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Electronic Supplementary Information

Assessment of certain ionic liquids for separation of binary mixtures based on gamma infinity data measurements†

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Table 1S The sources and mass fraction purities of materials

Chemical name[a]	Source	Initial mass fraction purity	Purification method	Final mass fraction purity	Analysis method
Pentane	Aldrich	≥ 0.99	–	–	–
Hexane	Fluka	≥ 0.99	–	–	–
3-Methylpentane	Aldrich	≥ 0.99	–	–	–
2,2,-Dimethylbutane	Aldrich	≥ 0.99	–	–	–
Heptane	Aldrich	≥ 0.995	–	–	–
Octane	Aldrich	≥ 0.99	–	–	–
2,2,4-Trimethylpentane	Aldrich	≥ 0.99	–	–	–
Nonane	Aldrich	≥ 0.99	–	–	–
Decane	Aldrich	≥ 0.99	–	–	–
Cyclopentane	Aldrich	≥ 0.99	–	–	–
Cyclohexane	Aldrich	≥ 0.99	–	–	–
Methylcyclohexane	Aldrich	≥ 0.99	–	–	–
Cycloheptane	Aldrich	≥ 0.98	–	–	–
Cyclooctane	Fluka	≥ 0.99	–	–	–
Pent-1-ene	Aldrich	≥ 0.985	–	–	–
Hex-1-ene	Aldrich	≥ 0.99	–	–	–
Cyclohexene	Aldrich	≥ 0.99	–	–	–
Hept-1-ene	Aldrich	≥ 0.99	–	–	–
Oct-1-ene	Aldrich	≥ 0.98	–	–	–
Dec-1-ene	Aldrich	≥ 0.97	–	–	–
Pent-1-yne	Aldrich	≥ 0.99	–	–	–
Hex-1-yne	Aldrich	≥ 0.97	–	–	–
Hept-1yne	Aldrich	≥ 0.98	–	–	–
Oct-1-yne	Aldrich	≥ 0.97	–	–	–
Benzene	Aldrich	≥ 0.998	–	–	–

Chemical name[a]	Source	Initial mass fraction purity	Purification method	Final mass fraction purity	Analysis method
Toluene	Aldrich	≥ 0.998	–	–	–
Ethylbenzene	Aldrich	≥ 0.998	–	–	–
o-Xylene	Aldrich	≥ 0.99	–	–	–
m-Xylene	Aldrich	≥ 0.99	–	–	–
p-Xylene	Aldrich	≥ 0.99	–	–	–
n-Propylbenzene	Aldrich	≥ 0.98	–	–	–
Cumene (*iso*-Propylbenzene)	Aldrich	≥ 0.99	–	–	–
Styrene	Aldrich	≥ 0.999	–	–	–
Prop-1-en-2-ylbenzene (α-Methylstyrene)	Aldrich	≥ 0.99	–	–	–
Thiophene	Aldrich	≥ 0.99	–	–	–
Pyridine	Aldrich	≥ 0.998	–	–	–
Methanol	Aldrich	≥ 0.999	–	–	–
Ethanol	Aldrich	≥ 0.998	–	–	–
Propan-1-ol	Aldrich	≥ 0.999	–	–	–
Propan-2-ol	Fluka	≥ 0.999	–	–	–
Butan-1-ol	Aldrich	≥ 0.998	–	–	–
Butan-2-ol	Aldrich	≥ 0.995	–	–	–
2-Methyl-propan-1-ol	Aldrich	≥ 0.998			
2-Methyl-propan-2-ol (*tert*-Butanol)	Aldrich	≥ 0.997	–	–	–
1-Pentanol	Aldrich	≥ 0.998	–	–	–
Water	own source	–	distillation, filtration	≥ 0.999	density
Methyl acetate	Aldrich	≥ 0.998	–	–	–

Chemical name[a]	Source	Initial mass fraction purity	Purification method	Final mass fraction purity	Analysis method
Methyl propanoate	Aldrich	≥ 0.99	–	–	–
Methyl butanoate	Aldrich	≥ 0.99	–	–	–
Ethyl acetate	Aldrich	≥ 0.998	–	–	–
Oxolane (Tetrahydrofuran, THF)	Aldrich	≥ 0.999	–	–	–
1,4-Dioxane	Aldrich	≥ 0.998	–	–	–
2-Methoxy-2-methylpropane (*tert*-Butyl methyl ether, MTBE)	Aldrich	≥ 0.998	–	–	–
2-Ethoxy-2-methylpropane (*tert*-Butyl ethyl ether, ETBE)	Aldrich	≥ 0.99	–	–	–
2-Methoxy-2-methylbutane (*tert*-Amyl methyl ether, TAME)	Aldrich	≥ 0.97	–	–	–
Ethoxyethane (Diethyl ether)	Aldrich	≥ 0.999	–	–	–
1-Propoxypropane (Di-*n*-propyl ether)	Aldrich	≥ 0.99	–	–	–
2-Propan-2-yloxypropane (Di-*iso*-propyl ether)	Fluka	≥ 0.99	–	–	–
1-Butoxybutane (Di-*n*-butyl ether)	Aldrich	≥ 0.993	–	–	–
Propan-2-one (Acetone)	Aldrich	≥ 0.999	–	–	–

Chemical name[a]	Source	Initial mass fraction purity	Purification method	Final mass fraction purity	Analysis method
Pentan-2-one	Aldrich	≥ 0.99	–	–	–
Pentan-3-one	Aldrich	≥ 0.99	–	–	–
Butanal	Fluka	≥ 0.99	–	–	–
Acetonitrile	Fluka	≥ 0.999	–	–	–
1-Nitropropane	Aldrich	≥ 0.985	–	–	–
Dicyanoazanide; 1-benzyl-3-methylimidazol-3-ium (1-Benzyl-3-methylimidazolium dicyanamide)	Io-Li-Tec	≥ 0.980	vacuum heating	–	–
bis(trifluoromethylsulfonyl)azanide; 1-benzyl-3-methylimidazol-3-ium (1-Benzyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide)	Io-Li-Tec	≥ 0.990	vacuum heating	–	–

[a] Names in parentheses are common names used in text.

Table 2S. Mean column pressure, $\bar{p}$, inlet column pressure, p_i and outlet column pressure, p_o at given temperatures at standard state of solutes: hypothecical liquid for ionic liquid [BzMIM][DCA].

Solute		*T*/K					
		318.15	328.15	338.15	348.15	358.15	368.15
Pentane	$\bar{p}$/kPa	109.7	109.7	109.9	108.7	108.6	
	p_i/kPa	119.4	119.4	119.6	118.4	118.3	
	p_o/kPa	99.4	99.4	99.6	98.4	98.3	
Hexane	$\bar{p}$/kPa	109.7	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	119.4	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	99.4	99.4	98.5	98.4	98.4	98.5
3-Methylpentane	$\bar{p}$/kPa	109.7	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	119.4	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	99.4	99.4	99.6	98.4	98.3	98.5
2,2-Dimethylbutane	$\bar{p}$/kPa	109.7	109.7	109.9	108.7	108.6	
	p_i/kPa	119.4	119.4	119.6	118.4	118.3	
	p_o/kPa	99.4	99.4	99.6	98.4	98.3	
Heptane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Octane	$\bar{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
2,2,4-Trimethylpentane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Nonane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Decane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Cyclopentane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Cyclohexane	$\bar{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
Methylcyclohexane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Cycloheptane	$\bar{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5

	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Cyclooctane	$\overline{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
Pent-1-ene	$\overline{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Hex-1-ene	$\overline{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
Cyclohexene	$\overline{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Hept-1-ene	$\overline{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Oct-1-ene	$\overline{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
Dec-1-ene	$\overline{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Pent-1-yne	$\overline{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Hex-1-yne	$\overline{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
Hept-1-yne	$\overline{p}$/kPa	108.8	109.7	109.9	108.7	108.6	108.8
	p_i/kPa	118.5	119.4	119.6	118.4	118.3	118.5
	p_o/kPa	98.5	99.4	99.6	98.4	98.3	98.5
Oct-1-yne	$\overline{p}$/kPa	108.8	109.7	108.8	108.7	108.7	108.8
	p_i/kPa	118.5	119.4	118.5	118.4	118.4	118.5
	p_o/kPa	98.5	99.4	98.5	98.4	98.4	98.5
Benzene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.5	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	158.1	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	98.1	98.5
Toluene	$\overline{p}$/kPa	132.0	132.0	130.8	130.3	130.9	130.8
	p_i/kPa	159.7	159.7	158.5	158.0	158.5	158.5
	p_o/kPa	99.7	99.7	98.5	98.0	98.5	98.5
Ethylbenzene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.5	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	158.1	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	98.1	98.5
o-Xylene	$\overline{p}$/kPa	132.0	132.0	130.8	130.3	130.9	130.8
	p_i/kPa	159.7	159.7	158.5	158.0	158.5	158.5
	p_o/kPa	99.7	99.7	98.5	98.0	98.5	98.5
m-Xylene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.4	130.8

	p_i/kPa	159.7	159.7	159.3	158.0	158.0	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	98.0	98.5
p-Xylene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.4	131.4
	p_i/kPa	159.7	159.7	159.3	158.0	158.0	159.1
	p_o/kPa	99.7	99.7	99.3	98.0	98.0	99.1
n-Propylbenzene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.5	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	158.1	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	98.1	98.5
iso-Propylbenzene	$\overline{p}$/kPa	132.0	132.0	131.6	131.5	130.2	130.8
	p_i/kPa	159.7	159.7	159.3	159.1	157.8	158.5
	p_o/kPa	99.7	99.7	99.3	99.1	97.8	98.5
Styrene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.5	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	158.1	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	98.1	98.5
α-Methylstyrene	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.5	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	158.1	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	98.1	98.5
Thiophene	$\overline{p}$/kPa	131.7	132.1	130.8	130.5	130.9	130.0
	p_i/kPa	159.4	159.8	158.5	158.2	158.5	157.7
	p_o/kPa	99.4	99.8	98.5	98.2	98.5	97.7
Pyridine	$\overline{p}$/kPa	144.5	143.7	143.1	143.0	130.3	141.6
	p_i/kPa	180.7	179.8	179.3	179.1	158.0	177.8
	p_o/kPa	100.7	99.8	99.3	99.1	98.0	97.8
Methanol	$\overline{p}$/kPa	132.0	132.0	130.8	130.3	130.9	130.8
	p_i/kPa	159.7	159.7	158.5	157.9	158.5	158.5
	p_o/kPa	99.7	99.7	98.5	97.9	98.5	98.5
Ethanol	$\overline{p}$/kPa	132.0	132.0	131.6	130.5	130.2	131.4
	p_i/kPa	159.7	159.7	159.3	158.2	157.8	159.1
	p_o/kPa	99.7	99.7	99.3	98.2	97.8	99.1
Propan-1-ol	$\overline{p}$/kPa	130.8	132.0	131.6	130.3	130.2	131.4
	p_i/kPa	158.5	159.7	159.3	157.9	157.8	159.1
	p_o/kPa	98.5	99.7	99.3	97.9	97.8	99.1
Propan-2-ol	$\overline{p}$/kPa	130.8	132.1	131.6	131.5	130.2	131.4
	p_i/kPa	158.5	159.8	159.3	159.1	157.8	159.1
	p_o/kPa	98.5	99.8	99.3	99.1	97.8	99.1
Butan-1-ol	$\overline{p}$/kPa	130.8	132.0	130.8	130.5	130.9	130.8
	p_i/kPa	158.5	159.7	158.5	158.2	158.5	158.5
	p_o/kPa	98.5	99.7	98.5	98.2	98.5	98.5
Butan-2-ol	$\overline{p}$/kPa	144.5	143.7	143.1	142.3	141.8	141.6
	p_i/kPa	180.7	179.8	179.3	178.5	177.9	177.8
	p_o/kPa	100.7	99.8	99.3	98.5	97.9	97.8
2-Methylpropan-1-ol	$\overline{p}$/kPa	144.5	143.7	143.1	142.3	141.9	141.6
	p_i/kPa	180.7	179.9	179.3	178.5	178	177.8
	p_o/kPa	100.7	99.9	99.3	98.5	98.0	97.8
tert-Butanol	$\overline{p}$/kPa	144.3	132.1	131.6	130.5	130.3	131.4
	p_i/kPa	180.5	159.8	159.3	158.2	157.9	159.1
	p_o/kPa	100.5	99.8	99.3	98.2	97.9	99.1

Pentan-1-ol	$\overline{p}$/kPa	144.5	143.7	143.1	142.9	141.9	141.6
	p_i/kPa	180.7	179.8	179.3	179.1	178.0	177.8
	p_o/kPa	100.7	99.8	99.3	99.1	98.0	97.8
Water	$\overline{p}$/kPa	144.5	143.7	130.9	142.9	130.9	141.6
	p_i/kPa	180.7	179.9	158.5	179.1	158.5	177.8
	p_o/kPa	100.7	99.9	98.5	99.1	98.5	97.8
Methyl acetate	$\overline{p}$/kPa	130.8	131.9	130.8	130.5	130.9	130.0
	p_i/kPa	158.5	159.6	158.5	158.2	158.5	157.7
	p_o/kPa	98.5	99.6	98.5	98.2	98.5	97.7
Methyl propanoate	$\overline{p}$/kPa	130.1	131.9	131.6	130.5	130.2	130.0
	p_i/kPa	157.8	159.6	159.3	158.2	157.8	157.7
	p_o/kPa	97.8	99.6	99.3	98.2	97.8	97.7
Methyl butanoate	$\overline{p}$/kPa	130.2	131.9	131.6	131.5	130.2	131.4
	p_i/kPa	157.8	159.6	159.3	159.1	157.8	159.1
	p_o/kPa	97.8	99.6	99.3	99.1	97.8	99.1
Ethyl acetate	$\overline{p}$/kPa	130.2	131.9	130.8	130.5	130.9	130.0
	p_i/kPa	157.8	159.6	158.5	158.2	158.5	157.7
	p_o/kPa	97.8	99.6	98.5	98.2	98.5	97.7
Tetrahydrofuran	$\overline{p}$/kPa	131.7	132.1	130.8	130.5	130.9	130.0
	p_i/kPa	159.4	159.8	158.5	158.2	158.5	157.7
	p_o/kPa	99.4	99.8	98.5	98.2	98.5	97.7
1,4-Dioxane	$\overline{p}$/kPa	130.1	132.1	131.6	130.5	130.3	130.0
	p_i/kPa	157.8	159.8	159.3	158.2	157.9	157.7
	p_o/kPa	97.8	99.8	99.3	98.2	97.9	97.7
tert-Butyl methyl ether	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.3	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	157.9	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	97.9	98.5
tert-Butyl ethyl ether	$\overline{p}$/kPa	132.0	132.0	131.6	130.3	130.3	130.8
	p_i/kPa	159.7	159.7	159.3	158.0	157.9	158.5
	p_o/kPa	99.7	99.7	99.3	98.0	97.9	98.5
tert-Amyl methyl ether	$\overline{p}$/kPa	132.0	132.0	130.8	130.3	130.9	130.8
	p_i/kPa	159.7	159.7	158.5	157.9	158.5	158.5
	p_o/kPa	99.7	99.7	98.5	97.9	98.5	98.5
Diethyl ether	$\overline{p}$/kPa	131.7	132.1	130.8	130.5	130.9	130.0
	p_i/kPa	159.4	159.8	158.5	158.2	158.5	157.7
	p_o/kPa	99.4	99.8	98.5	98.2	98.5	97.7
Di-*n*-propyl ether	$\overline{p}$/kPa	132.0	132.0	130.8	130.3	130.9	130.8
	p_i/kPa	159.7	159.7	158.5	157.9	158.5	158.5
	p_o/kPa	99.7	99.7	98.5	97.9	98.5	98.5
Di-*iso*-propyl ether	$\overline{p}$/kPa	132	132	131.6	130.5	130.3	130.8
	p_i/kPa	159.7	159.7	159.3	158.2	157.9	158.5
	p_o/kPa	99.7	99.7	99.3	98.2	97.9	98.5
Di-*n*-butyl ether	$\overline{p}$/kPa	132.0	132.0	131.6	130.5	130.3	130.0
	p_i/kPa	159.7	159.7	159.3	158.2	157.9	157.7
	p_o/kPa	99.7	99.7	99.3	98.2	97.9	97.7

Acetone	$\overline{p}$/kPa	130.8	131.9	130.9	130.5	130.9	130.0
	p_i/kPa	158.5	159.6	158.5	158.2	158.5	157.7
	p_o/kPa	98.5	99.6	98.5	98.2	98.5	97.7
Pentan-2-one	$\overline{p}$/kPa	130.8	131.9	130.9	130.5	130.9	130.0
	p_i/kPa	158.5	159.6	158.5	158.2	158.5	157.7
	p_o/kPa	98.5	99.6	98.5	98.2	98.5	97.7
Pentan-3-one	$\overline{p}$/kPa	130.1	131.9	131.6	130.5	130.2	130.0
	p_i/kPa	157.8	159.6	159.3	158.2	157.8	157.7
	p_o/kPa	97.8	99.6	99.3	98.2	97.8	97.7
Butanal	$\overline{p}$/kPa	130.2	131.9	130.8	130.5	130.9	130.0
	p_i/kPa	157.8	159.6	158.5	158.2	158.5	157.7
	p_o/kPa	97.8	99.6	98.5	98.2	98.5	97.7
Acetonitrile	$\overline{p}$/kPa	144.5	143.7	130.9	142.9	130.9	141.6
	p_i/kPa	180.7	179.8	158.5	179.1	158.5	177.8
	p_o/kPa	100.7	99.8	98.5	99.1	98.5	97.8
1-Nitropropane	$\overline{p}$/kPa	144.5	143.7	143.1	143.0	130.3	141.6
	p_i/kPa	180.7	179.8	179.3	179.1	158.0	177.8
	p_o/kPa	100.7	99.8	99.3	99.1	98.0	97.8

[a] Standard uncertainties u are u (T) = 0.02 K, u ($\overline{p}$) = 0.06 kPa, u (p_i) = 0.1 kPa, u (p_o) = 0.07 kPa.

Table 3S Mean column pressure, $\overline{p}$, inlet column pressure, p_i and outlet column pressure, p_o at given temperatures at standard state of solutes: hypothetical liquid

Solute		*T*/K					
		318.15	328.15	338.15	348.15	358.15	368.15
Pentane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Hexane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
3-Methylpentane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
2,2-Dimethylbutane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Heptane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Octane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	98.9
2,2,4-Trimethylpentane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Nonane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Decane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Cyclopentane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Cyclohexane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	98.9
Methylcyclohexane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Cycloheptane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9

Cyclooctane	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	98.9
Pent-1-ene	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Hex-1-ene	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.5
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	119.1
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	99.1
Cyclohexene	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Hept-1-ene	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.5
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	119.1
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	99.1
Oct-1-ene	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.5
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	119.1
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	99.1
Dec-1-ene	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Pent-1-yne	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Hex-1-yne	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	98.9
Hept-1-yne	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	109.0	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.7	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.7	98.9
Oct-1-yne	$\overline{p}$/kPa	109.7	109.9	110.0	109.5	108.8	109.2
	p_i/kPa	119.4	119.6	119.7	119.2	118.5	118.9
	p_o/kPa	99.4	99.6	99.7	99.2	98.5	98.9
Benzene	$\overline{p}$/kPa	130.7	130.8	130.7	130.5	130.5	130.5
	p_i/kPa	158.4	158.5	158.3	158.1	158.1	158.2
	p_o/kPa	98.4	98.5	98.3	98.1	98.1	98.2
Toluene	$\overline{p}$/kPa	130.7	130.5	131.1	130.5	130.5	130.5
	p_i/kPa	158.4	158.2	158.8	158.1	158.1	158.2
	p_o/kPa	98.4	98.2	98.8	98.1	98.1	98.2
Ethylbenzene	$\overline{p}$/kPa	130.7	130.5	130.7	130.5	130.5	130.5
	p_i/kPa	158.4	158.2	158.3	158.1	158.1	158.2
	p_o/kPa	98.4	98.2	98.3	98.1	98.1	98.2
o-Xylene	$\overline{p}$/kPa	130.7	130.5	131.1	130.5	130.5	130.5
	p_i/kPa	158.4	158.2	158.8	158.1	158.1	158.2
	p_o/kPa	98.4	98.2	98.8	98.1	98.1	98.2
m-Xylene	$\overline{p}$/kPa	130	130.8	130.8	130.5	130.3	130.5
	p_i/kPa	157.7	158.5	158.5	158.1	158.0	158.2

	p_o/kPa	97.7	98.5	98.5	98.1	98.0	98.2
p-Xylene	$\overline{p}$/kPa	130.2	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.8	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.8	98.2	98.5	98.1	98.0	98.2
n-Propylbenzene	$\overline{p}$/kPa	130.2	130.5	130.7	130.5	130.3	130.5
	p_i/kPa	157.8	158.2	158.3	158.1	158.0	158.2
	p_o/kPa	97.8	98.2	98.3	98.1	98.0	98.2
iso-Propylbenzene	$\overline{p}$/kPa	130.2	130.5	130.7	130.5	130.3	130.5
	p_i/kPa	157.8	158.2	158.3	158.1	158.0	158.2
	p_o/kPa	97.8	98.2	98.3	98.1	98.0	98.2
Styrene	$\overline{p}$/kPa	130.7	130.5	130.7	130.5	130.5	130.5
	p_i/kPa	158.4	158.2	158.3	158.1	158.1	158.2
	p_o/kPa	98.4	98.2	98.3	98.1	98.1	98.2
α-Methylstyrene	$\overline{p}$/kPa	130.7	130.5	130.7	130.5	130.5	130.5
	p_i/kPa	158.4	158.2	158.3	158.1	158.1	158.2
	p_o/kPa	98.4	98.2	98.3	98.1	98.1	98.2
Thiophene	$\overline{p}$/kPa	130.2	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.8	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.8	98.2	98.8	98.1	98.9	98.2
Pyridine	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.5	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.1	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.1	98.2
Methanol	$\overline{p}$/kPa	130.2	130.8	131.1	130.5	131.3	130.5
	p_i/kPa	157.8	158.5	158.8	158.1	158.9	158.2
	p_o/kPa	97.8	98.5	98.8	98.1	98.9	98.2
Ethanol	$\overline{p}$/kPa	130.2	130.5	130.7	130.5	130.5	130.5
	p_i/kPa	157.8	158.2	158.3	158.1	158.1	158.2
	p_o/kPa	97.8	98.2	98.3	98.1	98.1	98.2
Propan-1-ol	$\overline{p}$/kPa	130.2	130.8	130.8	130.5	130.3	130.5
	p_i/kPa	157.8	158.5	158.5	158.1	158.0	158.2
	p_o/kPa	97.8	98.5	98.5	98.1	98.0	98.2
Propan-2-ol	$\overline{p}$/kPa	130.2	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.8	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.8	98.2	98.5	98.1	98.0	98.2
Butan-1-ol	$\overline{p}$/kPa	129.9	130.8	131.1	130.5	131.3	130.5
	p_i/kPa	157.6	158.5	158.8	158.2	158.9	158.2
	p_o/kPa	97.6	98.5	98.8	98.2	98.9	98.2
Butan-2-ol	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
2-Methylpropan-1-ol	$\overline{p}$/kPa	130.2	130.5	130.7	130.5	130.3	130.5
	p_i/kPa	157.8	158.2	158.3	158.1	158.0	158.2
	p_o/kPa	97.8	98.2	98.3	98.1	98.0	98.2
tert-Butanol	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
Pentan-1-ol	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5

	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
Water	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
Methyl acetate	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
Methyl propanoate	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
Methyl butanoate	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.5	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.1	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.1	98.2
Ethyl acetate	$\overline{p}$/kPa	129.9	130.5	131.2	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.9	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.9	98.1	98.9	98.2
Tetrahydrofuran	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
1,4-Dioxane	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
tert-Butyl methyl ether	$\overline{p}$/kPa	130.2	130.5	130.7	130.5	130.5	130.5
	p_i/kPa	157.8	158.2	158.3	158.1	158.1	158.2
	p_o/kPa	97.8	98.2	98.3	98.1	98.1	98.2
tert-Butyl ethyl ether	$\overline{p}$/kPa	130.2	130.5	130.7	130.5	130.3	130.5
	p_i/kPa	157.8	158.2	158.3	158.1	158.0	158.2
	p_o/kPa	97.8	98.2	98.3	98.1	98.0	98.2
tert-Amyl methyl ether	$\overline{p}$/kPa	130.2	130.5	131.1	130.5	131.3	130.5
	p_i/kPa	157.8	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.8	98.2	98.8	98.1	98.9	98.2
Diethyl ether	$\overline{p}$/kPa	129.9	130.5	130.7	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.3	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.3	98.1	98.0	98.2
Di-*n*-propyl ether	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
Di-*iso*-propyl ether	$\overline{p}$/kPa	129.9	130.5	130.7	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.3	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.3	98.1	98.0	98.2
Di-*n*-butyl ether	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
Acetone	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5

	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
Pentan-2-one	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
Pentan-3-one	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.3	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.0	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.0	98.2
Butanal	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
Acetonitrile	$\overline{p}$/kPa	129.9	130.5	131.1	130.5	131.2	130.5
	p_i/kPa	157.6	158.2	158.8	158.1	158.9	158.2
	p_o/kPa	97.6	98.2	98.8	98.1	98.9	98.2
1-Nitropropane	$\overline{p}$/kPa	129.9	130.5	130.8	130.5	130.5	130.5
	p_i/kPa	157.6	158.2	158.5	158.1	158.1	158.2
	p_o/kPa	97.6	98.2	98.5	98.1	98.1	98.2

[a] Standard uncertainties u are u (T) = 0.02 K, u ($\overline{p}$) = 0.06 kPa, u (p_i) = 0.1 kPa, u (p_o) = 0.07 kPa

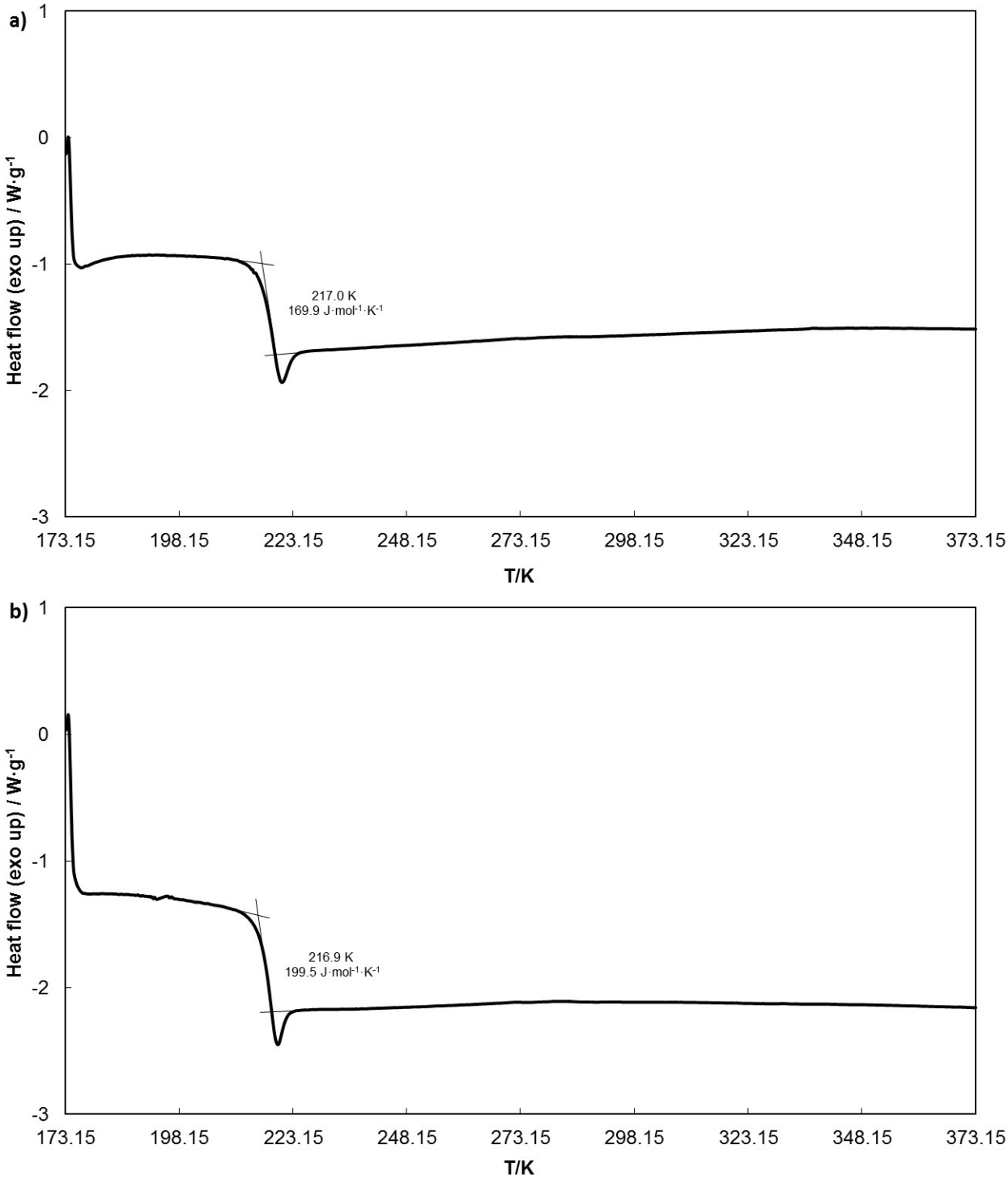

Fig. 1S DSC of a) [BzMIM][DCA]; b) [BzMIM][NTf_2].

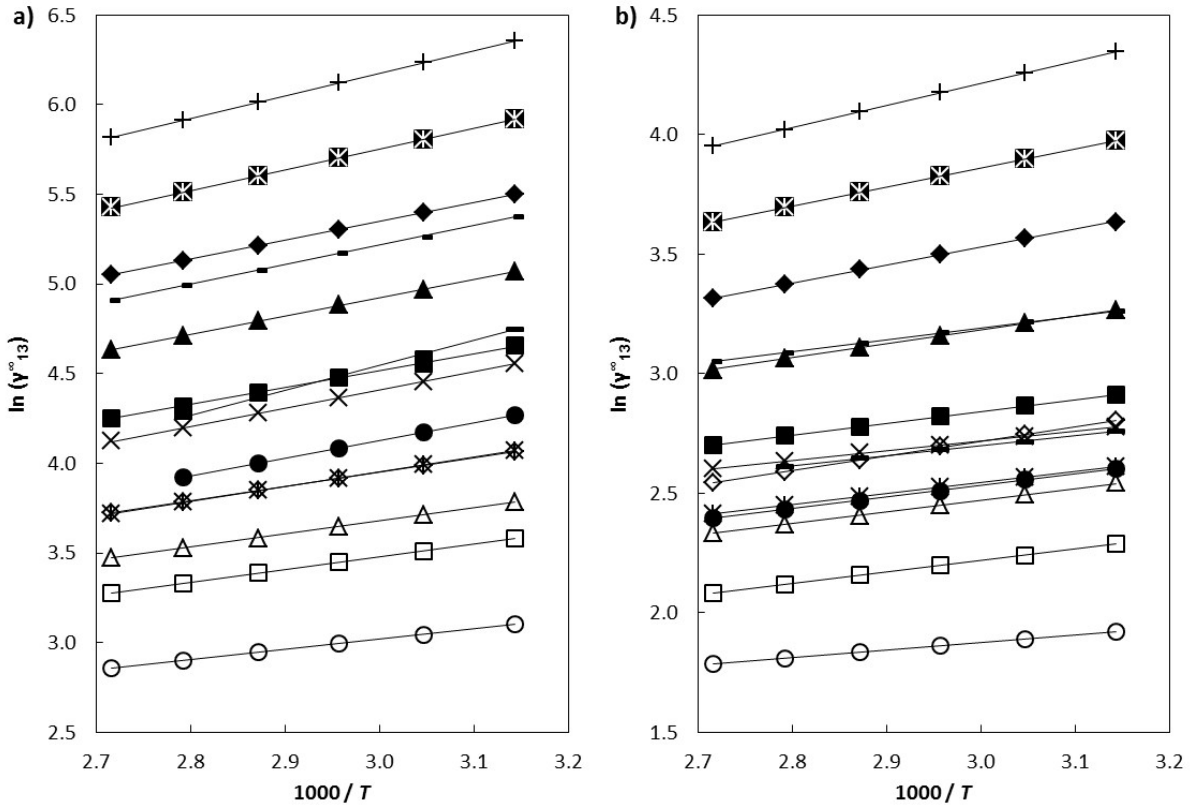

Fig. 2S Plot of ln(γ_{13}^{∞}) for ionic liquid a) [BzMIM][DCA]; b) [BzMIM][NTf_2] versus 1/T for the solutes: (●) pentane; (■) hexane; (×) 3-methylpentane; (─) 2,2,-dimethylbutane; (▲) heptane; (✹) octane; (-) 2,2,4-trimethylpentane; (⩛) nonane; (⇗) decane; (○) cyclopentane; (□) cyclohexane; (⩛) methylcyclohexane; (Δ) cycloheptane; (◊) cyclooctane.

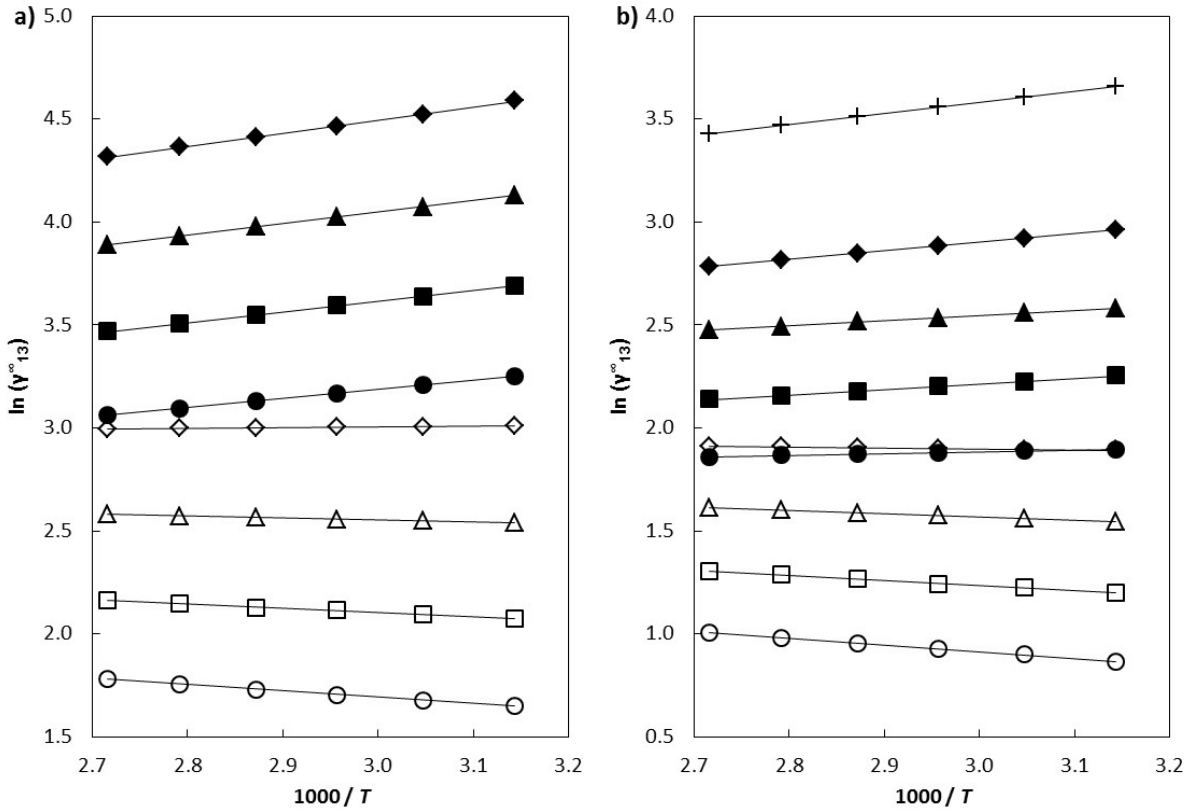

Fig. 3S Plot of ln(γ_{13}^{∞})for ionic liquid a) [BzMIM][DCA]; b) [BzMIM][NTf_2] versus 1/T for the solutes: (●) pent-1-ene; (■) hex-1-ene; (×) cyclohexene; (▲) hept-1-ene; (✹) oct-1-ene; (🖈) dec-1-ene; (○) pent-1-yne; (□) hex-1-yne; (Δ) hept-1-yne; (◊) oct-1-yne.

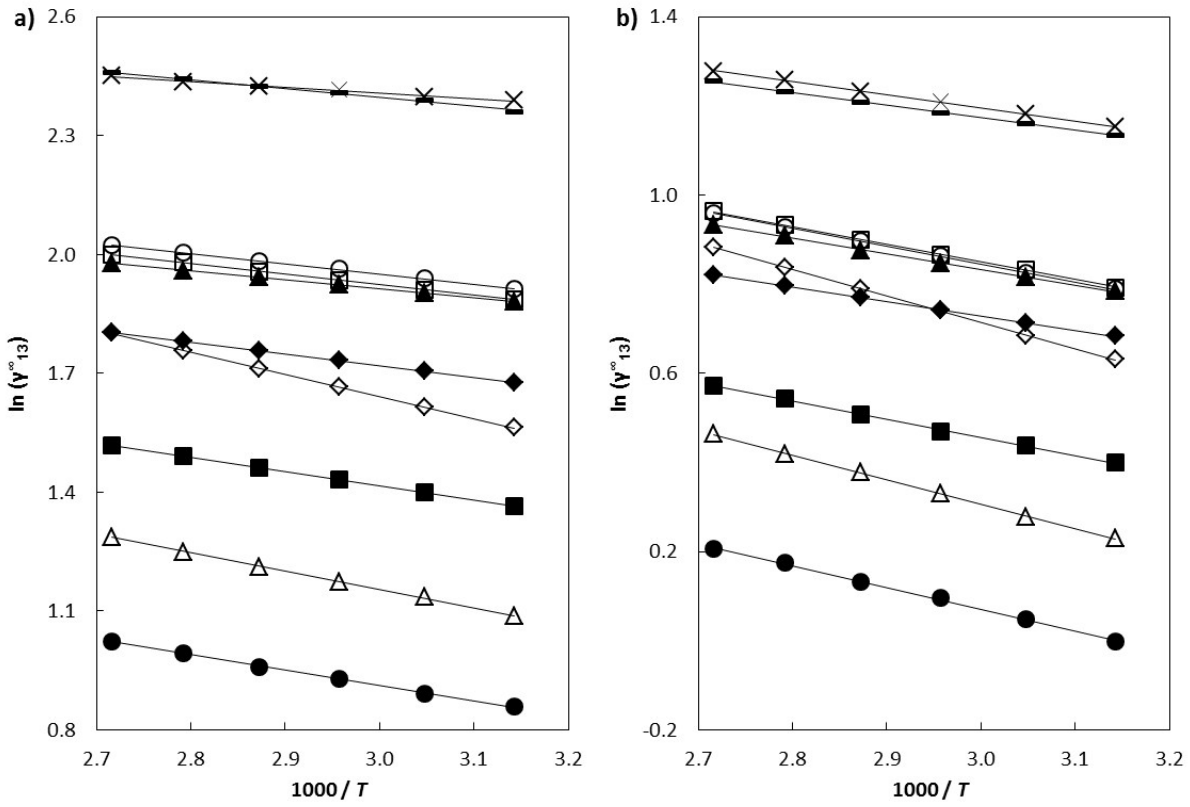

Fig. 4S Plot of ln(γ_{13}^{∞})for ionic liquid a) [BzMIM][DCA]; b) [BzMIM][NTf_2] versus 1/T for the solutes: (●) benzene; (■) toluene; (▲) ethylbenzene; (✹) *o*-xylene; (○) *m*-xylene; (□) *p*-xylene; (×) propylbenzene; (─) *iso*-propylbenzene; (Δ) styrene; (◊) *α*-methylstyrene.

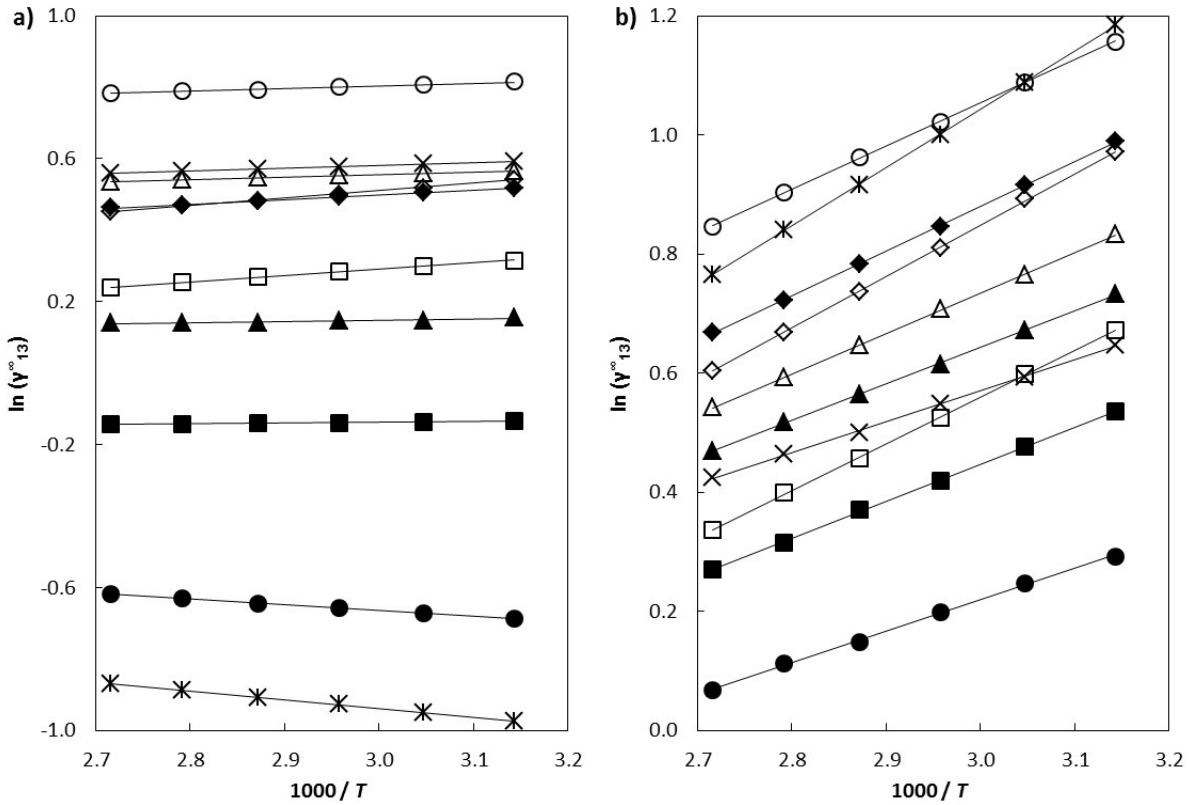

Fig. 5S Plot of ln(γ_{13}^{∞})for ionic liquid a) [BzMIM][DCA]; b) [BzMIM][NTf_2] versus 1/T for the solutes: (●) methanol; (■) ethanol; (▲) propan-1-ol; (✹) butan-1-ol; (□) propan-2-ol; (Δ) butan-2-ol; (◊) 2-methyl-1-propanol; (×) *tert*-butanol; (○) pentan-1-ol; (➢) water.

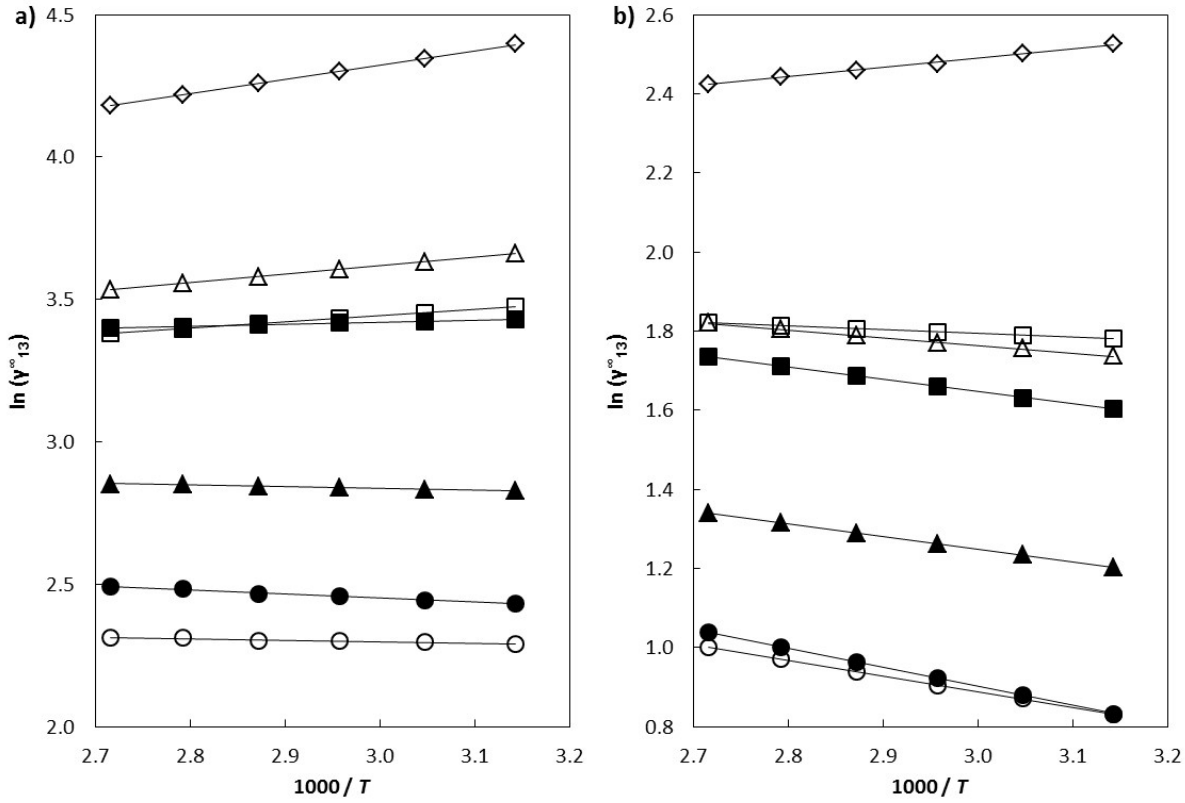

Fig. 6S Plot of ln(γ_{13}^{∞})for ionic liquid a) [BeMIM][DCA]; b) [BeMIM][NTf_2] versus 1/T for the solutes: (○) diethyl ether; (□) di-*n*-propyl ether; (Δ) di-*iso*-propyl ether; (◊) di-*n*-butyl ether; (●) MTBE; (■) ETBE; (▲) TAME.

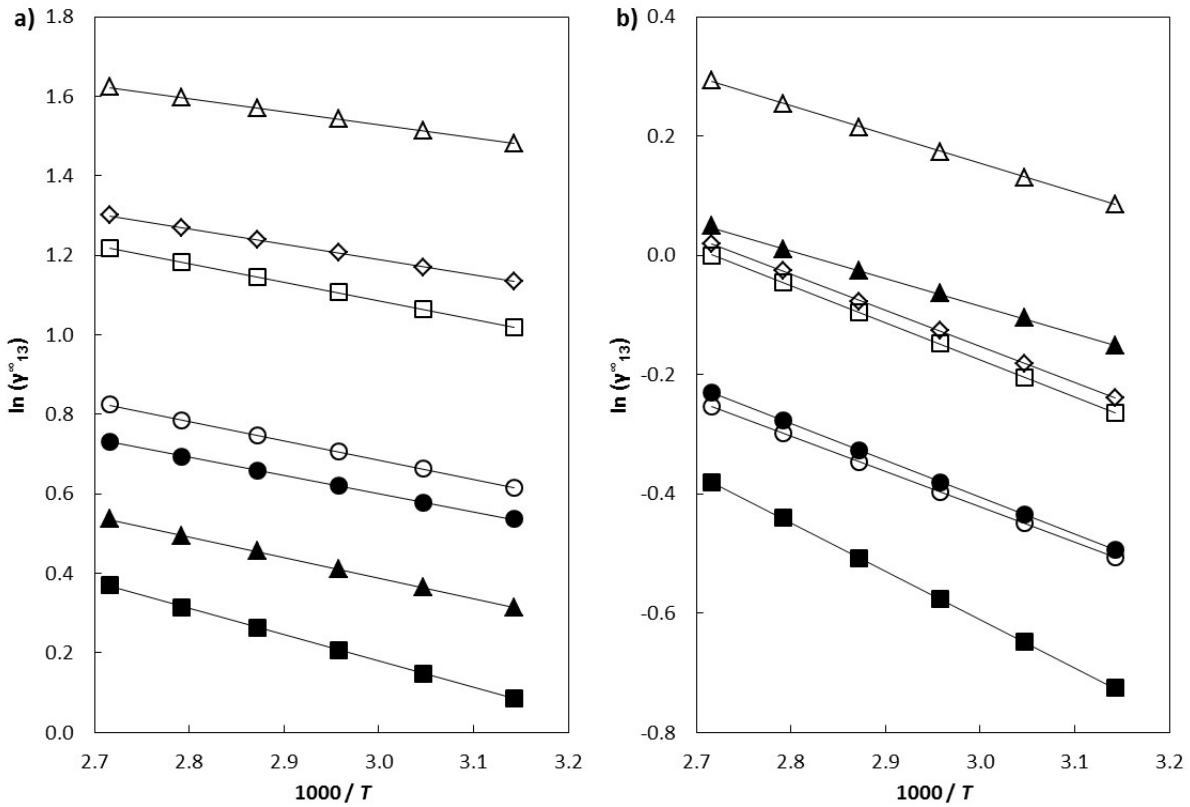

Fig. 7S Plot of ln(γ_{13}^{∞})for ionic liquid a) [BzMIM][DCA]; b) [BzMIM][NTf_2] versus 1/T for the solutes: (○) methyl acetate; (□) methyl propanoate; (Δ) methyl butanoate; (◊) ethyl acetate; (●) THF; (■) 1,4-dioxane; (▲) thiophene.

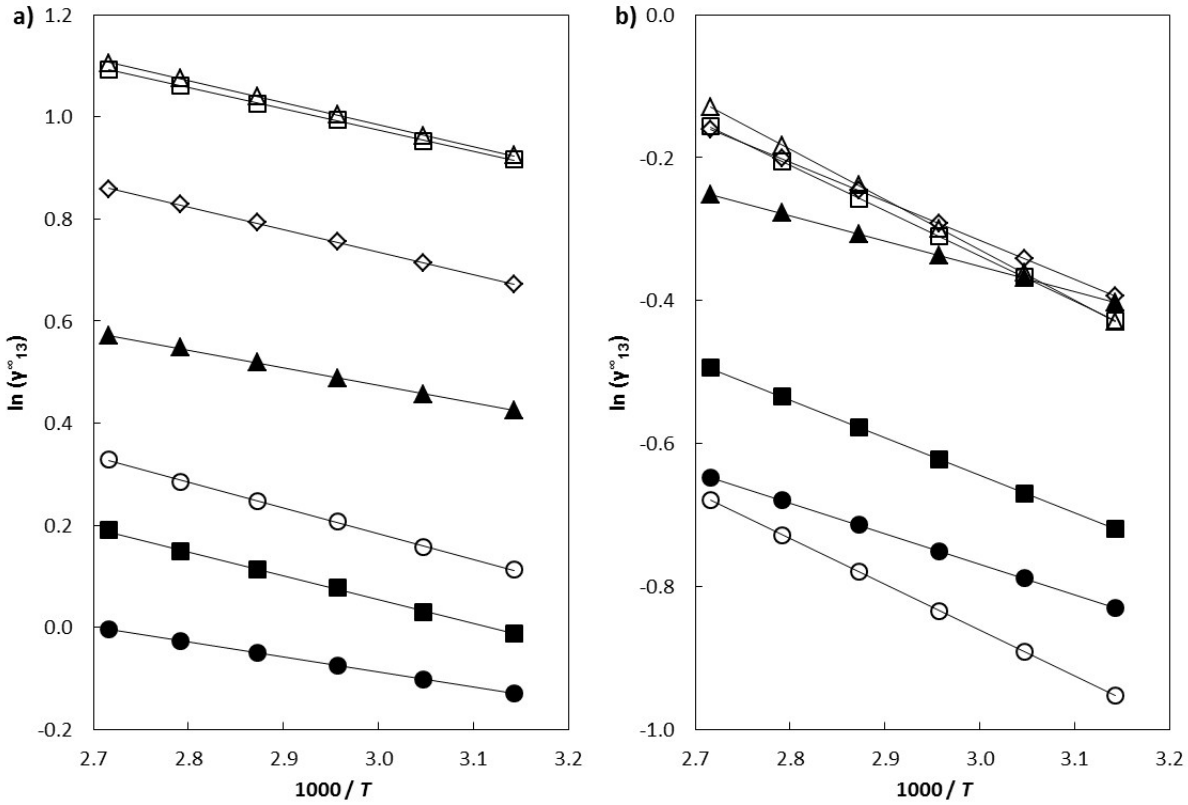

Fig. 8S Plot of ln(γ_{13}^{∞})for ionic liquid a) [BzMIM][DCA]; b) [BzMIM][NTf_2] versus 1/T for the solutes: (○) acetone; (□) pentan-2-one; (Δ) pentan-3-one; (●) acetonitrile; (■) pyridine; (▲) 1-nitropropane; (◊) butanal.