Supporting Information

Shuai Lan[1,2,3], ChenSa Zhang[1], YuLin Li[1], Sibo Shen[1], Dongjun Wang*[1] , Kui Niu*[1,2,3]

1 Hebei Normal University of Science and Technology. No. 360, Hebei Street, Qinhuangdao, Hebei province, P. R. China.

2 Engineering Research Center of Chestnut Industry Technology Ministry of Education. No. 360, Hebei Street, Qinhuangdao, Hebei province, P. R. China.

3 Hebei Key Laboratory of Active Components and Functions in Natural Products. No. 360, Hebei Street, Qinhuangdao, Hebei province, P. R. China.

* Corresponding authors E-mail: niukui007@163.com; wdj9999@126.com

.

Supplementary Figures

Cyclopentanol($C_5H_{10}O$): colorless liquid, ^{1}H NMR (600 MHz, $CDCl_3$) δ 4.31 (s, 1H, OH), 1.97 (d, J = 2.6 Hz, 1H, CH), 1.83 – 1.72 (m, 4H, CH_2), 1.63 – 1.52 (m, 4H, CH_2).

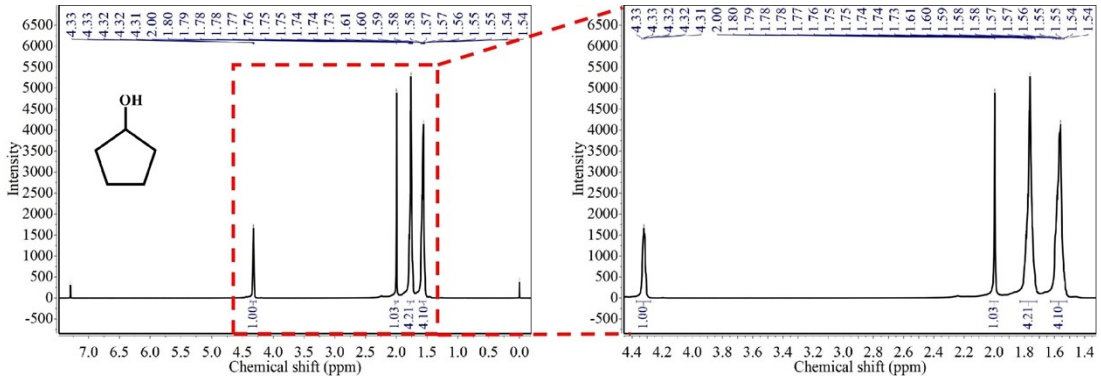
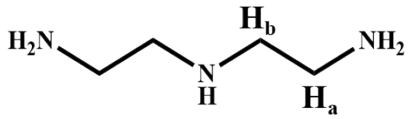


Figure S1 The ^{1}H NMR spectra of original CPA in $CDCl_3$.

Original DETA was purified by distillation under reduced pressure. For the purified DETA, no impurities could be found in 1H NMR.

Diethylenetriamine (C4H13N3): colorless liquid, 1H NMR (600 MHz, D2O) δ 2.76 – 2.69 (t, 4H, CH2), 2.67-2.60 (t, J = 5.7 Hz, 4H, CH2).

Diethylenetriamine (C4H13N3): colorless liquid,1H NMR (600 MHz, CDCl3) δ 2.80 (t, J = 5.9 Hz, 4H, CH2), 2.68 (t, J = 5.9 Hz, 4H, CH2), 1.20 (s, 5H, NH).



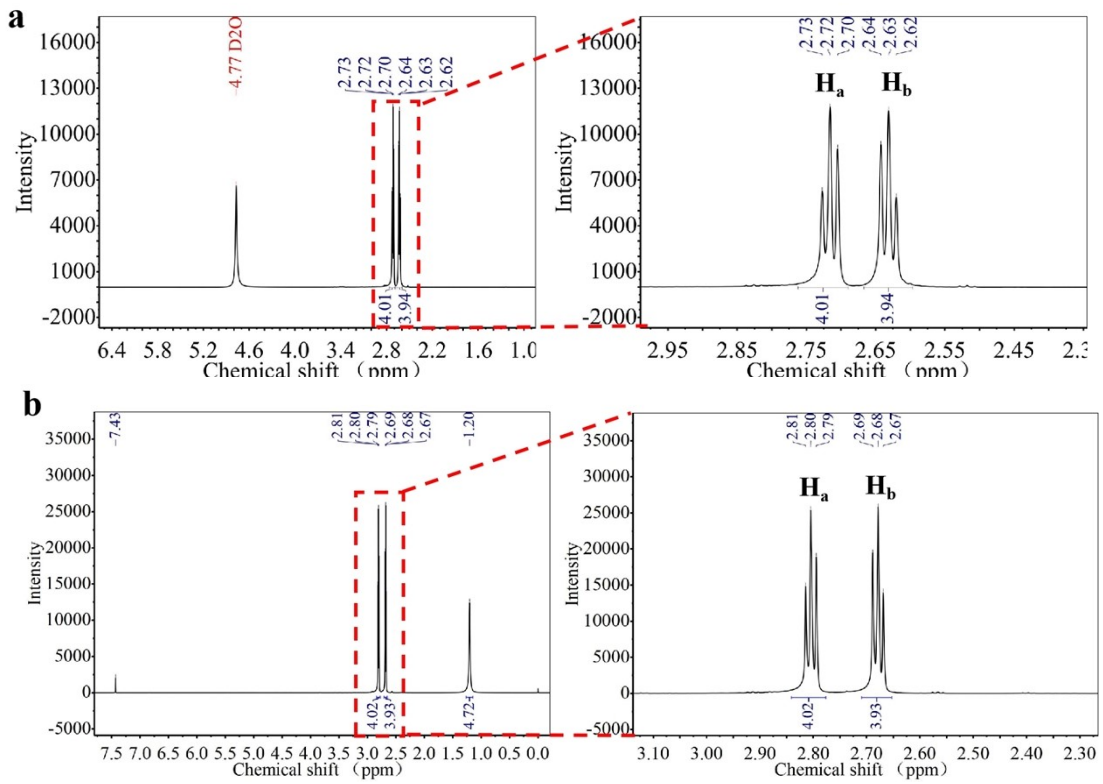


Figure S2 The ^{1}H NMR spectra of purified DETA in (a) D_2O and (b) $CDCl_3$

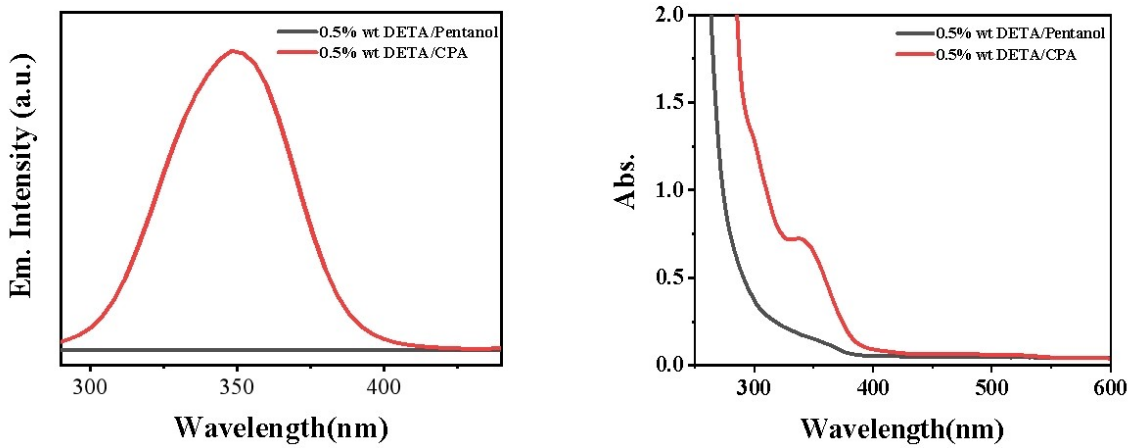


Figure S3 Comparison of fluorescence and UV absorptionbetween two samples prepared by DETA/CPA and DETA/pentanol at the same concentration of 0.5 wt%. These results verified the decisive role of the micelles constructed by CPA

Table. S1 Quantum yields (QY) measurements

Systems	ABS	Peak area	≈ QY / %
DETA/pentanol			0
EDA/CPA	0.08	71075	3
DETA/CPA	0.39	595954	23
TETA/CPA	0.43	710562	28
TEPA/CPA	0.46	732724	29
PEPA/CPA	0.35	644134	26
PEI/CPA	0.15	454919	19

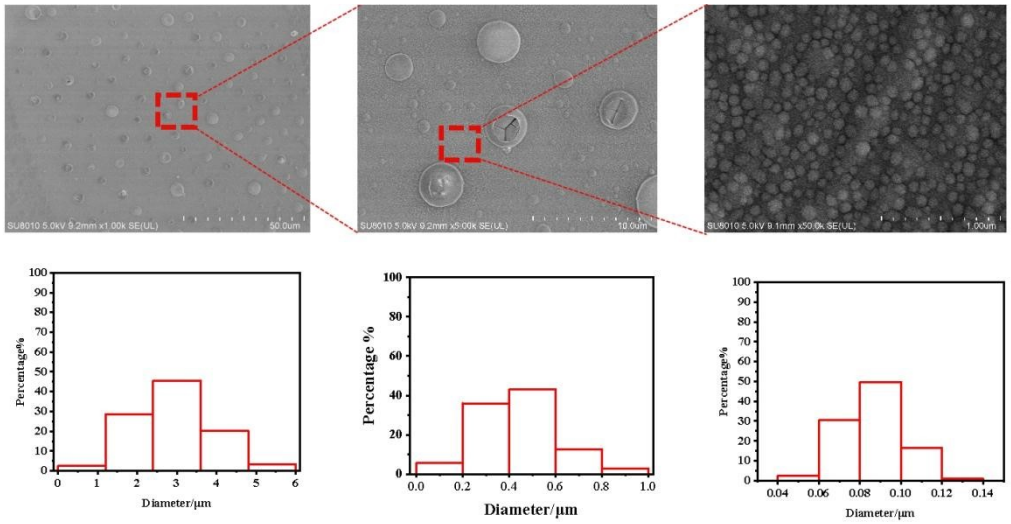


Figure S4 SEM images of the micelles in the mixtures of DETA/CPA at 0.5 wt%. The typical images show the morphology and size distribution of micelles

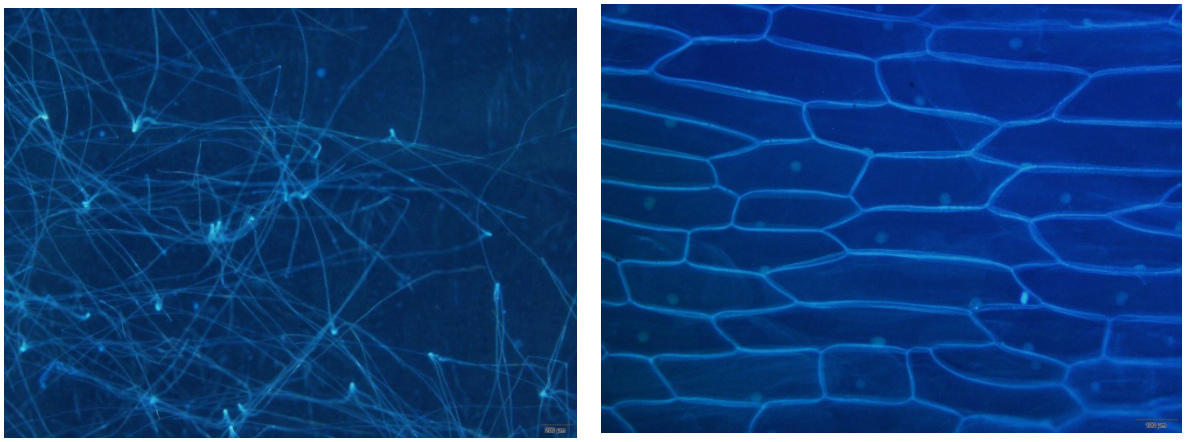


Figure S5 the image of onion cell and stained cotton fibers

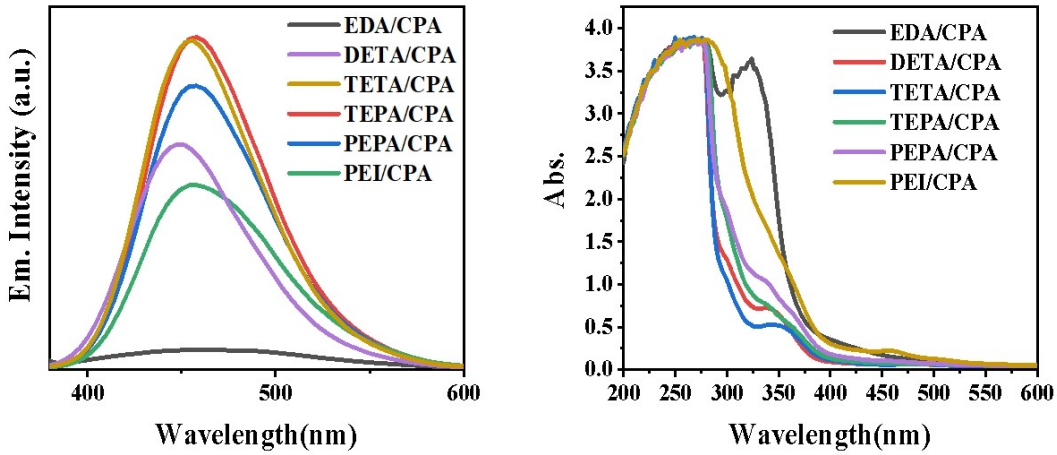


Figure S6 Spectra of fluorescence , UV absorption of ethylenediamine （EDA), diethylenetriamine(DETA), triethylenetetramine(TETA), tetraethylene pentamine (TEPA), polyethylene polyamine (PEPA) and polyethylenimine (PEI) dispersed in CPA with a concentration of 0.5 wt%, respectively.

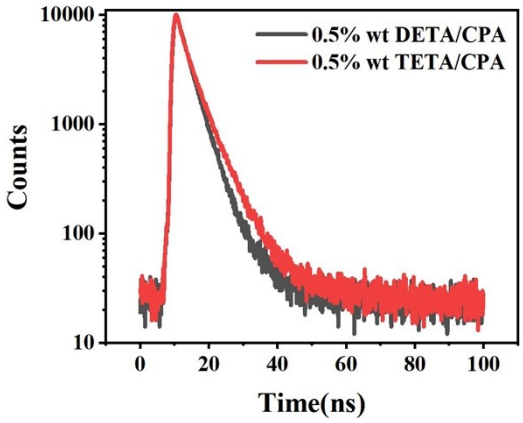


Figure S7 Fluorescence decay curves of typical samples

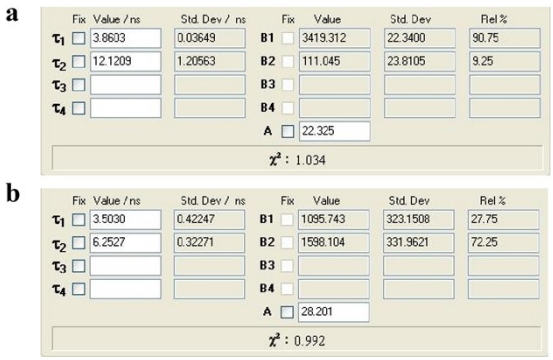


Figure S8 Screenshot of fluorescence lifetime test for typical samples：a) DETA/CPA, b) TETA/CPA

Table. S2 The excited state lifetime and average lifetime of typical samples

Systems	Excited state lifetime (ns)			
	τ_1	τ_2	τ_{ave}	$\chi 2$
DETA/CPA	3.86	12.12	4.62	1.034
TETA/CPA	3.50	6.25	5.49	0.992

Table. S3 The radiative and non-radiative rates of typical samples

Systems	QY / %	τ_{ave} (ns)	$Kr(s^{-1}) = QY/\tau_{ave}$	$Knr(s^{-1})=(1-QY)/\tau_{ave}$
DETA/CPA	23	4.62	4.98×10^7	1.667×10^8
TETA/CPA	28	5.49	5.10×10^7	1.311×10^8

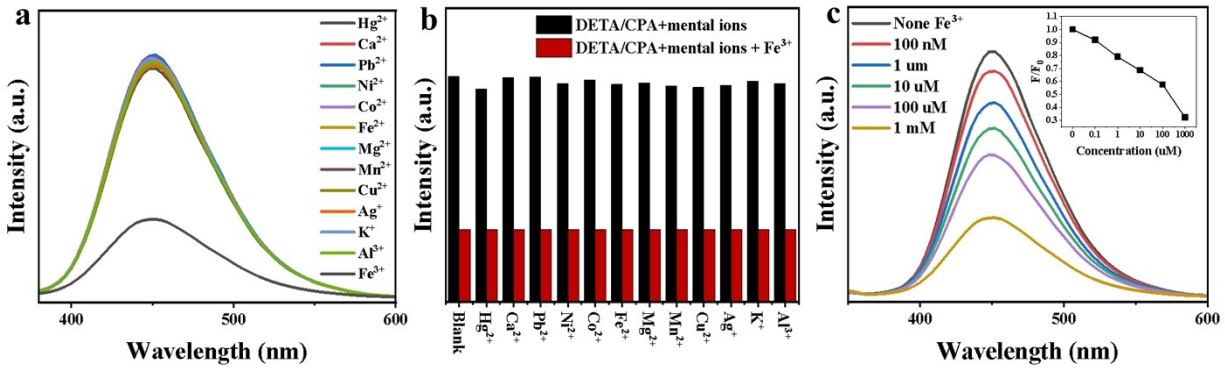


Figure S9 (a) The difference of fluorescence change about DETA/CPA in the presence of various metal ions. (b) Fluorescence intensities of DETA/CPA with presence of individual metal ion solutions (black column), and coexistence of Fe^{3+} ion with other metal ions (red column). (c) Fluorescence change of DETA/CPA with different Fe^{3+} concentrations from 0 to 1 mM. (insert: The function of fluorescence change (F/F0) of DETA/CPA on theconcentration of Fe^{3+} ions ranging from 0 to 1 mM).