Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

Light-Responsive Fluids Based on Reversible Wormlike Micelle to Rodlike Micelle Transitions

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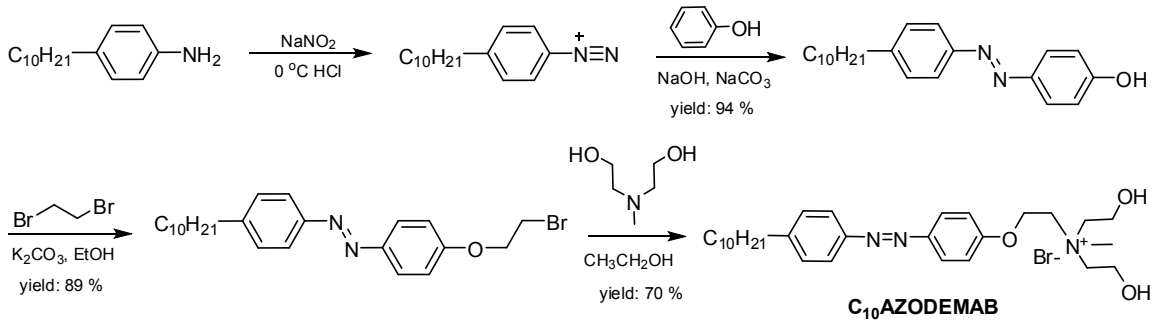
1. Synthetic route

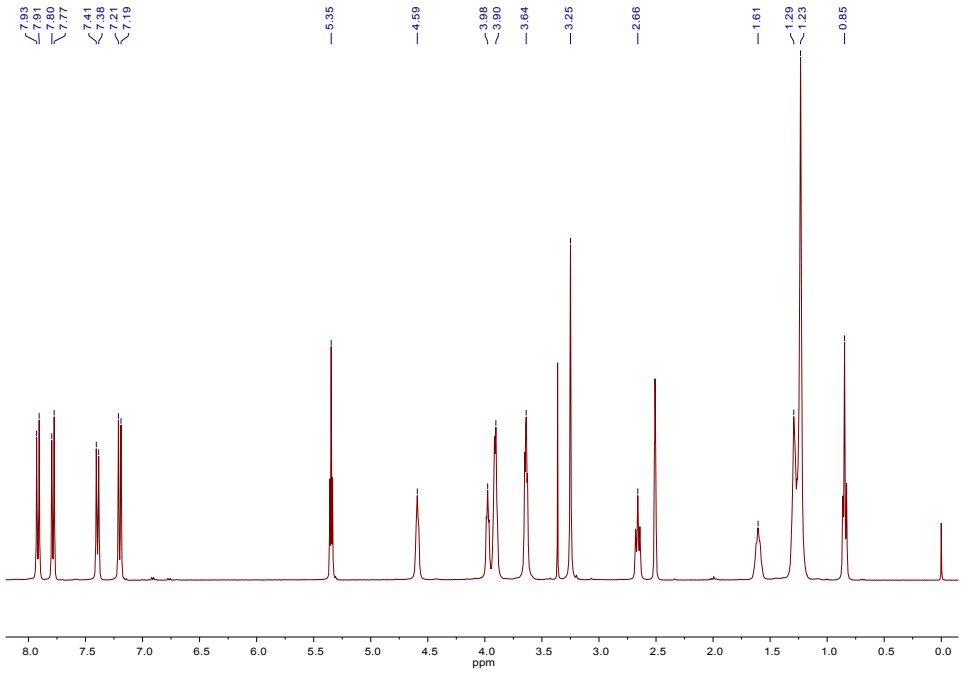
4-decylazobenzene-4-(oxyethyl)-dihydroxyethylmethylammonium bromide (C_{10}AZODEMAB) was synthesized according to the similar procedure as reported previously [1], the detailed synthetic route was shown in **Scheme S1**.



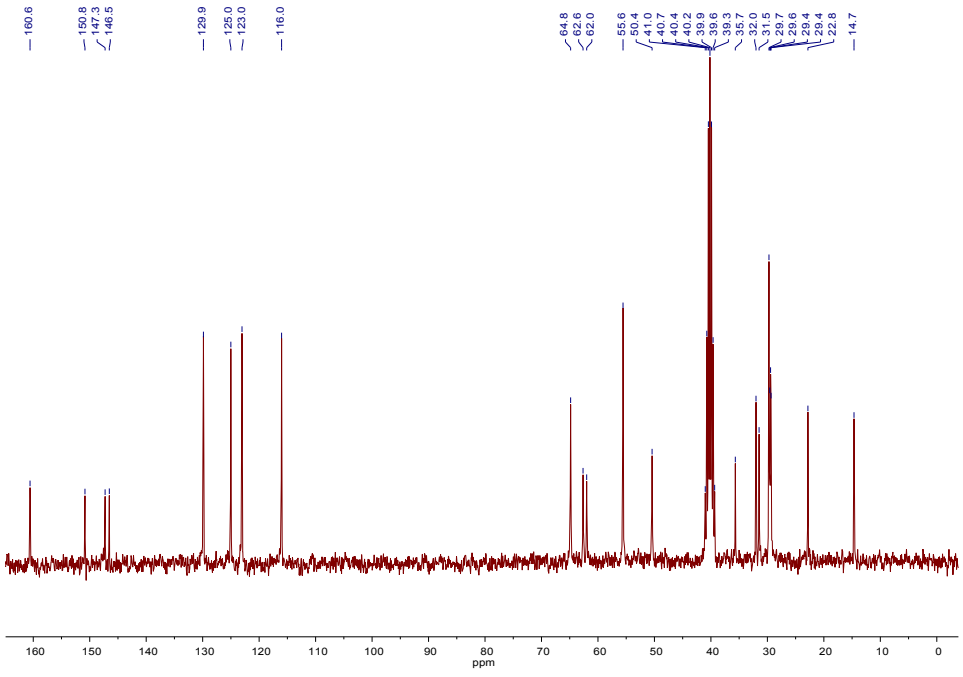
Scheme S1. Synthetic route of C_{10}AZODEMAB

1.1 Characterization of C_{10}AZODEMAB: ^{1}H NMR (400 MHz, $(CD_3)_2SO$) δ (ppm): 0.85 (*t*, 3H, -**CH_3**),1.23~1.29 (*m*, 14H, CH_3-**CH_2-CH_2-CH_2-CH_2-CH_2-CH_2-CH_2-**), 1.61 (*m*, 2H, -**CH2**-CH_2-Ar), 2.66 (*s*, 2H，-**CH_2**-Ar), 3,25 (*s*, 3H), 3.64 (*m*，4H), 3.90 (*m*, 4H), 3.98 (*t*, 2H), 4.59 (*t*, 2H), 5.35 (*t*, 2H, -O**H**), 7.19, 7.21 (*d*, 2H, **H**-Ar), 7.38, 7.41 (*d*, 2H, **H**-Ar), 7.77, 7.80 (*d*, 2H, **H**-Ar), 7.91, 7.93 (*d*, 2H, **H**-Ar). ^{13}C NMR (100 MHz, $(CD_3)_2SO$) δ (ppm): 14.7, 22.8, 29.3, 29.4, 29.5, 29. 7, 31.5, 32.0, 35.7, 50.4, 55.6, 62.0, 62.6, 64.8, 116.0, 123.0, 125.0, 129.9, 146.5, 147.3, 150.8, 160.6. ESI-MS; [M+H-Br^-] $C_{29}H_{46}N_3O_3^+$: Calcd: 484.4, Found: 484.3.

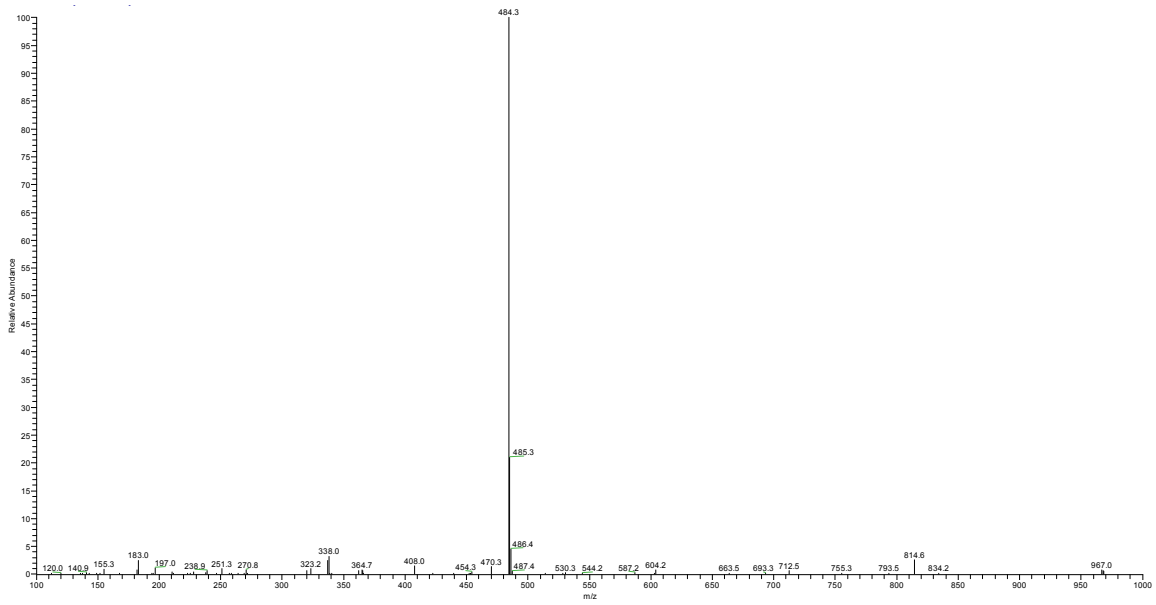
1.2 ^{1}H NMR spectrum of C_{10}AZODEMAB



1.3 ^{13}C NMR spectrum of C_{10}AZODEMAB



1.4 ESI-MS spectrum of C_{10}AZODEMAB



2. Critical micelle concentration measurements

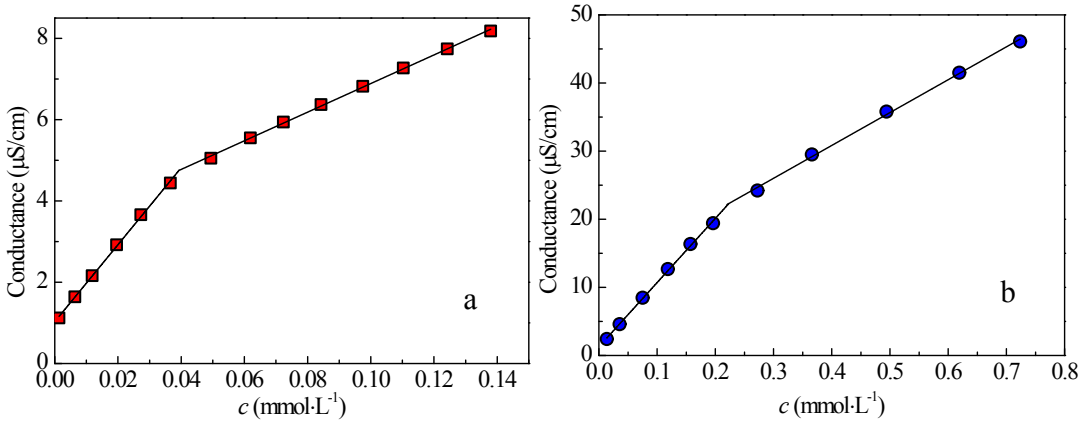


Figure S1. Concentration dependent conductance of C_{10}AZODEMAB at 30 °C before (a) and after (b) UV light irradiation for 3 h.

3. Steady-shear rheological responses

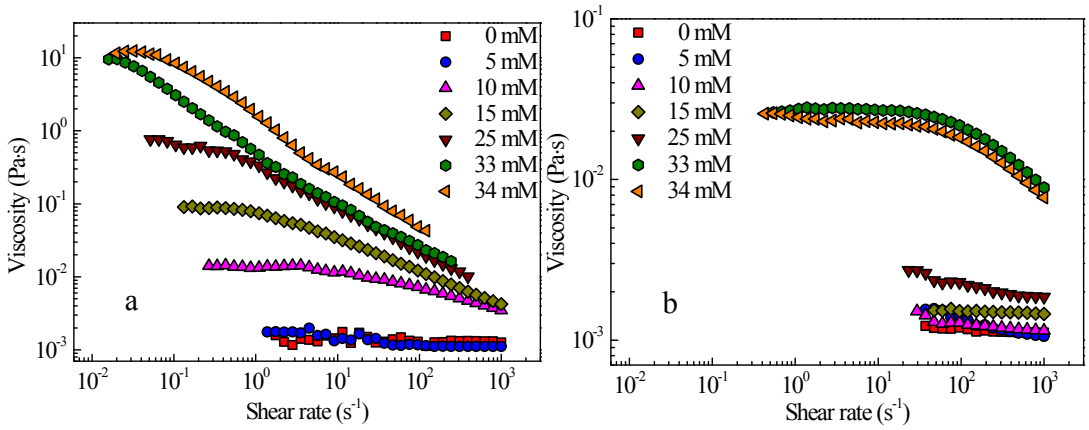


Figure S2. [5 mS] dependent steady-shear rheological responses of 30 mmol·L^{-1} C_{10}AZODEMAB before (a) and after (b) UV light irradiation for 3 h.

4. Irradiation time dependent zero-shear viscosity

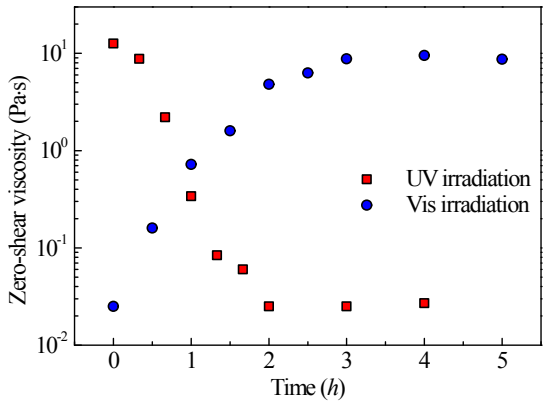


Figure S3. Light irradiation time dependent zero-shear viscosity of 30 mmol·L^{-1} C_{10}AZODEMAB/34 mmol·L^{-1} 5 mS binary systems.

5. UV-Vis Spectra of 30 mmol·L^{-1} C_{10}AZODEMAB/34 mmol·L^{-1} 5 mS binary systems

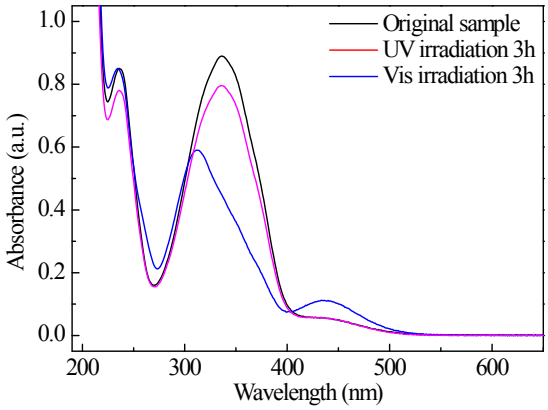


Figure S4. Effects of irradiation conditions on UV-Vis spectra of 0.05 mmol·L^{-1} C_{10}AZODEMAB solutions. Samples were prepared by diluting the concentrated C_{10}AZODEMAB/5 mS binary mixtures (30 mmol·L^{-1}/34 mmol·L^{-1}) using ultrapure deionized water.

References:

[1] K. L. Jia, Y. M. Cheng, X. Liu, X. F. Li and J. F. Dong, *RSC Adv.*, 2015, **5**, 640-642.