

Supporting Information for:
Thermodynamics in separation for ternary system
(1,2-Ethanediol+1,2-Propanediol+2,3-Butanediol)

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Table S1. Experimental VLE data for 1,2-EG(1)+1,2-PG(2) at 101.3kPa

T/K	x ₁	y ₁	γ ₁	γ ₂
469.71	1.0000	1.0000	1.0000	
469.46	0.9669	0.9572	0.9992	0.9807
469.27	0.9423	0.9253	0.9981	0.9886
468.92	0.8974	0.8700	0.9979	0.9794
468.56	0.8529	0.8160	0.9974	0.9787
468.24	0.8137	0.7698	0.9973	0.9774
467.85	0.7679	0.7170	0.9974	0.9768
467.39	0.7152	0.6575	0.9973	0.9779
467.02	0.6792	0.6176	0.9986	0.9809
466.53	0.6199	0.5538	0.9970	0.9810
466.13	0.5768	0.5078	0.9955	0.9844
465.52	0.5137	0.4431	0.9943	0.9875
465.00	0.4605	0.3902	0.9929	0.9902
464.47	0.4078	0.3387	0.9895	0.9939
463.92	0.3546	0.2894	0.9884	0.9957
463.30	0.2945	0.2349	0.9842	0.9986
462.72	0.2392	0.1870	0.9812	1.0002
462.08	0.1790	0.1377	0.9831	1.0002
461.60	0.1329	0.1002	0.9769	1.0014
461.42	0.1160	0.0877	0.9842	1.0005
460.70	0.0473	0.0353	0.9907	1.0001
460.22	0.0000	0.0000		1.0000

Table S2. Experimental VLE data for 2,3-BD(1)+1,2-EG(2) at 101.3kPa

T/K	x ₁	y ₁	γ ₁	γ ₂
453.08	1.0000	1.0000	1.0000	
453.58	0.9587	0.9714	1.0024	1.1552
454.16	0.9139	0.9413	1.0060	1.1228
454.82	0.8651	0.9046	1.0042	1.1452
455.58	0.8055	0.8645	1.0134	1.1092
456.37	0.7554	0.8275	1.0130	1.0998
457.17	0.7012	0.7976	1.0343	1.0390
458.04	0.6442	0.7545	1.0402	1.0340
458.83	0.5954	0.7180	1.0484	1.0226

460.34	0.5016	0.6400	1.0615	1.0146
461.10	0.4570	0.5973	1.0615	1.0172
462.27	0.3893	0.5319	1.0688	1.0130
462.96	0.3500	0.4896	1.0685	1.0136
463.78	0.3047	0.4361	1.0616	1.0169
464.53	0.2637	0.3890	1.0656	1.0137
465.57	0.2084	0.3239	1.0825	1.0064
466.22	0.1745	0.2788	1.0860	1.0050
466.95	0.1367	0.2297	1.0890	1.0022
467.71	0.0991	0.1688	1.0922	1.0020
468.42	0.0626	0.1103	1.0973	1.0016
469.71	0.0000	0.0000		1.0000

Table S3. Experimental VLE data for 2,3-BD(1)+1,2-PG(2) at 101.3kPa

T/K	x ₁	y ₁	γ ₁	γ ₂
453.08	1.0000	1.0000	1.0000	
453.55	0.9324	0.9444	0.9995	1.0243
453.87	0.8868	0.9064	0.9995	1.0215
454.17	0.8431	0.8694	0.9996	1.0190
454.33	0.8188	0.8486	0.9998	1.0176
454.83	0.7461	0.7803	0.9935	1.0366
455.18	0.6955	0.7404	1.0017	1.0117
455.48	0.6512	0.7003	1.0028	1.0098
455.79	0.6058	0.6586	1.0041	1.0082
456.11	0.5596	0.6153	1.0057	1.0066
456.48	0.5067	0.5646	1.0079	1.0050
456.85	0.4531	0.5121	1.0103	1.0037
457.19	0.4031	0.4619	1.0133	1.0030
457.65	0.3386	0.3953	1.0167	1.0016
458.05	0.2835	0.3365	1.0203	1.0009
458.26	0.2545	0.3048	1.0223	1.0006
458.60	0.2083	0.2532	1.0257	1.0002
458.82	0.1791	0.2198	1.0279	1.0001
459.22	0.1263	0.1578	1.0322	0.9999
459.49	0.0909	0.1150	1.0352	0.9999
469.71	0.0000	0.0000		1.0000

Table S4. Calculated VLE data for 1,2-EG(1)+1,2-PG(2) with UNIFAC at 101.3kPa

T/K	T _{cal} /K	x ₁	y ₁	y _{1,cal}	γ ₁	γ _{1,cal}	γ ₂	γ _{2,cal}
469.71	470.24	1.0000	1.0000	1.0000	1.0000	1.0000		
469.46	470.26	0.9669	0.9572	0.9675	0.9995	0.9996	1.0243	0.7444
469.27	470.27	0.9423	0.9253	0.9421	0.9995	0.9988	1.0215	0.7601
468.92	470.24	0.8974	0.8700	0.8935	0.9996	0.9963	1.0190	0.7871
468.56	470.15	0.8529	0.8160	0.8431	0.9998	0.9927	1.0176	0.8116
468.24	470.03	0.8137	0.7698	0.7973	0.9935	0.9888	1.0366	0.8316
467.85	469.84	0.7679	0.7170	0.7427	1.0017	0.9832	1.0117	0.8530
467.39	469.56	0.7152	0.6575	0.6792	1.0028	0.9758	1.0098	0.8754
467.02	469.33	0.6792	0.6176	0.6359	1.0041	0.9702	1.0082	0.8893
466.53	468.88	0.6199	0.5538	0.5652	1.0057	0.9600	1.0066	0.9100
466.13	468.50	0.5768	0.5078	0.5148	1.0079	0.9520	1.0050	0.9234
465.52	467.89	0.5137	0.4431	0.4432	1.0103	0.9393	1.0037	0.9407
465.00	467.31	0.4605	0.3902	0.3852	1.0133	0.9280	1.0030	0.9533
464.47	466.69	0.4078	0.3387	0.3303	1.0167	0.9162	1.0016	0.9641
463.92	466.03	0.3546	0.2894	0.2775	1.0203	0.9037	1.0009	0.9733
463.30	465.23	0.2945	0.2349	0.2214	1.0223	0.8892	1.0006	0.9820
462.72	464.46	0.2392	0.1870	0.1731	1.0257	0.8753	1.0002	0.9884
462.08	463.60	0.1790	0.1377	0.1241	1.0279	0.8598	1.0001	0.9936
461.60	462.91	0.1329	0.1002	0.0891	1.0322	0.8476	0.9999	0.9965
461.42	462.66	0.1160	0.0877	0.0769	1.0352	0.8431	0.9999	0.9974
460.70	461.61	0.0473	0.0353	0.0298	1.0380	0.8246	0.9999	0.9996
460.22	460.87	0.0000	0.0000	0.0000			0.9999	1.0000

Table S5. Calculated VLE data for 2,3-BD(1)+1,2-EG(2) with UNIFAC at 101.3kPa

T/K	T _{cal} /K	x ₁	y ₁	y _{1,cal}	γ ₁	γ _{1,cal}	γ ₂	γ _{2,cal}
453.08	453.66	1.0000	1.0000	1.0000	1.0000	1.0000		
453.58	454.43	0.9587	0.9714	0.9753	1.0024	0.9998	1.1552	0.9792
454.16	455.25	0.9139	0.9413	0.9472	1.0060	0.9992	1.1228	0.9850
454.82	456.12	0.8651	0.9046	0.9150	1.0042	0.9981	1.1452	0.9907
455.58	457.18	0.8055	0.8645	0.8734	1.0134	0.9963	1.1092	0.9969
456.37	458.05	0.7554	0.8275	0.8364	1.0130	0.9944	1.0998	1.0013
457.17	458.98	0.7012	0.7976	0.7943	1.0343	0.9922	1.0390	1.0053
458.04	459.93	0.6442	0.7545	0.7477	1.0402	0.9897	1.0340	1.0086

458.83	460.73	0.5954	0.7180	0.7058	1.0484	0.9877	1.0226	1.0108
460.34	462.23	0.5016	0.6400	0.6202	1.0615	0.9848	1.0146	1.0132
461.10	462.92	0.4570	0.5973	0.5771	1.0615	0.9842	1.0172	1.0135
462.27	463.96	0.3893	0.5319	0.5086	1.0688	0.9848	1.0130	1.0131
462.96	464.55	0.3500	0.4896	0.4672	1.0685	0.9865	1.0136	1.0124
463.78	465.23	0.3047	0.4361	0.4176	1.0616	0.9900	1.0169	1.0112
464.53	465.84	0.2637	0.3890	0.3711	1.0656	0.9952	1.0137	1.0097
465.57	466.68	0.2084	0.3239	0.3054	1.0825	1.0060	1.0064	1.0074
466.22	467.19	0.1745	0.2788	0.2631	1.0860	1.0156	1.0050	1.0059
466.95	467.79	0.1367	0.2297	0.2137	1.1118	1.0298	0.9996	1.0042
467.71	468.40	0.0991	0.1688	0.1615	1.0922	1.0487	1.0020	1.0025
468.42	469.03	0.0626	0.1103	0.1070	1.0973	1.0730	1.0016	1.0011
469.71	470.23	0.0000	0.0000	0.0000			1.0000	1.0000

Table S6. Calculated VLE data for 2,3-BD(1)+1,2-PG(2) with UNIFAC at 101.3kPa

T/K	T _{cal} /K	x ₁	y ₁	y _{1,cal}	γ ₁	γ _{1,cal}	γ ₂	γ _{2,cal}
453.08	453.66	1.0000	1.0000	1.0000	1.0000	1.0000		
453.55	454.13	0.9324	0.9444	0.9447	0.9995	1.0001	1.0243	1.0184
453.87	454.44	0.8868	0.9064	0.9067	0.9995	1.0003	1.0215	1.0165
454.17	454.75	0.8431	0.8694	0.8697	0.9996	1.0006	1.0190	1.0148
454.33	454.92	0.8188	0.8486	0.8489	0.9998	1.0008	1.0176	1.0139
454.83	455.43	0.7461	0.7803	0.7856	0.9935	1.0017	1.0366	1.0115
455.18	455.78	0.6955	0.7404	0.7405	1.0017	1.0024	1.0117	1.0099
455.48	456.09	0.6512	0.7003	0.7003	1.0028	1.0031	1.0098	1.0086
455.79	456.41	0.6058	0.6586	0.6583	1.0041	1.0039	1.0082	1.0074
456.11	456.74	0.5596	0.6153	0.6147	1.0057	1.0049	1.0066	1.0063
456.48	457.12	0.5067	0.5646	0.5637	1.0079	1.0061	1.0050	1.0051
456.85	457.50	0.4531	0.5121	0.5108	1.0103	1.0074	1.0037	1.0041
457.19	457.86	0.4031	0.4619	0.4603	1.0133	1.0088	1.0030	1.0032
457.65	458.33	0.3386	0.3953	0.3932	1.0167	1.0107	1.0016	1.0022
458.05	458.73	0.2835	0.3365	0.3342	1.0203	1.0125	1.0009	1.0016
458.26	458.95	0.2545	0.3048	0.3024	1.0223	1.0135	1.0006	1.0013
458.60	459.29	0.2083	0.2532	0.2507	1.0257	1.0152	1.0002	1.0008
458.82	459.51	0.1791	0.2198	0.2174	1.0279	1.0163	1.0001	1.0006
459.22	459.90	0.1263	0.1578	0.1557	1.0322	1.0184	0.9999	1.0003
459.49	460.17	0.0909	0.1150	0.1133	1.0352	1.0199	0.9999	1.0002

459.75	460.42	0.0587	0.0751	0.0739	1.0380	1.0212	0.9999	1.0001
459.94	460.61	0.0343	0.0443	0.0435	1.0402	1.0223	0.9999	1.0000
460.22	460.87	0.0000	0.0000	0.0000			1.0000	1.0000