

Supporting Information

Thermodynamic investigation of the aqueous two-phase systems formed by PEG 400 + water + either sodium carbonate or potassium carbonate at different temperatures: experimental and correlational approaches

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Table S1. Calibration curves for conductivity at 298.15 K in the range from 2.5×10^{-3} to 1.7×10^{-2} in mass fractions percent for K_2CO_3 and Na_2CO_3 used for each ATPS studied.

ATPS	Calibration curves	R ²
PEG + K_2CO_3	$(19,780.759)w_{K_2CO_3} + (1.2331)$	0,9993
PEG + Na_2CO_3	$(23,501.406)w_{Na_2CO_3} + (4.6630)$	0,9992

Table S2. Calibration curves for refractive index at 298.15 K in the range from 1.00 to 10.00 in mass fractions percent for K_2CO_3 and PEG 400 for the ATPS formed by PEG + K_2CO_3 and from 1.00 to 5.00 in mass fractions percent for Na_2CO_3 and PEG 400 for the ATPS formed by PEG + Na_2CO_3 .

ATPS	Calibration curves	R^2
PEG + K_2CO_3	$(1.33301) + (0.00129)w_{PEG} + (0.00165)w_{K_2CO_3}$	0,9998
PEG + Na_2CO_3	$(1.33311) + (0.00136)w_{PEG} + (0.00199)w_{Na_2CO_3}$	0.9940

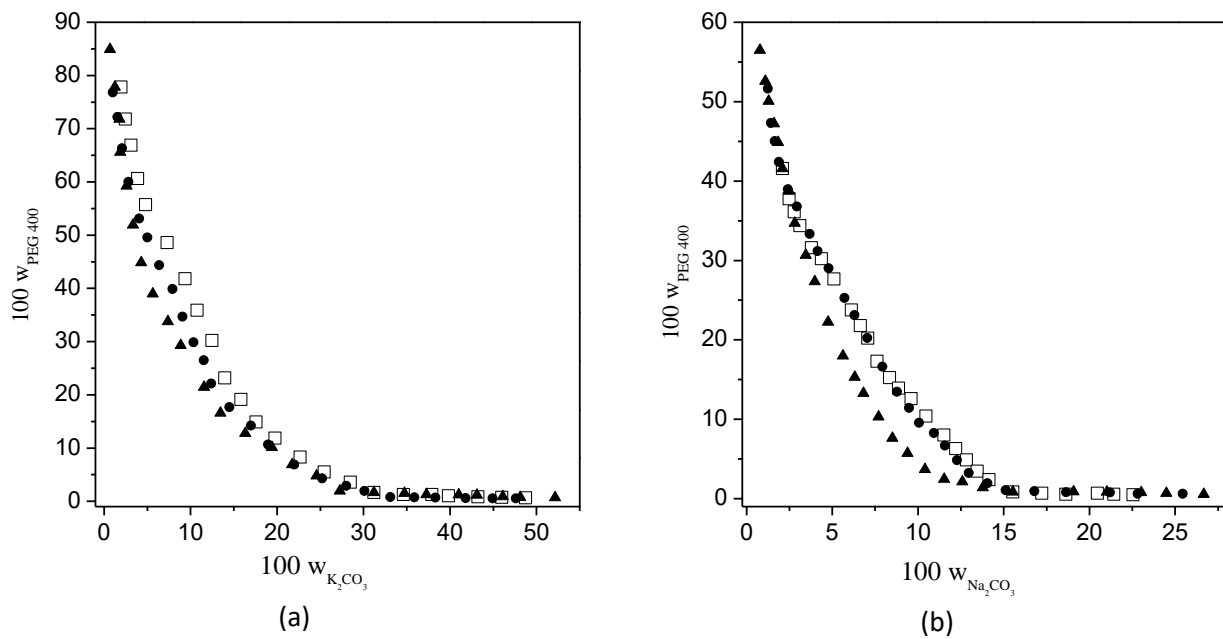


Figure S1. Binodal curves by liquid-liquid equilibrium data (Table S3 and S4) at temperatures of (\square) 283.15, (\bullet) 298.15 and (\blacktriangle) 313.15 K for ATPS formed by (a) PEG 400 + K_2CO_3 + H_2O . (b) PEG 400 + Na_2CO_3 + H_2O .

Table S3. Binodal data for the PEG 400 + K₂CO₃ + H₂O system at T = (283.15; 298.15, and 313.15)K and atmospheric pressure (≈ 91.8 kPa).^a

283.15 K		298.15 K		313.15 K	
100w _{K₂CO₃}	100w _{PEG}	100w _{K₂CO₃}	100w _{PEG}	100w _{K₂CO₃}	100w _{PEG}
1.96	77.8	1.02	76.79	0.7	84.92
2.48	71.79	1.54	72.18	1.26	77.8
3.13	66.91	2.08	66.32	1.78	71.79
3.88	60.65	2.83	60.02	1.86	65.6
4.82	55.7	4.07	53.11	2.61	59.23
7.31	48.61	5.01	49.55	3.35	51.93
9.36	41.79	6.39	44.37	4.31	44.84
10.75	35.88	7.91	39.9	5.64	38.97
12.48	30.22	9.07	34.68	7.39	33.78
13.95	23.16	10.34	29.85	8.88	29.3
15.83	19.15	11.52	26.51	11.55	21.46
17.57	14.91	12.39	22.1	13.46	16.57
19.77	11.86	14.49	17.7	16.32	12.78
22.67	8.3	16.98	14.2	19.41	10.12
25.46	5.48	18.96	10.67	21.75	6.9
28.47	3.58	21.98	6.9	24.58	4.77
31.21	1.66	25.22	4.3	27.28	1.95
34.61	1.26	28.01	2.9	31.21	1.66
37.91	1.24	30.1	1.96	34.72	1.48
39.82	1	33.11	0.78	37.28	1.24
43.23	0.83	35.9	0.72	41	1.2
45.99	0.72	38.32	0.68	43.13	1.16
48.76	0.65	41.81	0.61	46.1	0.86
		44.94	0.56	48.12	0.72
		47.61	0.53	52.16	0.7

^a The standard uncertainties σ for temperature and pressure are: $u(T) = 0.05$ K and $u(p) = 0.5$ kPa, respectively.

^b 100w_{Na₂CO₃} and 100w_{PEG} represented mass fractions percent of Na₂CO₃ and PEG 400, respectively and the relative standard uncertainties are $u_r(w_{K_2CO_3}) = u(w_{K_2CO_3}) / w_{K_2CO_3}$ and $u_r(w_{PEG}) = u(w_{PEG}) / w_{PEG} = 0.046$

Table S4. Binodal data for the + PEG 400 + Na₂CO₃ + H₂O system at T = 283.15; 298.15 and 313.15 K and atmospheric pressure (≈ 91.8 kPa).^a

283.15 K		298.15 K		313.15 K	
100w _{Na₂CO₃}	100w _{PEG}	100w _{Na₂CO₃}	100w _{PEG}	100w _{Na₂CO₃}	100w _{PEG}
2.1	41.58	1.25	51.63	0.78	56.48
2.49	37.75	1.42	47.32	1.1	52.57
2.78	36.11	1.65	45.01	1.29	50.06
3.11	34.36	1.88	42.42	1.6	47.23
3.78	31.6	2.41	38.96	1.85	44.85
4.37	30.22	2.93	36.8	2.1	41.58
5.1	27.65	3.68	33.34	2.48	38.73
6.11	23.76	4.15	31.18	2.82	34.69
6.64	21.78	4.78	29.03	3.45	30.65
7.08	20.2	5.71	25.27	3.98	27.35
7.61	17.3	6.29	23.12	4.75	22.23
8.34	15.22	7.05	20.23	5.62	17.98
8.87	13.92	7.92	16.63	6.31	15.31
9.6	12.6	8.78	13.46	6.82	13.27
10.47	10.4	9.48	11.44	7.7	10.29
11.52	8.02	10.06	9.57	8.51	7.62
12.2	6.28	10.93	8.27	9.39	5.72
12.83	4.87	11.57	6.69	10.4	3.68
13.46	3.44	12.27	4.83	11.53	2.44
14.14	2.39	12.96	3.23	12.59	2.12
15.54	0.83	14.06	1.95	13.78	1.39
17.23	0.69	15.11	1.07	15.54	0.83
18.63	0.56	16.79	0.93	19.07	0.86
20.47	0.69	18.64	0.81	21.02	0.84
21.43	0.56	21.2	0.78	23.03	0.79
22.55	0.49	22.82	0.61	24.48	0.69
		25.44	0.61	26.67	0.54

^a The standard uncertainties σ for temperature and pressure are: $u(T) = 0.05$ K and $u(p) = 0.5$ kPa, respectively.

^b 100w_{Na₂CO₃} and 100w_{PEG} represented mass fractions percent of Na₂CO₃ and PEG 400, respectively and the relative standard uncertainties a $u_r(w_{Na_2CO_3})=u(w_{Na_2CO_3})/w_{Na_2CO_3}$ and $u_r(w_{PEG})= u(w_{PEG})/w_{PEG} = 0.04$