Electronic Supplementary Information (ESI) for PCCP

Alcohols as Molecular Probes in Ionic Liquids: Evidence for Nanostructuration

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Table S1. Complete list of the schematic structures and abbreviations of the studied ionic liquids

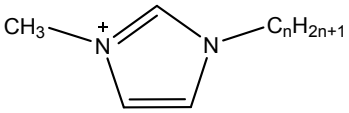
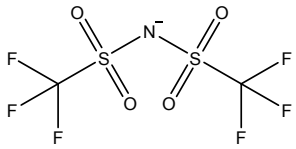
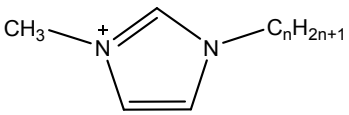
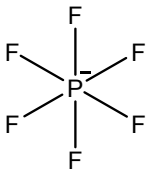
cation	anion	abbreviation
 Imidazolium (im)	 Bis(trifluoromethylsulfonyl)imide (NTf_2)	$[C_nC_1im][NTf_2]$
R: $-CH_2-CH_3$		$[C_2C_1im][NTf_2]$
R: $-(CH_2)_2-CH_3$		$[C_3C_1im][NTf_2]$
R: $-(CH_2)_3-CH_3$		$[C_4C_1im][NTf_2]$
R: $-(CH_2)_4-CH_3$		$[C_5C_1im][NTf_2]$
R: $-(CH_2)_5-CH_3$		$[C_6C_1im][NTf_2]$
R: $-(CH_2)_6-CH_3$		$[C_7C_1im][NTf_2]$
R: $-(CH_2)_7-CH_3$		$[C_8C_1im][NTf_2]$
R: $-(CH_2)_8-CH_3$		$[C_9C_1im][NTf_2]$
R: $-(CH_2)_9-CH_3$		$[C_{10}C_1im][NTf_2]$
R: $-(CH_2)_{10}-CH_3$		$[C_{11}C_1im][NTf_2]$
 Imidazolium (im)	 Hexafluorophosphate (PF_6)	$[C_nC_1im][PF_6]$
R: $-(CH_2)_3-CH_3$		$[C_4C_1im][PF_6]$
R: $-(CH_2)_4-CH_3$		$[C_5C_1im][PF_6]$
R: $-(CH_2)_5-CH_3$		$[C_6C_1im][PF_6]$
R: $-(CH_2)_6-CH_3$		$[C_7C_1im][PF_6]$
R: $-(CH_2)_7-CH_3$		$[C_8C_1im][PF_6]$
R: $-(CH_2)_8-CH_3$		$[C_9C_1im][PF_6]$

Table S2. List of the studied ILs, CAS registry number, purity and molar mass

ionic liquid	CAS registry number	source	purity	MW /g·mol^{-1}
		$[C_nC_1im][NTf_2]$		
$[C_2C_1im][NTf_2]$	174899-82-2	IoLiTec	99.5 %	391.31
$[C_3C_1im][NTf_2]$	216299-72-8	IoLiTec	99 %	405.34
$[C_4C_1im][NTf_2]$	174899-83-3	IoLiTec	99 %	419.37
$[C_5C_1im][NTf_2]$	280779-53-5	IoLiTec	> 99 %	433.39
$[C_6C_1im][NTf_2]$	382150-50-7	IoLiTec	99 %	447.42
$[C_7C_1im][NTf_2]$	455382-14-5	IoLiTec	> 99 %	461.45
$[C_8C_1im][NTf_2]$	178631-04-4	IoLiTec	99 %	475.47
$[C_9C_1im][NTf_2]$	–	IoLiTec	> 99 %	489.50
$[C_{10}C_1im][NTf_2]$	433337-23-6	IoLiTec	> 98 %	503.53
$[C_{11}C_1im][NTf_2]$	–	IoLiTec	97 %	517.55
		$[C_nC_1im][PF_6]$		
$[C_4C_1im][PF_6]$	174501-64 -5	IoLiTec	99 %	284.18
$[C_5C_1im][PF_6]$	280779-52-4	IoLiTec	> 99 %	298.21
$[C_6C_1im][PF_6]$	304680-35-1	IoLiTec	99 %	312.24
$[C_7C_1im][PF_6]$	357915-04-9	IoLiTec	> 99 %	326.26
$[C_8C_1im][PF_6]$	304680-36-2	IoLiTec	99 %	340.29
$[C_9C_1im][PF_6]$	343952-29-4	IoLiTec	> 99 %	354.32

Table S3. Standard (p^o=0.10 ± 0.01 MPa) molar enthalpy of solvation at infinite dilution of propan-1-ol, butan-1-ol and pentan-1-ol in the studied ILs, at reference temperature (T=298.15 K)

	$\Delta_{solv}H_m^{o,\infty}/\mathrm{kJ\cdot mol^{-1}}$		
ionic liquid	propan-1-ol	butan-1-ol	pentan-1-ol
	$[C_nC_1im][NTf_2]$		
$[C_2C_1im][NTf_2]$	– 38.73 (± 0.21)	– 42.94 (± 0.23)	– 47.16 (± 0.25)
$[C_3C_1im][NTf_2]$	– 38.87 (± 0.21)	– 43.20 (± 0.22)	– 47.58 (± 0.24)
$[C_4C_1im][NTf_2]$	– 39.08 (± 0.27)	– 43.46 (± 0.28)	– 47.83 (± 0.29)
$[C_5C_1im][NTf_2]$	– 39.11 (± 0.21)	– 43.65 (± 0.21)	– 48.21 (± 0.23)
$[C_6C_1im][NTf_2]$	– 39.32 (± 0.31)	– 44.00 (± 0.27)	– 48.49 (± 0.28)
$[C_7C_1im][NTf_2]$	– 39.07 (± 0.21)	– 43.90 (± 0.21)	– 48.70 (± 0.22)
$[C_8C_1im][NTf_2]$	– 39.03 (± 0.21)	– 43.82 (± 0.21)	– 48.87 (± 0.21)
$[C_9C_1im][NTf_2]$	– 38.98 (± 0.21)	– 43.85 (± 0.21)	– 48.91 (± 0.21)
$[C_{10}C_1im][NTf_2]$	– 39.00 (± 0.21)	– 43.81 (± 0.21)	– 48.84 (± 0.21)
$[C_{11}C_1im][NTf_2]$	– 38.88 (± 0.21)	– 43.68 (± 0.21)	– 48.92 (± 0.21)
	$[C_nC_1im][PF_6]$		
$[C_4C_1im][PF_6]$	– 36.43 (± 0.25)	–	–
$[C_5C_1im][PF_6]$	– 36.80 (± 0.19)	–	–
$[C_6C_1im][PF_6]$	– 36.96 (± 0.24)	–	–
$[C_7C_1im][PF_6]$	– 37.20 (± 0.40)	–	–
$[C_8C_1im][PF_6]$	– 37.29 (± 0.38)	–	–
$[C_9C_1im][PF_6]$	– 37.56 (± 0.37)	–	–

* Uncertainties are the extended standard deviations considering the overall uncertainty.

Table S4. Standard (p^o=0.10 ± 0.01 MPa) enthalpy of solvation at infinite dilution per unit volume of propan-1-ol, butan-1-ol and pentan-1-ol in the studied ionic liquids, at reference temperature (T=298.15 K)

	$\Delta_{solv}H_v^{o,\infty}/\mathrm{kJ\cdot cm^{-3}}$		
ionic liquid	propan-1-ol	butan-1-ol	pentan-1-ol
	$[C_nC_1im][NTf_2]$		
$[C_2C_1im][NTf_2]$	– 0.5153 (± 0.0028)	– 0.4668 (± 0.0025)	– 0.4339 (± 0.0023)
$[C_3C_1im][NTf_2]$	– 0.5172 (± 0.0028)	– 0.4697 (± 0.0024)	– 0.4378 (± 0.0022)
$[C_4C_1im][NTf_2]$	– 0.5200 (± 0.0036)	– 0.4725 (± 0.0031)	– 0.4401 (± 0.0027)
$[C_5C_1im][NTf_2]$	– 0.5203 (± 0.0028)	– 0.4746 (± 0.0023)	– 0.4436 (± 0.0021)
$[C_6C_1im][NTf_2]$	– 0.5232 (± 0.0042)	– 0.4784 (± 0.0030)	– 0.4461 (± 0.0026)
$[C_7C_1im][NTf_2]$	– 0.5198 (± 0.0028)	– 0.4773 (± 0.0023)	– 0.4481 (± 0.0020)
$[C_8C_1im][NTf_2]$	– 0.5193 (± 0.0028)	– 0.4764 (± 0.0023)	– 0.4496 (± 0.0020)
$[C_9C_1im][NTf_2]$	– 0.5186 (± 0.0028)	– 0.4767 (± 0.0023)	– 0.4500 (± 0.0020)
$[C_{10}C_1im][NTf_2]$	– 0.5189 (± 0.0028)	– 0.4763 (± 0.0023)	– 0.4494 (± 0.0020)
$[C_{11}C_1im][NTf_2]$	– 0.5173 (± 0.0028)	– 0.4749 (± 0.0023)	– 0.4501 (± 0.0020)
	$[C_nC_1im][PF_6]$		
$[C_4C_1im][PF_6]$	– 0.4846 (± 0.0033)	–	–
$[C_5C_1im][PF_6]$	– 0.4896 (± 0.0025)	–	–
$[C_6C_1im][PF_6]$	– 0.4917 (± 0.0032)	–	–
$[C_7C_1im][PF_6]$	– 0.4950 (± 0.0053)	–	–
$[C_8C_1im][PF_6]$	– 0.4962 (± 0.0050)	–	–
$[C_9C_1im][PF_6]$	– 0.4998 (± 0.0049)	–	–

* The uncertainty is the extended standard deviation considering overall uncertainty.