Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Supporting information for:

Ionic Liquids as Modulators of Physicochemical Properties and Nanostructures of Sodium Dodecyl Sulfate in Aqueous Solutions and Potential Application in Pesticide Microemulsion

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Table S1 The values of CMC from Tensiometry and Conductometry Plots for ILs in aqueous solutions

ILs	CMC[a] (mmol·kg^{-1})	CMC[b] (mmol·kg^{-1})
[C_6mpyr][Br]	55.94	55.00
[C_8mpyr][Br]	45.88	44.91
[C_{12}mpyr][Br]	13.25	11.96
[C_{16}mpyr][Br]	1.08	0.82
[C_6mp][Br]	57.91	57.03
[C_6mm][Br]	58.60	57.57

Note：a-The values obtained from tensiometry. B-The values obtained from conductometry

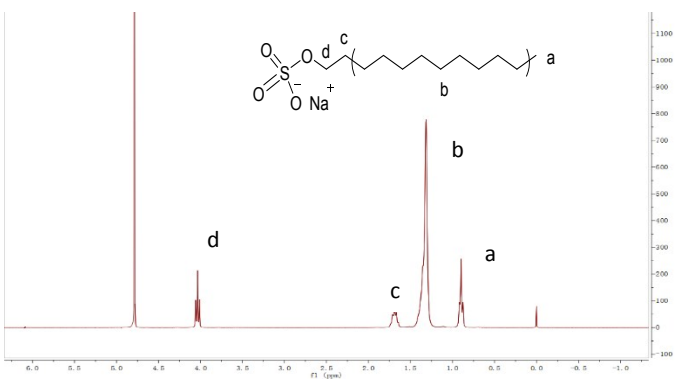
Table S2 The values of CMC, α, β, and thermodynamic parameters for SDS-ILs in aqueous solutions at different temperatures

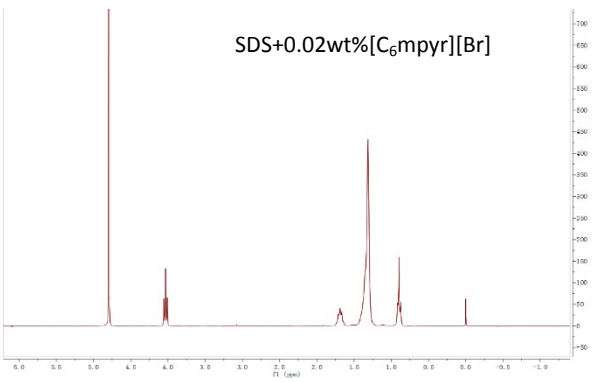
ILs	wt%	T（K）	CMC mmol • kg^{-1}	α	β	ΔG_m^0 （kJ • mol^{-1}）	ΔH_m^0 （kJ • mol^{-1}）	ΔS_m^0 （J • K^{-1} • mol^{-1}）
water		298	7.89	0.40	0.60	-35.12	-4.84	101.60
		308	8.02	0.40	0.60	-36.23	-5.17	100.84
		318	8.51	0.41	0.59	-36.93	-5.48	98.88
		328	8.88	0.42	0.58	-37.66	-5.79	97.16
[C_6mpyr][Br]	0.02	298	9.71	0.51	0.49	-31.94	-3.08	96.84
		308	10.51	0.51	0.49	-32.71	-3.29	95.52
		318	10.56	0.51	0.49	-33.75	-3.51	95.11
		328	10.67	0.52	0.48	-34.54	-3.71	94.00
	0.05	298	11.29	0.61	0.39	-29.28	-5.85	78.61
		308	12.08	0.61	0.39	-30.02	-6.25	77.17
		318	12.70	0.65	0.35	-29.92	-6.47	73.75
		328	13.42	0.66	0.34	-30.43	-6.83	71.95
	0.07	298	12.30	0.64	0.36	-28.36	-3.82	82.35
		308	12.49	0.65	0.35	-29.04	-4.05	81.14
		318	13.35	0.67	0.33	-29.30	-4.25	78.78
		328	13.67	0.68	0.33	-30.14	-4.52	78.10
	0.1	298	13.59	0.67	0.33	-27.40	-3.63	79.75
		308	13.62	0.67	0.33	-28.31	-3.88	79.32
		318	14.69	0.70	0.30	-28.31	-4.04	76.31
		328	15.01	0.72	0.28	-28.68	-4.24	74.52
	0.5	298	25.37	0.83	0.17	-22.28	-0.78	72.17
		308	25.74	0.84	0.16	-22.79	-0.82	71.33
		318	25.91	0.87	0.13	-22.90	-0.86	69.34
		328	26.11	0.87	0.13	-23.60	-0.91	69.18
	1	298	29.98	0.98	0.02	-18.99	-1.66	58.18
		308	30.12	0.98	0.02	-19.62	-1.77	57.95
		318	31.39	0.99	0.01	-19.95	-1.87	56.85

		328	31.84	0.99	0.01	-20.53	-1.99	56.55
$[C_8mpyr][Br]$	0.02	298	10.33	0.54	0.46	-31.07	-3.67	91.97
		308	10.67	0.55	0.45	-31.77	-3.89	90.54
		318	11.08	0.60	0.40	-31.54	-4.00	86.58
		328	11.43	0.61	0.39	-32.18	-4.23	85.21
	0.05	298	11.10	0.53	0.47	-31.02	-2.71	95.00
		308	11.44	0.53	0.47	-31.95	-2.90	94.32
		318	11.89	0.57	0.43	-31.94	-3.01	91.00
		328	11.91	0.61	0.39	-32.02	-3.11	88.15
	0.07	298	11.80	0.55	0.45	-30.38	-2.36	94.04
		308	11.65	0.56	0.44	-31.23	-2.50	93.28
		318	12.17	0.59	0.41	-31.41	-2.61	90.57
		328	12.51	0.63	0.37	-31.38	-2.70	87.44
	0.1	298	12.22	0.57	0.43	-29.84	-6.12	79.57
		308	13.46	0.60	0.40	-29.84	-6.40	76.10
		318	14.23	0.66	0.34	-29.30	-6.53	71.58
		328	14.56	0.67	0.33	-29.91	-6.90	70.15
	0.5	298	17.25	0.71	0.29	-25.80	-7.05	62.93
		308	18.89	0.73	0.27	-25.96	-7.41	60.22
		318	20.23	0.75	0.25	-26.15	-7.78	57.79
		328	21.56	0.77	0.23	-26.33	-8.14	55.46
	1	298	19.21	0.88	0.12	-22.09	-11.74	34.72
		308	27.18	0.89	0.11	-21.64	-12.43	29.90
		318	29.65	0.90	0.10	-21.89	-13.13	27.54
		328	30.00	0.90	0.10	-22.54	-13.97	26.13
$[C_{12}mpyr][Br]$	0.02	298	10.02	0.43	0.57	-33.53	-1.85	106.30
		308	10.16	0.46	0.54	-33.94	-1.94	103.89
		318	10.41	0.47	0.53	-34.72	-2.06	102.70
		328	10.49	0.47	0.53	-35.78	-2.19	102.40
	0.05	298	10.87	0.45	0.55	-32.79	-0.34	108.89
		308	10.96	0.51	0.49	-32.55	-0.35	104.53
		318	10.97	0.52	0.48	-33.38	-0.37	103.78
		328	10.99	0.53	0.47	-34.19	-0.39	103.02
	0.07	298	11.07	0.51	0.49	-31.45	-2.42	97.43
		308	11.19	0.53	0.47	-32.03	-2.55	95.72
		318	11.46	0.56	0.44	-32.31	-2.66	93.22
		328	11.81	0.58	0.42	-32.74	-2.79	91.31
	0.1	298	11.17	0.58	0.42	-29.94	-7.44	75.50
		308	13.29	0.60	0.40	-29.89	-7.84	71.59
		318	13.86	0.61	0.39	-30.48	-8.30	69.77
		328	13.96	0.62	0.38	-31.19	-8.76	68.37
	0.5	298	11.91	0.60	0.40	-29.29	-17.06	41.05
		308	15.23	0.63	0.37	-28.76	-17.83	35.49
		318	18.58	0.67	0.33	-28.13	-18.45	30.43

		328	19.32	0.69	0.31	-28.43	-19.33	27.75
	1	298	12.32	0.69	0.31	-27.28	-22.25	16.89
		308	23.45	0.71	0.29	-25.64	-23.40	7.26
		318	25.17	0.75	0.25	-25.41	-24.17	3.91
		328	25.86	0.85	0.15	-24.03	-23.66	1.14
$[C_{16}mpyr][Br]$	0.02	298	9.32	0.45	0.55	-33.38	-4.01	98.58
		308	10.02	0.47	0.53	-33.77	-4.22	95.94
		318	10.34	0.48	0.52	-34.52	-4.47	94.48
		328	10.38	0.48	0.52	-35.59	-4.76	93.99
	0.05	298	9.86	0.46	0.54	-32.95	-2.05	103.71
		308	10.23	0.47	0.53	-33.69	-2.17	102.34
		318	10.37	0.47	0.53	-34.73	-2.32	101.94
		328	10.41	0.48	0.52	-35.57	-2.45	100.99
	0.07	298	11.04	0.52	0.48	-31.25	-1.86	98.64
		308	11.09	0.52	0.48	-32.28	-1.98	98.38
		318	11.35	0.56	0.44	-32.34	-2.06	95.24
		328	11.58	0.58	0.42	-32.82	-2.16	93.48
	0.1	298	11.14	0.53	0.47	-31.01	-5.32	86.21
		308	12.57	0.54	0.46	-31.38	-5.64	83.56
		318	12.85	0.56	0.44	-31.87	-5.93	81.56
		328	13.01	0.56	0.44	-32.82	-6.31	80.83
	0.5	298	11.75	0.57	0.43	-29.96	-5.70	81.41
		308	12.78	0.58	0.42	-30.44	-6.05	79.21
		318	13.58	0.60	0.40	-30.77	-6.36	76.76
		328	13.78	0.62	0.38	-31.22	-6.67	74.88
	1	298	12.01	0.63	0.37	-28.61	-18.91	32.55
		308	19.96	0.64	0.36	-27.59	-20.06	24.45
		318	21.42	0.65	0.35	-28.02	-21.22	21.38
		328	21.88	0.66	0.34	-28.61	-22.41	18.90
$[C_6mp][Br]$	0.02	298	9.69	0.50	0.50	-32.16	-3.10	97.52
		308	9.89	0.52	0.48	-32.72	-3.27	95.62
		318	10.21	0.52	0.48	-33.66	-3.48	94.89
		328	10.52	0.53	0.47	-34.36	-3.68	93.54
	0.05	298	11.78	0.59	0.41	-29.55	-3.54	87.28
		308	12.34	0.65	0.35	-29.08	-3.62	82.66
		318	12.89	0.69	0.31	-28.98	-3.74	79.37
		328	13.01	0.69	0.31	-29.86	-3.98	78.90
	0.07	298	12.55	0.62	0.38	-28.70	-2.95	86.40
		308	12.95	0.66	0.34	-28.70	-3.06	83.23
		318	13.44	0.67	0.33	-29.28	-3.24	81.88
		328	13.64	0.69	0.31	-29.69	-3.40	80.17
	0.1	298	13.14	0.67	0.33	-27.51	-1.47	87.38
		308	13.24	0.70	0.30	-27.77	-1.54	85.16
		318	13.50	0.72	0.28	-28.16	-1.61	83.48

		328	13.71	0.75	0.25	-28.31	-1.68	81.21
	0.5	298	23.21	0.71	0.29	-24.85	-1.24	79.24
		308	23.89	0.73	0.27	-25.19	-1.30	77.57
		318	24.03	0.74	0.26	-25.79	-1.38	76.77
		328	24.22	0.76	0.24	-26.15	-1.44	75.33
	1	298	37.43	0.91	0.09	-19.70	-1.85	59.89
		308	38.24	0.91	0.09	-20.30	-1.98	59.49
		318	39.38	0.92	0.08	-20.68	-2.09	58.47
		328	40.00	0.94	0.06	-20.89	-2.18	57.05
[C_6mm][Br]	0.02	298	10.40	0.50	0.50	-31.90	-0.66	104.81
		308	10.44	0.54	0.46	-32.08	-0.69	101.90
		318	10.50	0.55	0.45	-32.87	-0.73	101.06
		328	10.59	0.55	0.45	-33.87	-0.78	100.88
	0.05	298	11.90	0.94	0.06	-22.19	-2.19	67.10
		308	12.32	0.59	0.41	-30.38	-3.11	88.52
		318	12.68	0.66	0.34	-29.71	-3.15	83.49
		328	12.94	0.67	0.33	-30.34	-3.33	82.34
	0.07	298	14.36	0.65	0.35	-27.63	-1.30	88.37
		308	14.56	0.65	0.35	-28.51	-1.38	88.06
		318	14.67	0.68	0.32	-28.75	-1.44	85.88
		328	14.97	0.72	0.28	-28.69	-1.49	82.93
	0.1	298	15.61	0.71	0.29	-26.13	-2.10	80.66
		308	15.93	0.84	0.16	-24.23	-2.01	72.13
		318	16.51	0.86	0.14	-24.48	-2.11	70.34
		328	16.59	0.87	0.13	-25.01	-2.22	69.47
	0.5	298	26.93	0.84	0.16	-21.92	-1.20	69.54
		308	27.84	0.85	0.15	-22.36	-1.27	68.49
		318	28.01	0.87	0.13	-22.67	-1.33	67.11
		328	28.20	0.88	0.12	-23.16	-1.40	66.32
	1	298	39.93	0.91	0.09	-19.52	-0.89	62.54
		308	40.15	0.94	0.06	-19.61	-0.92	60.68
		318	41.02	0.96	0.04	-19.80	-0.96	59.25
		328	41.08	0.97	0.03	-20.23	-1.01	58.57





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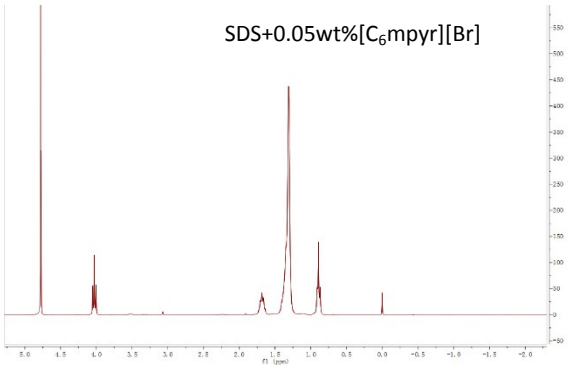

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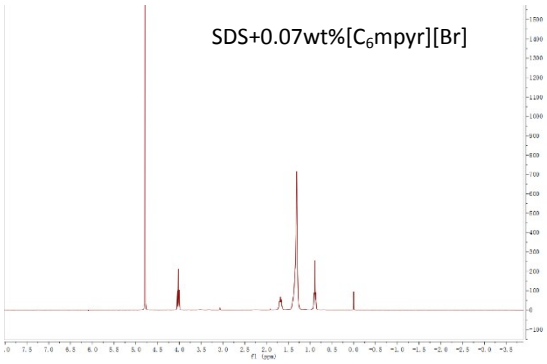

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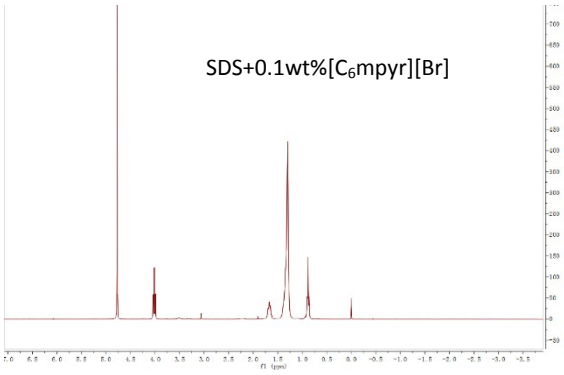

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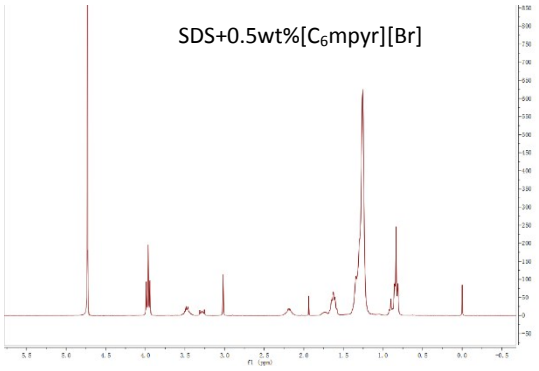

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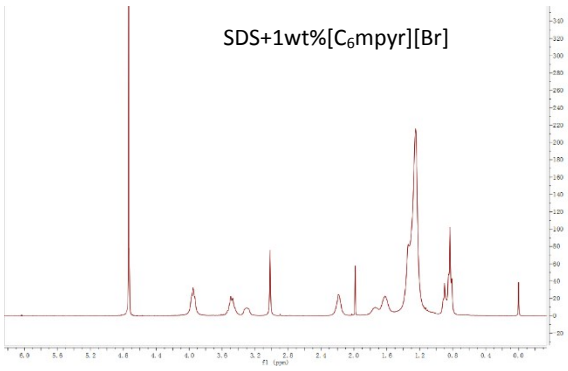

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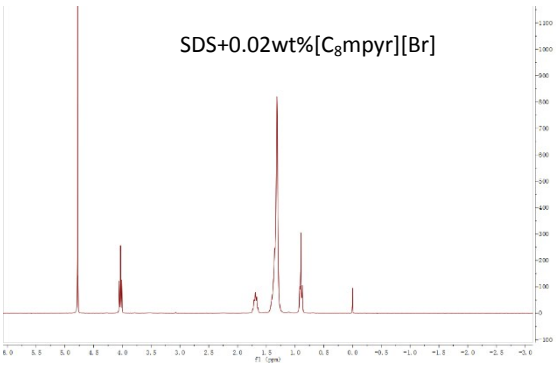

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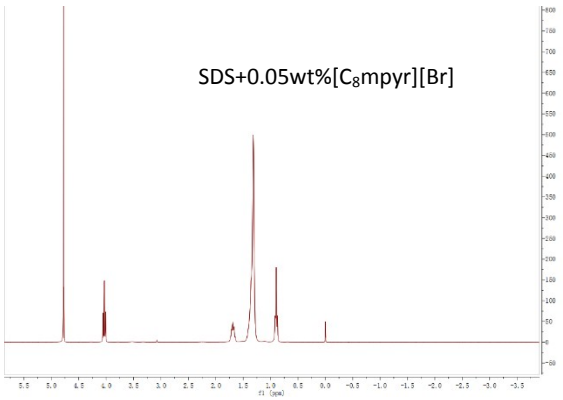

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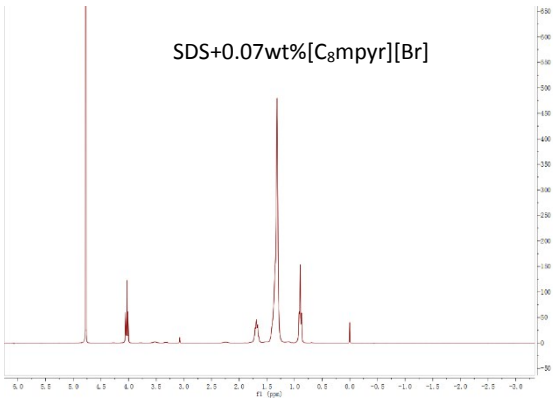

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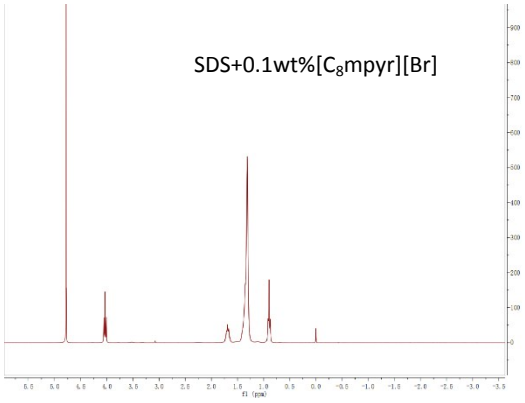

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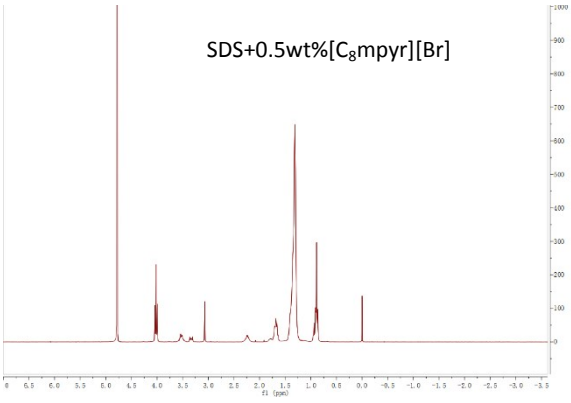

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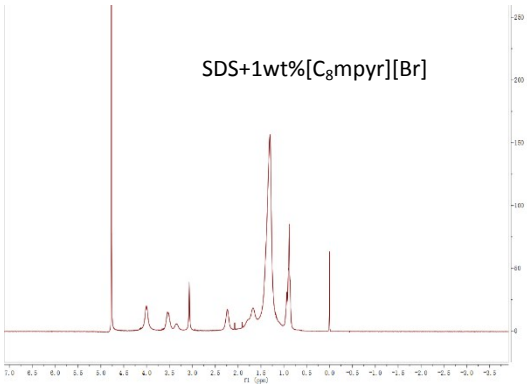

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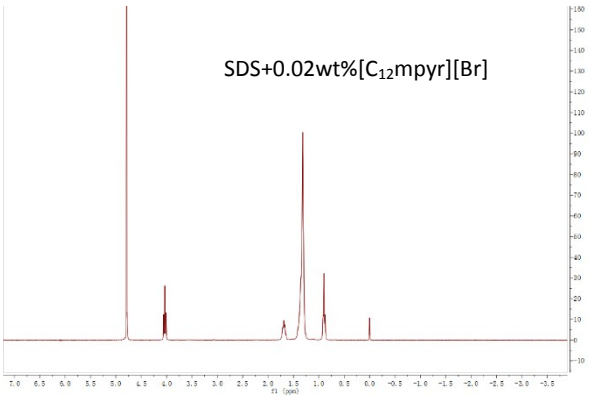

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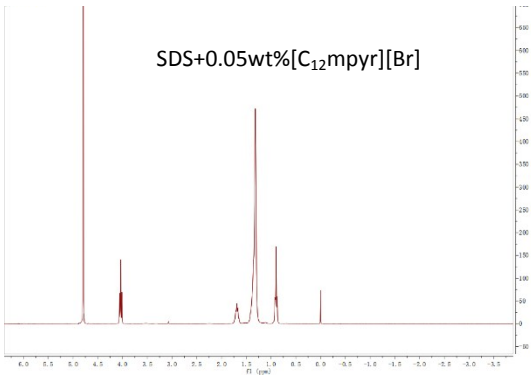

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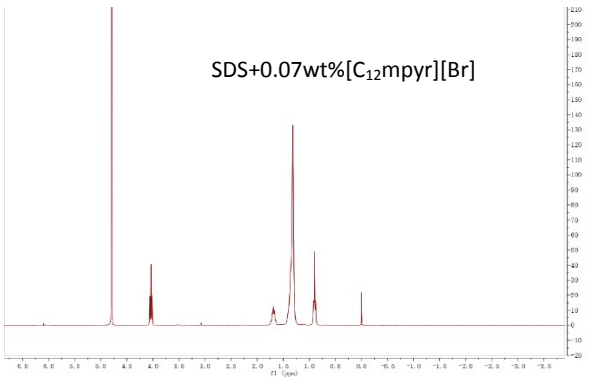

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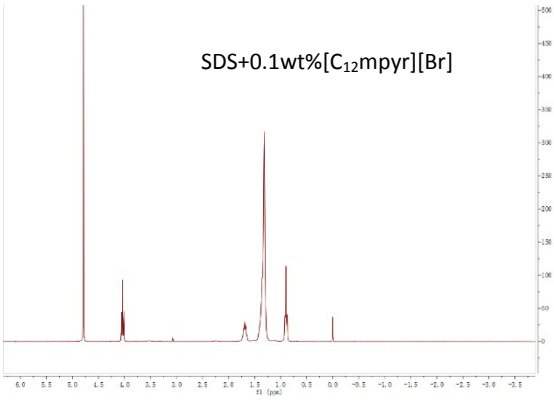

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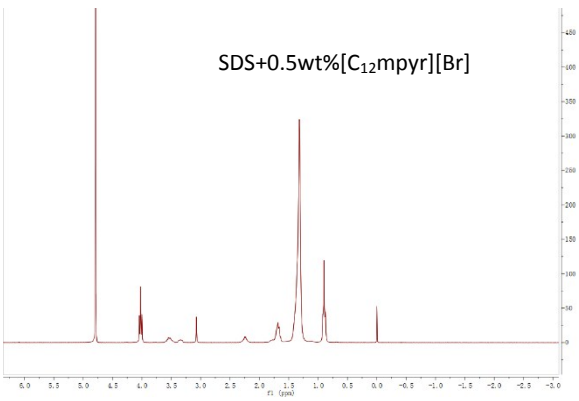

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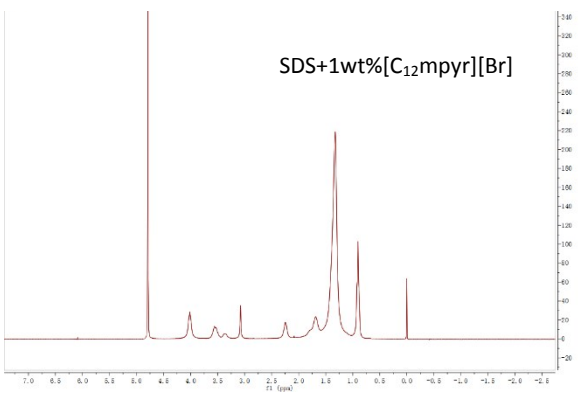

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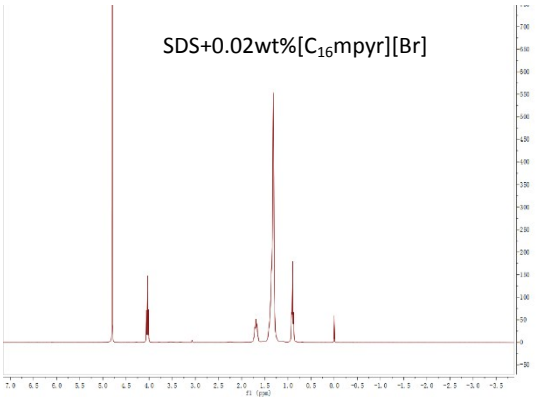
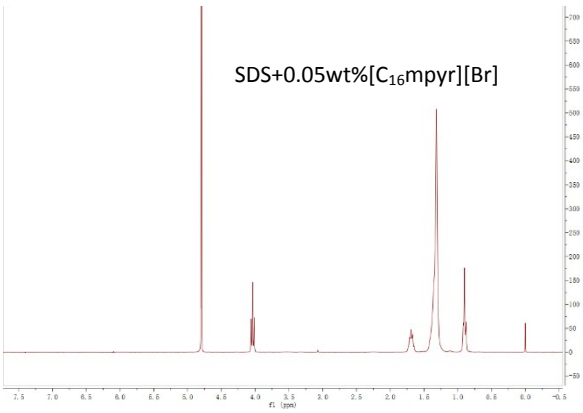
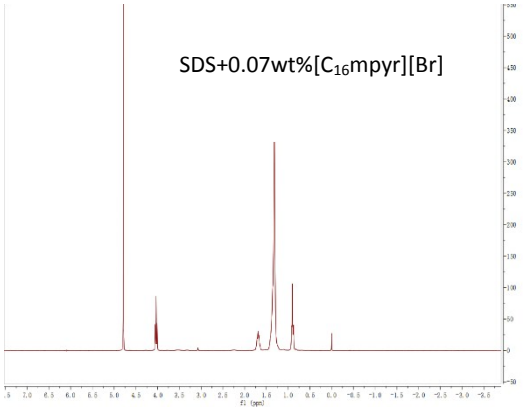


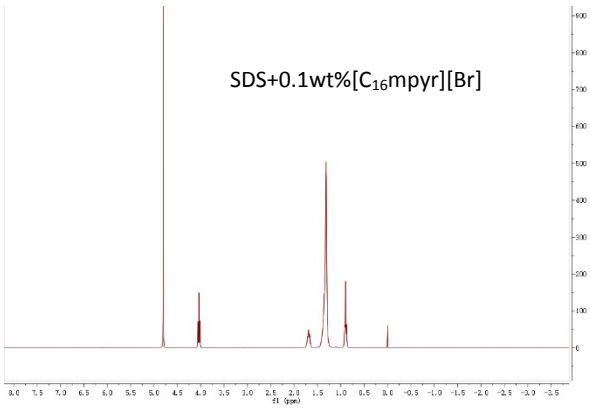
SDS+0.05wt%[C_{16}mpyr][Br]



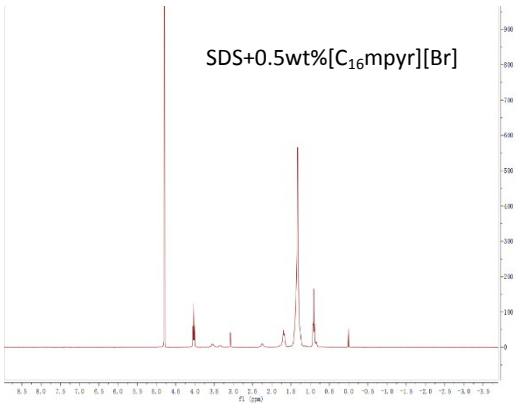
SDS+0.07wt%[C_{16}mpyr][Br]



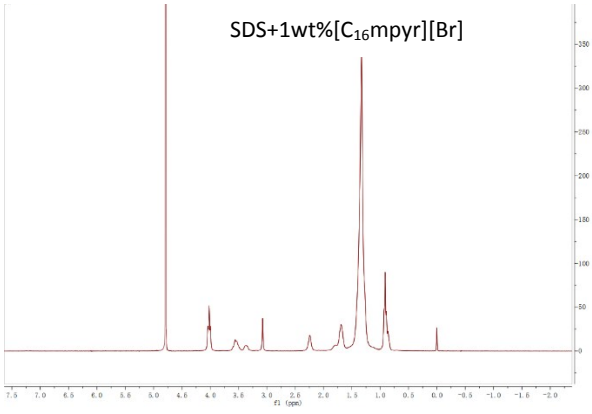
SDS+0.1wt%[C_{16}mpyr][Br]



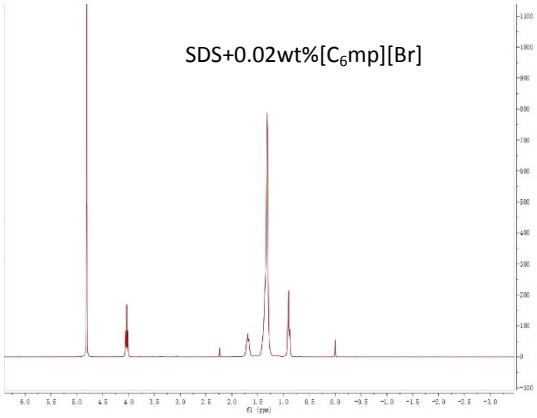
SDS+0.5wt%[C_{16}mpyr][Br]

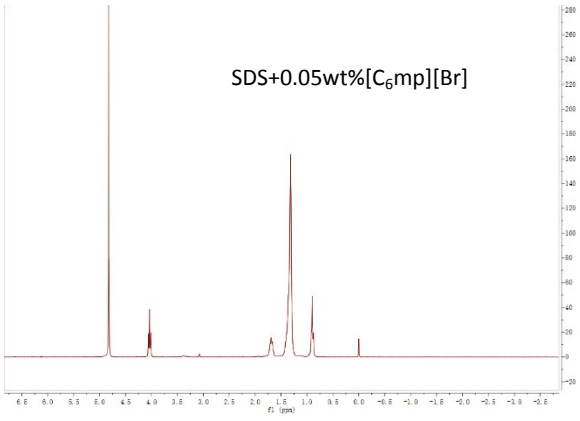


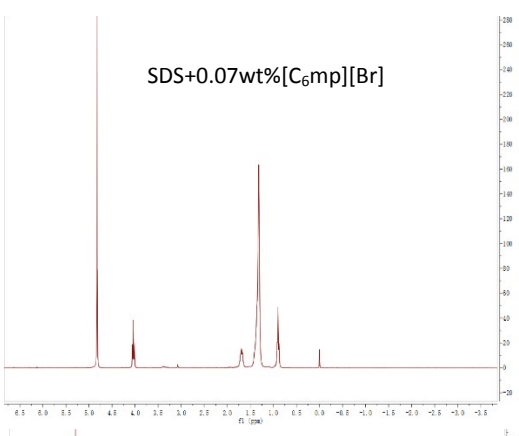
SDS+1wt%[C_{16}mpyr][Br]

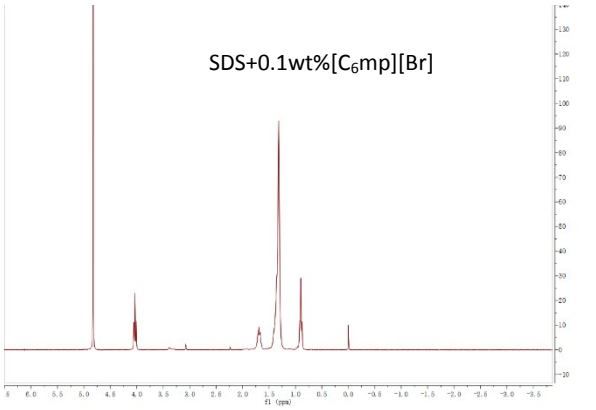


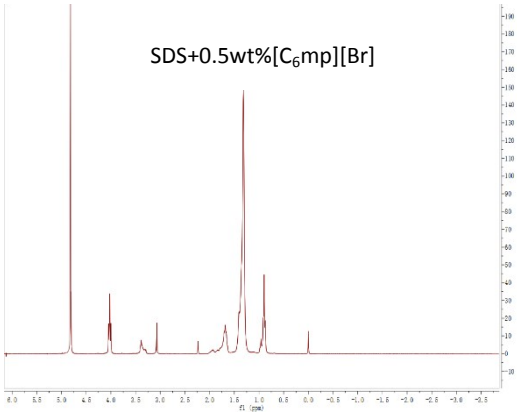
SDS+0.02wt%[C_{6}mp][Br]

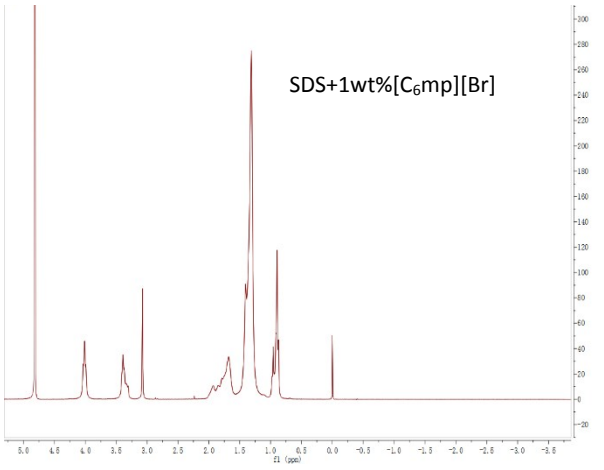


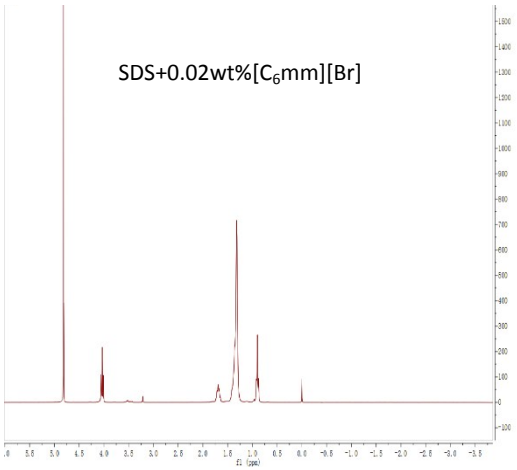

SDS+0.05wt%[C6mp][Br]

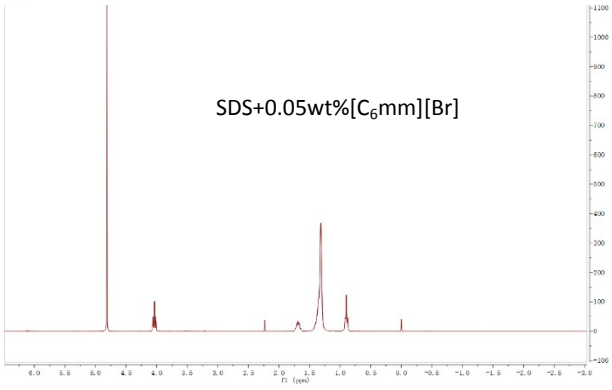

SDS+0.07wt%[C6mp][Br]

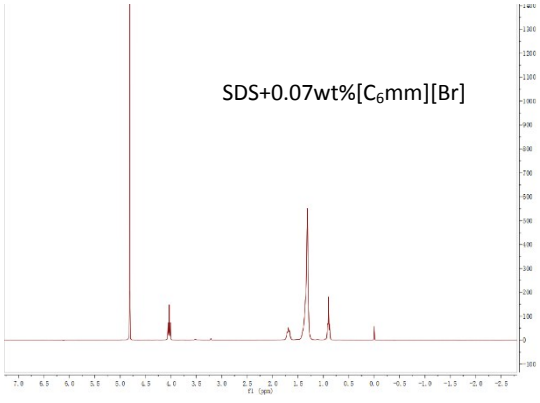

SDS+0.1wt%[C6mp][Br]


SDS+0.5wt%[C6mp][Br]


SDS+1wt%[C6mp][Br]


SDS+0.02wt%[C6mm][Br]


SDS+0.05wt%[C6mm][Br]


SDS+0.07wt%[C6mm][Br]

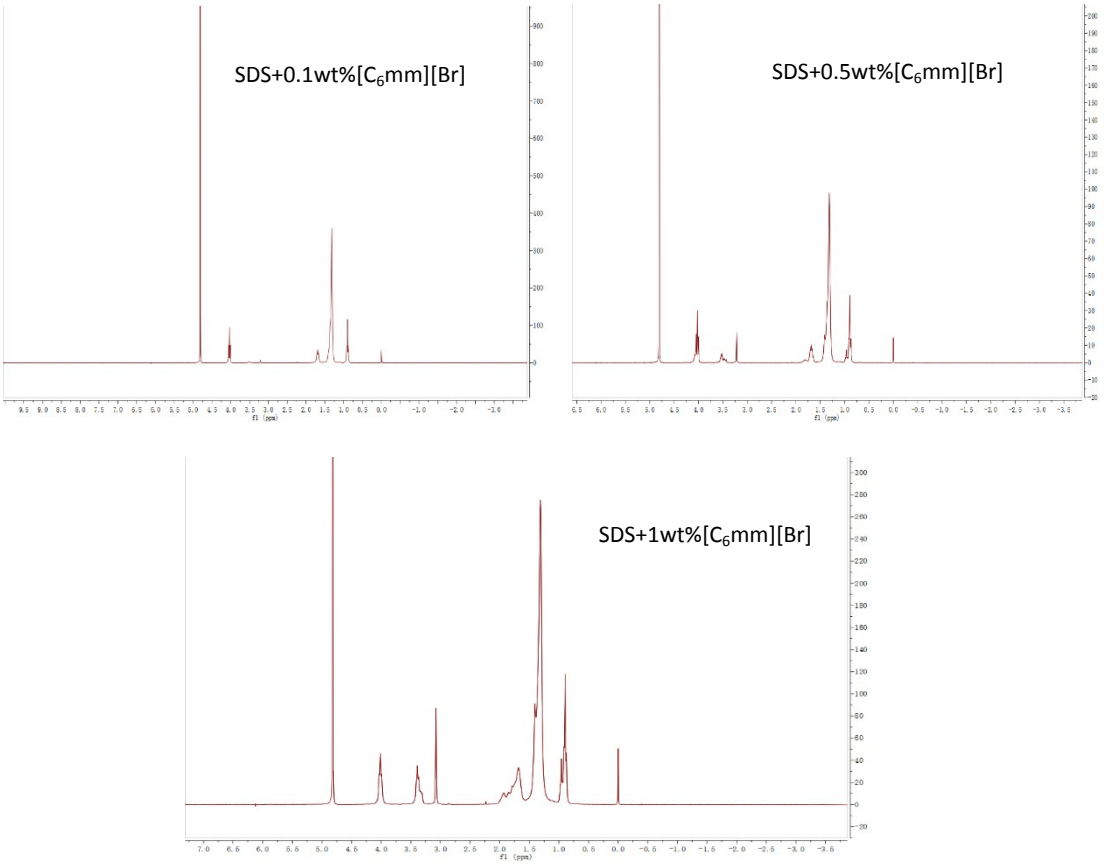


Fig. S1 ^{1}H NMR spectra of SDS and mixture of SDS-ILs