

Table S1. Properties, ρ and n_D , measured at 298.15 K and atmospheric pressure for pure compounds

Compounds	Moisture, ppm	$\rho/(\text{kg}\cdot\text{m}^{-3})$		n_D	
		exp.	lit.	exp.	lit.
[bpy][BF ₄]	478	1214.30	1214.04 ⁴	1.4451	1.4455 ⁴
[b2mpy][BF ₄]	507	1201.14	1202.17 ⁷ 1201.38 ²⁵	1.4548	1.4545 ⁷ 1.4577 ²⁵
[b3mpy][BF ₄]	513	1182.70	1182.19 ⁵ 1182.60 ²⁵	1.4472	1.4473 ⁵ 1.4511 ²⁵
[b4mpy][BF ₄]	403	1182.69	1183.49 ⁶ 1182.60 ²⁵	1.4520	1.4517 ⁶ 1.4525 ²⁵
1-Chloropropane	102	883.95	883.0 ¹⁹	1.3850	1.3851 ¹⁹
1-Chlorobutane	91	880.71	880.90 ¹⁹ 880.72 ²²	1.4005	1.4001 ¹⁹
1-Chloropentane	82	876.91	876.90 ¹⁹ 876.92 ²⁶	1.4101	1.4100 ¹⁹ 1.4099 ²⁶
1-Bromoethane	101	1451.52	1450.5 ¹⁹	1.4210	1.4212 ¹⁹
1-Bromopropane	75	1342.56	1345.2 ¹⁹	1.4319	1.4317 ¹⁹
1-Bromobutane	89	1267.28	1268.7 ¹⁹	1.4381	1.4378 ¹⁹
1-Bromopentane	110	1210.67	1211.9 ¹⁹	1.4417	1.4420 ¹⁹
1,1-Dichloromethane	149	1316.44	1316.80 ¹⁹ 1316.20 ²⁰	1.4210	1.42115 ¹⁹ 1.4213 ²⁰
1,2-Dichloroethane	79	1245.81	1245.80 ¹⁹ 1245.61 ²⁰ 1245.50 ²³	1.4420	1.4421 ^{19,20} 1.4422 ²¹
1,3-Dichloropropane	56	1178.32	1181.80 ²⁰ 1178.45 ²¹ 1178.66 ²⁴	1.4457	1.4460 ²⁰ 1.4455 ²¹ 1.4459 ²⁴
1,4-Dichlorobutane	75	1133.42	1135.30 ²⁰ 1133.70 ²³ 1133.75 ³⁵	1.4520	1.4522 ²⁰ 1.4524 ²¹ 1.4519 ²⁴
1,5-Dichloropentane	131	1095.16	1095.60 ²⁰ 1095.27 ²¹	1.4540	1.4541 ²⁰ 1.4545 ²¹
1,6-Dichlorohexane	145	1063.52	1067.59 ²¹ 1063.70 ²² 1063.80 ²³	1.4554	1.4555 ²¹
Dibromomethane	132	2476.97	2484.20 ¹⁹ 2478.37 ²⁷	1.5390	1.5367 ³¹ 1.5389 ³²
1,2-Dibromoethane	214	2168.37	2168.26 ²⁸ 2168.50 ²⁹	1.5358	1.5360 ³² 1.5356 ³³
1,3-Dibromopropane	245	1970.24	1970.14 ²⁸ 1971.37 ³⁰	1.5201	1.5298 ³² 1.5204 ³³
1,4-Dibromobutane	217	1819.40	1819.90 ²⁸ 1820.41 ³⁰	1.5161	1.5169 ³² 1.5167 ³³
1,5-Dibromopentane	294	1692.9	1692.49 ²⁸ 1692.81 ³⁰	1.5098	1.5103 ³² 1.5102 ³³
1,6-Dibromohexane	198	1602.51	1602.49 ²⁸ 1696.58 ³⁰	1.5070	1.5054 ³²

(4) Espiau, F.; Ortega, J.; Fernández, L.; Wisniak, J. Liquid-Liquid Equilibria in Binary Solutions Formed by [Pyridinium-Derived][F4B] Ionic Liquids and Alkanols: New Experimental Data and Validation of a Multiparametric Model for Correlating LLE Data. *Ind. & Eng. Chem. Res.* **2011**, *50*, 12259-12270.

(5) Ortega, J.; Vreekamp, R.; Marrero, E.; Penco, E. Thermodynamic properties of 1-butyl-3-methylpyridinium tetrafluoroborate and its mixtures with water and alkanols. *J. Chem. Eng. Data* **2007**, *52*, 2269-2276.

(6) Ortega, J.; Vreekamp, R.; Penco, E.; Marrero, E. Mixing thermodynamic properties of 1-butyl-4-methylpyridinium tetrafluoroborate [b4mpy][BF₄] with water and with an alkane-1-ol (methanol to pentanol). *J. Chem. Thermodyn.* **2008**, *40*, 1087-1094.

(7) Navas, A.; Ortega, J.; Vreekamp, R.; Marrero, E.; Palomar, J. Experimental Thermodynamic Properties of 1-Butyl-2-methylpyridinium Tetrafluoroborate [b2mpy][BF₄] with Water and with Alkan-1-ol and Their Interpretation with the COSMO-RS Methodology. *Ind. & Eng. Chem. Res.* **2009**, *48*, 2678-2690.

(8) Vreekamp, R.; Castellano, D.; Palomar, J.; Ortega, J.; Espiau, F.; Fernandez, L.; Penco, E. Thermodynamic Behavior of the Binaries 1-Butylpyridinium Tetrafluoroborate with Water and Alkanols: Their Interpretation Using ¹H-NMR Spectroscopy and Quantum-Chemistry Calculations. *J. Phys. Chem. B* **2011**, *115*, 8763-8774.

(9) Letcher, T.M.; Ramjugernath, D.; Tumba, K.; Królikowski, M.; Domanska, U. Solid+liquid) and (liquid+liquid) phase equilibria study and correlation of the binary systems {N-butyl-3-methylpyridinium tosylate+water, or +an alcohol, or +a hydrocarbon}. *Fluid Phase Equilib.* **2010**, *294*, 89-97.

(10) Meindersma, W.; van Acker, T.; de Haan, A.B. Physical properties of 3-methyl-N-butylpyridinium tricyanomethanide and ternary LLE data with an aromatic and an aliphatic hydrocarbon at T = (303.2 and 328.2) K and p = 0.1 MPa. *Fluid Phase Equilib.* **2011**, *307*, 30-38.

(11) Jongmans, M.T.G.; Raijmakers, M.; Schuur, B.; de Haan, A.B. Binary and Ternary Vapor-Liquid Equilibrium Data of the System (Ethylbenzene + Styrene + 4-Methyl-N-butylpyridinium Tetrafluoroborate) at Vacuum Conditions and Liquid-Liquid Equilibrium Data of Their Binary Systems. *J. Chem. Eng. Data* **2012**, *57*, 626-633.

(12) Shiflett, M.B.; Yokozeki, A. Solubility Differences of Halocarbon Isomers in Ionic Liquid [emim][Tf₂N]. *J. Chem. Eng. Data* **2007**, *52*, 2007-2015.

(13) Deive, F.J.; Rodríguez, A.; Pereiro, A.B.; Shimizu, K.; Forte, P.A.S.; Romão, C.C.; José N. Canonjía Lopes, J.N.; Esperança, J.M.S.S.; Rebelo, L.P.N. Phase Equilibria of Haloalkanes Dissolved in Ethylsulfate- or Ethylsulfonate-Based Ionic Liquids. *J. Phys. Chem. B* **2010**, *114*, 7329-7337.

(14) Cai, S.; Wang, L.; Yang, G.; Li, Y. Solubilities of 1-Methyl-3-(3-sulfopropyl)-imidazolium Hydrogen Sulfate in Selected Solvents. *Chinese J. of Chem. Eng.* **2010**, *18*, 1008-1012.

(15) Cai, S.; Wang, L. Mutual solubilities of selected solvents and 1-(2-hydroxyethyl)-3-methylimidazolium tetrafluoroborate. *Phys. Chem. Liq.* **49**, **2011**, 97-107.

(16) Renon, H.; Prausnitz, J.M. Local compositions in thermodynamic excess functions of liquid mixtures, *AIChE J.* **1968**, *114*, 135-144.

(17) Simulation Software: *ASPEN PLUS of ASPENTECH, Aspen Physical Properties System 2004.1 Physical Property Methods and Models*; Aspen Technology Inc, Cambridge, MA 02141-2201.

- (18) Ko, M.; Im, J.; Sung, J.Y.; Kim, H. Liquid-Liquid Equilibria for the Binary Systems of Sulfolane with Alkanes. *J. Chem. Eng. Data* **2007**, 52, 1464-1467.
- (19) Riddick, J. A.; Bunger, W. B., Sakano, T. K. *Organic Solvents: Physical Properties and Methods of Purification*, 4th ed.; Techniques of Chemistry, Vol. II; Wiley-Interscience: New York, 1986.
- (20) TRC. *Thermodynamic Tables Non-Hydrocarbons & Hydrocarbons*. Thermodynamic Research Center, Texas A&M University System: College Station, TX, 1991.
- (21) Ortega, J.; Plácido, J. Excess enthalpy of some alpha,omega-dichloroalkane (C2-C6) + normal alkane (C5-C17) mixtures. *Int. Data Ser. Sel. Data Mixtures. Ser. A* **1993**, 21, 1-37.
- (22) García-Gimenez, P.; Martínez-Lopez, J.F.; Artal, M.; Velasco, I.; Otín, S. Excess enthalpies and Isothermal (vapor+liquid) equilibria of (1-methyl-2-pyrrolidone +1-chloroalkane or + α,ω -dichloroalkane) mixtures. *J. Chem. Thermodyn.* **2008**, 40, 973-979.
- (23) García-Gimenez, P.; Martínez-Lopez, J.F.; Blanco, S.T.; Velasco, I.; Otín, S. Density and Isothermal Compressibilities at pressure up to 20 MPa of the Systems N,N-Dimethylformamide or N,N-Dimethylacetamide+ α,ω -Dichloroalkane. *J. Chem. Eng. Data* **2007**, 52, 2368-2374.
- (24) Artal, M.; Muñoz-Embid, J.; Velasco, I.; Otín, S. Analysis of {[α,ω -dichloroalkane or α,ω -dibromoalkane]+benzene and α,ω -dichloroalkane+tetrachloromethane} mixtures in terms of group contributions. *Phys. Chem. Liq.* **2000**, 38, 537-551.
- (25) Bandrés, I.; Royo, F.M.; Gascón, I.; Castro, M.; Lafuente, C. Thermophysical comparative study of two isomeric pyridinium-based ionic Liquids. *J. Phys. Chem. B* **2008**, 112, 3077-3084.
- (26) Ortega, J.; Matos, J.S.; Paz, M.I.; Fernández, J. Excess Molar Volumes of Ethyl Formate or Ethyl Acetate+1-Chloroalkane at 298.15. *J. Chem. Eng. Data* **1987**, 32, 464-466.
- (27) García-Giménez, P.; Gil-Hernández, V.; Velasco, I.; Emid, J.M.; Otín, S. Temperature and Pressure Dependence of the Volumetric Properties of Binary Liquid Mixtures Containing Dihaloalkanes. *Int. J. Thermophys.* **2005**, 26, 665-678.
- (28) Ortega, J. Plácido, J. *Int. Data Ser. Sel. Data Mixtures Ser. A* **1995**, 26, 285-319.
- (29) Mussari, L.; Postigo, M.; Lafuente, C.; Royo, F.M.; Urieta, J.S. Viscosity measurements for the binary mixtures of 1,2-dichloroethane or 1,2-dibromoethane with isomeric butanols. *J. Chem. Eng. Data* **2000**, 45, 86-91.
- (30) Ernst, S.; Zewski, M.C.; Trkaczyk, M.; Goralski, P. Heat capacities and densities of α,ω -dibromoalkanes as functions of temperature a group additivity analysis. *Fluid Phase Equilib.* **2000**, 174, 33-39.
- (31) Blanco, S.; Muñoz, J.; Velasco, I.; Otín, S. Excess Molar Enthalpies of Binary Mixtures Containing Mono- and Polybromoalkanes at 298.15 K. *J. Chem. Eng. Data* **1995**, 40, 605-606.
- (32) Vidal, M.; Ortega, J.; Plácido, J. Excess enthalpies of 12 binary liquid mixtures of α,ω -dibromoalkanes (C2,C4,C6)+benzene, toluene, ethylbenzene, or butylbenzene at 298.15 K. *ELDATA: Int. Electron. J. Phys. Chem. Data* **1996**, 2, 121-130.
- (33) Vidal, M.; Ortega, J.; Plácido, J. Thermodynamic properties of (an ethyl ester + an n-alkane) IX. H^E and V^E for $\{xCH_3(CH_2)_uCOOCH_2CH_3+(1-x)CH_3(CH_2)_{2v}+1CH_3\}$ with $u=0$ to 5, and $v=1$ to 7. *J. Chem. Thermodyn.* **1997**, 29, 47-74.

Table S2. LLE experimental (x_{IL}, T) values for binaries of [bpy][BF₄] or [bYmpy][BF₄] (Y=2,3,4) with CH₃(CH)_{*n*-1}Cl (*n*=3-5) at atmospheric pressure

x_{IL}	T / K	x_{IL}	T / K	x_{IL}	T / K	x_{IL}	T / K
[bpy][BF ₄]+1-chloropropane							
0.851	285.35	0.830	304.41	0.818	308.41	0.791	312.62
0.842	299.13						
[bpy][BF ₄]+1-chlorobutane							
0.830	345.26	0.845	326.26	0.876	309.36	0.889	303.85
[bpy][BF ₄]+1-chloropentane							
0.875	366.98	0.900	344.92	0.913	335.97	0.935	310.56
[b2mpy][BF ₄]+1-chloropropane							
0.710	290.94	0.665	299.96	0.602	309.00	0.577	313.25
0.680	296.92	0.618	306.92				
[b2mpy][BF ₄]+1-chlorobutane							
0.680	343.40	0.700	338.54	0.730	331.16	0.761	322.30
[b2mpy][BF ₄]+1-chloropentane							
0.815	360.78	0.843	344.38	0.874	327.75	0.897	314.81
[b3mpy][BF ₄]+1-chloropropane							
0.629	289.85	0.616	299.45	0.565	309.03	0.540	311.43
[b3mpy][BF ₄]+1-chlorobutane							
0.665	343.00	0.709	330.40	0.740	321.84		
[b3mpy][BF ₄]+1-chloropentane							
0.776	362.71	0.803	345.60	0.849	323.36	0.870	310.07
[b4mpy][BF ₄]+1-chloropropane							
0.636	293.04	0.601	302.20	0.590	306.65	0.544	311.37
[b4mpy][BF ₄]+1-chlorobutane							
0.829	345.26	0.845	326.26	0.876	309.36	0.889	303.85
[b4mpy][BF ₄]+1-chloropentane							
0.764	374.38	0.811	340.51	0.834	326.96	0.864	312.86
0.789	356.80						

Table S3. LLE experimental (x_{IL}, T) values for binaries of [bpy][BF₄] or [bYmpy][BF₄] (Y=2,3,4) with CH₃(CH)_{*n*-1}Br (*n*=2-5) at atmospheric pressure

x_{IL}	T / K	x_{IL}	T / K	x_{IL}	T / K
[bpy][BF ₄]+1-bromoethane					
0.681	304.06	0.701	301.12	0.721	295.57
[bpy][BF ₄]+1-bromopropane					
0.821	333.77	0.831	314.57	0.851	291.65
[bpy][BF ₄]+1-bromobutane					
0.879	343.18	0.893	327.35	0.907	313.63
0.918	304.37				
[bpy][BF ₄]+1-bromopentane					
0.913	374.37	0.922	362.90	0.932	351.56
0.938	343.25	0.945	335.48	0.952	326.11
[b2mpy][BF ₄]+1-bromoethane					
0.654	310.11	0.673	300.21	0.689	298.51
[b2mpy][BF ₄]+1-bromopropane					
0.795	332.55	0.807	317.96	0.820	299.58
[b2mpy][BF ₄]+1-bromobutane					
0.859	362.89	0.865	358.24	0.871	353.08
0.877	346.05	0.891	335.28	0.898	328.52
0.904	322.56	0.914	313.99	0.923	304.08
[b2mpy][BF ₄]+1-bromopentane					
0.893	376.51	0.905	364.74	0.915	354.07
0.926	343.25	0.937	330.86	0.951	316.63
[b3mpy][BF ₄]+1-bromoethane					
0.592	306.18	0.600	303.20	0.608	300.85
0.616	298.03				
[b3mpy][BF ₄]+1-bromopropane					
0.708	338.04	0.725	329.63	0.734	313.60
0.754	300.58				
[b3mpy][BF ₄]+1-bromobutane					
0.820	358.92	0.838	347.38	0.854	334.67
0.878	323.02	0.887	317.33		
[b3mpy][BF ₄]+1-bromopentane					
0.879	370.47	0.889	361.51	0.899	352.00
0.910	344.57	0.923	335.83	0.934	326.65
0.946	315.09	0.958	303.97		
[b4mpy][BF ₄]+1-bromoethane					
0.621	308.93	0.651	293.25	0.635	300.19
[b4mpy][BF ₄]+1-bromopropane					
0.716	343.04	0.732	329.94	0.749	320.65

0.764	313.11	0.802	295.37		
[b4mpy][BF ₄]+1-bromobutane					
0.833	356.48	0.845	346.36	0.861	330.03
0.877	320.30	0.893	300.84		
[b4mpy][BF ₄]+1-bromopentane					
0.870	372.82	0.881	366.30	0.891	353.05
0.901	347.89	0.912	341.25	0.923	335.22
0.934	324.10	0.945	314.72	0.957	300.49

Table S4. LLE experimental (x_{IL}, T) values for binaries of [bpy][BF₄] or [bYmpy][BF₄] (Y=2,3,4) with 1, ω -Cl(CH₂)_nCl ($\omega=n=3-6$) at atmospheric pressure

x_{IL}	T / K	x_{IL}	T / K	x_{IL}	T / K
[bpy][BF ₄]+1,3-dichloropropane					
0.007	288.86	0.080	349.62	0.214	332.31
0.008	291.43	0.111	350.72	0.224	328.77
0.011	295.02	0.122	350.59	0.234	324.77
0.012	295.33	0.132	349.76	0.245	321.38
0.014	306.72	0.142	348.92	0.256	316.65
0.021	318.89	0.152	348.03	0.266	311.45
0.031	331.33	0.162	346.30	0.277	306.64
0.040	339.26	0.173	343.48	0.287	301.68
0.049	343.57	0.183	341.60	0.298	296.14
0.060	346.69	0.193	338.79	0.308	290.71
0.071	348.51	0.203	335.92	0.318	286.11
[bpy][BF ₄]+1,4-dichlorobutane					
0.007	307.15	0.392	418.39	0.489	339.87
0.007	309.05	0.403	409.06	0.497	332.48
0.010	313.80	0.413	401.02	0.506	325.55
0.011	314.51	0.421	393.45	0.516	319.02
0.013	314.95	0.431	385.01	0.525	310.93
0.014	348.15	0.440	378.75	0.535	305.98
0.016	353.84	0.449	370.20	0.543	300.13
0.019	357.91	0.459	360.89	0.552	293.53
0.019	373.15	0.468	355.40	0.561	288.85
0.382	424.06	0.478	347.56	0.568	284.36
[bpy][BF ₄]+1,5-dichloropentane					
0.001	305.29	0.641	414.95	0.715	348.85
0.003	318.93	0.649	409.01	0.723	340.55
0.004	326.41	0.657	401.23	0.733	329.47
0.006	382.83	0.665	395.76	0.744	327.07
0.006	410.63	0.674	388.67	0.763	309.44
0.591	452.08	0.684	382.17	0.770	303.43
0.619	431.38	0.695	371.60	0.781	296.97
0.633	419.09	0.705	362.57	0.783	292.77
[bpy][BF ₄]+1,6-dichlorohexane					
0.002	326.87	0.763	422.95	0.856	334.25
0.003	349.55	0.793	404.25	0.888	318.45
0.005	370.35	0.811	387.35	0.919	309.45
0.007	420.05	0.826	368.05	0.973	296.85
0.733	441.85	0.842	341.45		
[b2mpy][BF ₄]+1,4-dichlorobutane					
0.025	295.90	0.101	323.04	0.255	315.45
0.039	310.08	0.120	323.98	0.281	311.53
0.048	314.75	0.140	323.78	0.312	303.46

0.069	321.37	0.160	323.48	0.343	293.10
0.081	322.00	0.190	322.30		
0.091	323.08	0.231	318.74		
[b2mpy][BF ₄]+1,5-dichloropentane					
0.006	328.89	0.016	434.03	0.603	367.89
0.008	351.55	0.490	437.05	0.629	353.10
0.009	365.43	0.520	422.44	0.652	340.60
0.011	386.40	0.537	408.68	0.689	321.61
0.013	414.94	0.565	388.86		
[b2mpy][BF ₄]+1,6-dichlorohexane					
0.002	296.25	0.801	353.32	0.779	376.25
0.004	301.58	0.008	382.37	0.754	395.93
0.007	314.64	0.834	318.35	0.723	418.25
0.826	331.35	0.847	300.55	0.692	444.73
[b3mpy][BF ₄]+1,5-dichloropentane					
0.005	296.85	0.020	377.62	0.323	437.45
0.007	304.85	0.022	385.09	0.362	422.82
0.008	308.24	0.025	395.10	0.402	402.59
0.010	310.28	0.027	398.45	0.432	384.35
0.012	335.29	0.031	402.30	0.466	368.25
0.014	344.68	0.033	407.10	0.494	349.58
0.016	359.35	0.035	408.85	0.523	329.49
0.018	367.68	0.039	412.67	0.553	311.55
[b3mpy][BF ₄]+1,6-dichlorohexane					
0.753	310.53	0.735	330.64	0.643	410.58
0.723	344.05	0.687	376.74	0.622	421.46
0.702	363.77	0.662	395.65		
[b4mpy][BF ₄]+1,5-dichloropentane					
0.003	282.48	0.140	421.67	0.493	386.92
0.008	291.56	0.173	422.20	0.517	378.30
0.011	294.34	0.204	422.97	0.540	368.51
0.013	300.24	0.236	423.31	0.561	359.32
0.020	309.09	0.269	423.59	0.582	349.71
0.022	328.69	0.301	423.33	0.601	340.50
0.027	339.56	0.324	422.18	0.620	330.76
0.034	353.49	0.355	420.48	0.639	320.21
0.041	363.88	0.384	416.92	0.657	310.09
0.065	381.48	0.412	410.44	0.673	292.77
0.081	399.77	0.441	402.93		
0.110	412.43	0.464	395.96		
[b4mpy][BF ₄]+1,6-dichlorohexane					
0.003	307.64	0.008	397.28	0.702	354.35
0.004	348.75	0.586	439.38	0.730	327.45
0.005	370.35	0.613	416.57	0.765	296.50
0.006	384.25	0.646	397.57		
0.007	392.35	0.673	378.65		

Table S5. LLE experimental (x_{IL}, T) values for binaries of [bpy][BF₄] or [bYmpy][BF₄] (Y=2,3,4) with 1, ω -Br(CH) _{n -1}Br ($\omega=n=1-6$) at atmospheric pressure

x_{IL}	T / K	x_{IL}	T / K	x_{IL}	T / K
[bpy][BF ₄]+dibromomethane					
0.003	306.40	0.222	364.12	0.235	325.19
0.004	339.27	0.225	352.78	0.238	316.03
0.004	346.07	0.229	342.62	0.245	300.31
0.005	359.78	0.233	333.41		
[bpy][BF ₄]+1,2-dibromoethane					
0.005	356.08	0.504	365.82	0.574	318.04
0.007	395.04	0.520	352.90	0.590	304.58
0.450	402.47	0.536	341.66	0.594	303.42
0.462	392.19	0.554	331.79	0.604	292.95
0.477	383.12	0.565	324.08		
0.490	374.37	0.573	317.91		
[bpy][BF ₄]+1,3-dibromopropane					
0.004	324.89	0.016	405.69	0.470	361.65
0.007	354.39	0.019	420.28	0.489	352.98
0.009	367.86	0.020	423.15	0.507	343.39
0.010	377.16	0.022	430.57	0.530	332.60
0.012	384.89	0.406	389.29	0.552	324.04
0.014	393.99	0.420	381.89	0.576	311.51
0.015	397.99	0.435	375.61	0.598	300.04
0.016	404.04	0.451	369.33	0.617	289.37
[bpy][BF ₄]+1,4-dibromobutane					
0.002	308.49	0.615	392.68	0.701	341.31
0.003	339.41	0.632	381.26	0.719	324.08
0.004	351.82	0.651	371.31	0.737	306.43
0.005	369.63	0.665	361.50	0.752	297.25
0.006	394.08	0.681	351.42	0.767	288.16
[bpy][BF ₄]+1,5-dibromopentane					
0.001	315.91	0.763	403.37	0.818	359.83
0.003	389.16	0.771	398.66	0.830	347.60
0.719	437.78	0.778	393.24	0.843	333.33
0.728	431.47	0.787	387.71	0.857	317.35
0.737	424.07	0.794	383.75	0.870	302.84
0.746	415.84	0.803	373.63	0.877	297.27
0.756	410.95	0.810	365.51	0.899	279.07
[b2mpy][BF ₄]+1,2-dibromoethane					
0.001	304.47	0.001	338.32	0.003	391.85
0.001	313.92	0.002	364.90	0.003	399.40
0.001	323.93	0.002	380.74		
[b2mpy][BF ₄]+1,4-dibromobutane					
0.004	298.64	0.015	358.52	0.024	383.58

0.009	328.92	0.018	368.93	0.028	391.99
0.012	344.99	0.021	378.12		
[b2mpy][BF ₄]+1,5-dibromopentane					
0.001	292.34	0.003	324.79	0.008	407.24
0.001	300.56	0.004	342.30	0.010	429.35
0.002	309.80	0.004	350.50		
0.003	322.63	0.006	377.18		
[b2mpy][BF ₄]+1,6-dibromohexane					
0.002	343.91	0.004	380.12	0.006	409.07
[b3mpy][BF ₄]+1,2-dibromoethane					
0.001	318.88	0.001	332.70	0.003	383.84
0.001	325.38	0.002	350.99	0.004	397.28
0.001	305.48	0.002	359.34	0.005	412.59
[b3mpy][BF ₄]+1,4-dibromobutane					
0.006	299.62	0.021	344.50	0.044	369.01
0.010	313.24	0.028	355.23	0.053	374.12
0.012	323.19	0.033	362.58		
0.015	331.30	0.038	367.22		
[b3mpy][BF ₄]+1,5-dibromopentane					
0.002	295.42	0.005	347.32	0.014	411.23
0.003	326.40	0.006	359.68	0.016	420.15
0.004	336.00	0.008	381.04		
[b3mpy][BF ₄]+1,6-dibromohexane					
0.003	373.79	0.005	410.32	0.008	428.78
0.004	397.13	0.006	417.33		
[b4mpy][BF ₄]+1,2-dibromoethane					
0.001	291.14	0.004	347.39	0.007	379.78
0.002	338.17	0.004	354.31	0.009	393.73
0.002	321.14	0.006	364.70	0.010	403.54
[b4mpy][BF ₄]+1,4-dibromobutane					
0.007	301.16	0.048	351.94	0.127	363.35
0.012	312.21	0.072	359.22	0.164	361.93
0.030	338.78	0.098	362.19	0.201	362.00
[b4mpy][BF ₄]+1,5-dibromopentane					
0.003	312.41	0.007	349.92	0.011	387.19
0.004	324.93	0.008	361.88	0.013	396.71
0.005	338.44	0.010	376.19		
[b4mpy][BF ₄]+1,6-dibromohexane					
0.001	315.43	0.002	343.76	0.004	402.19
0.001	316.29	0.003	378.10	0.005	417.99

Table S6. Coefficients obtained in the application of the models given by Eq (3) and Eq (12) to LLE data measured for this work showing the corresponding standard deviation of the composition $s(x_{IL})$, Eq (14)

[bpy][BF ₄]+1-chloropropane							
Proposed model, Eq (3)				NRTL, Eq (12)			
i	1	2	3	i	1	2	3
g_{1i}	43.40	-8137.31	-288.74	Δg_{12i}	942.64	-40427.01	-141.29
g_{2i}	76643.52	525.87	-154578.34	Δg_{21i}	983.22	-40493.89	-147.12
		k	1.782			α	0.278
$s(x_{IL})$			0.000				0.000
[bpy][BF ₄]+1-chlorobutane							
g_{1i}	-51.57	18029.78	782.40	Δg_{12i}	-388.86	19493.65	57.35
g_{2i}	-199493.79	-1362.97	362956.60	Δg_{21i}	-1106.72	55078.87	163.49
		k	0.922			α	0.327
$s(x_{IL})$			0.000				0.002
[bpy][BF ₄]+1-chloropentane							
g_{1i}	2.24	3681.87	-20.89	Δg_{12i}	-13.12	1969.62	1.40
g_{2i}	435.63	14.34	-2352.97	Δg_{21i}	-13.10	2144.70	2.70
		k	1.361			α	0.184
$s(x_{IL})$			0.002				0.004
[b2mpy][BF ₄]+1-chloropropane							
g_{1i}	-30.68	10775.24	-251.59	Δg_{12i}	-145.80	9696.63	19.94
g_{2i}	72969.36	297.18	-96736.25	Δg_{21i}	-470.64	23848.03	70.26
		k	0.980			α	0.226
$s(x_{IL})$			0.000				0.001
[b2mpy][BF ₄]+1-chlorobutane							
g_{1i}	-100.21	28584.89	-968.99	Δg_{12i}	-282.86	15348.18	40.68
g_{2i}	337680.03	878.86	-353244.04	Δg_{21i}	-2420.48	112479.97	360.28
		k	1.245			α	0.172
$s(x_{IL})$			0.000				0.007
[b2mpy][BF ₄]+1-chloropentane							
g_{1i}	7.42	3283.22	-238.10	Δg_{12i}	-58.48	3617.48	8.44
g_{2i}	66712.60	201.39	-65565.52	Δg_{21i}	-257.56	10670.97	40.30
		k	2.337			α	0.238
$s(x_{IL})$			0.000				0.001
[b3mpy][BF ₄]+1-chloropropane							
g_{1i}	68.65	18621.40	-224.56	Δg_{12i}	313.58	-12135.21	-48.13
g_{2i}	62724.16	691.62	-209136.77	Δg_{21i}	123.66	-4039.81	-17.29
		k	0.702			α	0.160
$s(x_{IL})$			0.000				0.001
[b3mpy][BF ₄]+1-chlorobutane							
g_{1i}	-2.506	2411.128	-207.74	Δg_{12i}	-122.82	7268.30	17.21
g_{2i}	73747.326	86.570	-44578.50	Δg_{21i}	-568.10	22255.83	88.14
		k	0.800			α	0.154
$s(x_{IL})$			0.000				0.000

[b3mpy][BF ₄]+1-chloropentane							
g_{1i}	20.90	-1470.47	-178.56	Δg_{12i}	-39.88	2389.02	5.90
g_{2i}	46367.26	166.99	-50302.62	Δg_{21i}	-249.72	10844.16	38.86
		k	1.970			α	0.265
$s(x_{IL})$			0.001				0.005
[b4mpy][BF ₄]+1-chloropropane							
g_{1i}	355.62	-92078.31	14.55	Δg_{12i}	61,04	-7,83	-10,83
g_{2i}	-26095.73	768.92	-190805.54	Δg_{21i}	82,64	1,67	-12,50
		k	1.745			α	0.179
$s(x_{IL})$			0.000				0.000
[b4mpy][BF ₄]+1-chlorobutane							
g_{1i}	23.54	-4071.49	-301.30	Δg_{12i}	-242.20	13706.51	34.38
g_{2i}	87320.28	360.99	-114221.92	Δg_{21i}	-251.10	6605.83	41.75
		k	1.586			α	0.140
$s(x_{IL})$			0.000				0.002
[b4mpy][BF ₄]+1-chloropentane							
g_{1i}	-11.30	5293.11	-52.60	Δg_{12i}	-256.64	13419.72	37.17
g_{2i}	52390.19	-223.69	20245.70	Δg_{21i}	-677.62	30720.36	102.50
		k	0.862			α	0.149
$s(x_{IL})$			0.001				0.005
[bpy][BF ₄]+1-bromoethane							
g_{1i}	390.83	-123200.81	-7766.49	Δg_{12i}	-274.29	12739.04	40.78
g_{2i}	2408597.89	12721.79	-3977811.29	Δg_{21i}	-9433.07	417077.66	1411.59
		k	0.800			α	0.254
$s(x_{IL})$			0.000				0.000
[bpy][BF ₄]+1-bromopropane							
g_{1i}	3.66	1194.21	-6.30	Δg_{12i}	-1.49	799.35	0.25
g_{2i}	-136.15	0.91	-113.73	Δg_{21i}	6.88	1197.28	-0.40
		k	0.806			α	0.314
$s(x_{IL})$			0.003				0.000
[bpy][BF ₄]+1-bromobutane							
g_{1i}	2.21	1340.03	243.43	Δg_{12i}	-88.49	5158.14	12.32
g_{2i}	-13789.40	-483.11	75755.10	Δg_{21i}	-150.56	4075.68	25.82
		k	0.812			α	0.100
$s(x_{IL})$			0.000				0.002
[bpy][BF ₄]+1-bromopentane							
g_{1i}	12.25	-1543.86	-3.38	Δg_{12i}	-11.42	1277.33	1.79
g_{2i}	3631.50	-23.46	3555.91	Δg_{21i}	-64.31	1943.19	11.47
		k	0.818			α	0.295
$s(x_{IL})$			0.001				0.001
[b2mpy][BF ₄]+1-bromoethane							
g_{1i}	67.85	-18398.09	-267.95	Δg_{12i}	-224.92	2883.61	38.00
g_{2i}	78294.97	345.04	-106247.20	Δg_{21i}	16286.71	-750756.0	-2415.1
		k	0.832			α	0.291

$s(x_{IL})$	0.008			0.005			
[b2mpy][BF ₄]+1-bromopropane							
g_{1i}	-13.02	3817.19	80.09	Δg_{12i}	-445.93	20494.17	66.19
g_{2i}	35790.56	-441.51	38284.57	Δg_{21i}	-3022.31	136394.50	451.79
			0.937			α	0.168
$s(x_{IL})$	0.001			0.000			
[b2mpy][BF ₄]+1-bromobutane							
g_{1i}	1.48	1382.73	-531.27	Δg_{12i}	6.90	-2.45	-0.85
g_{2i}	257259.41	317.16	-211294.16	Δg_{21i}	-48.68	2.90	9.90
		k	1.008			α	0.258
$s(x_{IL})$	0.001			0.003			
[b2mpy][BF ₄]+1-bromopentane							
g_{1i}	10.92	-359.15	-130.77	Δg_{12i}	-32.93	1693.55	5.32
g_{2i}	68952.00	41.58	-46770.47	Δg_{21i}	-247.77	11179.23	38.33
			1.100			α	0.322
$s(x_{IL})$	0.000			0.011			
[b3mpy][BF ₄]+1-bromoethane							
g_{1i}	-120.79	32529.49	-292.96	Δg_{12i}	7.37	0.41	-1.51
g_{2i}	100968.92	-490.96	91996.45	Δg_{21i}	-192.79	-1.55	35.63
		k	0.837			α	0.166
$s(x_{IL})$	0.000			0.002			
[b3mpy][BF ₄]+1-bromopropane							
g_{1i}	4.18	-1258.56	-234.57	Δg_{12i}	-210.76	10063.63	30.90
g_{2i}	81148.48	165.78	-82980.40	Δg_{21i}	-3078.02	141755.39	458.69
			1.152			α	0.143
$s(x_{IL})$	0.005			0.005			
[b3mpy][BF ₄]+1-bromobutane							
g_{1i}	3.62	1776.74	-193.07	Δg_{12i}	4.04	-1.17	-0.48
g_{2i}	76444.31	9.97	-29580.56	Δg_{21i}	-88.84	-1.96	16.83
		k	1.299			α	0.225
$s(x_{IL})$	0.002			0.005			
[b3mpy][BF ₄]+1-bromopentane							
g_{1i}	17.58	-1578.15	-126.90	Δg_{12i}	-234.66	13047.02	33.63
g_{2i}	46052.11	60.09	-30468.33	Δg_{21i}	-316.78	12563.16	49.72
		k	1.387			α	0.126
$s(x_{IL})$	0.001			0.003			
[b4mpy][BF ₄]+ 1-bromoetane							
g_{1i}	-68.02	19882.56	26.13	Δg_{12i}	-328.18	14504.04	49.23
g_{2i}	-1587.75	-527.48	129880.09	Δg_{21i}	-207.10	7045.94	33.69
			0.846			α	0.282
$s(x_{IL})$	0.000			0.000			
[b4mpy][BF ₄]+1-bromopropane							
g_{1i}	-116.50	33974.26	-239.98	Δg_{12i}	-362.52	17864.13	52.82

g_{2i}	78756.06	-134.21	8196.32	Δg_{21i}	-999.55	42613.32	152.29
		k	1.587			α	0.113
$s(x_{IL})$			0.002				0.006
[b4mpy][BF ₄]+1-bromobutane							
g_{1i}	7.23	1139.97	-290.25	Δg_{12i}	4.41	0.87	-0.48
g_{2i}	92440.93	220.40	-87464.89	Δg_{21i}	-65.53	-1.54	12.84
		k	2.200			α	0.249
$s(x_{IL})$			0.000				0.008
[b4mpy][BF ₄]+1-bromopentane							
g_{1i}	36.80	-4569.44	-200.46	Δg_{12i}	5.08	2.51	-0.35
g_{2i}	52638.00	141.06	-42051.21	Δg_{21i}	-49.42	3.88	10.02
		k	2.500			α	0.315
$s(x_{IL})$			0.003				0.006
[bpy][BF ₄]+1,3-dichloropropane							
g_{1i}	-34.72	-12.66	-84.09	Δg_{12i}	-61.89	3765.99	8.72
g_{2i}	10900.76	999.50	26548.29	Δg_{21i}	-102.95	6660.85	14.85
		k	0.800			α	0.491
$s(x_{IL})$			0.009				0.009
[bpy][BF ₄]+1,4-dichlorobutane							
g_{1i}	-303.76	-247.09	-336.67	Δg_{12i}	474.73	-25489.32	-71.14
g_{2i}	65206.02	69862.87	19710.60	Δg_{21i}	-1062.45	57456.67	157.34
		k	1.250			α	0.020
$s(x_{IL})$			0.004				0.016
[bpy][BF ₄]+1,5-dichloropentane							
g_{1i}	-5.55	-36.15	25.94	Δg_{12i}	18.87	-450.05	-3.06
g_{2i}	3003.51	11825.74	-15849.98	Δg_{21i}	-61.80	4003.53	9.58
		k	1.226			α	0.198
$s(x_{IL})$			0.003				0.004
[bpy][BF ₄]+1,6-dichlorohexane							
g_{1i}	-36.09	14.78	-72.22	Δg_{12i}	36.25	-990.35	-13.03
g_{2i}	15500.33	-10600.73	23108.34	Δg_{21i}	9.05	1005.71	7.95
		k	2.032			α	0.005
$s(x_{IL})$			0.011				0.077
[b2mpy][BF ₄]+1,4-dichlorobutane							
g_{1i}	0.26	9.070	2.75	Δg_{12i}	-552.28	28050.84	80.59
g_{2i}	582.82	-3260.57	-99.24	Δg_{21i}	13.85	1018.49	-2.44
		k	0.569			α	0.500
$s(x_{IL})$			0.007				0.003
[b2mpy][BF ₄]+1,5-dichloropentane							
g_{1i}	-2.50	-14.51	10.78	Δg_{12i}	-17.37	1884.23	2.18
g_{2i}	2317.69	2523.14	-3998.11	Δg_{21i}	-46.47	3366.69	7.03
		k	1.089			α	0.353
$s(x_{IL})$			0.002				0.002
[b2mpy][BF ₄]+1,6-dichlorohexane							
g_{1i}	6.73	-27.40	30.14	Δg_{12i}	48.64	-1810.53	-7.05

g_{2i}	102.78	5574.47	-8904.80	Δg_{21i}	-2.81	563.80	0.93
		k	1.500			α	0.390
$s(x_{IL})$			0.002				0.003
[b3mpy][BF ₄]+1,5-dichloropentane							
g_{1i}	18.50	-2.31	62.66	Δg_{12i}	24.83	-248.28	-3.96
g_{2i}	-7418.81	-5565.74	-21699.34	Δg_{21i}	119.61	-5270.03	-17.21
		k	1.498			α	0.423
$s(x_{IL})$			0.009				0.010
[b3mpy][BF ₄]+1,6-dichlorohexane							
g_{1i}	-0.596	-225.77	-286.14	Δg_{12i}	14.48	-370.45	-2.11
g_{2i}	129162.82	291.91	-164011.50	Δg_{21i}	-258.15	12652.90	39.35
		k	0.807			α	0.263
$s(x_{IL})$			0.003				0.035
[b4mpy][BF ₄]+1,5-dichloropentane							
g_{1i}	-125.74	1.59	-70.74	Δg_{12i}	1046.58	-52878.36	-136.09
g_{2i}	29490.83	-2520.81	4115.35	Δg_{21i}	-487.25	-23657.56	37.14
		k	2.080			α	0.014
$s(x_{IL})$			0.038				0.059
[b4mpy][BF ₄]+1,6-dichlorohexane							
g_{1i}	2.92	-19.94	40.40	Δg_{12i}	-63.97	4824.63	8.85
g_{2i}	1231.03	1139.83	-12178.48	Δg_{21i}	20.19	362.59	-2.83
		k	1.577			α	0.377
$s(x_{IL})$			0.010				0.011
[bpy][BF ₄]+1,1-dibromomethane							
g_{1i}	15.17	11.19	45.32	Δg_{12i}	-4.31	536.99	0.40
g_{2i}	-4891.90	-9050.46	-11767.23	Δg_{21i}	34.40	-905.31	-4.58
		k	0.754			α	0.451
$s(x_{IL})$			0.001				0.000
[bpy][BF ₄]+1,2-dibromoethane							
g_{1i}	-12.32	-55.00	59.53	Δg_{12i}	-2.70	485.48	-0.22
g_{2i}	2037.46	14884.09	-32465.85	Δg_{21i}	-34.42	2664.12	6.03
		k	1.106			α	0.125
$s(x_{IL})$			0.001				0.007
[bpy][BF ₄]+1,3-dibromopropane							
g_{1i}	-113.89	-221.98	182.55	Δg_{12i}	139.01	-101.77	-19.37
g_{2i}	19948.60	68475.36	-120611.58	Δg_{21i}	-1449.86	-918.29	176.28
		k	1.195			α	0.011
$s(x_{IL})$			0.003				0.008
[bpy][BF ₄]+1,4-dibromobutane							
g_{1i}	-25.55	-45.67	31.01	Δg_{12i}	10.98	-192.68	-2.18
g_{2i}	7859.08	10910.53	-18414.23	Δg_{21i}	-178.59	10212.70	26.91
		k	1.651			α	0.108
$s(x_{IL})$			0.004				0.006
[bpy][BF ₄]+1,5-dibromopentane							
g_{1i}	4.54	-35.65	38.63	Δg_{12i}	20.86	-390.04	-3.47
g_{2i}	2040.57	5133.51	-9967.38	Δg_{21i}	-36.22	2273.46	6.23

		k	1.801	α				0.147
$s(x_{IL})$			0.004					0.004
[b2mpy][BF ₄]+1,2-dibromoethane								
g_{1i}	2.91	-5.26	43.78	Δg_{12i}	37.99	-1225.89	-6.12	
g_{2i}	16.18	-2730.55	-13612.14	Δg_{21i}	-45.13	3708.79	7.05	
		k	0.955	α				0.218
$s(x_{IL})$			0.005					0.003
[b2mpy][BF ₄]+1,3-dibromopropane								
g_{1i}	-3.08	39.57	-3.04	Δg_{12i}	-713.00	35465.68	104.41	
g_{2i}	1565.03	-16666.42	4182.51	Δg_{21i}	412.93	-17164.28	-61.69	
		k	1.271	α				0.439
$s(x_{IL})$			0.017					0.012
[b2mpy][BF ₄]+1,4-dibromobutane								
g_{1i}	17.73	-25.83	131.41	Δg_{12i}	147.97	-6646.74	-22.13	
g_{2i}	-6337.78	4215.72	-47424.98	Δg_{21i}	-255.27	13988.20	37.59	
		k	1.381	α				0.220
$s(x_{IL})$			0.008					0.017
[b2mpy][BF ₄]+1,5-dibromopentane								
g_{1i}	-8.32	-49.19	50.27	Δg_{12i}	61.850	-2034.07	-9.78	
g_{2i}	4988.11	13894.23	-19015.47	Δg_{21i}	-198.48	10640.40	29.84	
		k	1.489	α				0.128
$s(x_{IL})$			0.005					0.007
[b2mpy][BF ₄]+1,6-dibromohexane								
g_{1i}	-53.20	-168.72	70.17	Δg_{12i}	-190.28	8602.40	25.98	
g_{2i}	18984.24	80987.62	-65856.57	Δg_{21i}	-81.90	9676.83	13.21	
		k	1.645	α				0.018
$s(x_{IL})$			0.003					0.026
[b3mpy][BF ₄]+1,2-dibromoethane								
g_{1i}	66.76	10.35	246.20	Δg_{12i}	-85.25	4815.49	11.63	
g_{2i}	-31212.59	-20563.45	-86574.53	Δg_{21i}	200.21	-8703.80	-28.20	
		k	1.245	α				0.153
$s(x_{IL})$			0.004					0.010
[b3mpy][BF ₄]+1,3-dibromopropane								
g_{1i}	1773.71	1286.67	3200.16	Δg_{12i}	-478.97	20503.37	71.32	
g_{2i}	-575077.20	-424726.79	-1004333.4	Δg_{21i}	105.39	3567.29	-18.99	
		k	1.205	α				0.142
$s(x_{IL})$			0.009					0.008
[b3mpy][BF ₄]+1,4-dibromobutane								
g_{1i}	-2.21	9.50	8.49	Δg_{12i}	-4.64	630.14	0.03	
g_{2i}	1825.74	-5690.21	-1087.02	Δg_{21i}	-12.29	2487.00	2.08	
		k	0.943	α				0.140
$s(x_{IL})$			0.012					0.012
[b3mpy][BF ₄]+1,5-dibromopentane								
g_{1i}	-1.82	-15.42	35.55	Δg_{12i}	-31.22	1982.84	4.03	
g_{2i}	2759.50	110.74	-10087.41	Δg_{21i}	64.04	-1540.14	-8.90	
		k	1.431	α				0.125

$s(x_{IL})$	0.004			0.009			
[b3mpy][BF ₄]+1,6-dibromohexane							
g_{1i}	-104.68	-187.79	133.78	Δg_{12i}	-124.09	4547.07	17.15
g_{2i}	31633.18	81996.21	-96436.96	Δg_{21i}	-212.18	19892.62	30.05
		k	1.878			α	0.026
$s(x_{IL})$	0.003			0.017			
[b4mpy][BF ₄]+1,2-dibromoethane							
g_{1i}	-2048.41	983.36	-2691.86	Δg_{12i}	-343.44	10609.28	59.63
g_{2i}	-5228.93	-25167.21	-14810.82	Δg_{21i}	-6402.90	-12068.84	843.23
		k	2.510			α	0.003
$s(x_{IL})$	0.005			0.003			
[b4mpy][BF ₄]+1,3-dibromopropane							
g_{1i}	35936.44	863.84	38025.39	Δg_{12i}	644.00	-21564.02	-100.47
g_{2i}	-10626979	-270141.16	-11183499	Δg_{21i}	-464.58	20250.27	70.23
		k	1.974			α	0.580
$s(x_{IL})$	0.009			0.009			
[b4mpy][BF ₄]+1,4-dibromobutane							
g_{1i}	-75.45	29.27	-116.50	Δg_{12i}	-539.64	39109.28	74.64
g_{2i}	23849.65	-16516.63	40943.01	Δg_{21i}	8138.95	13330.19	-2887.1
		k	1.432			α	0.001
$s(x_{IL})$	0.022			0.029			
[b4mpy][BF ₄]+1,5-dibromopentane							
g_{1i}	-11.57	-18.75	11.51	Δg_{12i}	102.47	-4141.95	-15.37
g_{2i}	5530.03	2709.34	-4451.68	Δg_{21i}	-236.94	13522.00	34.61
		k	1.337			α	0.311
$s(x_{IL})$	0.002			0.023			
[b4mpy][BF ₄]+1,6-dibromohexane							
g_{1i}	-19.75	-153.42	101.443	Δg_{12i}	58.98	-2064.14	-9.33
g_{2i}	7863.61	66247.04	-61152.79	Δg_{21i}	-285.34	15504.72	42.47
		k	1.183			α	0.108
$s(x_{IL})$	0.004			0.008			