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APPENDICES

Appendix A Raw Data for Gas Solubility Measurements Using The Gravimetric Microbalance

Table A1 Carbon dioxide in [bmim][PF_6] at 323.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.026297	99.139	49.963	0.00060	0.35189	0.17
0.103683	500.432	49.963	0.00236	0.35189	0.67
0.191363	998.346	49.958	0.00435	0.35189	1.22
0.384911	2001.113	49.968	0.00875	0.35189	2.43
0.758605	3998.772	49.974	0.01724	0.35189	4.67
1.303474	6998.399	49.974	0.02962	0.35189	7.76
1.676567	8995.124	49.963	0.03810	0.35189	9.77
1.872966	10001.63	49.942	0.04256	0.35189	10.79
2.062531	11002.13	49.979	0.04687	0.35189	11.75
2.448915	12995.52	49.968	0.05564	0.35189	13.65
2.827328	14996.11	49.968	0.06424	0.35189	15.44
3.225539	16998.31	49.979	0.07329	0.35189	17.24
3.630797	18997.44	49.952	0.08250	0.35189	18.99

Table A2 Carbon dioxide in $[S_{222}][Tf_2N]$ at 313.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.026596	94.735	39.964	0.00060	0.25038	0.24
0.120652	500.032	39.97	0.00274	0.25038	1.08
0.230851	999.147	39.964	0.00525	0.25038	2.05
0.473782	2001.913	39.97	0.01077	0.25038	4.12
0.965894	3996.771	39.964	0.02195	0.25038	8.06
1.682117	6998.265	39.975	0.03822	0.25038	13.24
2.181124	8997.927	39.964	0.04956	0.25038	16.52
2.430143	9996.29	39.975	0.05522	0.25038	18.07
2.706169	10998.26	39.97	0.06149	0.25038	19.72
3.222818	12998.05	39.97	0.07323	0.25038	22.63
3.750496	14999.98	39.954	0.08522	0.25038	25.39
4.250873	16999.91	39.991	0.09659	0.25038	27.84
4.797696	18997.84	39.949	0.10901	0.25038	30.33

Table A3 Carbon dioxide in $[S_{222}][Tf_2N]$ at 323.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.021656	102.742	49.963	0.00049	0.25038	0.20
0.093187	500.165	49.963	0.00212	0.25038	0.84
0.188976	999.013	49.968	0.00429	0.25038	1.69
0.401957	1998.177	49.958	0.00913	0.25038	3.52
0.804387	3998.772	49.968	0.01828	0.25038	6.80
1.400203	6997.865	49.952	0.03182	0.25038	11.27
1.811068	8999.262	49.942	0.04115	0.25038	14.12
2.011021	9999.76	49.958	0.04569	0.25038	15.43
2.209979	10999.32	49.931	0.05022	0.25038	16.71
2.624756	12997.38	49.963	0.05964	0.25038	19.24
3.048651	15002.52	50.011	0.06927	0.25038	21.67
3.499422	16998.98	49.974	0.07951	0.25038	24.10
3.946252	19006.24	49.963	0.08967	0.25038	26.37

Table A4 Carbon dioxide in $[S_{222}][Tf_2N]$ at 333.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.023509	101.407	59.986	0.00053	0.25038	0.21
0.081335	498.43	59.981	0.00185	0.25038	0.73
0.170277	998.88	59.992	0.00387	0.25038	1.52
0.351139	1998.577	59.986	0.00798	0.25038	3.09
0.683135	3997.305	59.976	0.01552	0.25038	5.84
1.185815	6997.464	59.986	0.02694	0.25038	9.72
1.534785	9000.596	59.992	0.03487	0.25038	12.23
1.706737	9997.357	59.992	0.03878	0.25038	13.41
1.876778	10997.99	60.002	0.04264	0.25038	14.55
2.254458	12997.52	59.986	0.05123	0.25038	16.98
2.598529	14997.45	59.997	0.05904	0.25038	19.08
2.948051	16997.91	59.965	0.06699	0.25038	21.11
3.233453	18998.1	59.97	0.07347	0.25038	22.69

Table A5 Carbon dioxide in [deme][Tf_2N] at 313.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.02609	101.14	39.975	0.00059	0.23452	0.25
0.123882	499.098	39.97	0.00281	0.23452	1.19
0.235815	996.077	39.97	0.00536	0.23452	2.23
0.478805	1996.308	39.975	0.01088	0.23452	4.43
0.977255	3998.105	39.959	0.02221	0.23452	8.65
1.69294	7000.934	39.964	0.03847	0.23452	14.09
2.188317	8998.194	39.975	0.04972	0.23452	17.49
2.439501	9998.691	39.97	0.05543	0.23452	19.12
2.70061	10999.32	39.975	0.06136	0.23452	20.74
3.224116	12997.65	39.975	0.07326	0.23452	23.80
3.747015	14999.58	39.97	0.08514	0.23452	26.63
4.29205	17000.71	39.959	0.09752	0.23452	29.37
4.860829	18998.24	39.97	0.11045	0.23452	32.02

Table A6 Carbon dioxide in [deme][Tf_2N] at 323.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.023853	98.471	49.968	0.00054	0.23452	0.23
0.102777	499.231	49.968	0.00234	0.23452	0.99
0.200949	999.947	49.963	0.00457	0.23452	1.91
0.415523	1999.778	49.958	0.00944	0.23452	3.87
0.819781	3998.639	49.968	0.01863	0.23452	7.36
1.411529	7002.001	49.968	0.03207	0.23452	12.03
1.837188	9000.063	49.984	0.04174	0.23452	15.11
2.047844	10000.16	49.984	0.04653	0.23452	16.56
2.266601	10998.79	49.937	0.05150	0.23452	18.01
2.714963	12999.39	49.947	0.06169	0.23452	20.83
3.139786	14999.18	49.942	0.07134	0.23452	23.32
3.571429	17007.52	49.942	0.08115	0.23452	25.71
4.023636	18998.5	50	0.09143	0.23452	28.05

Table A7 Carbon dioxide in [deme][Tf_2N] at 333.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.031003	98.738	59.992	0.00070	0.23452	0.30
0.092456	499.098	59.981	0.00210	0.23452	0.89
0.17469	998.746	59.986	0.00397	0.23452	1.66
0.365163	1998.177	59.97	0.00830	0.23452	3.42
0.710708	3998.372	59.992	0.01615	0.23452	6.44
1.217313	6994.662	59.976	0.02766	0.23452	10.55
1.576538	8996.459	60.002	0.03582	0.23452	13.25
1.757032	9998.559	59.986	0.03992	0.23452	14.55
1.941359	11004.26	59.992	0.04411	0.23452	15.83
2.283527	12998.85	59.976	0.05189	0.23452	18.12
2.637786	14997.58	59.965	0.05994	0.23452	20.35
3.012986	17002.98	60.045	0.06846	0.23452	22.60
3.371517	19004.38	60.055	0.07661	0.23452	24.62

Table A8 Carbon dioxide in [pmim][Tf_2N] at 313.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.029227	99.272	39.964	0.00066	0.24671	0.27
0.129517	501.767	39.97	0.00294	0.24671	1.18
0.243978	1000.748	39.97	0.00554	0.24671	2.20
0.491782	1999.111	39.964	0.01117	0.24671	4.33
0.997368	3998.906	39.97	0.02266	0.24671	8.41
1.720234	6998.665	39.97	0.03909	0.24671	13.68
2.267056	8999.528	39.964	0.05151	0.24671	17.27
2.516176	9998.024	39.97	0.05717	0.24671	18.81
2.770664	11000.26	39.975	0.06296	0.24671	20.33
3.319799	12998.45	39.97	0.07543	0.24671	23.42
3.861975	14998.51	39.949	0.08775	0.24671	26.24
4.440975	16999.78	39.975	0.10091	0.24671	29.03
5.016111	18998.24	39.98	0.11398	0.24671	31.60

Table A9 Carbon dioxide in [pmim][Tf_2N] at 323.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.025046	99.806	49.958	0.00057	0.24671	0.23
0.1006	500.032	49.963	0.00229	0.24671	0.92
0.20073	998.479	49.963	0.00456	0.24671	1.82
0.422078	2000.179	49.963	0.00959	0.24671	3.74
0.831407	3999.573	49.968	0.01889	0.24671	7.11
1.425414	6998.265	49.958	0.03239	0.24671	11.60
1.844341	8999.395	49.963	0.04191	0.24671	14.52
2.060531	9998.024	49.963	0.04682	0.24671	15.95
2.282959	10998.92	49.958	0.05187	0.24671	17.37
2.721626	13000.32	49.974	0.06184	0.24671	20.04
3.160615	14998.91	49.968	0.07182	0.24671	22.55
3.61067	16998.44	49.979	0.08204	0.24671	24.96
4.064489	19002.51	49.91	0.09235	0.24671	27.24

Table A10 Carbon dioxide in [pmim][Tf_2N] at 333.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.040145	99.005	59.986	0.00091	0.24671	0.37
0.124485	500.299	59.986	0.00283	0.24671	1.13
0.217685	999.814	59.981	0.00495	0.24671	1.97
0.419447	1999.378	59.992	0.00953	0.24671	3.72
0.77525	3999.04	59.992	0.01762	0.24671	6.66
1.28038	6996.263	59.976	0.02909	0.24671	10.55
1.619012	8998.194	59.997	0.03679	0.24671	12.98
1.803301	9999.226	59.992	0.04097	0.24671	14.24
1.969578	11000.52	59.986	0.04475	0.24671	15.35
2.316359	12998.59	59.986	0.05263	0.24671	17.58
2.691045	15000.38	60.002	0.06115	0.24671	19.86
3.047179	16998.31	59.992	0.06924	0.24671	21.91
3.395764	18991.7	60.002	0.07716	0.24671	23.82

Table A11 Carbon dioxide in [amim][Tf_2N] at 313.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.029875	99.672	39.97	0.00068	0.24794	0.27
0.132383	499.898	39.97	0.00301	0.24794	1.20
0.248291	998.746	39.97	0.00564	0.24794	2.22
0.497202	1999.378	39.964	0.01130	0.24794	4.36
1.004087	3999.84	39.975	0.02281	0.24794	8.43
1.728722	7001.602	39.97	0.03928	0.24794	13.68
2.236785	9000.329	39.98	0.05082	0.24794	17.01
2.493113	10000.03	39.964	0.05665	0.24794	18.60
2.786932	10999.73	39.964	0.06332	0.24794	20.34
3.306024	13001.79	39.964	0.07512	0.24794	23.25
3.862011	14996.91	39.97	0.08775	0.24794	26.14
4.442987	16997.91	39.986	0.10095	0.24794	28.94
5.017573	18994.9	39.97	0.11401	0.24794	31.50

Table A12 Carbon dioxide in [amim][Tf_2N] at 323.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.023261	99.539	49.984	0.00053	0.24794	0.21
0.094959	499.631	49.968	0.00216	0.24794	0.86
0.196233	998.746	49.963	0.00446	0.24794	1.77
0.417529	2001.38	49.963	0.00949	0.24794	3.69
0.810382	3998.639	49.963	0.01841	0.24794	6.91
1.393183	6999.066	49.963	0.03166	0.24794	11.32
1.808775	8999.795	49.968	0.04110	0.24794	14.22
2.015228	9999.626	49.963	0.04579	0.24794	15.59
2.248199	10999.86	49.963	0.05108	0.24794	17.08
2.717278	12997.65	49.952	0.06174	0.24794	19.94
3.137714	14999.31	49.963	0.07130	0.24794	22.33
3.599649	16998.98	49.937	0.08179	0.24794	24.81
4.003482	18997.84	49.958	0.09097	0.24794	26.84

Table A13 Carbon dioxide in [amim][Tf_2N] at 333.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.026421	100.473	59.981	0.00060	0.24794	0.24
0.086128	498.964	59.986	0.00196	0.24794	0.78
0.167634	998.479	59.992	0.00381	0.24794	1.51
0.357429	1999.111	60.002	0.00812	0.24794	3.17
0.704491	3997.705	59.992	0.01601	0.24794	6.06
1.220273	7000.801	59.992	0.02773	0.24794	10.06
1.554221	8999.528	59.992	0.03532	0.24794	12.47
1.745552	10000.03	59.992	0.03966	0.24794	13.79
1.911799	11000.12	59.976	0.04344	0.24794	14.91
2.253586	12996.98	59.986	0.05121	0.24794	17.12
2.602196	14998.65	59.992	0.05913	0.24794	19.26
2.956861	17000.04	60.002	0.06719	0.24794	21.32
3.332749	18994.77	60.029	0.07573	0.24794	23.40

Table A14 Carbon dioxide in [4mbp][BF_4] at 313.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.020342	101.808	39.97	0.00046	0.42185	0.11
0.107354	499.231	39.975	0.00244	0.42185	0.57
0.212405	999.013	39.97	0.00483	0.42185	1.13
0.450027	2000.846	40.007	0.01023	0.42185	2.37
0.937411	3998.372	39.975	0.02130	0.42185	4.81
1.617857	7000.667	39.964	0.03676	0.42185	8.02
2.106669	8998.327	39.964	0.04787	0.42185	10.19
2.34062	9997.892	39.975	0.05318	0.42185	11.20
2.607002	10999.59	39.959	0.05924	0.42185	12.31
3.13532	12998.45	39.964	0.07124	0.42185	14.45
3.641282	14998.91	39.975	0.08274	0.42185	16.40
4.181013	17004.18	39.98	0.09500	0.42185	18.38
4.723603	18998.37	39.975	0.10733	0.42185	20.28

Table A15 Carbon dioxide in [4mbp][BF_4] at 323.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.018765	95.402	49.963	0.00043	0.42185	0.10
0.092875	498.297	49.963	0.00211	0.42185	0.50
0.188975	999.147	49.968	0.00429	0.42185	1.01
0.397641	2001.38	49.958	0.00904	0.42185	2.10
0.791343	3999.44	49.958	0.01798	0.42185	4.09
1.346497	6998.399	49.974	0.03060	0.42185	6.76
1.748601	8999.795	49.952	0.03973	0.42185	8.61
1.948799	9998.158	49.947	0.04428	0.42185	9.50
2.148788	10999.19	49.974	0.04882	0.42185	10.37
2.569532	12997.92	49.974	0.05839	0.42185	12.16
2.979776	14997.05	49.974	0.06771	0.42185	13.83
3.411067	16998.98	49.963	0.07751	0.42185	15.52
3.818344	19000.64	49.937	0.08676	0.42185	17.06

Table A16 Carbon dioxide in [4mbp][BF_4] at 333.15 K

%Mass = Asymptotic mass uptake as percentage of dry mass

P = Average pressure reading for isotherm point (millibars)

Sample T = Average sample temperature reading for isotherm point (°C)

% Mass	Pressure (mbar)	Sample T (°C)	Mole CO_2	Mole IL	Mole fraction of CO_2 (mol %)
0.019229	103.009	59.992	0.00044	0.42185	0.10
0.073017	499.365	59.992	0.00166	0.42185	0.39
0.158415	998.613	59.986	0.00360	0.42185	0.85
0.351489	2001.646	59.986	0.00799	0.42185	1.86
0.674087	3998.372	59.965	0.01532	0.42185	3.50
1.154585	6998.532	59.992	0.02623	0.42185	5.85
1.476173	9000.329	59.97	0.03354	0.42185	7.37
1.655759	9998.825	60.002	0.03762	0.42185	8.19
1.825016	10998.66	59.986	0.04147	0.42185	8.95
2.144022	12996.72	59.965	0.04872	0.42185	10.35
2.475946	15000.92	59.992	0.05626	0.42185	11.77
2.81405	17001.65	59.986	0.06394	0.42185	13.16
3.168231	18998.5	59.986	0.07199	0.42185	14.58

Appendix B Critical Property Estimation

Table B1 The normal boiling temperature, critical properties, and acentric factor of $[S_{222}][Tf_2N]$

M = 399.39 g/mol

A_M = 0.5703

B_M = 1.0121

C_M = 0.2573

E_M = 6.75

Groups	n	ΔT_{bM}	ΔT_M	ΔP_M	ΔV_M	$n*\Delta T_{bM}$	$n*\Delta T_M$	$n*\Delta P_M$	$n*\Delta V_M$
$[>S-]^+$	1	117.52	-0.0004	0.6901	184.67	117.52	-0.0004	0.6901	184.67
$-CH_3$ nonring	3	23.58	0.0275	0.3031	66.81	70.74	0.0825	0.9093	200.43
$-CH_2-$ nonring	3	22.88	0.0159	0.2165	57.11	68.64	0.0477	0.6495	171.33
-F	6	-0.03	0.0228	0.2912	31.47	-0.18	0.1368	1.7472	188.82
>C< nonring	2	18.18	-0.0206	0.0539	21.78	36.36	-0.0412	0.1078	43.56
$-SO_2$	2	147.24	-0.0563	-0.0606	112.19	294.48	-0.1126	-0.1212	224.38
>N- nonring	1	11.74	-0.0028	0.0304	26.7	11.74	-0.0028	0.0304	26.7
SUM						599.3	0.11	4.0131	1039.89

Table B2 The normal boiling temperature, critical properties, and acentric factor of [deme][Tf_2N]

M = 426.4 g/mol

A_M = 0.5703

B_M = 1.0121

C_M = 0.2573

E_M = 6.75

Groups	n	ΔT_{bM}	ΔT_M	ΔP_M	ΔV_M	$n*\Delta T_{bM}$	$n*\Delta T_M$	$n*\Delta P_M$	$n*\Delta V_M$
$[>N<]^+$	1	11.74	-0.0028	0.0304	26.7	11.74	-0.0028	0.0304	26.7
$-CH_3$ nonring	4	23.58	0.0275	0.3031	66.81	94.32	0.11	1.2124	267.24
$-CH_2-$ nonring	4	22.88	0.0159	0.2165	57.11	91.52	0.0636	0.866	228.44
-O-	1	22.42	0.0051	0.13	15.61	22.42	0.0051	0.13	15.61
-F	6	-0.03	0.0228	0.2912	31.47	-0.18	0.1368	1.7472	188.82
>C< nonring	2	18.18	-0.0206	0.0539	21.78	36.36	-0.0412	0.1078	43.56
$-SO_2$	2	147.24	-0.0563	-0.0606	112.19	294.48	-0.1126	-0.1212	224.38
>N- nonring	1	11.74	-0.0028	0.0304	26.7	11.74	-0.0028	0.0304	26.7
SUM						562.4	0.1561	4.003	1021.45

Table B3 The normal boiling temperature, critical properties, and acentric factor of [pmim][Tf_2N]

M = 405.34 g/mol

A_M = 0.5703

B_M = 1.0121

C_M = 0.2573

E_M = 6.75

Groups	n	ΔT_{bM}	ΔT_M	ΔP_M	ΔV_M	$n*\Delta T_{bM}$	$n*\Delta T_M$	$n*\Delta P_M$	$n*\Delta V_M$
=CH- ring	3	26.73	0.0114	0.1693	42.55	80.19	0.0342	0.5079	127.65
$[>N=]^+$ ring	1	57.55	-0.0011	0.0559	42.15	57.55	-0.0011	0.0559	42.15
>N- ring	1	68.16	0.0063	0.0538	25.17	68.16	0.0063	0.0538	25.17
$-CH_3$ nonring	2	23.58	0.0275	0.3031	66.81	47.16	0.055	0.6062	133.62
$-CH_2-$ nonring	2	22.88	0.0159	0.2165	57.11	45.76	0.0318	0.433	114.22
-F	6	-0.03	0.0228	0.2912	31.47	-0.18	0.1368	1.7472	188.82
>C< nonring	2	18.18	-0.0206	0.0539	21.78	36.36	-0.0412	0.1078	43.56
$-SO_2$	2	147.24	-0.0563	-0.0606	112.19	294.48	-0.1126	-0.1212	224.38
>N- nonring	1	11.74	-0.0028	0.0304	26.7	11.74	-0.0028	0.0304	26.7
SUM						641.22	0.1064	3.421	926.27

Table B4 The normal boiling temperature, critical properties, and acentric factor of [amim][Tf_2N]

M = 403.32 g/mol

A_M = 0.5703

B_M = 1.0121

C_M = 0.2573

E_M = 6.75

Groups	n	ΔT_{bM}	ΔT_M	ΔP_M	ΔV_M	$n*\Delta T_{bM}$	$n*\Delta T_M$	$n*\Delta P_M$	$n*\Delta V_M$
=CH- ring	3	26.73	0.0114	0.1693	42.55	80.19	0.0342	0.5079	127.65
$[>N=]^+$ ring	1	57.55	-0.0011	0.0559	42.15	57.55	-0.0011	0.0559	42.15
>N- ring	1	68.16	0.0063	0.0538	25.17	68.16	0.0063	0.0538	25.17
$-CH_3$ nonring	1	23.58	0.0275	0.3031	66.81	23.58	0.0275	0.3031	66.81
$-CH_2-$ nonring	1	22.88	0.0159	0.2165	57.11	22.88	0.0159	0.2165	57.11
=CH- nonring	1	18.25	0.0182	0.1866	49.92	18.25	0.0182	0.1866	49.92
$=CH_2$ nonring	1	24.96	0.017	0.2493	60.37	24.96	0.017	0.2493	60.37
-F	6	-0.03	0.0228	0.2912	31.47	-0.18	0.1368	1.7472	188.82
>C< nonring	2	18.18	-0.0206	0.0539	21.78	36.36	-0.0412	0.1078	43.56
$-SO_2$	2	147.24	-0.0563	-0.0606	112.19	294.48	-0.1126	-0.1212	224.38
>N- nonring	1	11.74	-0.0028	0.0304	26.7	11.74	-0.0028	0.0304	26.7
SUM						637.97	0.0982	3.3373	912.64

Table B5 The normal boiling temperature, critical properties, and acentric factor of [4mbp][BF_4]

M = 237.05 g/mol

A_M = 0.5703

B_M = 1.0121

C_M = 0.2573

E_M = 6.75

Groups	n	ΔT_{bM}	ΔT_M	ΔP_M	ΔV_M	$n*\Delta T_{bM}$	$n*\Delta T_M$	$n*\Delta P_M$	$n*\Delta V_M$
=CH- ring	4	26.73	0.0114	0.1693	42.55	106.92	0.0456	0.6772	170.2
$[>N=]^+$ ring	1	57.55	-0.0011	0.0559	42.15	57.55	-0.0011	0.0559	42.15
=C< ring	1	31.01	0.0051	0.0955	31.28	31.01	0.0051	0.0955	31.28
$-CH_3$ nonring	2	23.58	0.0275	0.3031	66.81	47.16	0.055	0.6062	133.62
$-CH_2-$ nonring	3	22.88	0.0159	0.2165	57.11	68.64	0.0477	0.6495	171.33
-B	1	-24.56	0.0352	0.0348	22.45	-24.56	0.0352	0.0348	22.45
-F	4	-0.03	0.0228	0.2912	31.47	-0.12	0.0912	1.1648	125.88
SUM						286.6	0.2787	3.2839	696.91

Appendix C Consistency Test of Densities

Table C1 The calculated density of $[S_{222}][Tf_2N]$ and comparison with the experimental values at a range of temperatures from 278.15 K to 353.15 K

T (K)	T_R	Ω	ρ_{exp} (g/cm^3)	ρ_{cal} (g/cm^3)	$\%\Delta\rho_{cal}$
278.15	0.23352	-1.1145	1.48082	1.33287	10.0
283.15	0.23771	-1.1137	1.47589	1.33014	9.9
288.15	0.24191	-1.1129	1.47096	1.32741	9.8
293.15	0.24611	-1.112	1.46606	1.32468	9.6
298.15	0.25031	-1.1112	1.46118	1.32194	9.5
303.15	0.25451	-1.1103	1.45633	1.31919	9.4
308.15	0.2587	-1.1095	1.45151	1.31644	9.3
313.15	0.2629	-1.1086	1.44671	1.31368	9.2
318.15	0.2671	-1.1077	1.44193	1.31092	9.1
323.15	0.2713	-1.1069	1.43718	1.30815	9.0
328.15	0.27549	-1.106	1.43245	1.30538	8.9
333.15	0.27969	-1.1051	1.42775	1.30260	8.8
338.15	0.28389	-1.1042	1.42307	1.29981	8.7
343.15	0.28809	-1.1034	1.41841	1.29702	8.6
348.15	0.29228	-1.1025	1.41377	1.29423	8.5
353.15	0.29648	-1.1016	1.40916	1.29143	8.4
AAD					9.2

Table C2 The calculated density of [deme][Tf_2N] and comparison with the experimental values at a range of temperatures from 278.15 K to 353.15 K

T (K)	T_R	Ω	ρ_{exp} (g/cm^3)	ρ_{cal} (g/cm^3)	$\%\Delta\rho_{cal}$
278.15	0.25742	-1.1244	1.42664	1.45658	2.1
283.15	0.26205	-1.1234	1.42201	1.45338	2.2
288.15	0.26668	-1.1224	1.41736	1.45018	2.3
293.15	0.27131	-1.1215	1.41271	1.44697	2.4
298.15	0.27593	-1.1205	1.40809	1.44376	2.5
303.15	0.28056	-1.1195	1.40347	1.44053	2.6
308.15	0.28519	-1.1185	1.39888	1.43730	2.7
313.15	0.28981	-1.1176	1.39430	1.43406	2.9
318.15	0.29444	-1.1166	1.38974	1.43082	3.0
323.15	0.29907	-1.1156	1.38520	1.42756	3.1
328.15	0.3037	-1.1146	1.38069	1.42430	3.2
333.15	0.30832	-1.1136	1.37619	1.42103	3.3
338.15	0.31295	-1.1125	1.37171	1.41775	3.4
343.15	0.31758	-1.1115	1.36726	1.41446	3.5
348.15	0.32221	-1.1105	1.36282	1.41117	3.5
353.15	0.32683	-1.1095	1.35840	1.40786	3.6
AAD					2.9

Table C3 The calculated density of [pmim][Tf_2N] and comparison with the experimental values at a range of temperatures from 278.15 K to 353.15 K

T (K)	T_R	Ω	ρ_{exp} (g/cm^3)	ρ_{cal} (g/cm^3)	$\%\Delta\rho_{cal}$
278.15	0.22091	-1.1159	1.49344	1.50002	0.4
283.15	0.22488	-1.1151	1.48842	1.49733	0.6
288.15	0.22885	-1.1143	1.48339	1.49462	0.8
293.15	0.23282	-1.1135	1.47838	1.49191	0.9
298.15	0.23679	-1.1127	1.47337	1.48920	1.1
303.15	0.24076	-1.1119	1.46839	1.48648	1.2
308.15	0.24473	-1.1111	1.46342	1.48376	1.4
313.15	0.2487	-1.1103	1.45844	1.48103	1.5
318.15	0.25267	-1.1095	1.45343	1.47829	1.7
323.15	0.25665	-1.1087	1.44828	1.47555	1.9
328.15	0.26062	-1.1079	1.44297	1.47281	2.1
333.15	0.26459	-1.1071	1.43756	1.47006	2.3
338.15	0.26856	-1.1063	1.43189	1.46730	2.5
343.15	0.27253	-1.1055	1.42672	1.46454	2.7
348.15	0.2765	-1.1046	1.42143	1.46177	2.8
353.15	0.28047	-1.1038	1.41638	1.45900	3.0
AAD					1.7

Table C4 The calculated density of [amim][Tf_2N] and comparison with the experimental values at a range of temperatures from 278.15 K to 353.15 K

T (K)	T_R	Ω	ρ_{exp} (g/cm^3)	ρ_{cal} (g/cm^3)	$\%\Delta\rho_{cal}$
278.15	0.21956	-1.1135	1.52037	1.50329	1.1
283.15	0.22351	-1.1127	1.51520	1.50064	1.0
288.15	0.22746	-1.112	1.51002	1.49798	0.8
293.15	0.2314	-1.1112	1.50487	1.49531	0.6
298.15	0.23535	-1.1104	1.49974	1.49264	0.5
303.15	0.2393	-1.1096	1.49464	1.48997	0.3
308.15	0.24324	-1.1088	1.48956	1.48729	0.2
313.15	0.24719	-1.108	1.48452	1.48460	0.0
318.15	0.25114	-1.1072	1.47950	1.48191	0.2
323.15	0.25508	-1.1064	1.47452	1.47922	0.3
328.15	0.25903	-1.1056	1.46955	1.47652	0.5
333.15	0.26298	-1.1048	1.46461	1.47381	0.6
338.15	0.26692	-1.104	1.45969	1.47110	0.8
343.15	0.27087	-1.1032	1.45480	1.46838	0.9
348.15	0.27482	-1.1024	1.44994	1.46566	1.1
353.15	0.27876	-1.1015	1.44510	1.46293	1.2
AAD					0.6

Table C5 The calculated density of [4mbp][BF_4] and comparison with the experimental values at a range of temperatures from 278.15 K to 353.15 K

T (K)	T_R	Ω	ρ_{exp} (g/cm^3)	ρ_{cal} (g/cm^3)	$\%\Delta\rho_{cal}$
278.15	0.44448	-1.1162	1.19503	1.17495	1.7
283.15	0.45247	-1.1141	1.19152	1.16915	1.9
288.15	0.46046	-1.112	1.18799	1.16332	2.1
293.15	0.46845	-1.1098	1.18447	1.15746	2.3
298.15	0.47644	-1.1076	1.18103	1.15157	2.5
303.15	0.48443	-1.1054	1.17766	1.14564	2.7
308.15	0.49242	-1.1032	1.17428	1.13968	2.9
313.15	0.50041	-1.101	1.17090	1.13368	3.2
318.15	0.5084	-1.0987	1.16752	1.12765	3.4
323.15	0.51639	-1.0964	1.16415	1.12158	3.7
328.15	0.52438	-1.094	1.16081	1.11546	3.9
333.15	0.53237	-1.0917	1.15746	1.10931	4.2
338.15	0.54036	-1.0893	1.15414	1.10312	4.4
343.15	0.54835	-1.0869	1.15083	1.09689	4.7
348.15	0.55634	-1.0844	1.14753	1.09061	5.0
353.15	0.56433	-1.0819	1.14425	1.08429	5.2
AAD					3.4

Appendix D Modeling Results with The AADs

Table D1 Modeling solubility (P, T, x) data for $[S_{222}][Tf_2N]$ (1) + CO_2 (2) system at 313.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
313.1	0.0998	0.23	0.0994	0.23	0.0960	0.24	0.0964	0.24
313.1	0.5114	1.05	0.5095	1.05	0.4939	1.09	0.4975	1.09
313.1	1.0112	2.01	1.0080	2.02	0.9800	2.08	0.9875	2.09
313.1	2.0267	4.05	2.0205	4.05	1.9759	4.16	1.9893	4.17
313.1	4.0269	7.97	4.0164	7.98	3.9712	8.08	3.9937	8.11
313.1	6.9535	13.33	6.9417	13.33	6.9645	13.28	6.9981	13.31
313.1	8.8745	16.77	8.8645	16.77	8.9741	16.54	9.0135	16.56
313.1	9.8209	18.42	9.8128	18.42	9.9762	18.09	10.0188	18.10
313.1	10.7776	20.15	10.7717	20.16	10.9985	19.69	11.0437	19.69
313.1	12.6381	23.31	12.6388	23.32	13.0066	22.60	13.0607	22.58
313.1	14.4688	26.36	14.4788	26.37	15.0103	25.38	15.0774	25.31
313.1	16.2494	29.13	16.2712	29.15	16.9807	27.90	17.0685	27.79
313.1	18.0113	31.95	18.0473	31.97	18.9570	30.43	19.0725	30.27
AAD %	2.5	2.8	2.4	2.8	0.6	0.5	0.5	0.6

Table D2 Modeling solubility (P, T, x) data for $[S_{222}][Tf_2N]$ (1) + CO_2 (2) system at 323.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
323.1	0.1065	0.19	0.1061	0.19	0.1026	0.19	0.1036	0.20
323.1	0.5049	0.83	0.5036	0.83	0.4882	0.86	0.4923	0.86
323.1	1.0098	1.66	1.0072	1.66	0.9786	1.71	0.9868	1.72
323.1	2.0372	3.43	2.0318	3.43	1.9834	3.53	1.9998	3.53
323.1	4.0459	6.70	4.0372	6.70	3.9772	6.81	4.0071	6.82
323.1	6.9917	11.28	6.9819	11.28	6.9644	11.30	7.0110	11.30
323.1	8.9308	14.23	8.9226	14.23	8.9695	14.15	9.0269	14.13
323.1	9.8843	15.63	9.8778	15.63	9.9658	15.48	10.0288	15.45
323.1	10.8270	16.99	10.8226	16.99	10.9576	16.77	11.0265	16.73
323.1	12.7054	19.71	12.7069	19.71	12.9537	19.32	13.0367	19.25
323.2	14.5656	22.34	14.5748	22.35	14.9550	21.76	15.0560	21.67
323.1	16.4011	24.98	16.4202	24.99	16.9558	24.19	17.0805	24.06
323.1	18.2080	27.49	18.2394	27.50	18.9462	26.48	19.1021	26.30
AAD %	1.9	2.2	1.8	2.2	0.7	0.6	0.5	0.5

Table D3 Modeling solubility (P, T, x) data for $[S_{222}][Tf_2N]$ (1) + CO_2 (2) system at 333.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
333.1	0.1114	0.19	0.1109	0.19	0.1071	0.20	0.1082	0.20
333.1	0.5082	0.71	0.5071	0.71	0.4916	0.74	0.4949	0.74
333.1	1.0265	1.47	1.0241	1.47	0.9944	1.52	1.0020	1.52
333.1	2.0597	2.98	2.0551	2.98	2.0035	3.06	2.0194	3.07
333.1	4.0677	5.72	4.0607	5.72	3.9897	5.82	4.0163	5.84
333.1	7.0359	9.66	7.0285	9.65	6.9795	9.72	7.0199	9.73
333.1	8.9986	12.23	8.9927	12.23	8.9901	12.22	9.0411	12.22
333.1	9.9626	13.47	9.9582	13.46	9.9871	13.41	10.0435	13.41
333.2	10.9209	14.67	10.9185	14.66	10.9841	14.56	11.0459	14.55
333.1	12.8525	17.19	12.8549	17.19	13.0134	16.95	13.0920	16.92
333.1	14.7212	19.45	14.7307	19.45	14.9969	19.08	15.0919	19.03
333.1	16.5640	21.66	16.5826	21.66	16.9740	21.15	17.0907	21.06
333.1	18.3196	23.50	18.3497	23.51	18.8707	22.88	19.0079	22.78
AAD %	2.3	2.5	2.2	2.5	0.7	0.8	1.0	0.8

Table D4 Modeling solubility (P, T, x) data for [deme][Tf_2N] (1) + CO_2 (2) system at 313.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
313.1	0.1027	0.24	0.1023	0.25	0.0997	0.25	0.1012	0.25
313.1	0.5034	1.16	0.5016	1.16	0.4892	1.20	0.4988	1.19
313.1	0.9959	2.21	0.9928	2.22	0.9696	2.28	0.9931	2.26
313.1	1.9928	4.40	1.9871	4.41	1.9526	4.50	1.9914	4.47
313.1	3.9737	8.66	3.9643	8.66	3.9412	8.72	3.9903	8.72
313.1	6.8732	14.34	6.8635	14.34	6.9201	14.21	6.9785	14.24
313.1	8.7769	17.95	8.7694	17.95	8.9233	17.60	8.9676	17.68
313.1	9.7207	19.69	9.7152	19.69	9.9292	19.22	9.9635	19.33
313.1	10.6625	21.44	10.6595	21.44	10.9431	20.83	10.9614	20.97
313.1	12.5208	24.79	12.5243	24.78	12.9657	23.86	12.9523	24.07
313.1	14.3499	27.95	14.3624	27.94	14.9834	26.69	14.9431	26.94
313.1	16.1562	31.03	16.1799	31.02	17.0066	29.42	16.9345	29.71
313.1	17.9383	34.04	17.9754	34.03	19.0314	32.05	18.9252	32.38
AAD %	2.5	2.9	2.5	2.9	1.0	0.7	0.3	1.0

Table D5 Modeling solubility (P, T, x) data for [deme][Tf_2N] (1) + CO_2 (2) system at 323.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
323.1	0.1029	0.22	0.1025	0.22	0.0997	0.23	0.1006	0.23
323.1	0.5079	0.96	0.5064	0.96	0.4914	0.99	0.5076	0.97
323.1	1.0118	1.87	1.0092	1.87	0.9808	1.93	1.0148	1.89
323.1	2.0277	3.78	2.0225	3.78	1.9767	3.88	2.0335	3.81
323.1	4.0204	7.27	4.0125	7.27	3.9530	7.39	4.0605	7.26
323.1	6.9545	12.08	6.9469	12.08	6.9177	12.14	7.0924	11.90
323.1	8.8968	15.28	8.8912	15.27	8.9236	15.21	9.1199	14.93
323.1	9.8568	16.80	9.8530	16.79	9.9248	16.66	10.1319	16.36
323.1	10.8121	18.33	10.8105	18.32	10.9301	18.10	11.1433	17.78
323.1	12.7143	21.33	12.7187	21.32	12.9535	20.90	13.1745	20.55
323.1	14.5712	24.07	14.5840	24.06	14.9460	23.44	15.1895	23.03
323.1	16.4099	26.72	16.4332	26.70	16.9423	25.88	17.2104	25.40
323.2	18.2208	29.32	18.2562	29.30	18.9353	28.24	19.2232	27.71
AAD %	2.1	2.6	1.9	2.5	0.9	0.8	1.4	1.3

Table D6 Modeling solubility (P, T, x) data for [deme][Tf_2N] (1) + CO_2 (2) system at 333.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
333.1	0.1111	0.26	0.1104	0.26	0.1084	0.27	0.1025	0.29
333.1	0.5183	0.84	0.5169	0.84	0.5003	0.88	0.4979	0.89
333.1	1.0259	1.60	1.0236	1.60	0.9906	1.66	0.9793	1.70
333.1	2.0613	3.28	2.0565	3.28	2.0005	3.38	1.9910	3.45
333.1	4.0824	6.26	4.0756	6.26	3.9873	6.41	3.9615	6.54
333.1	7.0544	10.42	7.0485	10.42	6.9527	10.57	6.9095	10.75
333.2	9.0290	13.18	9.0253	13.17	8.9574	13.27	8.9364	13.43
333.1	10.0075	14.52	10.0056	14.51	9.9596	14.57	9.9568	14.70
333.1	10.9864	15.85	10.9867	15.84	10.9685	15.85	10.9896	15.95
333.1	12.8878	18.28	12.8946	18.27	12.9368	18.20	12.9930	18.23
333.1	14.7767	20.69	14.7915	20.67	14.9150	20.50	15.0291	20.42
333.2	16.6654	23.09	16.6897	23.07	16.9178	22.76	17.1130	22.53
333.2	18.5068	25.32	18.5428	25.30	18.8835	24.86	19.1546	24.50
AAD %	2.5	3.0	2.3	2.9	1.2	1.3	0.9	1.1

Table D7 Modeling solubility (P, T, x) data for [pmim][Tf_2N] (1) + CO_2 (2) system at 313.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
313.1	0.0990	0.27	0.0987	0.27	0.0975	0.27	0.1004	0.27
313.1	0.4967	1.18	0.4953	1.18	0.4874	1.21	0.5043	1.18
313.1	0.9869	2.21	0.9843	2.21	0.9673	2.26	1.0009	2.21
313.1	1.9697	4.38	1.9651	4.38	1.9377	4.45	1.9951	4.37
313.1	3.9312	8.54	3.9240	8.54	3.8987	8.61	3.9870	8.50
313.1	6.8379	14.01	6.8314	14.00	6.8512	13.98	6.9696	13.85
313.1	8.7680	17.76	8.7646	17.75	8.8815	17.51	8.9693	17.48
313.1	9.7190	19.40	9.7183	19.39	9.8851	19.05	9.9634	19.05
313.1	10.6691	21.02	10.6716	21.01	10.8985	20.54	10.9616	20.59
313.1	12.5537	24.33	12.5645	24.31	12.9576	23.49	12.9567	23.70
313.1	14.4128	27.39	14.4347	27.37	15.0216	26.18	14.9512	26.55
313.1	16.2544	30.44	16.2900	30.42	17.1222	28.75	16.9525	29.35
313.1	18.0627	33.30	18.1148	33.27	19.2181	31.11	18.9495	31.93
AAD %	2.5	2.7	2.6	2.6	1.6	1.5	0.4	1.0

Table D8 Modeling solubility (P, T, x) data for [pmim][Tf_2N] (1) + CO_2 (2) system at 323.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
323.1	0.1013	0.22	0.1009	0.22	0.0998	0.23	0.1061	0.22
323.1	0.5011	0.91	0.4997	0.91	0.4891	0.93	0.5008	0.92
323.1	1.0002	1.79	0.9973	1.79	0.9770	1.84	1.0006	1.82
323.1	2.0070	3.70	2.0016	3.70	1.9698	3.77	2.0450	3.67
323.1	4.0006	7.07	3.9919	7.07	3.9396	7.18	4.0581	7.02
323.1	6.9621	11.64	6.9529	11.64	6.8891	11.77	7.0723	11.50
323.1	8.9263	14.63	8.9194	14.63	8.8778	14.71	9.0981	14.37
323.1	9.9020	16.11	9.8971	16.10	9.8772	16.15	10.1108	15.78
323.1	10.8765	17.58	10.8742	17.57	10.8842	17.57	11.1266	17.17
323.1	12.8094	20.37	12.8142	20.36	12.8960	20.24	13.1561	19.78
323.1	14.7172	23.01	14.7315	23.00	14.9056	22.75	15.1817	22.24
323.1	16.6051	25.58	16.6317	25.57	16.9259	25.15	17.2114	24.58
323.1	18.4674	28.04	18.5090	28.03	18.9464	27.42	19.2411	26.81
AAD %	1.1	1.5	1.0	1.5	1.1	1.1	1.5	1.4

Table D9 Modeling solubility (P, T, x) data for [pmim][Tf_2N] (1) + CO_2 (2) system at 333.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
333.1	0.1054	0.34	0.1048	0.34	0.1067	0.33	0.1052	0.35
333.1	0.5208	1.07	0.5186	1.07	0.5169	1.08	0.5088	1.12
333.1	1.0331	1.87	1.0293	1.87	1.0201	1.90	0.9952	1.99
333.1	2.0604	3.56	2.0534	3.56	2.0352	3.60	1.9832	3.77
333.1	4.0958	6.44	4.0848	6.45	4.0408	6.53	3.9187	6.85
333.1	7.1178	10.31	7.1049	10.32	7.0217	10.44	6.8156	10.92
333.1	9.1213	12.76	9.1100	12.76	9.0071	12.91	8.7748	13.43
333.1	10.1221	14.04	10.1122	14.04	10.0101	14.18	9.7872	14.69
333.1	11.1134	15.17	11.1058	15.17	10.9954	15.33	10.7687	15.83
333.1	13.0836	17.46	13.0821	17.46	12.9690	17.61	12.7578	18.08
333.2	15.0475	19.80	15.0544	19.80	14.9651	19.92	14.7979	20.30
333.1	16.9800	21.95	16.9979	21.94	16.9291	22.05	16.8020	22.35
333.2	18.8846	23.96	18.9159	23.96	18.8714	24.06	18.7853	24.27
AAD %	2.0	2.6	1.8	2.6	1.4	2.1	2.0	2.5

Table D10 Modeling solubility (P, T, x) data for [amim][Tf_2N] (1) + CO_2 (2) system at 313.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
313.1	0.1038	0.26	0.1033	0.26	0.1006	0.27	0.1008	0.27
313.1	0.5101	1.16	0.5081	1.16	0.4953	1.20	0.4982	1.21
313.1	1.0072	2.19	1.0038	2.19	0.9804	2.25	0.9878	2.27
313.1	2.0092	4.30	2.0030	4.31	1.9672	4.40	1.9813	4.43
313.1	3.9965	8.39	3.9864	8.39	3.9567	8.46	3.9828	8.51
313.1	6.9025	13.86	6.8918	13.86	6.9325	13.77	6.9780	13.80
313.1	8.8163	17.38	8.8077	17.38	8.9365	17.10	8.9926	17.11
313.1	9.7628	19.08	9.7562	19.07	9.9395	18.69	10.0008	18.68
313.1	10.7222	20.91	10.7179	20.91	10.9688	20.37	11.0327	20.35
313.1	12.5830	24.10	12.5856	24.09	12.9766	23.30	13.0518	23.22
313.1	14.4256	27.27	14.4375	27.27	14.9963	26.16	15.0820	26.03
313.1	16.2522	30.38	16.2759	30.37	17.0256	28.93	17.1237	28.73
313.1	18.0370	33.29	18.0751	33.28	19.0301	31.51	19.1458	31.23
AAD %	2.5	3.0	2.4	3.0	0.7	0.5	0.5	0.8

Table D11 Modeling solubility (P, T, x) data for [amim][Tf_2N] (1) + CO_2 (2) system at 323.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
323.1	0.1036	0.20	0.1032	0.20	0.1003	0.21	0.1011	0.21
323.1	0.5017	0.85	0.5004	0.85	0.4861	0.88	0.4903	0.89
323.1	1.0071	1.74	1.0044	1.74	0.9780	1.79	0.9869	1.80
323.1	2.0319	3.60	2.0263	3.60	1.9831	3.69	2.0015	3.70
323.1	4.0148	6.85	4.0063	6.85	3.9505	6.96	3.9864	6.97
323.1	6.9401	11.40	6.9311	11.39	6.9069	11.44	6.9687	11.44
323.1	8.8794	14.41	8.8720	14.40	8.9042	14.35	8.9845	14.32
323.1	9.8372	15.85	9.8314	15.85	9.9002	15.74	9.9900	15.68
323.1	10.8077	17.40	10.8037	17.40	10.9198	17.20	11.0199	17.12
323.1	12.7248	20.40	12.7262	20.39	12.9541	20.00	13.0755	19.87
323.1	14.5836	23.02	14.5931	23.02	14.9417	22.45	15.0865	22.25
323.1	16.4358	25.72	16.4553	25.71	16.9512	24.93	17.1228	24.66
323.1	18.2245	28.05	18.2564	28.04	18.9009	27.09	19.1044	26.74
AAD %	1.9	2.4	1.8	2.3	1.0	0.9	0.6	0.9

Table D12 Modeling solubility (P, T, x) data for [amim][Tf_2N] (1) + CO_2 (2) system at 333.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
333.1	0.1108	0.22	0.1102	0.22	0.1072	0.22	0.1080	0.22
333.1	0.5119	0.76	0.5106	0.75	0.4956	0.78	0.4993	0.79
333.1	1.0180	1.47	1.0156	1.47	0.9871	1.52	0.9936	1.53
333.2	2.0552	3.06	2.0500	3.06	2.0009	3.14	2.0181	3.15
333.1	4.0756	5.91	4.0675	5.91	3.9953	6.02	4.0279	6.04
333.1	7.0611	9.94	7.0523	9.94	6.9888	10.02	7.0443	10.03
333.1	9.0095	12.44	9.0025	12.43	8.9694	12.47	9.0398	12.46
333.1	9.9979	13.78	9.9921	13.77	9.9859	13.77	10.0683	13.74
333.1	10.9559	14.96	10.9522	14.96	10.9729	14.92	11.0637	14.87
333.1	12.8608	17.31	12.8625	17.30	12.9516	17.17	13.0626	17.09
333.1	14.7499	19.61	14.7586	19.60	14.9339	19.36	15.0694	19.23
333.2	16.6178	21.84	16.6355	21.84	16.9136	21.48	17.0784	21.29
333.2	18.4717	24.09	18.4999	24.09	18.9002	23.58	19.1022	23.33
AAD %	2.2	2.6	2.1	2.6	0.9	1.0	1.1	0.9

Table D13 Modeling solubility (P, T, x) data for [4mbp][BF_4] (1) + CO_2 (2) system at 313.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
313.1	0.1004	0.11	0.1002	0.11	0.0991	0.11	0.1002	0.11
313.1	0.5001	0.57	0.4991	0.57	0.4946	0.58	0.4990	0.58
313.1	0.9970	1.13	0.9951	1.13	0.9866	1.14	0.9948	1.14
313.2	2.0164	2.34	2.0123	2.34	1.9994	2.35	2.0122	2.35
313.1	4.0429	4.74	4.0350	4.74	4.0195	4.75	4.0353	4.76
313.1	7.0058	8.00	6.9939	8.00	6.9893	8.00	6.9949	8.02
313.1	8.9829	10.20	8.9688	10.20	8.9818	10.18	8.9730	10.22
313.1	9.9564	11.24	9.9416	11.24	9.9667	11.21	9.9481	11.26
313.1	10.9510	12.37	10.9354	12.37	10.9733	12.32	10.9452	12.38
313.1	12.9174	14.55	12.9010	14.55	12.9695	14.46	12.9199	14.55
313.1	14.8474	16.58	14.8310	16.59	14.9388	16.46	14.8630	16.56
313.1	16.7832	18.65	16.7675	18.66	16.9195	18.48	16.8176	18.61
313.1	18.6889	20.65	18.6750	20.66	18.8774	20.43	18.7486	20.58
AAD %	0.7	0.8	0.8	0.8	0.6	0.5	0.7	0.7

Table D14 Modeling solubility (P, T, x) data for [4mbp][BF_4] (1) + CO_2 (2) system at 323.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
323.1	0.0974	0.10	0.0972	0.10	0.0961	0.10	0.0973	0.10
323.1	0.5017	0.49	0.5008	0.49	0.4949	0.50	0.5008	0.50
323.1	1.0082	1.00	1.0063	0.99	0.9956	1.01	1.0063	1.00
323.1	2.0374	2.05	2.0334	2.05	2.0164	2.07	2.0336	2.06
323.1	4.0494	4.03	4.0420	4.03	4.0198	4.05	4.0431	4.04
323.1	6.9971	6.76	6.9858	6.76	6.9772	6.76	6.9916	6.77
323.1	8.9777	8.63	8.9641	8.63	8.9785	8.61	8.9756	8.64
323.1	9.9588	9.54	9.9442	9.54	9.9738	9.51	9.9595	9.54
323.1	10.9384	10.44	10.9229	10.44	10.9701	10.39	10.9428	10.44
323.1	12.9018	12.26	12.8847	12.26	12.9731	12.17	12.9160	12.25
323.1	14.8365	14.00	14.8186	14.00	14.9572	13.86	14.8648	13.97
323.1	16.7752	15.75	16.7568	15.76	16.9527	15.56	16.8219	15.70
323.1	18.6718	17.39	18.6538	17.40	18.9170	17.15	18.7424	17.32
AAD %	1.0	1.2	1.0	1.2	0.4	0.4	0.9	0.9

Table D15 Modeling solubility (P, T, x) data for [4mbp][BF_4] (1) + CO_2 (2) system at 333.15 K

T (K)	STD PR-EoS		STD SRK-EoS		SRK+quadratic mixing rules		NRTL	
	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$	P_{cal} (bar)	$100x_{2,cal}$
333.1	0.1078	0.10	0.1075	0.10	0.1062	0.10	0.1077	0.10
333.1	0.4914	0.40	0.4906	0.40	0.4828	0.40	0.4917	0.40
333.1	1.0020	0.84	1.0003	0.84	0.9866	0.85	1.0015	0.84
333.1	2.0553	1.80	2.0515	1.80	2.0300	1.82	2.0529	1.81
333.1	4.0487	3.45	4.0419	3.45	4.0123	3.48	4.0472	3.46
333.1	7.0097	5.84	6.9991	5.84	6.9838	5.85	7.0151	5.85
333.1	8.9675	7.39	8.9546	7.39	8.9656	7.38	8.9810	7.39
333.2	9.9674	8.22	9.9532	8.22	9.9813	8.19	9.9848	8.21
333.1	10.9480	9.00	10.9327	9.00	10.9810	8.95	10.9708	8.98
333.1	12.8707	10.47	12.8539	10.47	12.9516	10.38	12.9082	10.44
333.1	14.8034	11.95	14.7852	11.95	14.9426	11.81	14.8585	11.90
333.1	16.7255	13.41	16.7063	13.41	16.9326	13.22	16.8015	13.34
333.1	18.6508	14.88	18.6308	14.89	18.9336	14.64	18.7508	14.80
AAD %	1.4	1.5	1.4	1.5	0.9	0.9	1.2	1.2

Appendix E Henry's Law Constants and Enthalpies and Entropies of Absorption

Table E1 Experimental fugacity of CO_2 in $[S_{222}][Tf_2N]$ at 313.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09474	0.00241	414.93690	0.09473
0.50003	0.01083	92.33606	0.50003
0.99915	0.02052	48.73293	0.99915
2.00191	0.04122	24.26007	2.00191
3.99677	0.08059	12.40849	3.99677
6.99827	0.13244	7.55059	6.99827
8.99793	0.16523	6.05217	8.99793
9.99629	0.18069	5.53434	9.99629
10.99826	0.19716	5.07202	10.99826
12.99805	0.22629	4.41911	12.99805
14.99998	0.25393	3.93809	14.99998
16.99991	0.27838	3.59221	16.99991
18.99784	0.30333	3.29674	18.99784

Table E2 Experimental fugacity of CO_2 in $[S_{222}][Tf_2N]$ at 323.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.10274	0.00196	510.20200	0.10274
0.50017	0.00839	119.18940	0.50016
0.99901	0.01686	59.31195	0.99901
1.99818	0.03519	28.41716	1.99818
3.99877	0.06803	14.69940	3.99877
6.99787	0.11274	8.86997	6.99786
8.99926	0.14115	7.08466	8.99926
9.99976	0.15433	6.47962	9.99976
10.99932	0.16705	5.98623	10.99932
12.99738	0.19237	5.19832	12.99738
15.00252	0.21671	4.61446	15.00252
16.99898	0.24103	4.14886	16.99898
19.00624	0.26369	3.79233	19.00624

Table E3 Experimental fugacity of CO_2 in $[S_{222}][Tf_2N]$ at 333.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.10141	0.00213	469.48060	0.10141
0.49843	0.00733	136.42540	0.49843
0.99888	0.01522	65.70296	0.99888
1.99858	0.03088	32.38341	1.99858
3.99731	0.05838	17.12915	3.99730
6.99746	0.09716	10.29230	6.99746
9.00060	0.12225	8.17996	9.00059
9.99736	0.13411	7.45657	9.99736
10.99799	0.14553	6.87144	10.99799
12.99752	0.16984	5.88789	12.99752
14.99745	0.19082	5.24054	14.99745
16.99791	0.21107	4.73776	16.99791
18.99810	0.22687	4.40781	18.99810

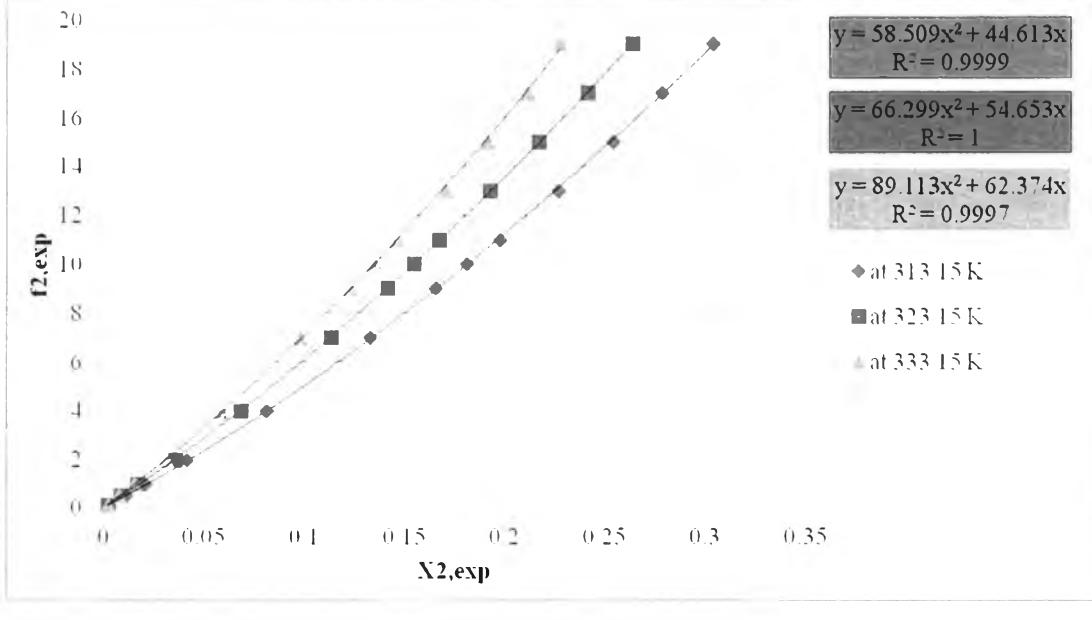

Figure E1 Determining the Henry's law constant for CO_2 in $[S_{222}][Tf_2N]$.

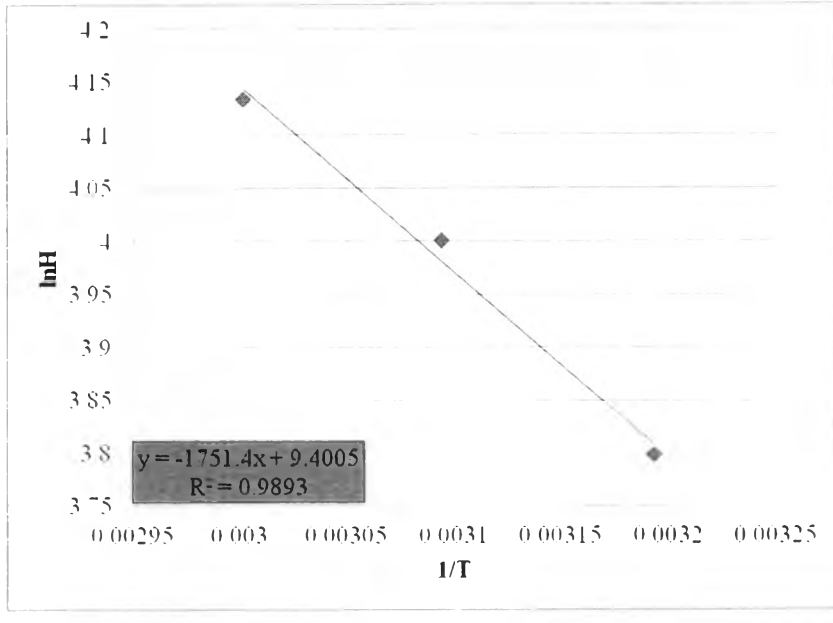

Figure E2 Determining the enthalpy of absorption for CO_2 in $[S_{222}][Tf_2N]$.

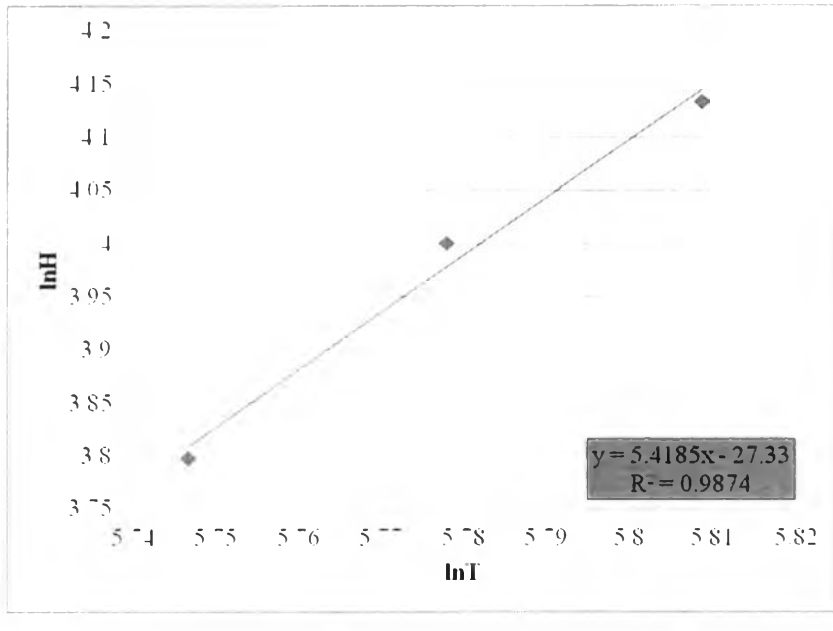

Figure E3 Determining the entropy of absorption for CO_2 in $[S_{222}][Tf_2N]$.

Table E4 Experimental fugacity of CO_2 in [deme][Tf_2N] at 313.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.10114	0.00252	396.82510	0.10114
0.49910	0.01186	84.31702	0.49910
0.99608	0.02234	44.76275	0.99608
1.99631	0.04433	22.55809	1.99631
3.99811	0.08649	11.56203	3.99810
7.00093	0.14091	7.09673	7.00093
8.99819	0.17493	5.71657	8.99819
9.99869	0.19117	5.23095	9.99869
10.99932	0.20739	4.82183	10.99932
12.99765	0.23802	4.20133	12.99765
14.99958	0.26634	3.75460	14.99958
17.00071	0.29371	3.40472	17.00071
18.99824	0.32017	3.12334	18.99824

Table E5 Experimental fugacity of CO_2 in [deme][Tf_2N] at 323.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09847	0.00231	432.89990	0.09847
0.49923	0.00986	101.41980	0.49923
0.99995	0.01910	52.35601	0.99995
1.99978	0.03870	25.83979	1.99978
3.99864	0.07358	13.59065	3.99864
7.00200	0.12031	8.31186	7.00200
9.00006	0.15110	6.61813	9.00006
10.00016	0.16556	6.04011	10.00016
10.99879	0.18006	5.55370	10.99879
12.99939	0.20826	4.80169	12.99939
14.99918	0.23325	4.28725	14.99918
17.00752	0.25707	3.88999	17.00752
18.99850	0.28049	3.56519	18.99850

Table E6 Experimental fugacity of CO_2 in [deme][Tf_2N] at 333.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09874	0.00299	334.44760	0.09874
0.49910	0.00888	112.61250	0.49910
0.99875	0.01664	60.09613	0.99875
1.99818	0.03417	29.26543	1.99818
3.99837	0.06442	15.52313	3.99837
6.99466	0.10550	9.47867	6.99466
8.99646	0.13251	7.54660	8.99646
9.99856	0.14547	6.87427	9.99856
11.00426	0.15831	6.31672	11.00426
12.99885	0.18116	5.51998	12.99885
14.99758	0.20355	4.91280	14.99758
17.00298	0.22596	4.42556	17.00298
19.00438	0.24623	4.06124	19.00438

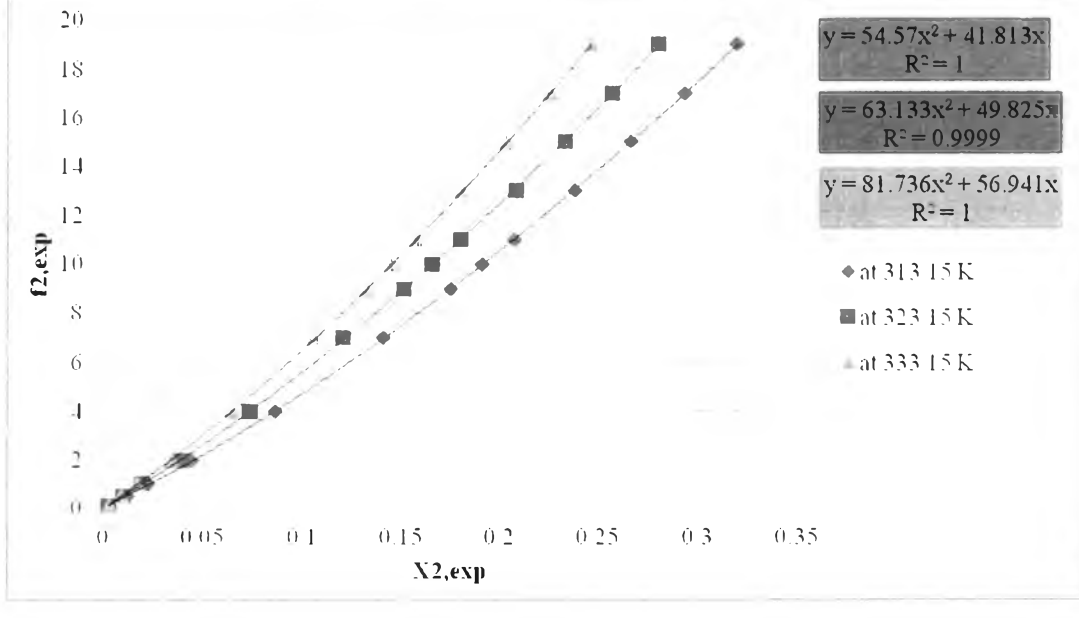

Figure E4 Determining the Henry's law constant for CO_2 in [deme][Tf_2N].

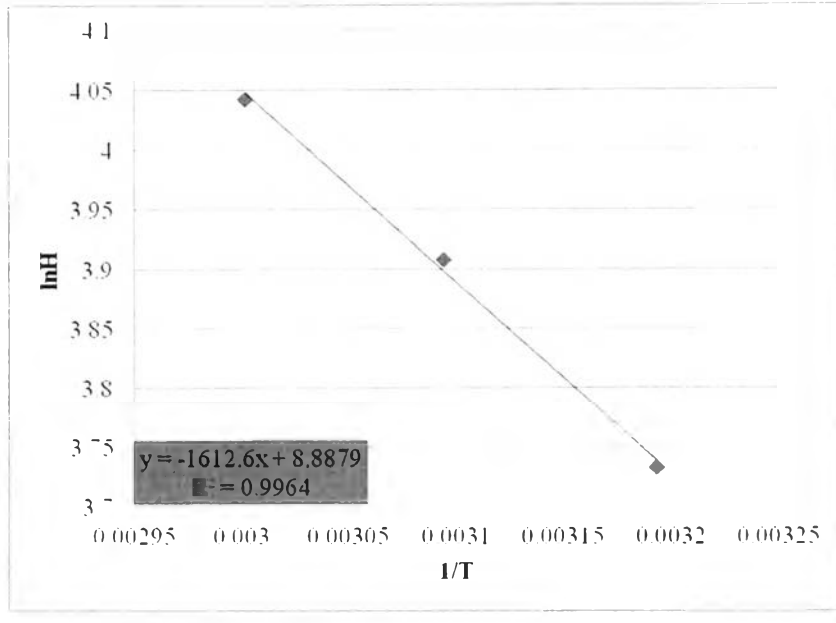

Figure E5 Determining the enthalpy of absorption for CO_2 in [deme][Tf_2N].

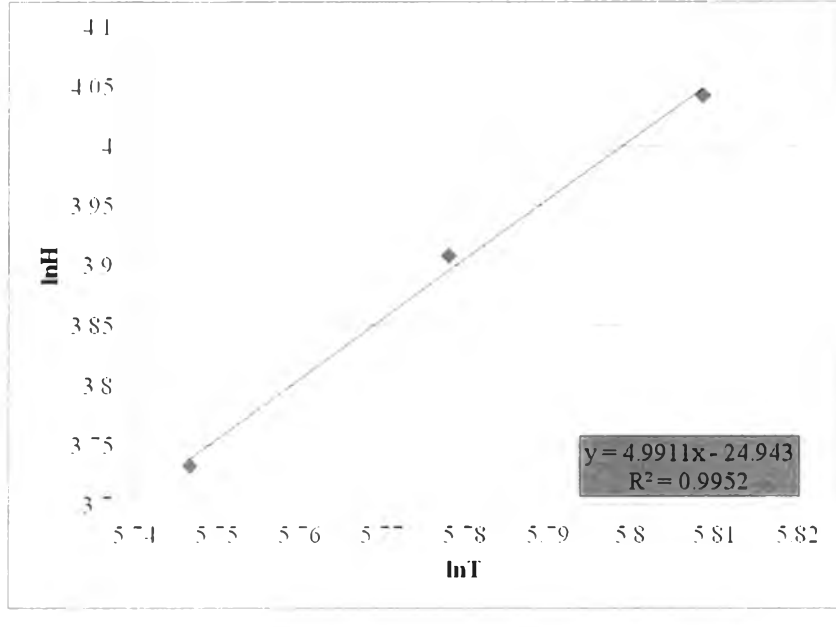

Figure E6 Determining the entropy of absorption for CO_2 in [deme][Tf_2N].

Table E7 Experimental fugacity of CO_2 in [pmim][Tf_2N] at 313.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09927	0.00268	373.13430	0.09927
0.50177	0.01179	84.81764	0.50177
1.00075	0.02198	45.49590	1.00075
1.99911	0.04333	23.07870	1.99911
3.99891	0.08413	11.88637	3.99891
6.99867	0.13677	7.31155	6.99867
8.99953	0.17273	5.78938	8.99953
9.99802	0.18814	5.31519	9.99802
11.00026	0.20330	4.91884	11.00026
12.99845	0.23416	4.27058	12.99845
14.99851	0.26237	3.81141	14.99851
16.99978	0.29029	3.44483	16.99978
18.99824	0.31600	3.16456	18.99824

Table E8 Experimental fugacity of CO_2 in [pmim][Tf_2N] at 323.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09981	0.00230	434.78250	0.09981
0.50003	0.00918	108.93250	0.50003
0.99848	0.01815	55.09642	0.99848
2.00018	0.03742	26.72368	2.00018
3.99957	0.07113	14.05877	3.99957
6.99827	0.11605	8.61698	6.99826
8.99940	0.14520	6.88705	8.99939
9.99802	0.15951	6.26920	9.99802
10.99892	0.17373	5.75606	10.99892
13.00032	0.20043	4.98927	13.00032
14.99891	0.22547	4.43518	14.99891
16.99844	0.24956	4.00705	16.99844
19.00251	0.27238	3.67134	19.00251

Table E9 Experimental fugacity of CO_2 in [pmim][Tf_2N] at 333.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09901	0.00368	271.73910	0.09900
0.50030	0.01134	88.18342	0.50030
0.99981	0.01966	50.86470	0.99981
1.99938	0.03719	26.88895	1.99938
3.99904	0.06664	15.00600	3.99904
6.99626	0.10549	9.47957	6.99626
8.99819	0.12976	7.70654	8.99819
9.99923	0.14243	7.02099	9.99923
11.00052	0.15355	6.51254	11.00052
12.99859	0.17583	5.68731	12.99859
15.00038	0.19862	5.03474	15.00038
16.99831	0.21915	4.56309	16.99831
18.99170	0.23824	4.19745	18.99170

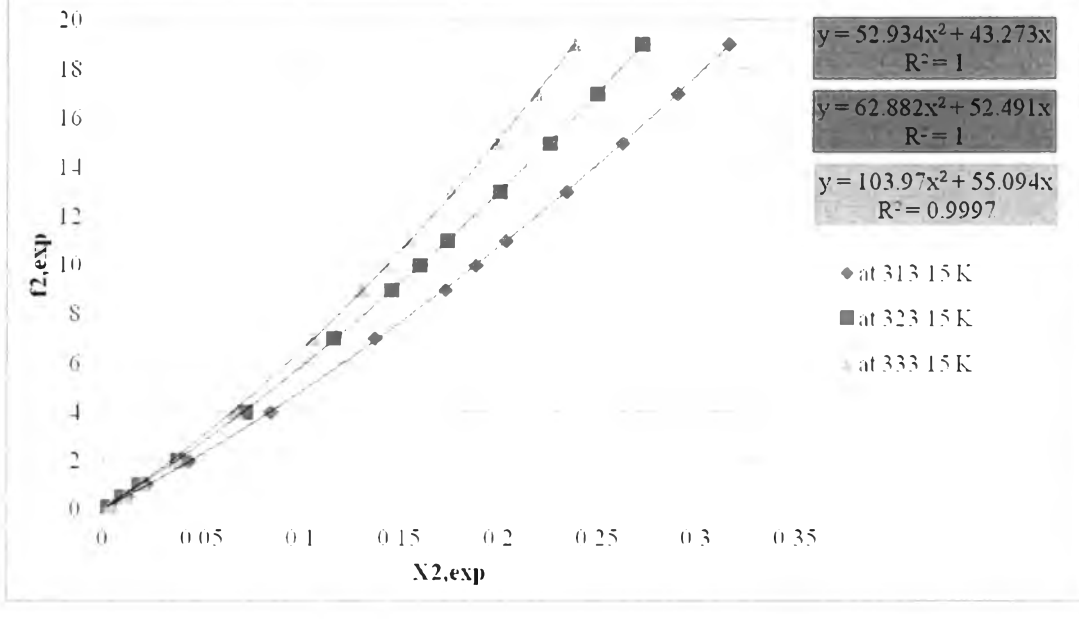

Figure E7 Determining the Henry's law constant for CO_2 in [pmim][Tf_2N].

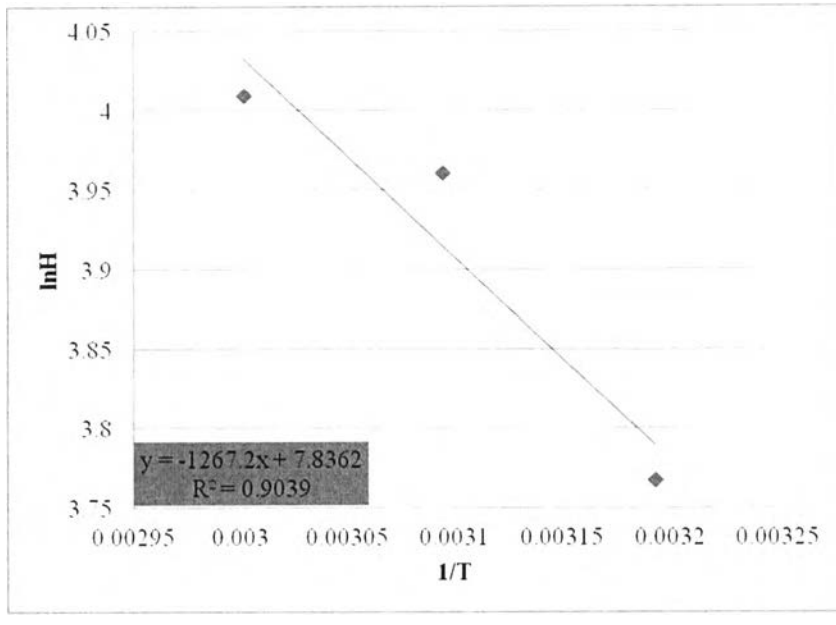

Figure E8 Determining the enthalpy of absorption for CO_2 in [pmim][Tf_2N].

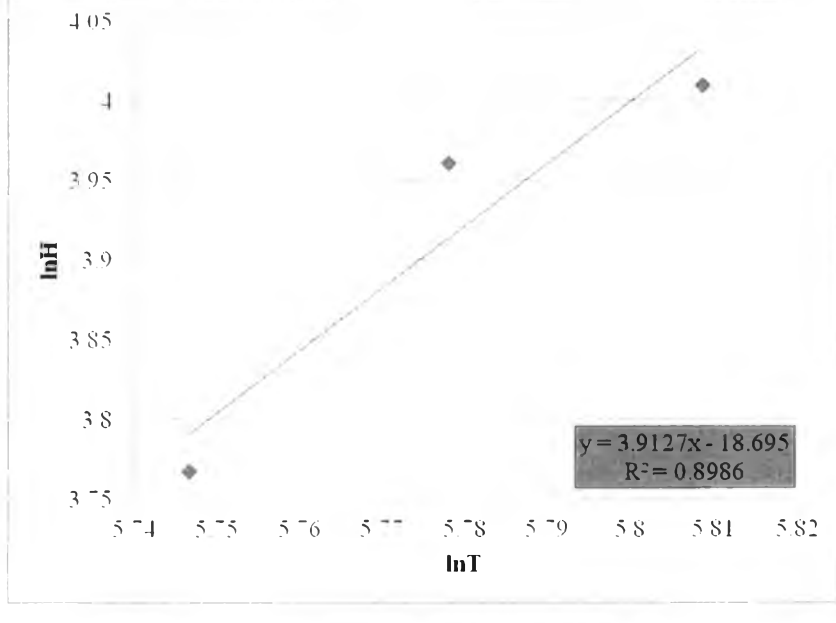

Figure E9 Determining the entropy of absorption for CO_2 in [pmim][Tf_2N].

Table E10 Experimental fugacity of CO_2 in [amim][Tf_2N] at 313.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09967	0.00273	366.30030	0.09967
0.49990	0.01199	83.40283	0.49990
0.99875	0.02225	44.94382	0.99875
1.99938	0.04358	22.94631	1.99938
3.99984	0.08426	11.86803	3.99984
7.00160	0.13676	7.31208	7.00160
9.00033	0.17011	5.87855	9.00033
10.00003	0.18598	5.37692	10.00003
10.99973	0.20344	4.91545	10.99973
13.00179	0.23252	4.30071	13.00179
14.99691	0.26141	3.82541	14.99691
16.99791	0.28935	3.45602	16.99791
18.99490	0.31499	3.17470	18.99490

Table E11 Experimental fugacity of CO_2 in [amim][Tf_2N] at 323.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09954	0.00213	469.48340	0.09954
0.49963	0.00863	115.87480	0.49963
0.99875	0.01767	56.59309	0.99875
2.00138	0.03685	27.13704	2.00138
3.99864	0.06913	14.46550	3.99864
6.99907	0.11322	8.83236	6.99907
8.99980	0.14219	7.03284	8.99979
9.99963	0.15589	6.41478	9.99963
10.99986	0.17083	5.85377	10.99986
12.99765	0.19937	5.01580	12.99765
14.99931	0.22333	4.47768	14.99931
16.99898	0.24805	4.03145	16.99898
18.99784	0.26841	3.72564	18.99784

Table E12 Experimental fugacity of CO_2 in [amim][Tf_2N] at 333.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.10047	0.00242	413.22300	0.10047
0.49896	0.00783	127.71390	0.49896
0.99848	0.01513	66.09385	0.99848
1.99911	0.03172	31.52585	1.99911
3.99771	0.06065	16.48805	3.99771
7.00080	0.10058	9.94233	7.00080
8.99953	0.12468	8.02053	8.99953
10.00003	0.13791	7.25111	10.00003
11.00012	0.14908	6.70781	11.00012
12.99698	0.17117	5.84215	12.99698
14.99865	0.19255	5.19346	14.99865
17.00004	0.21320	4.69043	17.00004
18.99477	0.23396	4.27424	18.99477

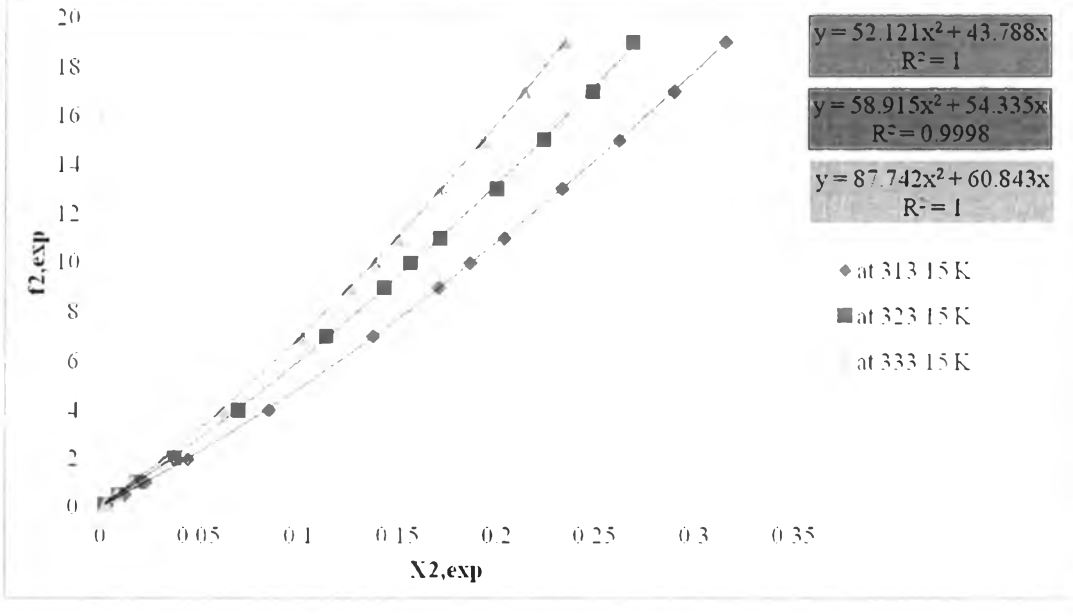

Figure E10 Determining the Henry's law constant for CO_2 in [amim][Tf_2N].

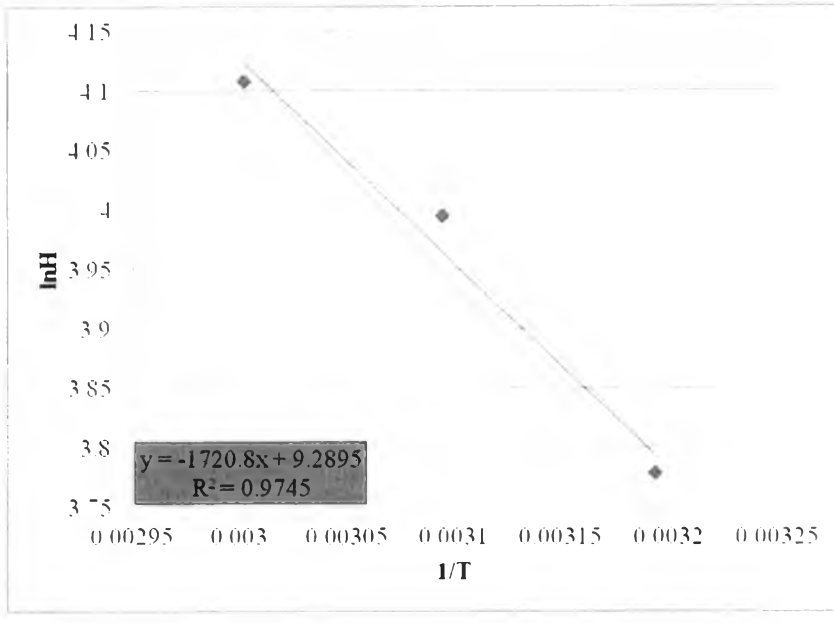

Figure E11 Determining the enthalpy of absorption for CO_2 in [amim][Tf_2N].

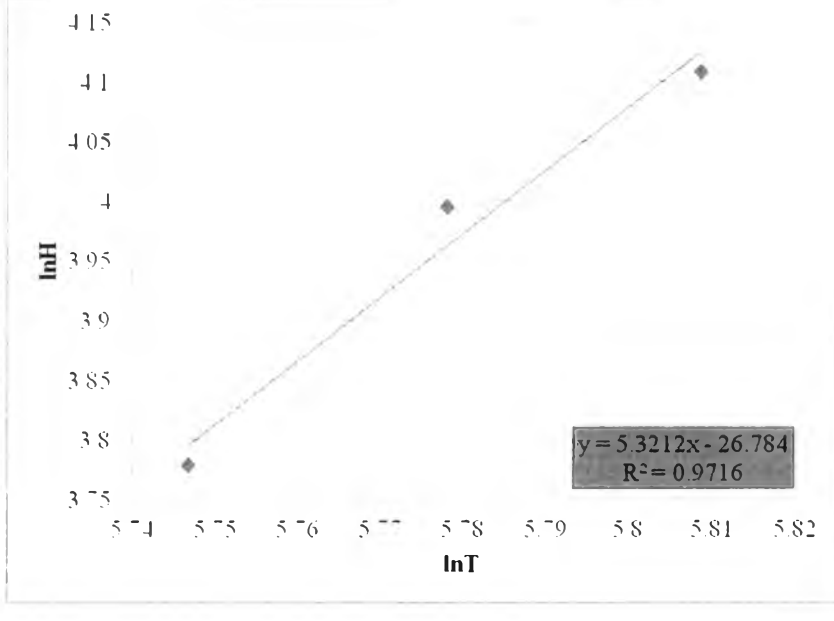

Figure E12 Determining the entropy of absorption for CO_2 in [amim][Tf_2N].

Table E13 Experimental fugacity of CO_2 in [4mbp][BF_4] at 313.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.10181	0.00109	911.61920	0.10116
0.49923	0.00575	173.70400	0.49863
0.99901	0.01131	88.36359	0.99841
2.00085	0.02367	42.23543	2.00027
3.99837	0.04806	20.80446	3.99782
7.00067	0.08016	12.47405	7.00011
8.99833	0.10191	9.81198	8.99778
9.99789	0.11196	8.93127	9.99734
10.99959	0.12313	8.12110	10.99904
12.99845	0.14448	6.92109	12.99791
14.99891	0.16397	6.09846	14.99838
17.00418	0.18381	5.44023	17.00365
18.99837	0.20282	4.93035	18.99785

Table E14 Experimental fugacity of CO_2 in [4mbp][BF_4] at 323.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.09540	0.00101	979.59910	0.09439
0.49830	0.00498	200.36940	0.49722
0.99915	0.01008	99.10086	0.99808
2.00138	0.02097	47.66306	2.00037
3.99944	0.04088	24.45562	3.99842
6.99840	0.06762	14.78631	6.99735
8.99980	0.08608	11.61576	8.99876
9.99816	0.09500	10.52523	9.99713
10.99919	0.10373	9.63951	10.99816
12.99792	0.12158	8.22439	12.99690
14.99705	0.13830	7.23017	14.99604
16.99898	0.15521	6.44250	16.99798
19.00064	0.17058	5.86204	18.99964

Table E15 Experimental fugacity of CO_2 in [4mbp][BF_4] at 333.15 K

P_{exp} (bar)	$x_{2,exp}$	$\phi_{2,exp}$	$f_{2,exp}$
0.10301	0.00103	955.61690	0.10139
0.49937	0.00392	254.03940	0.49728
0.99861	0.00846	117.97580	0.99669
2.00165	0.01858	53.77457	1.99991
3.99837	0.03504	28.52590	3.99656
6.99853	0.05855	17.07490	6.99668
9.00033	0.07365	13.57492	8.99846
9.99883	0.08188	12.21074	9.99698
10.99866	0.08950	11.17131	10.99681
12.99672	0.10353	9.65766	12.99487
15.00092	0.11767	8.49729	14.99907
17.00165	0.13162	7.59681	16.99980
18.99850	0.14577	6.85946	18.99667

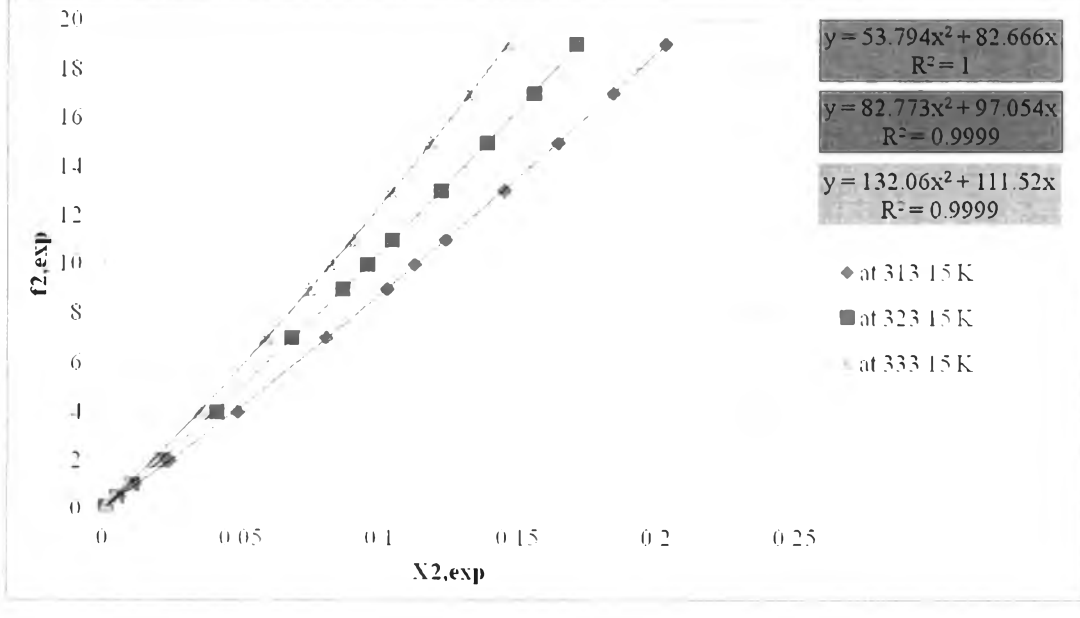

Figure E13 Determining the Henry's law constant for CO_2 in [4mbp][BF_4].

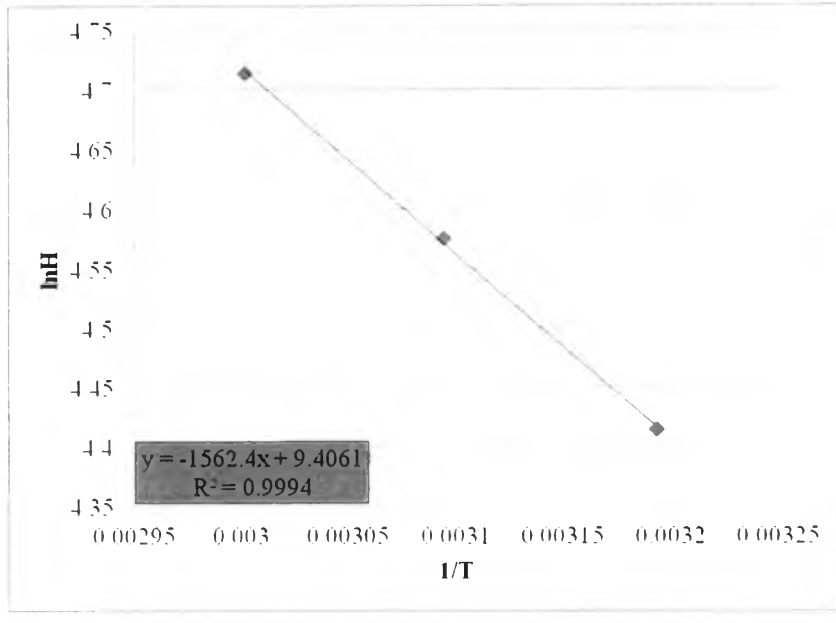

Figure E14 Determining the enthalpy of absorption for CO_2 in [4mbp][BF_4].

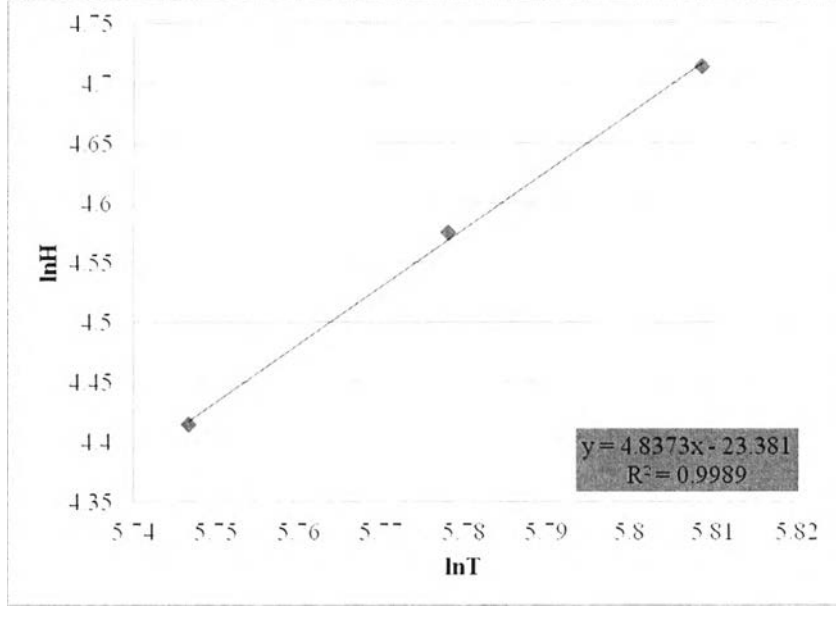

Figure E15 Determining the entropy of absorption for CO_2 in [4mbp][BF_4].

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Proceedings:

1. Nonthanasin, T.; Henni, A.; and Saiwan, C. (2013, April 23) Solubility of Carbon Dioxide in Two Promising Ionic Liquids. Proceedings of the 4th Research Symposium on Petrochemicals and Materials Technology and The 19th PPC Symposium on Petroleum, Petrochemicals, and Polymers, Bangkok, Thailand.
2. Nonthanasin, T.; Henni, A.; and Saiwan, C. (2013, September 29-October 2) Solubility of Carbon Dioxide in Five Promising Ionic Liquids. The 16th Conference Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction, Rhodes Island, Greece.