

## Electronic Supplementary Information

### Screening of Deep Eutectic Solvents (DESs) as green CO<sub>2</sub> sorbents: from solubility to viscosity

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**Table S1** CO<sub>2</sub> solubility in different DESs

Salt	HBD	Molar ratio salt:HBD	Temperature (K)	Pressure (MPa)	mol/kg	mol/mol	Ref
choline chloride	urea	1:1.5	313.15	11.84	2.7380	0.201	38
choline chloride	urea	1:1.5	323.15	12.52	2.5696	0.191	38
choline chloride	urea	1:1.5	333.15	12.50	2.2609	0.172	38
choline chloride	urea	1:2	313.15	12.50	5.1646	0.309	38
choline chloride	urea	1:2	323.15	11.10	4.2934	0.271	38
choline chloride	urea	1:2	333.15	12.73	4.2721	0.270	38
choline chloride	urea	1:2.5	313.15	12.45	3.0767	0.203	38
choline chloride	urea	1:2.5	323.15	12.28	2.7600	0.186	38
choline chloride	urea	1:2.5	333.15	12.55	2.4390	0.168	38
choline chloride	glycerol	1:2	303.15	5.863	3.6929	0.2859	51
choline chloride	glycerol	1:2	313.15	5.991	3.0718	0.2490	51
choline chloride	glycerol	1:2	323.15	6.170	2.6508	0.2224	51
choline chloride	glycerol	1:2	333.15	6.265	2.1243	0.1865	51
choline chloride	glycerol	1:2	343.15	6.347	1.6010	0.1473	51
choline chloride	triethylene glycol	1:4	298.15	1	0.2954	0.0419	59
choline chloride	ethylene glycol	1:4	298.15	1	0.3034	0.0230	59
choline chloride	ethylene glycol	1:8	298.15	1	0.3806	0.0262	59
choline chloride	urea	1:4	298.15	1	0.3237	0.0240	59
choline chloride	urea	1:2.5	298.15	1	0.2604	0.0211	59
choline chloride	glycerol	1:3	298.15	1	0.4574	0.0454	59
choline chloride	glycerol	1:8	298.15	1	0.3242	0.0306	59
choline chloride	ethanolamine	1:6	298.15	1	1.7025	0.1096	59
choline chloride	diethanolamine	1:6	298.15	1	0.9260	0.0925	59
benzyltriphenylphosphonium chloride	glycerol	1:12	298.15	1	0.4686	0.0511	59
butyltriphenylphosphonium bromide	ethylene glycol	1:12	298.15	1	0.6018	0.0503	59
methyltriphenylphosphonium bromide	ethanolamine	1:6	298.15	1	1.6286	0.1441	59
methyltriphenylphosphonium bromide	ethanolamine	1:7	298.15	1	1.4617	0.1254	59
methyltriphenylphosphonium bromide	ethanolamine	1:8	298.15	1	1.4360	0.1189	59
tetrabutylammonium bromide	ethanolamine	1:6	298.15	1	1.3438	0.1168	59
tetrabutylammonium bromide	diethanolamine	1:6	298.15	1	0.8487	0.1036	59
tetrabutylammonium bromide	triethanolamine	1:3	298.15	1	0.4702	0.0830	59
choline chloride	urea	1:2	303.15	5.654	3.5592	0.2355	25
choline chloride	urea	1:2	313.15	5.722	3.1151	0.2124	25
choline chloride	urea	1:2	323.15	5.782	2.7870	0.1944	25
choline chloride	urea	1:2	333.15	5.845	2.3945	0.1717	25
choline chloride	urea	1:2	343.15	5.911	1.9860	0.1467	25
choline chloride	phenol	1:2	293.15	0.494	0.1945	0.0208	48
choline chloride	phenol	1:2	303.15	0.510	0.1587	0.0170	48
choline chloride	phenol	1:2	313.15	0.503	0.1380	0.0149	48
choline chloride	phenol	1:2	323.15	0.520	0.1054	0.0114	48
choline chloride	phenol	1:3	293.15	0.508	0.2052	0.0212	48
choline chloride	phenol	1:3	303.15	0.514	0.1707	0.0177	48
choline chloride	phenol	1:3	313.15	0.507	0.1499	0.0156	48
choline chloride	phenol	1:3	323.15	0.513	0.1276	0.0133	48
choline chloride	phenol	1:4	293.15	0.509	0.2108	0.0213	48
choline chloride	phenol	1:4	303.15	0.523	0.1692	0.0172	48
choline chloride	phenol	1:4	313.15	0.504	0.1542	0.0157	48
choline chloride	phenol	1:4	323.15	0.529	0.1300	0.0132	48
choline chloride	diethylene glycol	1:3	293.15	0.513	0.1687	0.0189	48
choline chloride	diethylene glycol	1:3	303.15	0.524	0.1501	0.0169	48
choline chloride	diethylene glycol	1:3	313.15	0.515	0.1261	0.0142	48
choline chloride	diethylene glycol	1:3	323.15	0.518	0.1029	0.0116	48
choline chloride	diethylene glycol	1:4	293.15	0.509	0.1852	0.0205	48
choline chloride	diethylene glycol	1:4	303.15	0.519	0.1509	0.0167	48
choline chloride	diethylene glycol	1:4	313.15	0.518	0.1326	0.0147	48
choline chloride	diethylene glycol	1:4	323.15	0.527	0.1084	0.0121	48
choline chloride	triethylene glycol	1:3	293.15	0.504	0.1909	0.0274	48
choline chloride	triethylene glycol	1:3	303.15	0.512	0.1612	0.0232	48
choline chloride	triethylene glycol	1:3	313.15	0.510	0.1340	0.0194	48
choline chloride	triethylene glycol	1:3	323.15	0.516	0.1126	0.0163	48
choline chloride	triethylene glycol	1:4	293.15	0.513	0.1941	0.0280	48
choline chloride	triethylene glycol	1:4	303.15	0.513	0.1708	0.0247	48
choline chloride	triethylene glycol	1:4	313.15	0.519	0.1390	0.0202	48
choline chloride	triethylene glycol	1:4	323.15	0.520	0.1144	0.0167	48
choline chloride	ethylene glycol	1:2	303.15	5.863	3.1265	0.2156	26
choline chloride	ethylene glycol	1:2	313.15	5.902	2.6142	0.1870	26
choline chloride	ethylene glycol	1:2	323.15	6.167	2.1903	0.1615	26
choline chloride	ethylene glycol	1:2	333.15	6.104	1.5824	0.1221	26
choline chloride	ethylene glycol	1:2	343.15	6.323	1.2168	0.0966	26
choline chloride	1,4-butanediol	1:3	293.15	0.509	0.1624	0.0164	31
choline chloride	1,4-butanediol	1:3	303.15	0.495	0.1410	0.0142	31

choline chloride	1,4-butanediol	1:3	313.15	0.503	0.1196	0.0121	31
choline chloride	1,4-butanediol	1:3	323.15	0.526	0.1014	0.0103	31
choline chloride	1,4-butanediol	1:4	293.15	0.513	0.1560	0.0154	31
choline chloride	1,4-butanediol	1:4	303.15	0.503	0.1364	0.0135	31
choline chloride	1,4-butanediol	1:4	313.15	0.507	0.1208	0.0119	31
choline chloride	1,4-butanediol	1:4	323.15	0.519	0.1031	0.0102	31
choline chloride	2,3-butanediol	1:3	293.15	0.511	0.1501	0.0152	31
choline chloride	2,3-butanediol	1:3	303.15	0.513	0.1377	0.0139	31
choline chloride	2,3-butanediol	1:3	313.15	0.529	0.1251	0.0127	31
choline chloride	2,3-butanediol	1:3	323.15	0.514	0.1140	0.0116	31
choline chloride	2,3-butanediol	1:4	293.15	0.500	0.1915	0.0188	31
choline chloride	2,3-butanediol	1:4	303.15	0.511	0.1695	0.0167	31
choline chloride	2,3-butanediol	1:4	313.15	0.511	0.1469	0.0145	31
choline chloride	2,3-butanediol	1:4	323.15	0.512	0.1320	0.0130	31
choline chloride	1,2-propanediol	1:3	293.15	0.514	0.1827	0.0165	31
choline chloride	1,2-propanediol	1:3	303.15	0.517	0.1543	0.0140	31
choline chloride	1,2-propanediol	1:3	313.15	0.515	0.1264	0.0115	31
choline chloride	1,2-propanediol	1:3	323.15	0.524	0.1031	0.0094	31
choline chloride	1,2-propanediol	1:4	293.15	0.501	0.1884	0.0165	31
choline chloride	1,2-propanediol	1:4	303.15	0.517	0.1474	0.0129	31
choline chloride	1,2-propanediol	1:4	313.15	0.525	0.1208	0.0106	31
choline chloride	1,2-propanediol	1:4	323.15	0.520	0.0989	0.0087	31
choline chloride	levulinic acid	1:3	303.15	0.570	0.2549	0.0320	49
choline chloride	levulinic acid	1:3	313.15	0.580	0.2180	0.0259	49
choline chloride	levulinic acid	1:3	323.15	0.579	0.1738	0.0208	49
choline chloride	levulinic acid	1:3	333.15	0.583	0.1526	0.0183	49
choline chloride	levulinic acid	1:4	303.15	0.575	0.2700	0.0316	49
choline chloride	levulinic acid	1:4	313.15	0.566	0.2319	0.0273	49
choline chloride	levulinic acid	1:4	323.15	0.584	0.1937	0.0229	49
choline chloride	levulinic acid	1:4	333.15	0.587	0.1562	0.0185	49
choline chloride	levulinic acid	1:5	303.15	0.566	0.2869	0.0333	49
choline chloride	levulinic acid	1:5	313.15	0.573	0.2410	0.0281	49
choline chloride	levulinic acid	1:5	323.15	0.580	0.2038	0.0239	49
choline chloride	levulinic acid	1:5	333.15	0.581	0.1694	0.0199	49
choline chloride	furfuryl alcohol	1:3	303.15	0.583	0.1856	0.0197	49
choline chloride	furfuryl alcohol	1:3	313.15	0.581	0.1618	0.0173	49
choline chloride	furfuryl alcohol	1:3	323.15	0.585	0.1383	0.0148	49
choline chloride	furfuryl alcohol	1:3	333.15	0.586	0.1208	0.0129	49
choline chloride	furfuryl alcohol	1:4	303.15	0.581	0.2196	0.0228	49
choline chloride	furfuryl alcohol	1:4	313.15	0.569	0.1753	0.0183	49
choline chloride	furfuryl alcohol	1:4	323.15	0.566	0.1566	0.0164	49
choline chloride	furfuryl alcohol	1:4	333.15	0.585	0.1389	0.0146	49
choline chloride	furfuryl alcohol	1:5	303.15	0.577	0.2276	0.0234	49
choline chloride	furfuryl alcohol	1:5	313.15	0.570	0.1924	0.0198	49
choline chloride	furfuryl alcohol	1:5	323.15	0.573	0.1743	0.0180	49
choline chloride	furfuryl alcohol	1:5	333.15	0.577	0.1486	0.0154	49
tetramethylammonium chloride	lactic acid	1:2	308.15	1.992	0.6471	0.0588	60
tetraethylammonium chloride	lactic acid	1:2	308.15	1.993	0.8207	0.0725	60
tetrabutylammonium chloride	lactic acid	1:2	308.15	1.992	0.9546	0.1272	60
tetramethylammonium chloride	lactic acid	1:2	318.15	1.993	0.5487	0.0503	60
tetraethylammonium chloride	lactic acid	1:2	318.15	1.992	0.6866	0.0614	60
tetrabutylammonium chloride	lactic acid	1:2	318.15	1.992	0.8117	0.1103	60
choline chloride	lactic acid	1:2	303.29	0.829	0.2386	0.0248	61
choline chloride	lactic acid	1:2	303.29	1.655	0.4896	0.0496	61
choline chloride	lactic acid	1:2	303.29	2.580	0.7519	0.0742	61
choline chloride	lactic acid	1:2	303.29	3.591	1.0367	0.0995	61
choline chloride	urea-H <sub>2</sub> O	1:2:0.0185	308.2	4.376	2.1289	0.1690	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.0185	318.2	4.352	1.8302	0.1470	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.0185	328.2	4.480	1.7233	0.1390	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.0910	308.2	4.504	1.8840	0.1510	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.0910	318.2	4.356	1.7233	0.1390	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.0910	328.2	4.457	1.5909	0.1290	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.183	308.2	4.499	1.7766	0.1430	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.183	318.2	4.396	1.6041	0.1300	28
choline chloride	urea-H <sub>2</sub> O	1:2:0.183	328.2	4.486	1.3432	0.1100	28
choline chloride	glycerol-MTBD	1:2:6	ambient	ambient	2.2727	0.2389	27
choline chloride	glycerol-DBU	1:2:6	ambient	ambient	0.8068	0.0998	27
choline chloride	glycerol-DBN	1:2:6	ambient	ambient	2.3410	0.2175	27
choline chloride	glycerol-DBN	1:2:3	ambient	ambient	2.1818	0.2021	27
choline chloride	glycerol-DBN	1:2:7	ambient	ambient	2.3864	0.2216	27
choline chloride	glycerol-DBN	1:2:8	ambient	ambient	2.3409	0.2189	27
choline chloride	glycerol-DBN	1:3:10	ambient	ambient	2.3636	0.2187	27
choline chloride	urea-H <sub>2</sub> O	1:2:50%w	313.2	0.7841	—	0.111	62
choline chloride	urea-H <sub>2</sub> O	1:2:50%w	333.2	0.8567	—	0.107	62
choline chloride	urea-H <sub>2</sub> O	1:2:50%w	353.2	0.7836	—	0.097	62
choline chloride	urea-H <sub>2</sub> O	1:2:60%w	313.2	0.8061	—	0.103	62
choline chloride	urea-H <sub>2</sub> O	1:2:60%w	333.2	0.9036	—	0.102	62
choline chloride	urea-H <sub>2</sub> O	1:2:60%w	353.2	0.8834	—	0.096	62

choline chloride	urea-H <sub>2</sub> O	1:2:70%w	313.2	0.8096	—	0.097	62
choline chloride	urea-H <sub>2</sub> O	1:2:70%w	333.2	0.9246	—	0.097	62
choline chloride	urea-H <sub>2</sub> O	1:2:70%w	353.2	0.8757	—	0.088	62
choline chloride	urea-H <sub>2</sub> O-MEA	50%w-15%w	313.2	0.8185	—	0.229	62
choline chloride	urea-H <sub>2</sub> O-MEA	50%w-15%w	333.2	0.8558	—	0.181	62
choline chloride	urea-H <sub>2</sub> O-MEA	50%w-15%w	353.2	0.8041	—	0.197	62
choline chloride	urea-H <sub>2</sub> O-MEA	60%w-10%w	313.2	0.8253	—	0.202	62
choline chloride	urea-H <sub>2</sub> O-MEA	60%w-10%w	333.2	0.8349	—	0.181	62
choline chloride	urea-H <sub>2</sub> O-MEA	60%w-10%w	353.2	0.8588	—	0.171	62
choline chloride	urea-H <sub>2</sub> O-MEA	70%w-5%w	313.2	0.8133	—	0.189	62
choline chloride	urea-H <sub>2</sub> O-MEA	70%w-5%w	333.2	0.8294	—	0.171	62
choline chloride	urea-H <sub>2</sub> O-MEA	70%w-5%w	353.2	0.8086	—	0.148	62

**Table S2** Viscosity of different DESs

Salt	HBD	Molar ratio (Salt:HBD)	Viscosity (mPa.s)	Temperature (K)	Ref
choline chloride	urea	1:2	1571	298.15	28
choline chloride	glucose	1:1	34400	323.15	46
choline chloride	glucose	1:1	4470	343.15	46
choline chloride	glucose	1:1	560	373.15	46
choline chloride	xylitol	1:1	5230	303.15	46
choline chloride	xylitol	1:1	860	323.15	46
choline chloride	xylitol	1:1	250	343.15	46
choline chloride	sorbitol	1:1	12730	303.15	46
choline chloride	sorbitol	1:1	2000	323.15	46
choline chloride	sorbitol	1:1	480	343.15	46
tetrabutylammonium bromide	ethylene glycole	1:1.5	150	303.15	45
tetrabutylammonium bromide	1,3-ropandiol	1:1.5	220	303.15	45
tetrabutylammonium bromide	1,5-pentandiol	1:1.5	300	333.15	45
tetrabutylammonium bromide	glycerol	1:3	467.2	303.15	45
choline chloride	oxalic acid	1:1	585.28	303.15	52
choline chloride	ethylene glycole	1:1	33.911	303.15	52
choline chloride	triethanolamine	1:1	80.732	303.15	52
tetrapropylammonium bromide	ethylene glycol	1:3	5.2	303.15	53
tetrapropylammonium bromide	ethylene glycol	1:3	86.1	293.15	53
tetrapropylammonium bromide	ethylene glycol	1:3	8.6	353.15	53
tetrapropylammonium bromide	ethylene glycol	1:5	32.8	303.15	53
tetrapropylammonium bromide	triethylene glycol	1:2.5	78.2	303.15	53
tetrapropylammonium bromide	triethylene glycol	1:4	61.8	303.15	53
tetrapropylammonium bromide	triethylene glycol	1:4	117.0	293.15	53
tetrapropylammonium bromide	triethylene glycol	1:4	11.8	353.15	53
tetrapropylammonium bromide	glycerol	1:2	1510	293.15	53
tetrapropylammonium bromide	glycerol	1:4	80	293.15	53
tetrapropylammonium bromide	glycerol	1:4	33	352.75	53
potassium carbonate	glycerol	1:4	29107.4	293.15	54
potassium carbonate	glycerol	1:5	8018.2	293.15	54
potassium carbonate	glycerol	1:6	5500.0	293.15	54
choline chloride	malonic acid	1:1	828.70	298.15	55
choline chloride	oxalic acid	1:1	458.40	298.15	55
choline chloride	triethanolamine	1:2	838.82	298.15	55
choline chloride	zinc nitrate hexahydrate	1:1	106.70	298.15	55
choline chloride	2,2,2-trifluoroacetamide	1:2	77.30	298.15	55
n,n-diethylenethanol ammonium chloride	malonic acid	1:1	541.10	298.15	55
n,n-diethylenethanol ammonium chloride	zinc nitrate hexahydrate	1:1	163.40	298.15	55
choline chloride	urea	1:2	632	298.15	55
choline chloride	ethylene glycol	1:2	36	298.15	12
choline chloride	glycerol	1:2	376	298.15	12
choline chloride	malonic acid	1:1	721	298.15	12
choline chloride	chromium chloride. 6H <sub>2</sub> O		2346	298.15	12
choline chloride	ethylene glycol	1:2	41	298.15	63
choline chloride	ethylene glycol	1:3	26	298.15	63
choline chloride	ethylene glycol	1:4	25	298.15	63
choline chloride	ethylene glycol	1:5	22	298.15	63
choline chloride	triethylene glycol	1:3	66	298.15	63
choline chloride	triethylene glycol	1:4	62	298.15	63
choline chloride	triethylene glycol	1:5	5	298.15	63
choline chloride	triethylene glycol	1:6	45	298.15	63
choline chloride	urea	1:1.5	821	293.15	63
choline chloride	urea	1:2	750	293.15	63
choline chloride	urea	1:2.5	636	293.15	63
choline chloride	malonic acid	2:1	1460	293.15	63
choline chloride	malonic acid	1:1	417	293.15	63
choline chloride	malonic acid	1:2	800	293.15	63
tetrabutylammonium chloide	glycerol	1:3	580	303.15	63
tetrabutylammonium chloide	glycero	1:4	476.1	303.15	63
tetrabutylammonium chloide	glycerol	1:5	541.3	303.15	63
tetrabutylammonium chloide	ethylene glycol	1:2	127	303.15	63
tetrabutylammonium chloide	ethylene lycol	1:3	71.9	303.15	63
tetrabutylammonium chloide	ethylene glycol	1:4	56.9	303.15	63
tetrabutylammonium chloide	triethylene glycol	1:1	543.8	303.15	63
tetrabutylammonium chloide	triethylene glycol	2:1	1399	303.15	63
tetrabutylammonium chloide	triethylene glyco	4:1	3265.3	303.15	63
choline chloride	phenol	1:2	90.33	298.15	64
choline chloride	phenol	1:3	44.64	298.15	64
choline chloride	phenol	1:4	31.55	298.15	64
choline chloride	phenol	1:5	25.25	298.15	64
choine chloride	o-cresol	1:2	207.41	298.15	64
choline chloride	o-cresol	1:3	77.65	298.15	64
choline chloride	o-cresol	1:3.91	46.95	298.15	64
choline chloride	o-cresol	1:5	34.90	298.15	64

choline chloride	o-cresol	1:6	27.82	298.15	64
choline chloride	urea	1:2	1371.9719	293.15	65
choline chloride	urea	1:2	527.2786	303.15	65
choline chloride	urea	1:2	238.0763	313.15	65
choline chloride	urea	1:2	119.8049	323.15	65
choline chloride	urea	1:2	68.6478	333.15	65
choline chloride	urea	1:2	41.9612	343.15	65
choline chloride	urea	1:2	28.1053	353.15	65
choline chloride	urea	1:2	19.9490	363.15	65
choline chloride	glycolic acid	1:1	547.9	298.15	66
choline chloride	oxalic acid	1:1	8953	298.15	66
choline chloride	malonic acid	1:1	1389	298.15	66
choline chloride	levulinic acid	1:2	226.8	298.15	66
choline chloride	glutaric acid	1:1	2015	298.15	66
tetramethyl ammonium chloride	lactic acid	1:2	1197.6	293.15	66
tetramethyl ammonium chloride	lactic acid	1:2	756.29	298.15	66
tetramethyl ammonium chloride	lactic acid	1:2	46.64	303.15	66
tetramethyl ammonium chloride	lactic acid	1:2	337.20	308.15	66
tetramethyl ammonium chloride	lactic acid	1:2	235.85	313.15	66
tetramethyl ammonium chloride	lactic acid	1:2	169.58	318.15	66
tetraethyl ammonium chloride	lactic acid	1:2	67309	293.15	66
tetraethyl ammonium chloride	lactic acid	1:2	440.74	298.15	66
tetraethyl ammonium chloride	lactic acid	1:2	299.04	303.15	66
tetraethyl ammonium chloride	lactic acid	1:2	209.31	308.15	66
tetraethyl ammonium chloride	lactic acid	1:2	150.8	313.15	66
tetraethyl ammonium chloride	lactic acid	1:2	111.50	318.15	66
tetrabutyl ammonium chloride	lactic acid	1:2	1435.4	293.15	66
tetrabutyl ammonium chloride	lactic acid	1:2	890.73	298.15	66
tetrabutyl ammonium chloride	lactic acid	1:2	570.60	303.15	66
tetrabutyl ammonium chloride	lactic acid	1:2	378.68	308.15	66
tetrabutyl ammonium chloride	lactic acid	1:2	259.54	313.15	66
tetrabutyl ammonium chloride	lactic acid	1:2	183.16	318.15	66
cholin chloride	urea	1:2	449	303.15	67
cholin chloride	glycerol	1:2	246.79	303.15	68
cholin chloride	ethylene glycol	1:2	35	303.15	67
cholin chloride	glycolic acid	1:1	394.15	303.15	66
cholin chloride	levulinic acid	1:2	164.5	303.15	66
cholin chloride	phenol	1:3	35.17	303.15	64
n,n-diethylammonium chloride	glycerol	1:2	351.46	303.15	69
n,n-diethylammonium chloride	ethylene glycol	1:2	40.68	303.15	69
tetrapropylammonium bromide	ethylene glycol	1:3	58.2	303.15	53
tetrapropylammonium bromide	triethylene glycol	1:3	71.9	303.15	53
tetrabutylammonium chloride	glycerol	1:4	476.1	303.15	70
tetrabutylammonium chloride	ethylene glycol	1:4	56.90	303.15	70
tetrabutylammonium bromide	glycerol	1:3	467.2	303.15	45
tetrabutylammonium bromide	ethylene glycol	1:3	77	303.15	45
tetrabutylammonium bromide	1,3-propanediol	1:3	135	333.15	45
tetrabutylammonium bromide	1,5-propanediol	1:3	183	303.15	45
methyltriphenylphosphonium bromide	ethylene glycol	1:4	109.8	298.15	71
methyltriphenylphosphonium bromide	2,2,2- trifluoroacetamide	1:8	136.15	298.15	71
methyltriphenylphosphonium bromide	glycerol	1:1.75	887.1	318.15	71
methyltriphenylphosphonium bromide	ethylene glycol	1:4	109.8	298.15	71
methyltriphenylphosphonium bromide	ethylene glycol	1:4	68.6	308.15	71
methyltriphenylphosphonium bromide	trifluoroacetamide	1:8	136.5	298.15	71
methyltriphenylphosphonium bromide	trifluoroacetamide	1:8	71.3	308.15	71
cholin chloride	d-glucose	1:1	9037.1	298.15	72
cholin chloride	d-glucose	1.5:1	8000	298.15	72
cholin chloride	d-glucose	2:1	8045.1	298.15	72
cholin chloride	d-glucose	2.5:1	10910	298.15	72

**Table S3** CO<sub>2</sub> solubility in conventional ILs and their aqueous solutions

IL	Temperature (K)	Pressure (MPa)	m <sub>CO2</sub>	Ref.
[C <sub>4</sub> MIM][PF <sub>6</sub> ]	298.05	2.00	1.444	73
[C <sub>4</sub> MIM][BF <sub>4</sub> ]	298.05	2.00	1.695	73
[C <sub>4</sub> MIM][TFA]	298.02	2.24	1.572	57
[C <sub>4</sub> MIM][TFA]	313.13	2.34	1.443	57
[C <sub>4</sub> MIM][TFA]	333.26	2.46	1.060	57
[C <sub>4</sub> MIM][DCA]	298.20	2.50	1.970	34
[C <sub>4</sub> MIM][Tf <sub>2</sub> N]	298.20	2.08	1.667	34
[C <sub>6</sub> MIM][Tf <sub>2</sub> N]	298.20	2.20	1.724	34
[C <sub>8</sub> MIM][Tf <sub>2</sub> N]	298.20	2.27	1.734	34
[C <sub>4</sub> MIM][TfO]	298.20	2.07	1.814	34
[C <sub>8</sub> MIM][PF <sub>6</sub> ]	313.15	1.80	0.897	35
[C <sub>8</sub> MIM][PF <sub>6</sub> ]	323.15	1.60	0.843	35
[C <sub>8</sub> MIM][PF <sub>6</sub> ]	333.15	1.74	0.969	35
[C <sub>4</sub> MIM][NO <sub>3</sub> ]	313.15	1.55	1.211	35
[C <sub>4</sub> MIM][NO <sub>3</sub> ]	323.15	1.71	1.011	35
[C <sub>4</sub> MIM][NO <sub>3</sub> ]	333.15	1.84	1.113	35
[C <sub>8</sub> MIM][BF <sub>4</sub> ]	313.15	1.73	0.870	35
[C <sub>8</sub> MIM][BF <sub>4</sub> ]	323.15	1.56	0.840	35
[C <sub>8</sub> MIM][BF <sub>4</sub> ]	333.15	1.56	0.675	35
[N-bupy][BF <sub>4</sub> ]	313.15	1.55	0.754	35
[N-bupy][BF <sub>4</sub> ]	323.15	1.66	0.742	35
[N-bupy][BF <sub>4</sub> ]	333.15	1.87	0.892	35
[C <sub>2</sub> MIM][EtSO <sub>4</sub> ]	313.15	1.64	0.470	35
[C <sub>2</sub> MIM][EtSO <sub>4</sub> ]	323.15	1.62	0.486	35
[C <sub>2</sub> MIM][EtSO <sub>4</sub> ]	333.15	1.44	0.566	74
[C <sub>4</sub> MIM][CF <sub>3</sub> CO <sub>2</sub> ]	298.02	2.24	1.573	57
[C <sub>4</sub> MIM][CF <sub>3</sub> CO <sub>2</sub> ]	313.13	2.34	1.444	57
[C <sub>4</sub> MIM][CF <sub>3</sub> CO <sub>2</sub> ]	333.26	2.46	1.060	57
[C <sub>4</sub> MIM][C <sub>7</sub> F <sub>15</sub> CO <sub>2</sub> ]	333.08	1.50	0.453	57
[b2-Nic][Tf <sub>2</sub> N]	333.15	2.19	0.757	57
[hmpy][Tf <sub>2</sub> N]	298.01	1.30	0.953	57
[hmpy][Tf <sub>2</sub> N]	323.15	1.30	0.626	57
[C <sub>6</sub> MIM][eFAP]	298.15	1.30	0.950	57
[C <sub>6</sub> MIM][eFAP]	298.15	1.94	2.183	57
[C <sub>6</sub> MIM][eFAP]	333.15	1.30	0.524	57
[C <sub>6</sub> MIM][eFAP]	333.15	1.81	1.607	57
[P <sub>3</sub> MIM][bFAP]	298.15	2.19	0.688	57
[P <sub>3</sub> MIM][bFAP]	313.15	2.28	1.091	57
[P <sub>3</sub> MIM][bFAP]	333.15	2.28	0.704	57
[N <sub>4444</sub> ][doc]	333.31	2.01	0.348	57
[C <sub>6</sub> H <sub>4</sub> F <sub>9</sub> MIM][Tf <sub>2</sub> N]	298.15	1.69	1.473	57
[C <sub>6</sub> H <sub>4</sub> F <sub>9</sub> MIM][Tf <sub>2</sub> N]	313.15	1.73	1.070	57
[C <sub>6</sub> H <sub>4</sub> F <sub>9</sub> MIM][Tf <sub>2</sub> N]	333.15	2.04	0.993	57
[C <sub>8</sub> H <sub>4</sub> F <sub>13</sub> MIM][Tf <sub>2</sub> N]	298.15	2.20	1.709	57
[C <sub>8</sub> H <sub>4</sub> F <sub>13</sub> MIM][Tf <sub>2</sub> N]	333.15	1.30	0.426	57
Ecoeng 500	333.15	1.49	0.455	57
Ecoeng 500	333.15	2.45	0.674	57
Ecoeng 41M	313.15	2.65	0.430	57
Ecoeng 41M	333.15	2.09	0.320	57
[C <sub>6</sub> MIM][SAC]	333.15	0.30	0.076	57
[C <sub>6</sub> MIM][ACE]	333.15	0.30	0.090	57
[Choline][Tf <sub>2</sub> N]	333.15	2.12	0.870	57
[N <sub>4111</sub> ][Tf <sub>2</sub> N]	333.15	1.56	0.540	57
[C <sub>2</sub> MIM][TFA]	298.15	2.00	1.750	56
[C <sub>4</sub> MIM][TFA]	298.15	2.00	1.711	56
[C <sub>2</sub> MIM][AC]	298.15	2.00	4.400	56
[C <sub>4</sub> MIM][AC]	298.15	2.00	4.201	56
[C <sub>2</sub> MIM][Tf <sub>2</sub> N]	298.15	2.00	1.630	56
[C <sub>6</sub> MIM][Tf <sub>2</sub> N]	298.15	1.98	1.710	56
[C <sub>6</sub> MIM][FAP]	298.15	2.00	1.601	56
[C <sub>4</sub> MIM][TFES]	298.15	2.00	1.241	56
[C <sub>4</sub> MIM][PRO]	298.15	2.00	3.051	56
[C <sub>4</sub> MIM][ISB]	298.15	2.00	2.980	56
[C <sub>4</sub> MIM][LEV]	298.15	2.00	3.350	56
[C <sub>4</sub> MIM][SUC]	298.15	2.00	1.183	56
[C <sub>4</sub> MIM][TMA]	298.15	2.00	3.151	56
[TBP][FOR]	298.15	2.00	1.750	56
[C <sub>4</sub> MIM] <sub>2</sub> [IDA]	298.15	2.00	1.590	56
[C <sub>4</sub> MIM][IAC]	298.15	2.00	0.870	56

Table S4 Viscosity of different ILs

IL	Viscosity (mPa-s)	Temperature (K)	Ref.
[N <sub>2224</sub> ][CH <sub>3</sub> COO]	439	298.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]	306.70	313.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]	47.30	333.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-1H <sub>2</sub> O	79	298.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-1H <sub>2</sub> O	55.50	313.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-1H <sub>2</sub> O	15.60	333.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-2H <sub>2</sub> O	66	298.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-2H <sub>2</sub> O	39.40	313.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-2H <sub>2</sub> O	12.60	333.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-5H <sub>2</sub> O	13	298.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-5H <sub>2</sub> O	10.90	313.20	75
[N <sub>2224</sub> ][CH <sub>3</sub> COO]-5H <sub>2</sub> O	5.15	333.20	75
[C <sub>2</sub> MIM][BF <sub>4</sub> ]	36.17	298.15	76
[C <sub>4</sub> MIM][BF <sub>4</sub> ]	103	298.15	77
[C <sub>6</sub> MIM][BF <sub>4</sub> ]	145.60	298.15	78
[C <sub>8</sub> MIM][BF <sub>4</sub> ]	334	298.15	79
[BMPY][BF <sub>4</sub> ]	177	298.15	80
[C <sub>4</sub> MIM][PF <sub>6</sub> ]	282	298.15	81
[C <sub>6</sub> MIM][PF <sub>6</sub> ]	412	298.15	78
[MMIM][DMP]	271.86	298.15	82
[C <sub>2</sub> MIM][DEP]	431	298.15	82
[C <sub>2</sub> MIM][ES]	87.8	298.15	82
[C <sub>2</sub> MIM][HS]	1411	298.15	82
[C <sub>2</sub> MIM][Ac]	143.20	298.15	82
[EA][N]	28.50	298.15	82
[Et <sub>3</sub> S][Tf <sub>2</sub> N]	29.20	298.15	82
[O <sub>3</sub> MN][Tf <sub>2</sub> N]	558	298.15	82
[C <sub>2</sub> MIM][Tf <sub>2</sub> N]	33.40	298.15	82
[C <sub>4</sub> MIM][Tf <sub>2</sub> N]	50	298.15	82
[C <sub>6</sub> MIM][Tf <sub>2</sub> N]	68	298.15	82
[PMPYR][Tf <sub>2</sub> N]	63	298.15	82
[BMPYR][Tf <sub>2</sub> N]	76.70	298.15	82
[PMPYR][Tf <sub>2</sub> N]	63	298.15	82
[PMPYR][Tf <sub>2</sub> N]	125	298.15	82
[BMPY][Tf <sub>2</sub> N]	51.80	298.15	82
[C <sub>2</sub> MIM][Tf]	41	298.15	82
[C <sub>4</sub> MIM][Tf]	77	298.15	82
[C <sub>4</sub> MIM][DCA]	30.10	298.15	82
[BMPYR][DCA]	43.60	298.15	82
[H <sub>3</sub> D <sub>3</sub> PHO][Cl]	2137	298.15	82
[epy][EtSO <sub>4</sub> ]	137	298.15	83
[empty][EtSO <sub>4</sub> ]	150	298.15	83
[Et <sub>2</sub> Nic][EtSO <sub>4</sub> ]	3173	298.15	83
[bmpy][Tf <sub>2</sub> N]	63	298.15	83
[bmpy][BF <sub>4</sub> ]	177	298.15	83
[b <sub>2</sub> Nic][Tf <sub>2</sub> N]	531	298.15	83
[hpy][Tf <sub>2</sub> N]	80	298.15	83
[hmpy][Tf <sub>2</sub> N]	85	298.15	83
[hmmpy][Tf <sub>2</sub> N]	104	298.15	83
[hemmpy][Tf <sub>2</sub> N]	245	298.15	83
[hpeepy][Tf <sub>2</sub> N]	206	298.15	83
[hDMApy][Tf <sub>2</sub> N]	111	298.15	83
[hmDMApy][Tf <sub>2</sub> N]	112	298.15	83
[OMPY][Tf <sub>2</sub> N]	112	298.15	83
[C <sub>2</sub> MIM][Tf <sub>2</sub> N]	32	298.15	83
Ecoeng 41M	1033	298.15	83
[C <sub>4</sub> MIM][CH <sub>3</sub> CO <sub>2</sub> ]	440	298.15	83
[C <sub>4</sub> MIM][CF <sub>3</sub> CO <sub>2</sub> ]	70	298.15	83
[C <sub>6</sub> MIM][Tf <sub>2</sub> N]	68	298.15	83
[C <sub>6</sub> MMIM][Tf <sub>2</sub> N]	131	298.15	83
[N <sub>4444</sub> ][doc]	12100	298.15	83
Ecoeng 500	2790	298.15	83
[C <sub>4</sub> MIM][LEV]	1441	303.15	84
[C <sub>2</sub> py][EtSO <sub>4</sub> ]	143.00	298.15	85
[aP <sub>4443</sub> ][Ala]	758.00	298.15	85
[aP <sub>4443</sub> ][Gly]	713.90	298.15	85
[aP <sub>4443</sub> ][Ile]	1408.10	298.15	85
[aP <sub>4443</sub> ][Leu]	1193.80	298.15	85
[aP <sub>4443</sub> ][Lys]	1432.20	298.15	85
[aP <sub>4443</sub> ][Met]	766.80	298.15	85
[aP <sub>4443</sub> ][Phe]	1985.00	298.15	85
[aP <sub>4443</sub> ][Pro]	1772.80	298.15	85
[aP <sub>4443</sub> ][Ser]	1341.70	298.15	85
[aP <sub>4443</sub> ][Thr]	1790.50	298.15	85
[aP <sub>4443</sub> ][Val]	888.20	298.15	85
[C <sub>2</sub> MIM][EtSO <sub>4</sub> ]	101.42	298.15	86
[C <sub>4</sub> MIM][EtSO <sub>4</sub> ]	255.20	298.15	86



[C <sub>2</sub> MIM][DCA]	14.90	298.15	86
[C <sub>2</sub> MIM][FAP]	60.53	298.15	87
[C <sub>4</sub> MIM][BETI]	115.90	298.15	87
[C <sub>4</sub> MIM][FSI]	32.93	298.15	87
[C <sub>6</sub> MIM][TFSI]	70.51	298.15	87

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