (nm) | PDI | % Passing and % Channel vs Particle size |
|-------|-----------|-------|--|
| MDTA | 322 | 0.697 | |
| MDDTA | 395 | 0.674 | |

| | | | |
|-------|------|-------|---|
| MTDTA | 422 | 1.004 |  <p>The graph for MTDTA shows a particle size distribution with a sharp peak at approximately 500 nanometers. The x-axis represents Size (Nanometers) on a logarithmic scale from 0.1 to 10,000. The left y-axis represents % Passing from 0 to 100, and the right y-axis represents % Channel from 0 to 50. The distribution is narrow, with most particles falling between 100 and 1,000 nanometers.</p> |
| MHDTA | 38.7 | 1.268 |  <p>The graph for MHDTA shows a particle size distribution with a broad peak centered around 10-20 nanometers. The x-axis represents Size (Nanometers) on a logarithmic scale from 0.1 to 10,000. The left y-axis represents % Passing from 0 to 100, and the right y-axis represents % Channel from 0 to 20. The distribution is much wider than MTDTA, with particles ranging from approximately 1 to 1,000 nanometers.</p> |