

Influence of the ionic liquid/gas surface on ionic liquid chemistry

Supplementary Information

Note that the supplementary information section has a separate reference numbering system to the main perspective.

Table S1. List of techniques used for studying the ionic liquid/gas surface structure. Pressure = atmospheric/UHV as two options. Techniques at atmospheric pressure can be carried out at lower pressures if suitable apparatus is available. However, UHV techniques require UHV or HV, apart from some very specialist apparatus.

Technique	Probe	Detection method	Pressure
SFG ¹⁻¹⁶	visible + tunable IR	IR	Atmospheric
DLS ¹⁷⁻²²	He-Ne laser	Scattered light	Atmospheric
XPCS ²³	X-rays	X-rays	Atmospheric
XR ^{6,24-28}	X-rays	X-rays	Atmospheric
NR ²⁹	neutrons	neutrons	Atmospheric
HREELS ³⁰	electrons	electrons	UHV
XPS ³⁰⁻⁴⁸	X-rays	electrons	UHV
UPS ^{30,41,42,49}	Ultraviolet	electrons	UHV
MIES ^{30,41,42,49}	metastable He atoms	electrons	UHV
ToFSIMS ^{32,50}	ions/charged clusters	products from surface reactions	UHV
NICISS ^{43,51-53}	1-5 keV He ⁺	He ⁺	UHV
O scattering ⁵⁴⁻⁵⁶	O atoms with 16-500 kJ mol ⁻¹ kinetic energy	scattered OH, and products from surface reactions	UHV
CO ₂ scattering ^{57,58}	61.9 kJ mol ⁻¹ CO ₂	CO ₂	UHV
LEIS ⁴⁰	1 keV He ⁺	He ⁺	UHV
RBS ^{44,59-62}	400 keV He ⁺	He ⁺	UHV
DRS ⁶³⁻⁶⁵	2 keV Ne ⁺	ions and atoms	UHV
MD ⁶⁶⁻⁸²			

Table S2. List of ionic liquids studied, sorted by technique.

Technique	Cation	Anion	Ionic liquid name
Sum-frequency generation spectroscopy, sum-frequency generation vibrational spectroscopy			
SFG ^{1,2}	[C ₁ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-methyl-3-methylimidazolium methylsulfate
SFG ¹	[C ₁ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-methyl-3-methylimidazolium ethylsulfate
SFG ¹	[C ₁ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-methyl-3-methylimidazolium propylsulfate
SFG ¹	[C ₁ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-methyl-3-methylimidazolium butylsulfate
SFG ^{1,2}	[C ₁ C ₁ Im] ⁺	[PF ₆] ⁻	1-methyl-3-methylimidazolium hexafluorophosphate
SFG ^{1,2}	[C ₂ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-ethyl-3-methylimidazolium methylsulfate
SFG ¹	[C ₂ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-ethyl-3-methylimidazolium ethylsulfate
SFG ¹	[C ₂ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-ethyl-3-methylimidazolium propylsulfate
SFG ¹	[C ₂ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-ethyl-3-methylimidazolium butylsulfate
SFG ^{1,2}	[C ₂ C ₁ Im] ⁺	[PF ₆] ⁻	1-ethyl-3-methylimidazolium hexafluorophosphate
SFG ¹	[C ₃ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-propyl-3-methylimidazolium methylsulfate
SFG ¹	[C ₃ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-propyl-3-methylimidazolium ethylsulfate
SFG ¹	[C ₃ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-propyl-3-methylimidazolium propylsulfate
SFG ¹	[C ₃ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-propyl-3-methylimidazolium butylsulfate
SFG ¹	[C ₃ C ₁ Im] ⁺	[PF ₆] ⁻	1-propyl-3-methylimidazolium hexafluorophosphate
SFG ³	[C ₄ C ₁ Im] ⁺	Br ⁻	1-butyl-3-methylimidazolium bromide
SFG ^{3,6,7}	[C ₄ C ₁ Im] ⁺	I ⁻	1-butyl-3-methylimidazolium iodide
SFG ³	[C ₄ C ₁ Im] ⁺	[SCN] ⁻	1-butyl-3-methylimidazolium thiocyanate
SFG ¹⁻⁵	[C ₄ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-butyl-3-methylimidazolium methylsulfate
SFG ¹	[C ₄ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-butyl-3-methylimidazolium ethylsulfate
SFG ¹	[C ₄ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-butyl-3-methylimidazolium propylsulfate
SFG ¹	[C ₄ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-butyl-3-methylimidazolium butylsulfate
SFG ¹	[C ₄ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-butyl-3-methylimidazolium octylsulfate
SFG ^{3,4}	[C ₄ C ₁ Im] ⁺	[C ₁ SO ₃] ⁻	1-butyl-3-methylimidazolium methylsulfonate
SFG ^{3,5,8}	[C ₄ C ₁ Im] ⁺	[N(CN) ₂] ⁻	1-butyl-3-methylimidazolium dicyanamide
SFG ^{3,6,9,11-14}	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
SFG ^{1-3,6,9-11}	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate
SFG ¹⁶	[C ₄ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-butyl-3-methylimidazolium trifluoromethylsulfonate
SFG ^{3,7}	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
SFG ¹²	[C ₅ C ₁ Im] ⁺	[BF ₄] ⁻	1-pentyl-3-methylimidazolium tetrafluoroborate
SFG ¹²	[C ₆ C ₁ Im] ⁺	[BF ₄] ⁻	1-hexyl-3-methylimidazolium tetrafluoroborate
SFG ¹²	[C ₇ C ₁ Im] ⁺	[BF ₄] ⁻	1-heptyl-3-methylimidazolium tetrafluoroborate
SFG ¹	[C ₈ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-octyl-3-methylimidazolium butylsulfate
SFG ¹	[C ₈ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-octyl-3-methylimidazolium octylsulfate
SFG ¹²	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
SFG ¹²	[C ₉ C ₁ Im] ⁺	[BF ₄] ⁻	1-nonyl-3-methylimidazolium tetrafluoroborate
SFG ¹²	[C ₁₀ C ₁ Im] ⁺	[BF ₄] ⁻	1-decyl-3-methylimidazolium tetrafluoroborate
SFG ¹²	[C ₁₁ C ₁ Im] ⁺	[BF ₄] ⁻	1-undecyl-3-methylimidazolium tetrafluoroborate
SFG ¹⁵	[C ₃ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-propyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide
SFG ¹⁵	[C ₄ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-butyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide
SFG ¹⁵	[C ₅ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-pentyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide
SFG ¹⁵	[C ₆ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-hexyl-1-methylpyrrolidinium

SFG ¹⁵	[C ₁₀ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	bis[(trifluoromethane)sulfonyl]imide 1-decyl-1-methylpyrrolidinium
SFG ¹⁵	[(C ₂ H ₄ OCH ₃)C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	bis[(trifluoromethane)sulfonyl]imide 1-methyl-1-methoxyethylpyrrolidinium
SFG ¹⁵	[N _{3,1,1,i3}] ⁺	[Tf ₂ N] ⁻	bis[(trifluoromethane)sulfonyl]imide dimethylisopropylpropylammonium
SFG ¹⁵	[N _{4,1,1,i3}] ⁺	[Tf ₂ N] ⁻	bis[(trifluoromethane)sulfonyl]imide dimethylisopropylbutylammonium
SFG ¹⁵	[N _{6,1,1,i3}] ⁺	[Tf ₂ N] ⁻	bis[(trifluoromethane)sulfonyl]imide dimethylisopropylhexylammonium
SFG ¹⁵	[N _{10,1,1,i3}] ⁺	[Tf ₂ N] ⁻	bis[(trifluoromethane)sulfonyl]imide dimethylisopropyldecylammonium
SFG ⁸	[N _{6,4,4,4}] ⁺	[N(CN) ₂] ⁻	bis[(trifluoromethane)sulfonyl]imide hexyltributylammonium dicyanamide
Dynamic light scattering			
DLS ¹⁷	[C ₄ C ₁ Im] ⁺	Cl ⁻	1-butyl-3-methylimidazolium chloride
DLS ¹⁸⁻²⁰	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate
DLS ¹⁹⁻²²	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
DLS ¹⁷	[C ₄ C ₁ Im] ⁺	[AlCl ₄] ⁻	1-butyl-3-methylimidazolium tetrachloroaluminate
DLS ²⁰	[C ₆ C ₁ Im] ⁺	[PF ₆] ⁻	1-hexyl-3-methylimidazolium hexafluorophosphate
DLS ²⁰	[C ₈ C ₁ Im] ⁺	[PF ₆] ⁻	1-octyl-3-methylimidazolium hexafluorophosphate
DLS ²⁰	[N _{1,1,1,1}] ⁺	[Tf ₂ N] ⁻	tetramethylammonium bis[(trifluoromethane)sulfonyl]imide
DLS ²⁰	[C ₃ C ₁ Pip] ⁺	[Tf ₂ N] ⁻	methylpropylpiperidinium bis[(trifluoromethane)sulfonyl]imide
X-ray photon correlation spectroscopy			
XPCS ²³	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
X-ray reflectivity (XR or XRR)			
XR ⁶	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium iodide
XR ^{6,24}	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
XR ^{6,24,25}	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate
XR ²⁶	[C ₄ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-butyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide
XR ^{27,28}	[N _{8,8,8,1}] ⁺	[Nf ₂ N] ⁻	trioctylmethylammonium bis[(nonafluorobutane)sulfonyl]imide
XR ²⁷	[P _{6,6,6,14}] ⁺	[Nf ₂ N] ⁻	trihexyltetradecylphosphonium bis[(nonafluorobutane)sulfonyl]imide
High resolution electron energy loss spectroscopy			
HREELS ³⁰	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
X-ray photoelectron spectroscopy			
XPS ³¹	[C ₁ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-methyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ^{32-37,83}	[C ₂ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-ethyl-3-methylimidazolium ethylsulfate
XPS ^{34,37,38}	[C ₂ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-ethyl-3-methylimidazolium octylsulfate
XPS ^{30,32,38-43}	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ⁴⁴	[C ₄ C ₁ Im] ⁺	[N(CN) ₂] ⁻	1-butyl-3-methylimidazolium dicyanamide
XPS ^{32,34,45}	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
XPS ^{32,44}	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium

XPS ^{34,38,43}	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	hexafluorophosphate 1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ³⁴	[C ₆ C ₁ Im] ⁺	Cl ⁻	1-hexyl-3-methylimidazolium chloride
XPS ^{34,45}	[C ₆ C ₁ Im] ⁺	[BF ₄] ⁻	1-hexyl-3-methylimidazolium tetrafluoroborate
XPS ^{38,43}	[C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ^{32,46}	[C ₈ C ₁ Im] ⁺	Cl ⁻	1-octyl-3-methylimidazolium chloride
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	Br ⁻	1-octyl-3-methylimidazolium bromide
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	I ⁻	1-octyl-3-methylimidazolium iodide
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	[NO ₃] ⁻	1-octyl-3-methylimidazolium nitrate
XPS ^{34,45-47}	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	[PF ₆] ⁻	1-octyl-3-methylimidazolium hexafluorophosphate
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-octyl-3-methylimidazolium trifluoromethylsulfonate
XPS ^{38,43,46}	[C ₈ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-octyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	[Pf ₂ N] ⁻	1-octyl-3-methylimidazolium bis[(pentafluoroethyl)sulfonyl]imide
XPS ⁴⁶	[C ₈ C ₁ Im] ⁺	[PF ₃ (C ₂ F ₅) ₃] ⁻	1-octyl-3-methylimidazolium tris(pentafluoroethyl)trifluorophosphate
XPS ³⁴	[C ₁₀ C ₁ Im] ⁺	Cl ⁻	1-decyl-3-methylimidazolium chloride
XPS ³⁴	[C ₁₀ C ₁ Im] ⁺	Br ⁻	1-decyl-3-methylimidazolium bromide
XPS ³⁸	[C ₁₀ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-decyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ³⁸	[C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-dodecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ³⁸	[C ₁₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexadecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ³⁴	[C ₄ C ₁ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-2,3-dimethylimidazolium tetrafluoroborate
XPS ⁴⁸	[Me(EG)C ₁ Im] ⁺	I ⁻	3-[2-methoxy-ethyl]-1-methylimidazolium iodide
XPS ^{31,48}	[Me(EG)C ₁ Im] ⁺	[Tf ₂ N] ⁻	3-[2-methoxy-ethyl]-1-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ^{31,38,48}	[Et(EG) ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	3-[2-(2-ethoxy-ethoxy)-ethyl]-1- methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ^{31,38,48}	[Me(EG) ₃ C ₁ Im] ⁺	[Tf ₂ N] ⁻	3-[2-(2-(2-methoxy-ethoxy)-ethoxy)-ethyl]-1- methylimidazolium bis[(trifluoromethane)sulfonyl]imide
XPS ³⁴	[(C ₂ OH)C ₁ Im] ⁺	[BF ₄] ⁻	1-(2-hydroxyethyl)-3-methylimidazolium tetrafluoroborate
XPS ³⁴	[C ₄ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-butyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide
XPS ⁸³	[N(C ₁) ₂ (C ₂ OH) ₂] ⁺	[C ₁ SO ₃] ⁻	bis(2-hydroxyethyl)dimethylammonium methylsulfonate
XPS ³¹	9:1 [C ₂ C ₁ Im] ⁺ : [C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	
Ultraviolet photoelectron spectroscopy			
UPS ^{30,41,42}	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
UPS ⁴⁹	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
UPS ⁴⁹	[C ₄ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-butyl-3-methylimidazolium trifluoromethylsulfonate
UPS ⁴⁹	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium

UPS ⁴⁹	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	bis[(trifluoromethane)sulfonyl]imide
UPS ⁴⁹	[C ₈ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
UPS ⁴⁹	[C ₁₀ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium
UPS ⁴⁹	[C ₁₀ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	trifluoromethylsulfonate
UPS ⁴⁹	[C ₁₀ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-decyl-3-methylimidazolium tetrafluoroborate
			1-decyl-3-methylimidazolium
			trifluoromethylsulfonate
			1-decyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
metastable impact electron spectroscopy, metastable induced electron spectroscopy, metastable atom electron spectroscopy (MAES)			
MIES ^{30,41,42}	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium
MIES ⁴⁹	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	bis[(trifluoromethane)sulfonyl]imide
MIES ⁴⁹	[C ₄ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
			1-butyl-3-methylimidazolium
			trifluoromethylsulfonate
MIES ⁴⁹	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium
MIES ⁴⁹	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	bis[(trifluoromethane)sulfonyl]imide
MIES ⁴⁹	[C ₈ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
			1-octyl-3-methylimidazolium
			trifluoromethylsulfonate
MIES ⁴⁹	[C ₈ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-octyl-3-methylimidazolium
MIES ⁴⁹	[C ₁₀ C ₁ Im] ⁺	[BF ₄] ⁻	bis[(trifluoromethane)sulfonyl]imide
MIES ⁴⁹	[C ₁₀ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-decyl-3-methylimidazolium tetrafluoroborate
			1-decyl-3-methylimidazolium
			trifluoromethylsulfonate
MIES ⁴⁹	[C ₁₀ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-decyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
Time-of-flight secondary ion mass spectrometry			
ToFSIMS ⁵⁰	[C ₂ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-ethyl-3-methylimidazolium ethylsulfate
ToFSIMS ³²	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
ToFSIMS ⁸⁴	[C ₄ C ₁ Im] ⁺	I ⁻	1-butyl-3-methylimidazolium iodide
ToFSIMS ⁸⁴	[C ₄ C ₁ Im] ⁺	[OAc] ⁻	1-butyl-3-methylimidazolium acetate
ToFSIMS ⁸⁴	[C ₄ C ₁ Im] ⁺	[NO ₃] ⁻	1-butyl-3-methylimidazolium nitrate
ToFSIMS ⁸⁴	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium
			hexafluorophosphate
ToFSIMS ^{84,85}	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
Neutral impact collision ion scattering spectroscopy			
NICISS ⁴³	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
NICISS ⁴³	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
NICISS ^{51,53}	[C ₆ C ₁ Im] ⁺	Cl ⁻	1-hexyl-3-methylimidazolium chloride
NICISS ⁵²	[C ₆ C ₁ Im] ⁺	[BF ₄] ⁻	1-hexyl-3-methylimidazolium tetrafluoroborate
NICISS ⁴³	[C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
NICISS ⁵²	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
NICISS ⁴³	[C ₈ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-octyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
NICISS ⁵²	[C ₁₀ C ₁ Im] ⁺	[BF ₄] ⁻	1-decyl-3-methylimidazolium tetrafluoroborate
O scattering ⁵⁴⁻⁵⁶	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide
O scattering ⁵⁵	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium
			bis[(trifluoromethane)sulfonyl]imide

O scattering ⁵⁵	[C ₅ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-pentyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
O scattering ⁵⁵	[C ₈ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-octyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
O scattering ⁵⁴⁻⁵⁶	[C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-dodecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
CO ₂ scattering ^{57,58}	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
CO ₂ scattering ^{57,58}	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
CO ₂ scattering ⁵⁸	[C ₆ C ₁ Im] ⁺	[BF ₄] ⁻	1-hexyl-3-methylimidazolium tetrafluoroborate
CO ₂ scattering ⁵⁸	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
CO ₂ scattering ⁵⁸	[C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-dodecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
Low energy ion scattering			
LEIS ⁴⁰	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
Rutherford backscattering			
RBS ⁵⁹	[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
RBS ⁴⁴	[C ₄ C ₁ Im] ⁺	[N(CN) ₂] ⁻	1-butyl-3-methylimidazolium dicyanamide
RBS ^{44,60}	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate
RBS ⁵⁹	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
RBS ⁵⁹	[C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
RBS ^{61,62}	[N _{3,1,1,1}] ⁺	[Tf ₂ N] ⁻	trimethylpropylammonium bis[(trifluoromethane)sulfonyl]imide
RBS ⁵⁹	1:1 [C ₂ C ₁ Im] ⁺ : [C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	
Direct recoil spectroscopy			
DRS ^{63,64}	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
DRS ^{63,65}	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate
DRS ⁶⁴	[C ₈ C ₁ Im] ⁺	Cl ⁻	1-octyl-3-methylimidazolium chloride
DRS ⁶⁴	[C ₈ C ₁ Im] ⁺	Br ⁻	1-octyl-3-methylimidazolium bromide
DRS ^{63,64}	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
DRS ^{63,64}	[C ₈ C ₁ Im] ⁺	[PF ₆] ⁻	1-octyl-3-methylimidazolium hexafluorophosphate
DRS ⁶³	[C ₁₂ C ₁ Im] ⁺	[PF ₆] ⁻	1-dodecyl-3-methylimidazolium hexafluoroborate
DRS ^{63,64}	[C ₁₂ C ₁ Im] ⁺	[BF ₄] ⁻	1-dodecyl-3-methylimidazolium tetrafluoroborate
Neutron reflectometry			
NR ²⁹	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate
NR ²⁹	[C ₈ C ₁ Im] ⁺	[PF ₆] ⁻	1-octyl-3-methylimidazolium hexafluorophosphate
Molecular dynamics simulations			
MD ⁶⁶	[C ₁ C ₁ Im] ⁺	Cl ⁻	1-methyl-3-methylimidazolium chloride
MD ^{67,68}	[C ₂ C ₁ Im] ⁺	[NO ₃] ⁻	1-ethyl-3-methylimidazolium nitrate
MD ⁶⁹	[C ₂ C ₁ Im] ⁺	[BF ₄] ⁻	1-ethyl-3-methylimidazolium tetrafluoroborate
MD ⁷⁰	[C ₃ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-propyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
MD ⁷¹	[C ₄ C ₁ Im] ⁺	Cl ⁻	1-butyl-3-methylimidazolium chloride
MD ⁷²	[C ₄ C ₁ Im] ⁺	[NO ₃] ⁻	1-butyl-3-methylimidazolium nitrate
MD ^{71,73,74}	[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate

MD ^{71,74-79}	[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate
MD ^{80,81}	[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
MD ⁷⁰	[C ₅ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-pentyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
MD ⁷²	[C ₆ C ₁ Im] ⁺	[NO ₃] ⁻	1-hexyl-3-methylimidazolium nitrate
MD ⁸²	[C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide
MD ⁷²	[C ₈ C ₁ Im] ⁺	[NO ₃] ⁻	1-octyl-3-methylimidazolium nitrate
MD ⁶⁹	[C ₈ C ₁ Im] ⁺	[BF ₄] ⁻	1-octyl-3-methylimidazolium tetrafluoroborate
MD ⁷²	[C ₁₀ C ₁ Im] ⁺	[NO ₃] ⁻	1-decyl-3-methylimidazolium nitrate
MD ⁷²	[C ₁₂ C ₁ Im] ⁺	[NO ₃] ⁻	1-dodecyl-3-methylimidazolium nitrate
MD ⁷⁰	[C ₃ C ₃ Im] ⁺	[Tf ₂ N] ⁻	1-propyl-3-propylimidazolium bis[(trifluoromethane)sulfonyl]imide
MD ⁷⁰	[C ₅ C ₅ Im] ⁺	[Tf ₂ N] ⁻	1-pentyl-3-pentylimidazolium bis[(trifluoromethane)sulfonyl]imide
MD ⁶⁹	[(C ₂ OH)C ₁ Im] ⁺	[BF ₄] ⁻	1-(2-hydroxyethyl)-3-methylimidazolium tetrafluoroborate
MD ⁶⁹	[(C ₈ OH)C ₁ Im] ⁺	[BF ₄] ⁻	1-(2-hydroxyoctyl)-3-methylimidazolium tetrafluoroborate

Table S3. List of ionic liquids studied, sorted by cation.

Cation	Anion	Ionic liquid name	Technique
[C ₁ C ₁ Im] ⁺	Cl ⁻	1-methyl-3-methylimidazolium chloride	MD ⁶⁶
[C ₁ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-methyl-3-methylimidazolium methylsulfate	SFG ^{1,2}
[C ₁ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-methyl-3-methylimidazolium ethylsulfate	SFG ¹
[C ₁ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-methyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₁ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-methyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₁ C ₁ Im] ⁺	[PF ₆] ⁻	1-methyl-3-methylimidazolium hexafluorophosphate	SFG ^{1,2}
[C ₁ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-methyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³¹
[C ₂ C ₁ Im] ⁺	[NO ₃] ⁻	1-ethyl-3-methylimidazolium nitrate	MD ^{67,68}
[C ₂ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-ethyl-3-methylimidazolium methylsulfate	SFG ^{1,2} XPS ³⁴
[C ₂ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-ethyl-3-methylimidazolium ethylsulfate	XPS ^{32-37,83} SFG ¹ ToFSIMS ⁵⁰
[C ₂ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-ethyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₂ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-ethyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₂ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-ethyl-3-methylimidazolium octylsulfate	XPS ^{34,37,38}
[C ₂ C ₁ Im] ⁺	[BF ₄] ⁻	1-ethyl-3-methylimidazolium tetrafluoroborate	MD ⁶⁹
[C ₂ C ₁ Im] ⁺	[PF ₆] ⁻	1-ethyl-3-methylimidazolium hexafluorophosphate	SFG ^{1,2}
[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{30,32,38-43} NICISS ⁴³ O scattering ⁵⁴⁻⁵⁶ MIES ^{30,41,42} HREELS ³⁰ RBS ⁵⁹ ToFSIMS ³² UPS ^{30,41,42}
[C ₃ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-propyl-3-methylimidazolium methylsulfate	SFG ¹
[C ₃ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-propyl-3-methylimidazolium ethylsulfate	SFG ¹
[C ₃ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-propyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₃ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-propyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₃ C ₁ Im] ⁺	[PF ₆] ⁻	1-propyl-3-methylimidazolium hexafluorophosphate	SFG ¹
[C ₃ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-propyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	MD ⁷⁰
[C ₄ C ₁ Im] ⁺	Cl ⁻	1-butyl-3-methylimidazolium chloride	DLS ¹⁷ MD ⁷¹
[C ₄ C ₁ Im] ⁺	Br ⁻	1-butyl-3-methylimidazolium bromide	SFG ³
[C ₄ C ₁ Im] ⁺	I ⁻	1-butyl-3-methylimidazolium iodide	SFG ^{3,6,7} XR ⁶
[C ₄ C ₁ Im] ⁺	[NO ₃] ⁻	1-butyl-3-methylimidazolium nitrate	MD ⁷²
[C ₄ C ₁ Im] ⁺	[SCN] ⁻	1-butyl-3-methylimidazolium thiocyanate	SFG ³
[C ₄ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-butyl-3-methylimidazolium methylsulfate	SFG ¹⁻⁵
[C ₄ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-butyl-3-methylimidazolium ethylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-butyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-butyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-butyl-3-methylimidazolium octylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₁ SO ₃] ⁻	1-butyl-3-methylimidazolium methylsulfonate	SFG ^{3,4}
[C ₄ C ₁ Im] ⁺	[N(CN) ₂] ⁻	1-butyl-3-methylimidazolium dicyanamide	SFG ^{3,5,8} XPS ⁴⁴ RBS ⁴⁴
[C ₄ C ₁ Im] ⁺	[BF ₄] ⁻	1-butyl-3-methylimidazolium tetrafluoroborate	XPS ^{32,34,45}

			XR ^{6,24} SFG ^{3,6,9,11-14} NR ²⁹ MIES ⁴⁹ UPS ⁴⁹ Scattering ^{57,58} DRS ^{63,64} X-ray photon correlation spectroscopy ²³ MD ^{71,73,74} XPS ^{32,44} DRS ^{63,65} SFG ^{1-3,6,9-11} DLS ¹⁸⁻²⁰ XR ^{6,24,25} RBS ^{44,60} MD ^{71,74-79}
[C ₄ C ₁ Im] ⁺	[PF ₆] ⁻	1-butyl-3-methylimidazolium hexafluorophosphate	
[C ₄ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-butyl-3-methylimidazolium trifluoromethylsulfonate	SFG ¹⁶ MIES ⁴⁹ UPS ⁴⁹
[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{34,38,40,43} MIES ⁴⁹ UPS ⁴⁹ O scattering ⁵⁵ CO ₂ scattering ^{57,58} NICISS ⁴³ RBS ⁵⁹ SFG ^{3,7} LEIS ⁴⁰ DLS ¹⁹⁻²² MD ^{80,81} DLS ¹⁷
[C ₄ C ₁ Im] ⁺	[AlCl ₄] ⁻	1-butyl-3-methylimidazolium tetrachloroaluminate	
[C ₅ C ₁ Im] ⁺	[BF ₄] ⁻	1-pentyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
[C ₅ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-pentyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	O scattering ⁵⁵ MD ⁷⁰
[C ₆ C ₁ Im] ⁺	Cl ⁻	1-hexyl-3-methylimidazolium chloride	XPS ³⁴ NICISS ^{51,53} MD ⁷²
[C ₆ C ₁ Im] ⁺	[NO ₃] ⁻	1-hexyl-3-methylimidazolium nitrate	SFG ¹²
[C ₆ C ₁ Im] ⁺	[BF ₄] ⁻	1-hexyl-3-methylimidazolium tetrafluoroborate	NICISS ⁵² XPS ^{34,45} CO ₂ scattering ⁵⁸ DLS ²⁰
[C ₆ C ₁ Im] ⁺	[PF ₆] ⁻	1-hexyl-3-methylimidazolium hexafluorophosphate	
[C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{38,43} NICISS ⁴³ RBS ⁵⁹ MD ⁸²
[C ₇ C ₁ Im] ⁺	[BF ₄] ⁻	1-heptyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
[C ₈ C ₁ Im] ⁺	Cl ⁻	1-octyl-3-methylimidazolium chloride	XPS ^{32,46} DRS ⁶⁴
[C ₈ C ₁ Im] ⁺	Br ⁻	1-octyl-3-methylimidazolium bromide	XPS ⁴⁶ DRS ⁶⁴
[C ₈ C ₁ Im] ⁺	I ⁻	1-octyl-3-methylimidazolium iodide	XPS ⁴⁶

$[C_8C_1Im]^+$	$[NO_3]^-$	1-octyl-3-methylimidazolium nitrate	XPS ³¹ MD ⁷²
$[C_8C_1Im]^+$	$[C_4OSO_3]^-$	1-octyl-3-methylimidazolium butylsulfate	SFG ¹
$[C_8C_1Im]^+$	$[C_8OSO_3]^-$	1-octyl-3-methylimidazolium octylsulfate	SFG ¹
$[C_8C_1Im]^+$	$[BF_4]^-$	1-octyl-3-methylimidazolium tetrafluoroborate	XPS ^{34,45-47} SFG ¹² MIES ⁴⁹ UPS ⁴⁹ DRS ^{63,64} CO ₂ scattering ⁵⁸ NICISS ⁵² MD ⁶⁹ NR ²⁹ XPS ^{32,46} DRS ^{63,64} DLS ²⁰
$[C_8C_1Im]^+$	$[PF_6]^-$	1-octyl-3-methylimidazolium hexafluorophosphate	XPS ⁴⁶ MIES ⁴⁹ UPS ⁴⁹
$[C_8C_1Im]^+$	$[CF_3SO_3]^-$	1-octyl-3-methylimidazolium trifluoromethylsulfonate	XPS ^{38,43,46} MIES ⁴⁹ UPS ⁴⁹ O scattering ⁵⁵ NICISS ⁴³ XPS ⁴⁶
$[C_8C_1Im]^+$	$[Tf_2N]^-$	1-octyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	
$[C_8C_1Im]^+$	$[Pf_2N]^-$	1-octyl-3-methylimidazolium bis[(pentafluoroethyl)sulfonyl]imide	
$[C_8C_1Im]^+$	$[PF_3(C_2F_5)_3]^-$	1-octyl-3-methylimidazolium tris(pentafluoroethyl)trifluorophosphate	XPS ⁴⁶
$[C_9C_1Im]^+$	$[BF_4]^-$	1-nonyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
$[C_{10}C_1Im]^+$	Cl^-	1-decyl-3-methylimidazolium chloride	XPS ³⁴
$[C_{10}C_1Im]^+$	Br^-	1-decyl-3-methylimidazolium bromide	XPS ³⁴
$[C_{10}C_1Im]^+$	$[NO_3]^-$	1-decyl-3-methylimidazolium nitrate	MD ⁷²
$[C_{10}C_1Im]^+$	$[BF_4]^-$	1-decyl-3-methylimidazolium tetrafluoroborate	SFG ¹² MIES ⁴⁹ UPS ⁴⁹ NICISS ⁵²
$[C_{10}C_1Im]^+$	$[PF_6]^-$	1-decyl-3-methylimidazolium hexafluoroborate	UPS
$[C_{10}C_1Im]^+$	$[CF_3SO_3]^-$	1-decyl-3-methylimidazolium trifluoromethylsulfonate	MIES ⁴⁹ UPS ⁴⁹
$[C_{10}C_1Im]^+$	$[Tf_2N]^-$	1-decyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁸ MIES ⁴⁹ UPS ⁴⁹
$[C_{11}C_1Im]^+$	$[BF_4]^-$	1-undecyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
$[C_{12}C_1Im]^+$	$[NO_3]^-$	1-dodecyl-3-methylimidazolium nitrate	MD ⁷²
$[C_{12}C_1Im]^+$	$[PF_6]^-$	1-dodecyl -3-methylimidazolium hexafluoroborate	DRS ⁶³
$[C_{12}C_1Im]^+$	$[BF_4]^-$	1-dodecyl -3-methylimidazolium tetrafluoroborate	DRS ^{63,64}
$[C_{12}C_1Im]^+$	$[Tf_2N]^-$	1-dodecyl -3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁸ O scattering ⁵⁴⁻⁵⁶ CO ₂ scattering ⁵⁸
$[C_{16}C_1Im]^+$	$[Tf_2N]^-$	1-hexadecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁸
$[C_4C_1C_1Im]^+$	$[BF_4]^-$	1-butyl-2,3-dimethylimidazolium tetrafluoroborate	XPS ³⁴

$[\text{C}_3\text{C}_3\text{Im}]^+$	$[\text{Tf}_2\text{N}]^-$	1-propyl-3-propylimidazolium bis[(trifluoromethane)sulfonyl]imide	MD ⁷⁰
$[\text{C}_5\text{C}_5\text{Im}]^+$	$[\text{Tf}_2\text{N}]^-$	1-pentyl-3-pentylimidazolium bis[(trifluoromethane)sulfonyl]imide	MD ⁷⁰
$[\text{Me}(\text{EG})\text{C}_1\text{Im}]^+$	I^-	3-[2-methoxy-ethyl]-1-methylimidazolium iodide	XPS ⁴⁸
$[\text{Me}(\text{EG})\text{C}_1\text{Im}]^+$	$[\text{Tf}_2\text{N}]^-$	3-[2-methoxy-ethyl]-1-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{31,48}
$[\text{Et}(\text{EG})_2\text{C}_1\text{Im}]^+$	$[\text{Tf}_2\text{N}]^-$	3-[2-(2-ethoxy-ethoxy)-ethyl]-1- methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{31,38,48}
$[\text{Me}(\text{EG})_3\text{C}_1\text{Im}]^+$	$[\text{Tf}_2\text{N}]^-$	3-[2-(2-(2-methoxy-ethoxy)-ethoxy)-ethyl]-1- methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{31,38,48}
$[(\text{C}_2\text{OH})\text{C}_1\text{Im}]^+$	$[\text{BF}_4]^-$	1-(2-hydroxyethyl)-3-methylimidazolium tetrafluoroborate	XPS ³⁴ MD ⁶⁹
$[(\text{C}_8\text{OH})\text{C}_1\text{Im}]^+$	$[\text{BF}_4]^-$	1-(2-hydroxyoctyl)-3-methylimidazolium tetrafluoroborate	MD ⁶⁹
$[\text{C}_3\text{C}_1\text{Pyrr}]^+$	$[\text{Tf}_2\text{N}]^-$	1-propyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{C}_4\text{C}_1\text{Pyrr}]^+$	$[\text{Tf}_2\text{N}]^-$	1-butyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁴ XR ²⁶ SFG ¹⁵
$[\text{C}_5\text{C}_1\text{Pyrr}]^+$	$[\text{Tf}_2\text{N}]^-$	1-pentyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{C}_6\text{C}_1\text{Pyrr}]^+$	$[\text{Tf}_2\text{N}]^-$	1-hexyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{C}_{10}\text{C}_1\text{Pyrr}]^+$	$[\text{Tf}_2\text{N}]^-$	1-decyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[(\text{C}_2\text{H}_4\text{OCH}_3)\text{C}_1\text{Pyrr}]^+$	$[\text{Tf}_2\text{N}]^-$	1-methyl-1-methoxyethylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{N}_{1,1,1,1}]^+$	$[\text{Tf}_2\text{N}]^-$	tetramethylammonium bis[(trifluoromethane)sulfonyl]imide	DLS ²⁰
$[\text{N}_{3,1,1,1}]^+$	$[\text{Tf}_2\text{N}]^-$	trimethylpropylammonium bis[(trifluoromethane)sulfonyl]imide	RBS ^{61,62}
$[\text{N}_{3,1,1,i3}]^+$	$[\text{Tf}_2\text{N}]^-$	dimethylisopropylpropylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{N}_{4,1,1,i3}]^+$	$[\text{Tf}_2\text{N}]^-$	dimethylisopropylbutylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{N}_{6,1,1,i3}]^+$	$[\text{Tf}_2\text{N}]^-$	dimethylisopropylhexylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{N}_{10,1,1,i3}]^+$	$[\text{Tf}_2\text{N}]^-$	dimethylisopropyldecylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
$[\text{N}(\text{C}_1)_2(\text{C}_2\text{OH})_2]^+$	$[\text{C}_1\text{SO}_3]^-$	bis(2-hydroxyethyl)dimethylammonium methylsulfonate	XPS ⁸³
$[\text{N}_{8,8,8,1}]^+$	$[\text{Nf}_2\text{N}]^-$	trioctylmethylammonium bis[(nonafluorobutane)sulfonyl]imide	XR ^{27,28}
$[\text{N}_{6,4,4,4}]^+$	$[\text{N}(\text{CN})_2]^-$	hexyltributylammonium dicyanamide	SFG ⁸
$[\text{P}_{6,6,6,14}]^+$	$[\text{Nf}_2\text{N}]^-$	trihexyltetradecylphosphonium bis[(nonafluorobutane)sulfonyl]imide	XR ²⁷
$[\text{C}_3\text{C}_1\text{Pip}]^+$	$[\text{Tf}_2\text{N}]^-$	methylpropylpiperidinium	DLS ²⁰

bis[(trifluoromethane)sulfonyl]imide		
9:1 [C ₂ C ₁ Im] ⁺ : [C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	XPS ³¹
1:1 [C ₂ C ₁ Im] ⁺ : [C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	RBS ⁵⁹

Table S4. List of ionic liquids studied, sorted by anion.

Cation	Anion	Ionic liquid name	Technique
[C ₁ C ₁ Im] ⁺	Cl ⁻	1-methyl-3-methylimidazolium chloride	MD ⁶⁶
[C ₄ C ₁ Im] ⁺	Cl ⁻	1-butyl-3-methylimidazolium chloride	DLS ¹⁷ MD ⁷¹
[C ₆ C ₁ Im] ⁺	Cl ⁻	1-hexyl-3-methylimidazolium chloride	XPS ⁴ NICISS ^{51,53}
[C ₈ C ₁ Im] ⁺	Cl ⁻	1-octyl-3-methylimidazolium chloride	XPS ^{32,46} DRS ⁶⁴
[C ₁₀ C ₁ Im] ⁺	Cl ⁻	1-decyl-3-methylimidazolium chloride	XPS ³⁴
[C ₄ C ₁ Im] ⁺	Br ⁻	1-butyl-3-methylimidazolium bromide	SFG ³
[C ₈ C ₁ Im] ⁺	Br ⁻	1-octyl-3-methylimidazolium bromide	XPS ⁴⁶ DRS ⁶⁴
[C ₁₀ C ₁ Im] ⁺	Br ⁻	1-decyl-3-methylimidazolium bromide	XPS ³⁴
[C ₄ C ₁ Im] ⁺	I ⁻	1-butyl-3-methylimidazolium iodide	SFG ^{3,6,7} XR ⁶
[C ₈ C ₁ Im] ⁺	I ⁻	1-octyl-3-methylimidazolium iodide	XPS ⁴⁶
[Me(EG)C ₁ Im] ⁺	I ⁻	3-[2-methoxy-ethyl]-1-methylimidazolium iodide	XPS ⁴⁸
[C ₂ C ₁ Im] ⁺	[NO ₃] ⁻	1-ethyl-3-methylimidazolium nitrate	MD ^{67,68}
[C ₄ C ₁ Im] ⁺	[NO ₃] ⁻	1-butyl-3-methylimidazolium nitrate	MD ⁷²
[C ₆ C ₁ Im] ⁺	[NO ₃] ⁻	1-hexyl-3-methylimidazolium nitrate	MD ⁷²
[C ₈ C ₁ Im] ⁺	[NO ₃] ⁻	1-octyl-3-methylimidazolium nitrate	XPS ³¹ MD ⁷²
[C ₁₀ C ₁ Im] ⁺	[NO ₃] ⁻	1-decyl-3-methylimidazolium nitrate	MD ⁷²
[C ₁₂ C ₁ Im] ⁺	[NO ₃] ⁻	1-dodecyl-3-methylimidazolium nitrate	MD ⁷²
[C ₁ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-methyl-3-methylimidazolium methylsulfate	SFG ^{1,2}
[C ₂ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-ethyl-3-methylimidazolium methylsulfate	SFG ^{1,2} XPS ³⁴
[C ₃ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-propyl-3-methylimidazolium methylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₁ OSO ₃] ⁻	1-butyl-3-methylimidazolium methylsulfate	SFG ¹⁻⁵
[C ₁ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-methyl-3-methylimidazolium ethylsulfate	SFG ¹
[C ₂ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-ethyl-3-methylimidazolium ethylsulfate	XPS ^{32-37,83} SFG ¹ ToFSIMS ⁵⁰
[C ₃ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-propyl-3-methylimidazolium ethylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₂ OSO ₃] ⁻	1-butyl-3-methylimidazolium ethylsulfate	SFG ¹
[C ₁ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-methyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₂ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-ethyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₃ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-propyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₃ OSO ₃] ⁻	1-butyl-3-methylimidazolium propylsulfate	SFG ¹
[C ₁ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-methyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₂ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-ethyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₃ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-propyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-butyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₈ C ₁ Im] ⁺	[C ₄ OSO ₃] ⁻	1-octyl-3-methylimidazolium butylsulfate	SFG ¹
[C ₂ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-ethyl-3-methylimidazolium octylsulfate	XPS ^{34,37,38}
[C ₄ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-butyl-3-methylimidazolium octylsulfate	SFG ¹
[C ₈ C ₁ Im] ⁺	[C ₈ OSO ₃] ⁻	1-octyl-3-methylimidazolium octylsulfate	SFG ¹
[C ₄ C ₁ Im] ⁺	[C ₁ SO ₃] ⁻	1-butyl-3-methylimidazolium methylsulfonate	SFG ^{3,4}
[N(C ₁) ₂ (C ₂ OH) ₂] ⁺	[C ₁ SO ₃] ⁻	bis(2-hydroxyethyl)dimethylammonium methylsulfonate	XPS ⁸³
[C ₄ C ₁ Im] ⁺	[AlCl ₄] ⁻	1-butyl-3-methylimidazolium tetrachloroaluminate	DLS ¹⁷
[C ₄ C ₁ Im] ⁺	[SCN] ⁻	1-butyl-3-methylimidazolium thiocyanate	SFG ³
[C ₄ C ₁ Im] ⁺	[N(CN) ₂] ⁻	1-butyl-3-methylimidazolium dicyanamide	SFG ^{3,5,8}

			XPS ⁴⁴ RBS ⁴⁴ SFG ⁸
$[N_{6,4,4,4}]^+$	$[N(CN)_2]^-$	hexyltributylammonium dicyanamide	
$[C_2C_1Im]^+$	$[BF_4]^-$	1-ethyl-3-methylimidazolium tetrafluoroborate	MD ⁶⁹
$[C_4C_1Im]^+$	$[BF_4]^-$	1-butyl-3-methylimidazolium tetrafluoroborate	XPS ^{32,34,45} XR ^{6,24} SFG ^{3,6,9,11-14} NR ²⁹ MIES ⁴⁹ UPS ⁴⁹ CO ₂ scattering ^{57,58} DRS ^{63,64} X-ray photon correlation spectroscopy ²³ MD ^{71,73,74}
$[C_5C_1Im]^+$	$[BF_4]^-$	1-pentyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
$[C_6C_1Im]^+$	$[BF_4]^-$	1-hexyl-3-methylimidazolium tetrafluoroborate	SFG ¹² NICISS ⁵² XPS ^{34,45} CO ₂ scattering ⁵⁸
$[C_7C_1Im]^+$	$[BF_4]^-$	1-heptyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
$[C_8C_1Im]^+$	$[BF_4]^-$	1-octyl-3-methylimidazolium tetrafluoroborate	XPS ^{34,45-47} SFG ¹² MIES ⁴⁹ UPS ⁴⁹ DRS ^{63,64} CO ₂ scattering ⁵⁸ NICISS ⁵² MD ⁶⁹
$[C_9C_1Im]^+$	$[BF_4]^-$	1-nonyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
$[C_{10}C_1Im]^+$	$[BF_4]^-$	1-decyl-3-methylimidazolium tetrafluoroborate	SFG ¹² MIES ⁴⁹ UPS ⁴⁹ NICISS ⁵²
$[C_{11}C_1Im]^+$	$[BF_4]^-$	1-undecyl-3-methylimidazolium tetrafluoroborate	SFG ¹²
$[C_{12}C_1Im]^+$	$[BF_4]^-$	1-dodecyl-3-methylimidazolium tetrafluoroborate	DRS ^{63,64}
$[C_4C_1C_1Im]^+$	$[BF_4]^-$	1-butyl-2,3-dimethylimidazolium tetrafluoroborate	XPS ³⁴
$[(C_2OH)C_1Im]^+$	$[BF_4]^-$	1-(2-hydroxyethyl)-3-methylimidazolium tetrafluoroborate	XPS ³⁴ MD ⁶⁹
$[(C_8OH)C_1Im]^+$	$[BF_4]^-$	1-(2-hydroxyoctyl)-3-methylimidazolium tetrafluoroborate	MD ⁶⁹
$[C_1C_1Im]^+$	$[PF_6]^-$	1-methyl-3-methylimidazolium hexafluorophosphate	SFG ^{1,2}
$[C_2C_1Im]^+$	$[PF_6]^-$	1-ethyl-3-methylimidazolium hexafluorophosphate	SFG ^{1,2}
$[C_3C_1Im]^+$	$[PF_6]^-$	1-propyl-3-methylimidazolium hexafluorophosphate	SFG ¹
$[C_4C_1Im]^+$	$[PF_6]^-$	1-butyl-3-methylimidazolium hexafluorophosphate	XPS ^{32,44} DRS ^{63,65} SFG ^{1-3,6,9-11} DLS ¹⁸⁻²⁰ XR ^{6,24,25}

			RBS ^{44,60} MD ^{71,74-79} DLS ²⁰
[C ₆ C ₁ Im] ⁺	[PF ₆] ⁻	1-hexyl-3-methylimidazolium hexafluorophosphate	
[C ₈ C ₁ Im] ⁺	[PF ₆] ⁻	1-octyl-3-methylimidazolium hexafluorophosphate	NR ²⁹ XPS ^{32,46} DRS ^{63,64} DLS ²⁰ DRS ⁶³
[C ₁₂ C ₁ Im] ⁺	[PF ₆] ⁻	1-dodecyl-3-methylimidazolium hexafluoroborate	
[C ₄ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-butyl-3-methylimidazolium trifluoromethylsulfonate	SFG ¹⁶ MIES ⁴⁹ UPS ⁴⁹
[C ₈ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-octyl-3-methylimidazolium trifluoromethylsulfonate	XPS ⁴⁶ MIES ⁴⁹ UPS ⁴⁹
[C ₁₀ C ₁ Im] ⁺	[CF ₃ SO ₃] ⁻	1-decyl-3-methylimidazolium trifluoromethylsulfonate	MIES ⁴⁹ UPS ⁴⁹
[C ₁ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-methyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³¹
[C ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-ethyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{30,32,38-43} NICISS ⁴³ O scattering ⁵⁴⁻⁵⁶ MIES ^{30,41,42} HREELS ³⁰ RBS ⁵⁹ ToFSIMS ³² UPS ^{30,41,42} MD ⁷⁰
[C ₃ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-propyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	
[C ₄ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-butyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{34,38,40,43} MIES ⁴⁹ UPS ⁴⁹ O scattering ⁵⁵ CO ₂ scattering ^{57,58} NICISS ⁴³ RBS ⁵⁹ SFG ^{3,7} LEIS ⁴⁰ DLS ¹⁹⁻²² MD ^{80,81}
[C ₅ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-pentyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	O scattering ⁵⁵ MD ⁷⁰
[C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{38,43} NICISS ⁴³ RBS ⁵⁹ MD ⁸²
[C ₈ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-octyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{38,43,46} MIES ⁴⁹ UPS ⁴⁹ O scattering ⁵⁵ NICISS ⁴³
[C ₁₀ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-decyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁸ MIES ⁴⁹ UPS ⁴⁹
[C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-dodecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁸ O scattering ⁵⁴⁻⁵⁶

			CO ₂ scattering ⁵⁸ XPS ³⁸
[C ₁₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻	1-hexadecyl-3-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	
[C ₃ C ₃ Im] ⁺	[Tf ₂ N] ⁻	1-propyl-3-propylimidazolium bis[(trifluoromethane)sulfonyl]imide	MD ⁷⁰
[C ₅ C ₅ Im] ⁺	[Tf ₂ N] ⁻	1-pentyl-3-pentylimidazolium bis[(trifluoromethane)sulfonyl]imide	MD ⁷⁰
[Me(EG)C ₁ Im] ⁺	[Tf ₂ N] ⁻	3-[2-methoxy-ethyl]-1-methylimidazolium bis[(trifluoromethane)sulfonyl]imide	XPS ^{31,48}
[Et(EG) ₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻	3-[2-(2-ethoxy-ethoxy)-ethyl]-1- methylimidazolium	XPS ^{31,38,48}
[Me(EG) ₃ C ₁ Im] ⁺	[Tf ₂ N] ⁻	3-[2-(2-(2-methoxy-ethoxy)-ethoxy)-ethyl]-1- methylimidazolium	XPS ^{31,38,48}
[C ₃ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-propyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[C ₄ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-butyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	XPS ³⁴ XR ²⁶ SFG ¹⁵
[C ₅ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-pentyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[C ₆ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-hexyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[C ₁₀ C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-decyl-1-methylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[(C ₂ H ₄ OCH ₃)C ₁ Pyrr] ⁺	[Tf ₂ N] ⁻	1-methyl-1-methoxyethylpyrrolidinium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[N _{1,1,1,1}] ⁺	[Tf ₂ N] ⁻	tetramethylammonium bis[(trifluoromethane)sulfonyl]imide	DLS ²⁰
[N _{3,1,1,1}] ⁺	[Tf ₂ N] ⁻	trimethylpropylammonium bis[(trifluoromethane)sulfonyl]imide	RBS ^{61,62}
[N _{3,1,1,i3}] ⁺	[Tf ₂ N] ⁻	dimethylisopropylpropylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[N _{4,1,1,i3}] ⁺	[Tf ₂ N] ⁻	dimethylisopropylbutylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[N _{6,1,1,i3}] ⁺	[Tf ₂ N] ⁻	dimethylisopropylhexylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[N _{10,1,1,i3}] ⁺	[Tf ₂ N] ⁻	dimethylisopropyldecylammonium bis[(trifluoromethane)sulfonyl]imide	SFG ¹⁵
[C ₃ C ₁ Pip] ⁺	[Tf ₂ N] ⁻	methylpropylpiperidinium bis[(trifluoromethane)sulfonyl]imide	DLS ²⁰
[C ₈ C ₁ Im] ⁺	[Pf ₂ N] ⁻	1-octyl-3-methylimidazolium bis[(pentafluoroethyl)sulfonyl]imide	XPS ⁴⁶
[C ₈ C ₁ Im] ⁺	[PF ₃ (C ₂ F ₅) ₃] ⁻	1-octyl-3-methylimidazolium tris(pentafluoroethyl)trifluorophosphate	XPS ⁴⁶
[N _{8,8,8,1}] ⁺	[Nf ₂ N] ⁻	trioctylmethylammonium bis[(nonafluorobutane)sulfonyl]imide	XR ^{27,28}
[P _{6,6,6,14}] ⁺	[Nf ₂ N] ⁻	trihexyltetradecylphosphonium bis[(nonafluorobutane)sulfonyl]imide	XR ²⁷
9:1 [C ₂ C ₁ Im] ⁺ : [C ₁₂ C ₁ Im] ⁺	[Tf ₂ N] ⁻		XPS ³¹
1:1 [C ₂ C ₁ Im] ⁺ : [C ₆ C ₁ Im] ⁺	[Tf ₂ N] ⁻		RBS ⁵⁹

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