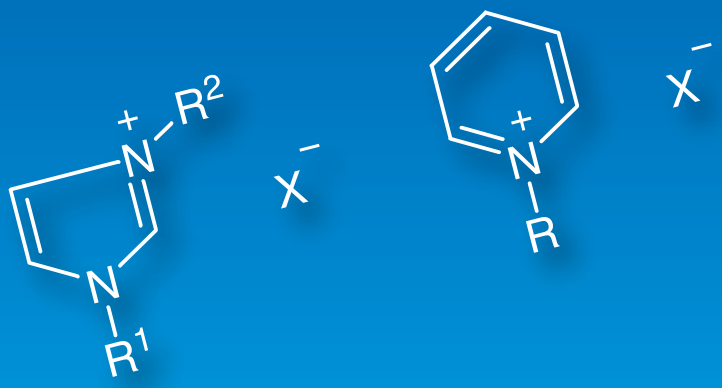
CHEMISTRY MATERIALS

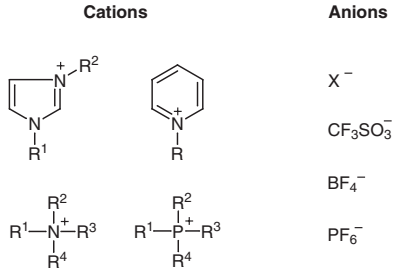
Ionic Liquids



- Ammonium Salts
- Imidazolium Salts
- Morpholinium Salts
- Phosphonium Salts
- Piperidinium Salts
- Pyridinium Salts
- Pyrrolidinium Salts
- Sulfonium Salts

Ionic Liquids

In recent years, environmentally-friendly reaction processes have vigorously been studied from the standpoint of green chemistry. For example, oxidation reactions with the air, or reactions in water, supercritical fluids, and fluorous solvents are cited. Most recently, ionic liquids have gained much attention as green reaction solvents for organic synthesis.



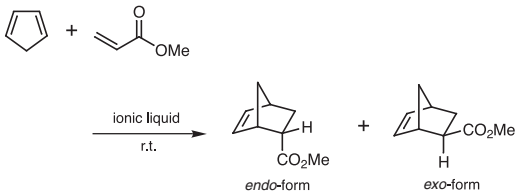
As seen above, ionic liquids are salts, consisting of cations such as imidazolium, pyridinium, quaternary ammonium and quaternary phosphonium, and anions such as halogen, triflate, tetrafluoroborate and hexafluorophosphate, which exist in the liquid state at relatively low temperatures. Their characteristic features include almost no vapor pressure, non-flammability, non-combustibility, high thermal stability, relatively low viscosity, wide temperature ranges for being liquids, and high ionic conductivity. When an ionic liquid is used as a reaction solvent, the solute is solvated by ions only, where the reaction proceeds under quite different conditions as compared to using water or ordinary organic solvents. Hence, they are expected to exhibit unconventional reactivity, and their applications in a variety of organic reactions are being explored.

Ionic liquids containing chloroaluminate as the anion have been investigated for many years. These ionic liquids are not only used as reaction solvents, but also exhibit Lewis acid or Lewis base properties, when the ratio of cations and anions is changed. However, they can only be used under an inert atmosphere or vacuum, due to their high moisture sensitivity. On the other hand, it has been found that ionic liquids containing anions such as hexafluorophosphate form stable salts in air, which lead to the synthesis of numerous stable ionic liquids today. Furthermore, some ionic liquids have very low solubility in water and polar organic solvents. Utilization of this property enables recovery and reuse of ionic liquids, after extracting the product with an organic solvent. That can help to reduce the waste of traditional solvents which are rarely reused. Moreover, ionic liquids have attracted much attention as safe solvents, due to their low volatility.

The followings are some reaction examples using ionic liquids.

1. Diels-Alder reaction

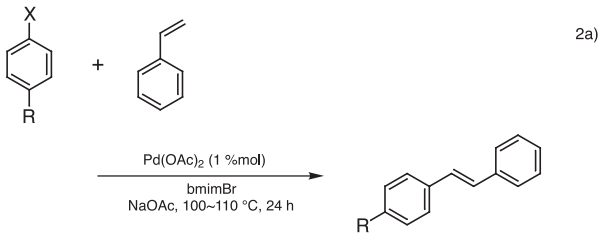
The Diels-Alder reaction between cyclopentadiene and methyl acrylate ester has been reported. In the Diels Alder reaction using 1-ethyl-3-methylimidazolium chloride / chloroaluminate [emimCl/$(AlCl_3)_x$], the *endo / exo* ratio of the products varies largely, depending on the ratio of emimCl/$(AlCl_3)_x$. The amount of *endo*-form increases four-fold with the acidic emimCl/$(AlCl_3)_x$, compared to that of the basic emimCl/$(AlCl_3)_x$.[1a] When the same reaction is carried out with 1-butyl-3-methylimidazolium tetrafluoroborate (bmimBF$_4$), it showed similar reactivity to Lewis basic emimCl/$(AlCl_3)_x$.[1b]



ionic liquids	composition (% $AlCl_3$)	time (h)	*endo*/*exo* ratio	Y. (%)	
emimCl/$(AlCl_3)_x$	48 (basic)	22	4.88	32.3	1a)
emimCl/$(AlCl_3)_x$	48 (basic)	72	5.25	95	1a)
emimCl/$(AlCl_3)_x$	51 (acidic)	22	19	53	1a)
emimCl/$(AlCl_3)_x$	51 (acidic)	72	19	79.4	1a)
bmimBF$_4$	-	72	4.3	91	1b)

2. Heck reaction

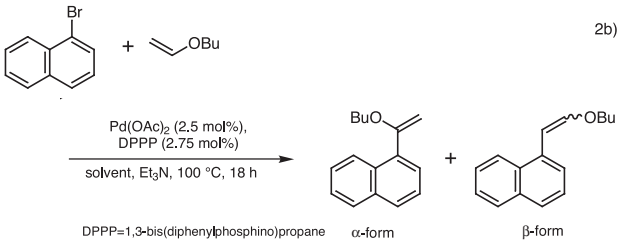
In the Heck reaction using palladium catalysts, polar solvents such as DMF and acetonitrile are employed, and aryl iodides are normally used as substrates. In cases where the less expensive but less reactive aryl bromides or chlorides are employed, it is necessary to use more active catalysts or add phosphine ligands in order to retain the catalytic activity. By utilizing 1-butyl-3-methylimidazolium bromide (bmimBr) as solvent, aryl bromides react with styrene to afford stilbenes in high yields without adding a phosphine ligand.[2a]



2a)

entry	X	R	conv. (%)	Y. (%)
1	I	H	100	99
2	Br	CHO	100	90
3	Br	MeCO	79	88

The reaction of enol ethers bearing an electron donating group with aryl halides generates a mixture of α-substituents and β-substituents under the normal Heck reaction conditions. However, the reaction of vinyl ethers with aryl halides using bmimBF$_4$ as solvent gives only α-substituents specifically.[2b] In addition, the Heck reaction employing tetrabutylammonium bromide (Bu_4NBr), which is a quaternary ammonium salt, has been reported.[2c]

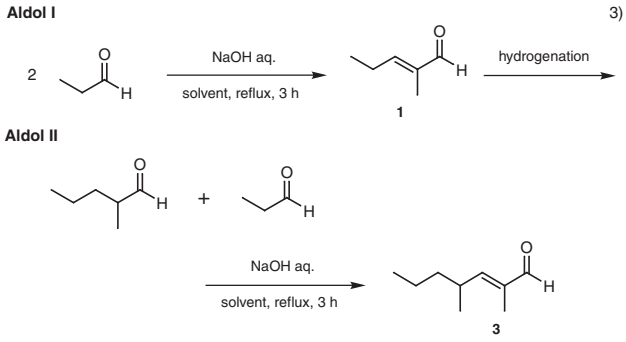


entry	solvent	conv. (%)	α/β	E/Z	Y. (%)
1	toluene	23	46/54	68/32	
2	DMSO	100	75/25	79/21	
3	$bmimBF_4$	50	>99/1		
4*	$bmimBF_4$	100	>99/1		95

*DPPP (2 eq.), time : 24 h

3. Aldol condensation

The Aldol condensation reaction using ionic liquids has been reported. In the reaction for obtaining 2,4-dimethylhept-2-enal **3** from propanal via two Aldol condensations, the conversion values of the ionic liquid phase is comparable to water medium in the Aldol I reaction. However, the product selectivity is reduced, as can be seen in the figure below. This is due to a side reaction proceeding from the high solubility of product **1** toward the ionic liquid. In contrast, in the Aldol II reaction, as compared with the reaction in water, the product selectivity in ionic liquids are increased. This is because the hydrogenated product of **1** is difficult to dissolve in water but easy in ionic liquids.[3)]

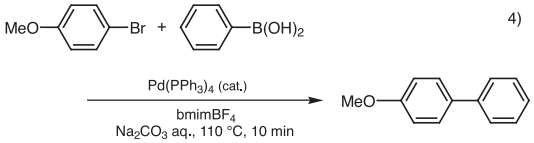


entry	solvent	reaction type	conv. (%)	selectivity (%) 1	2*	3	4**
1	$bmimBF_4$	Aldol I	99	64	2	-	33
2	H_2O	Aldol I	100	82	0	-	18
3	$emimBF_4$	Aldol II	100	4	6	69	21
4	$bmimBF_4$	Aldol II	100	3	3	80	14
5	H_2O	Aldol II	100	36	0	59	5

*2: 3-hydroxy-2-methylpentanal, **4: higher boiling aldehydes and oligomers.

4. Suzuki-Miyaura coupling reaction

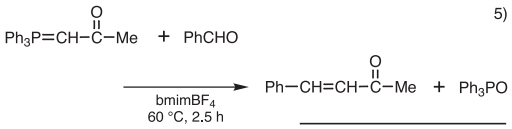
In the Suzuki-Miyaura coupling reaction where biaryls are produced from aryl halides and aryl boronic acids in the presence of a palladium catalyst and a base, the removal of the catalyst is often a problem. In the system where an ionic liquid is used as solvent, the product can be extracted with ether after the reaction is complete, with the catalyst being retained in the ionic liquid. The ionic liquid and the catalyst can then be reused as they are.[4)]



entry	catalytic solution	Y. (%)
1	1st use	81
2	2nd use	89
3	3rd use	77
4	4th use	82

5. Wittig reaction

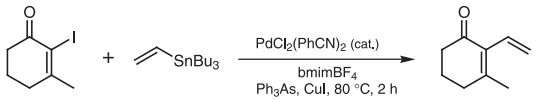
The Wittig reaction is a useful method for C-C double bond formation. However, the separation of the product and the by-product, triphenylphosphine oxide, is a classic problem. The separation and purification are usually carried out by crystallization or chromatography. When an ionic liquid is used as solvent, the product and phosphine oxide can be easily separated by combining an ether extraction and a toluene extraction after the reaction is complete. In addition, it is possible to efficiently reuse the ionic liquid.[5)]



	Y. (%)	*E/Z*
1st use	82	97/3
2nd use	83	
6th use	91	

6. Stille reaction

The Stille reaction is a useful reaction, where an organotin compound and an electrophilic reagent are reacted to form a C-C bond under mild conditions in the presence of palladium catalyst. In the reaction of vinyltributyltin and iodocyclohexenone in an ionic liquid, the product can be extracted with ether, and the catalyst is retained in the ionic liquid. The ionic liquid and the catalyst can be reused as they are. This ionic liquid / catalyst phase is air and moisture stable, and thus can be used after a long storage without loss in activity.[6)]

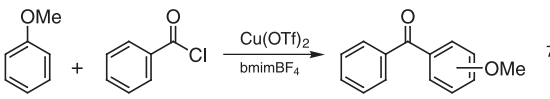


	Y. (%)
1st use	82
2nd use	78
3rd use	72*

* 3rd run using recycled catalyst/media after 24 days

7. Friedel-Crafts reaction

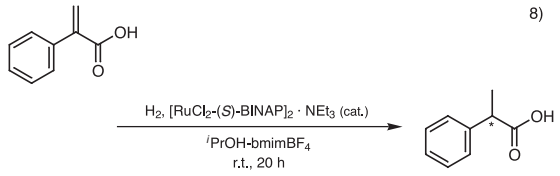
Here is an example of the Friedel-Crafts reaction. In the benzoylation of anisoles catalyzed by copper triflate in $bmimBF_4$, methoxybenzophenone is quantitatively obtained within 1h, with a *p*- / *o*-product ratio of 96/4.[7a)] The same reaction performed using acetonitrile gave a lower conversion of 64% at 1h, with the reduced *p*- / *o*-product ratio of 93/7. In addition, the regioselective acylations of indoles using $emimCl/(AlCl_3)_x$ has been reported as well.[7b)]



Y. quant. (*p*-/*o*-ratio = 96/4)

8. Hydrogenation

In the asymmetric hydrogenation of C-C double bond using homogeneous chiral transition metal complexes, the recovery of the catalyst and the seperation of the products are often troublesome.[8] Dupont *et al.* have reported an example in which the reagents are allowed to react in a two phase system of an ionic liquid and an alcohol. After the reaction is complete, the product exists in the alcoholic phase, while the catalyst in the ionic liquid phase. Thus, the product and the catalyst can be easily separated by decantation. In addition, the catalyst which exists in the ionic liquid phase can be reused without loss in activity.

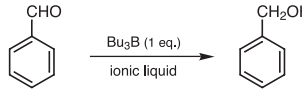


8)

	P (atm)	conv. (%)	% *e.e*
1st use	50	100	78 (*S*)
2nd use	75	100	84 (*S*)
3rd use	25	90	79 (*S*)
4th use	100	95	67 (*S*)

9. Reduction

The reduction of aldehydes using trialkylboranes is an important organic transformation reaction. However, reductions using simple trialkylboranes generally require reaction temperatures in excess of 150 °C. Kabalka *et al*. have reported this reduction using trialkylborane in which bmimBF$_4$, emimBF$_4$, and 1-ethyl-3-methylimidazolium hexafluorophosphate (emimPF$_6$) are used as solvents.[9a] For example, when benzaldehyde was reduced by tributylborane in emimPF$_6$, the reaction proceeded rapidly at 100 °C to give the product in high yield. Although long reaction time is needed comparatively, the product can be obtained even at room temperature. In addition, a photoreduction has also been reported using ionic liquids.[9b]

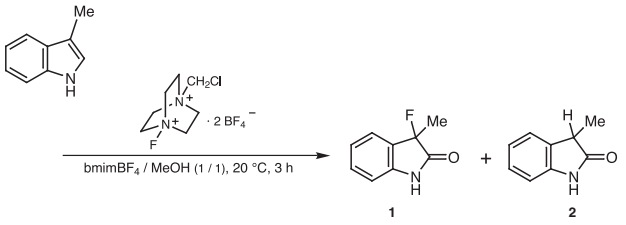


9a)

ionic liquid	temp. (°C)	time (h)	Y. (%)
bmimBF$_4$	100	16	93
emimBF$_4$	100	16	90
emimPF$_6$	100	16	96
emimPF$_6$	r.t.	48	94

10. Fluorination

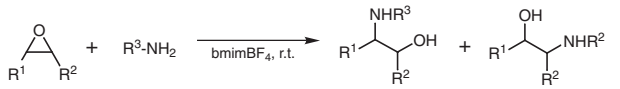
The introduction of fluorines in to heterocyclic compounds is important in the synthesis of bioactive compounds. In the electrophilic fluorination of indoles using *N*-fluoro-*N*′-(chloromethyl)triethylenediamine bis(tetrafluoroborate) as fluorinating agent and bmimBF$_4$ as a solvent, 3-fluorinated 2-oxoindoles can be obtained in high yield in a short period of time compared to the conventional method (entry 1).[10]



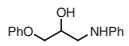
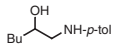
entry	solvent	cosolvent (1/1)	temp. (°C)	time (h)	1 (%)	2 (%)	
1	MeCN	H_2O	r.t.	overnight	71	small amount	10a)
2	bmimBF$_4$	MeOH	20	3	99	-	10b)

11. Ring opening reaction

β-Aminoalcohols are utilized as useful building blocks for the synthesis of bioactive compounds. One of the synthetic methods to obtain β-aminoalcohols involves the ring opening of epoxides using amines. However, these reactions require a large excess of the amines at elevated temperatures. The high temperature reaction conditions are not only detrimental to certain functional groups but also to the control of regioselectivity. Subsequently, a variety of activators or promoters such as metal amides, metal triflates and transition metal halides have been developed. However, many of these are often expensive or are needed in stoichiometric amounts, thus limiting their practicality. In the system using ionic liquids, the reaction proceeds at room temperature to give β-aminoalcohols in high yield.[11]



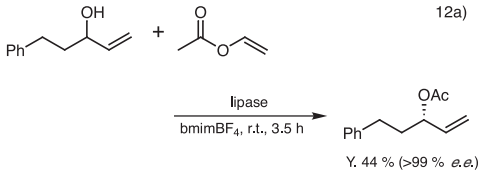
11)

entry	R^1	R^2	R^3	product	time (h)	Y. (%)
1	Ph	H	Ph		5.0	85
2	-(CH$_2$)$_4$-		Ph		6.0	83
3	PhOCH$_2$	H	Ph		6.0	89
4	Bu	H	p-tol		6.0	85

In the cases of glycidyl ether or alkyloxiranes in entry 3 and 4, amines attack on the less sterically hindered site on the epoxides. After the reaction, the product was extracted with ether, followed by drying at 80 °C under reduced pressure. The ionic liquid was reused in five runs without any loss of activity.

12. Enzymatic reaction

Enzymatic reactions using ionic liquids have also been reported.[12] It is known that lipase tolerates non-natural reaction conditions, and reactions in organic solvents have intensively been carried out. For example, transesterifications in organic solvents are well known as a useful synthetic methods for the preparation of optically-active compounds. In the asymmetric transesterification of allylic alcohols using ionic liquids, the desired products are afforded in similar yields to those of organic solvent systems.[12a]



As described above, a variety of reactions utilizing ionic liquids have been conducted, and the improvement of yields and the recovery and reuse of solvents have been reported. Furthermore, they are also applied to alkylations[13], allylations[14], epoxidations[15], cycloadditions[16], hydroesterifications[17], and reactions using supercritical CO_2[18], in which they are reported to be effective.

13. Other application

Ionic liquids are attracting attention in electrochemical application, because they consist of only ions and have high ionic conductivity. For example, they have been extensively studied as secondary battery electrolytes. These electrolytes require properties such as high ionic conductivity, non-volatility, thermal stability, non-flammability, and non-corrosiveness. Ionic liquids meet these requirements. Moreover, 1-alkyl-3-methylimidazolium iodide has been recently examined as an electrolyte of dye-sensitized solar cells.[19]

Recently Hamaguchi *et al*. reported that 1-butyl-3-methyl-imidazolium tetrachloroferrate is magnetic ionic liquid.[20] Traditional magnetic fluids have had problems of volatility and phase separation. The new magnetic ionic liquid overcomes these problems, and is expected to be applied to many fields, including the use as a sealing agent for the motor axis.

References

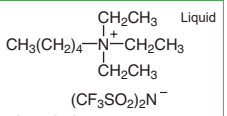
1) a) C. W. Lee, *Tetrahedron Lett.* **1999**, *40*, 2461; b) T. Fischer, A. Sethi, T. Welton, J. Woolf, *Tetrahedron Lett.* **1999**, *40*, 793.
2) a) L. Xu, W. Chen, J. Xiao, *Organometallics* **2000**, *19*, 1123; b) L. Xu, W. Chen, J. Ross, J. Xiao, *Org. Lett.* **2001**, *3*, 295; c) V. P. W. Böhm, W. A. Herrmann, *Chem. Eur. J.* **2000**, *6*, 1017.
3) C. P. Mehnert, N. C. Dispenziere, R. A. Cook, *Chem. Commun.* **2002**, 1610.
4) C. J. Mathews, P. J. Smith, T. Welton, *Chem. Commun.* **2000**, 1249.
5) V. L. Boulaire, R. Grée, *Chem. Commun.* **2000**, 2195.
6) S. T. Handy, X. Zhang, *Org. Lett.* **2001**, *3*, 233.
7) a) J. Ross, J. Xiao, *Green Chem.* **2002**, *4*, 129; b) K.-S. Yeung, M. E. Farkas, Z. Qiu, Z. Yang, *Tetrahedron Lett.* **2002**, *43*, 5793; c) A. Stark, B. L. MacLean, R. D. Singer, *J. Chem. Soc., Dalton Trans.* **1999**, 63; d) C. J. Adams, M. J. Earle, G. Roberts, K. R. Seddon, *Chem. Commun.* **1998**, 2097.
8) A. L. Monteiro, F. K. Zinn, R. F. de Souza, J. Dupont, *Tetrahedron: Asymmetry* **1997**, *8*, 177.
9) G. W. Kabalka, R. R. Malladi, *Chem. Commun.* **2000**, 2191; b) J. L. Reynolds, K. R. Erdner, P. B. Jones, *Org. Lett.* **2002**, *4*, 917.
10) a) Y. Takeuchi, T. Tarui, N. Shibata, *Org. Lett.* **2000**, *2*, 639; b) J. Baudoux, A.-F. Salit, D. Cahard, J.-C. Plaquevent, *Tetrahedron Lett.* **2002**, *43*, 6573.
11) J. S. Yadav, B. V. S. Reddy, A. K. Basak, A. V. Narsaiah, *Tetrahedron Lett.* **2003**, *44*, 1047.
12) a) T. Itoh, E. Akasaki, K. Kudo, S. Shirakami, *Chem. Lett.* **2001**, 262; b) R. M. Lau, F. van Rantwijk, K. R. Seddon, R. A. Sheldon, *Org. Lett.* **2000**, *2*, 4189; c) S. Park, R. J. Kazlauskas, *J. Org. Chem.* **2001**, *66*, 8395; d) T. Itoh, S.-h. Han, Y. Matsushita, S. Hayase, *Green Chem.* **2004**, *6*, 437; e) T. Ito, *Yuki Gosei Kagaku Kyokaishi (J. Synth. Org. Chem. Jpn.)* **2009**, *67*, 143.
13) M. Badri, J.-J. Brunet, *Tetrahedron Lett.* **1992**, *33*, 4435.
14) C. M. Gordon, A. McCluskey, *Chem. Commun.* **1999**, 1431.
15) G. S. Owens, M. M. Abu-Omar, *Chem. Commun.* **2000**, 1165.
16) a) J. Peng, Y. Deng, *New J. Chem.* **2001**, *25*, 639; b) J. F. Dubreuil, J. P. Bazureau, *Tetrahedron Lett.* **2000**, *41*, 7351.
17) a) K. Qiao, Y. Deng, *New J. Chem.* **2002**, *26*, 667; b) D. Zim, R. F. de Souza, J. Dupont, A. L. Monteiro, *Tetrahedron Lett.* **1998**, *39*, 7071.
18) S. V. Dzyuba, R. A. Bartsch, *Angew. Chem. Int. Ed.* **2003**, *42*, 148.
19) a) P. Bonhote, A.-P. Dias, N. Papageorgiou, K. Kalyanasundaram, M. Gratzel, *Inorg. Chem.* **1996**, *35*, 1168.
20) a) S. Hayashi, H. Hamaguchi, *Chem. Lett.* **2004**, *33*, 1590; b)H. Hamaguchi, *Expected Materials for the Future (Mirai Zairyo)* **2005**, *5*, 29.

Reviews

21) a) T. Welton, *Chem. Rev.* **1999**, *99*, 2071; b) J. D. Holbrey, K. R. Seddon, *Clean Prod. Proc.* **1999**, *1*, 223; c) P. Wasserscheid, W. Keim, *Angew. Chem. Int. Ed.* **2000**, *39*, 3772; d) R. Sheldon, *Chem. Commun.* **2001**, 2399; e) D. Zhao, M. Wu, Y. Kou, E. Min, *Catal. Today* **2002**, *74*, 157.

Ammonium Salts

A2274 5g



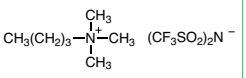
Liquid

Amyltriethylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 906478-91-9

B3233 5g

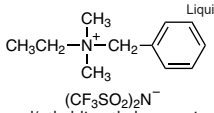
mp 17 °C



Butyltrimethylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 258273-75-5

B5427 5g

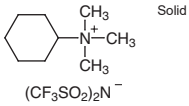


Liquid

Benzyl(ethyldimethylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 1186103-43-4

C1966 5g

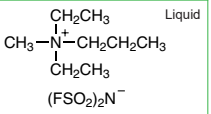


Solid

Cyclohexyltrimethylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 952155-74-7

D5237 1g

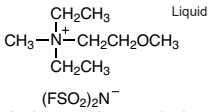


Liquid

Diethyl(methyl)-propylammonium Bis(fluorosulfonyl)imide

CAS RN: 1235234-32-8

D5238 1g

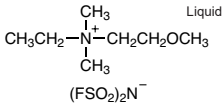


Liquid

Diethyl(2-methoxyethyl)-methylammonium Bis(fluorosulfonyl)imide

CAS RN: 1079129-48-8

E1275 1g

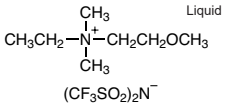


Liquid

Ethyl(2-methoxyethyl)-dimethylammonium Bis(fluorosulfonyl)imide

CAS RN: 1235234-35-1

E1281 5g

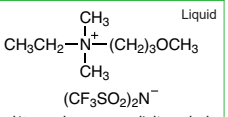


Liquid

Ethyl(2-methoxyethyl)dimethyl-ammonium Bis(trifluoromethane-sulfonyl)imide

CAS RN: 557788-37-1

E1282 5g

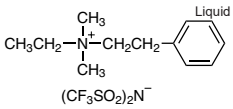


Liquid

Ethyl(3-methoxypropyl)dimethyl-ammonium Bis(trifluoromethane-sulfonyl)imide

CAS RN: 1373334-05-4

E1283 1g 5g

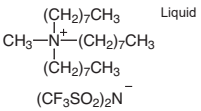


Liquid

Ethyl(dimethyl)(2-phenylethyl)-ammonium Bis(trifluoromethane-sulfonyl)imide

CAS RN: 1804970-28-2

M1660 5g



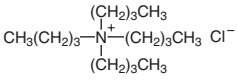
Liquid

Methyltri-*n*-octylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 375395-33-8

T0055 5g 25g 100g

mp 70 °C

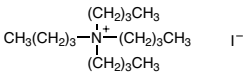


Tetrabutylammonium Chloride

CAS RN: 1112-67-0

T0057 25g 100g 500g

mp 147 °C

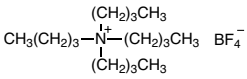


Tetrabutylammonium Iodide

CAS RN: 311-28-4

T0914 25g 100g 500g

mp 161 °C

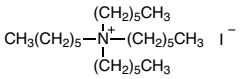


Tetrabutylammonium Tetrafluoroborate

CAS RN: 429-42-5

T1010 5g 25g

mp 100 °C

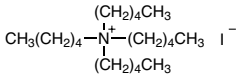


Tetrahexylammonium Iodide

CAS RN: 2138-24-1

T1011 5g 25g

mp 137 °C

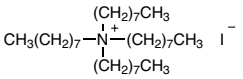


Tetraamylammonium Iodide

CAS RN: 2498-20-6

T1155 5g

mp 129 °C

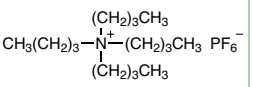


Tetra-*n*-octylammonium Iodide

CAS RN: 16829-91-7

T1279 25g 250g

Solid

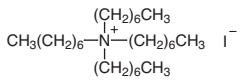


Tetrabutylammonium Hexafluorophosphate

CAS RN: 3109-63-5

T1396 25g

mp 123 °C

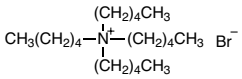


Tetraheptylammonium Iodide

CAS RN: 3535-83-9

T1432 5g 25g

mp 101 °C

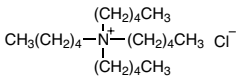


Tetraamylammonium Bromide

CAS RN: 866-97-7

T1433 5g 25g

Solid

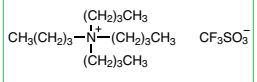


Tetraamylammonium Chloride

CAS RN: 4965-17-7

T1568 10g 25g

mp 113 °C

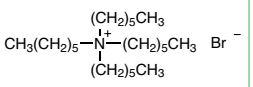


Tetrabutylammonium Triflate

CAS RN: 35895-70-6

T1599 25g

mp 99 °C

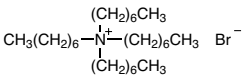


Tetrahexylammonium Bromide

CAS RN: 4328-13-6

T1602 5g 25g

mp 89 °C

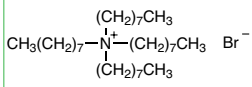


Tetraheptylammonium Bromide

CAS RN: 4368-51-8

T1603 10g 25g

mp 97 °C

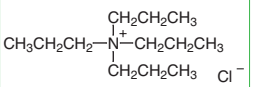


Tetra-*n*-octylammonium Bromide

CAS RN: 14866-33-2

T2106 25g

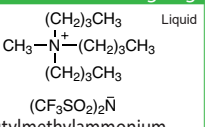
Solid



Tetrapropylammonium Chloride

CAS RN: 5810-42-4

T2679 5g 25g



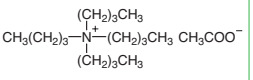
Liquid

Tributylmethylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 405514-94-5

T2694 25g 100g

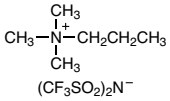
Solid



Tetrabutylammonium Acetate

CAS RN: 10534-59-5

T2761 5g 25g

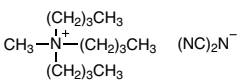


Liquid

Trimethylpropylammonium Bis(trifluoromethanesulfonyl)-imide

CAS RN: 268536-05-6

T3533 5g



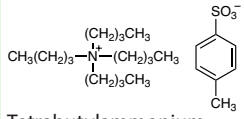
Liquid

Tributyl(methyl)-ammonium Dicyanamide

CAS RN: 1262230-03-4

T3660 5g 25g

mp 69 °C

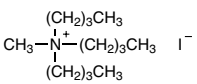


Tetrabutylammonium *p*-Toluenesulfonate

CAS RN: 7182-86-7

T3692 5g 25g

mp 184 °C



Tributylmethylammonium Iodide

CAS RN: 3085-79-8

Imidazolium Salts

M3212 5g 25g

Solid

1-Methylimidazole Hydrobromide

CAS RN: 101023-58-9

M3214 5g 25g

mp 88 °C

1-Methylimidazole Trifluoromethanesulfonate

CAS RN: 99257-94-0

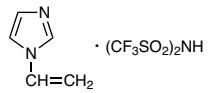
M3210 5g 25g

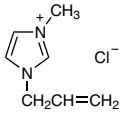
mp 49 °C

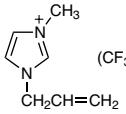
1-Methylimidazole Bis(trifluoromethanesulfonyl)imide

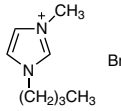
CAS RN: 353239-08-4

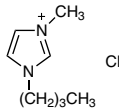
Please inquire for pricing and availability of listed products to our local sales representatives.

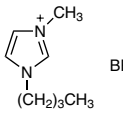
V0145 5g
mp 37 °C

1-Vinylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 1013027-27-4

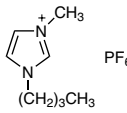
A2084 5g 25g
Liquid

1-Allyl-3-methylimidazolium Chloride
CAS RN: 65039-10-3

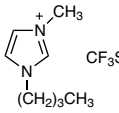
A3210 5g 25g
Liquid

1-Allyl-3-methylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 655249-87-9

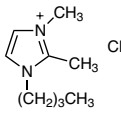
B2193 5g
Liquid

1-Butyl-3-methyl-imidazolium Bromide
CAS RN: 85100-77-2

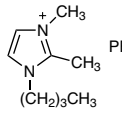
B2194 5g 25g 100g
mp 41 °C

1-Butyl-3-methyl-imidazolium Chloride
CAS RN: 79917-90-1

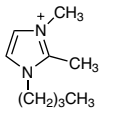
B2195 5g 25g 100g
Liquid

1-Butyl-3-methylimidazolium Tetrafluoroborate
CAS RN: 174501-65-6

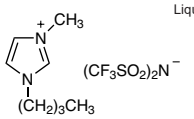
B2320 5g 25g
Liquid

1-Butyl-3-methylimidazolium Hexafluorophosphate
CAS RN: 174501-64-5

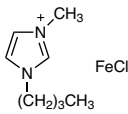
B2337 5g 25g
Liquid

1-Butyl-3-methylimidazolium Trifluoromethanesulfonate
CAS RN: 174899-66-2

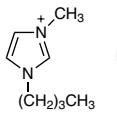
B2473 5g 25g
mp 99 °C

1-Butyl-2,3-dimethyl-imidazolium Chloride
CAS RN: 98892-75-2

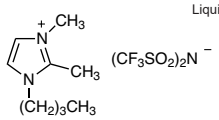
B2474 5g 25g
mp 38 °C

1-Butyl-2,3-dimethylimidazolium Hexafluorophosphate
CAS RN: 227617-70-1

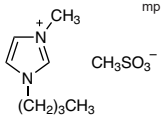
B2475 5g 25g
fp 32 °C

1-Butyl-2,3-dimethylimidazolium Tetrafluoroborate
CAS RN: 402846-78-0

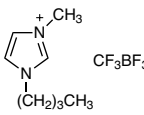
B2477 5g 25g
Liquid

1-Butyl-3-methylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 174899-83-3

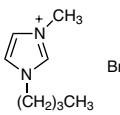
B2672 5g 25g
Liquid

1-Butyl-3-methylimidazolium Tetrachloroferrate
CAS RN: 359845-21-9

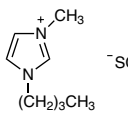
B2708 5g 25g
Liquid

1-Butyl-3-methylimidazolium Iodide
CAS RN: 65039-05-6

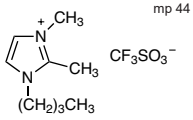
B3159 5g 25g
Liquid

1-Butyl-2,3-dimethylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 350493-08-2

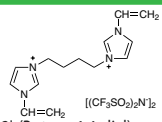
B3231 5g 25g
mp 76 °C

1-Butyl-3-methylimidazolium Methanesulfonate
CAS RN: 342789-81-5

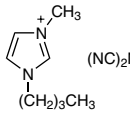
B3542 5g
Liquid

1-Butyl-3-methylimidazolium Trifluoro(trifluoromethyl)borate
CAS RN: 741677-68-9

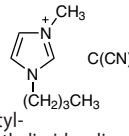
B3596 5g
mp 8 °C

1-Butyl-3-methyl-imidazolium Tribromide
CAS RN: 820965-08-0

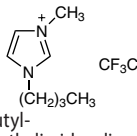
B4091 5g 25g
Liquid

1-Butyl-3-methylimidazolium Thiocyanate
CAS RN: 344790-87-0

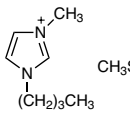
B4182 5g 25g
mp 44 °C

1-Butyl-2,3-dimethyl-imidazolium Triflate
CAS RN: 765910-73-4

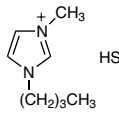
B5421 1g
mp 82 °C

3,3'-(Butane-1,4-diyl)-bis(1-vinyl-3-imidazolium)-Bis(trifluoromethanesulfonyl)imide
CAS RN: 1312310-16-9

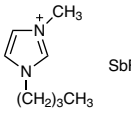
B5447 5g 25g
Liquid

1-Butyl-3-methylimidazolium Dicyanamide
CAS RN: 448245-52-1

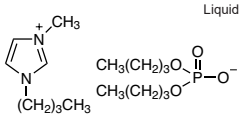
B5487 5g 25g
Liquid

1-Butyl-3-methylimidazolium Tricyanomethanide
CAS RN: 878027-73-7

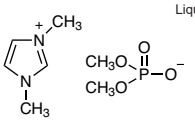
B5526 5g 25g
Liquid

1-Butyl-3-methylimidazolium Trifluoroacetate
CAS RN: 174899-94-6

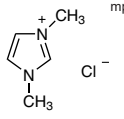
B5527 5g 25g
Liquid

1-Butyl-3-methylimidazolium Methyl Sulfate
CAS RN: 401788-98-5

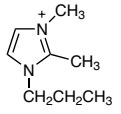
B5569 5g 25g
Liquid

1-Butyl-3-methylimidazolium Hydrogen Sulfate
CAS RN: 262297-13-2

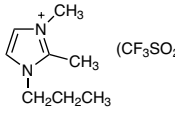
B5724 5g 25g
Liquid

1-Butyl-3-methylimidazolium Hexafluoroantimonate
CAS RN: 174645-81-9

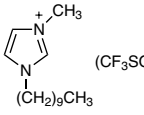
B5723 5g 25g
Liquid

1-Butyl-3-methylimidazolium Dibutyl Phosphate
CAS RN: 663199-28-8

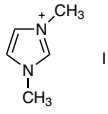
D3240 5g 25g
Liquid

1,3-Dimethylimidazolium Dimethyl Phosphate
CAS RN: 654058-04-5

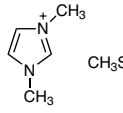
D3341 5g 25g
mp 125 °C

1,3-Dimethylimidazolium Chloride
CAS RN: 79917-88-7

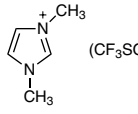
D3903 5g 25g
Solid

1,2-Dimethyl-3-propylimidazolium Iodide
CAS RN: 218151-78-1

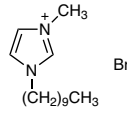
D4289 5g 25g
Liquid

2,3-Dimethyl-1-propylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 169051-76-7

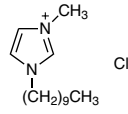
D4351 5g 25g
Liquid

1-Decyl-3-methylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 433337-23-6

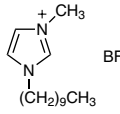
D4654 5g 25g
mp 86 °C

1,3-Dimethylimidazolium Iodide
CAS RN: 4333-62-4

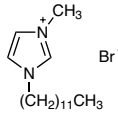
D5348 5g 25g
Liquid

1,3-Dimethylimidazolium Methyl Sulfate
CAS RN: 97345-90-9

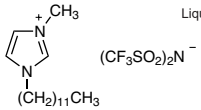
D5349 5g 25g
Solid

1,3-Dimethylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 174899-81-1

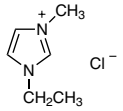
D5350 5g 25g
Liquid

1-Decyl-3-methylimidazolium Bromide
CAS RN: 188589-32-4

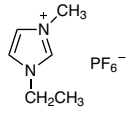
D5351 5g 25g
Liquid

1-Decyl-3-methylimidazolium Chloride
CAS RN: 171058-18-7

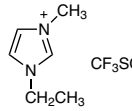
D5373 5g 25g
Liquid

1-Decyl-3-methylimidazolium Tetrafluoroborate
CAS RN: 244193-56-4

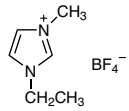
D5356 5g 25g
mp 45 °C

1-Dodecyl-3-methylimidazolium Bromide
CAS RN: 404001-48-5

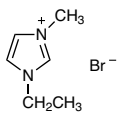
D5694 5g 25g

Liquid
1-Dodecyl-3-methylimidazolium Bis(trifluoromethanesulfonyl)-imide
CAS RN: 61546-00-7

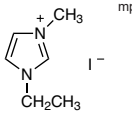
E0490 5g 25g 250g

mp 84 °C
1-Ethyl-3-methylimidazolium Chloride
CAS RN: 65039-09-0

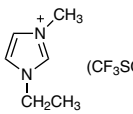
E0493 5g 25g

mp 61 °C
1-Ethyl-3-methylimidazolium Hexafluorophosphate
CAS RN: 155371-19-0

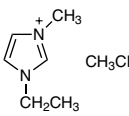
E0494 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Trifluoromethanesulfonate
CAS RN: 145022-44-2

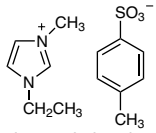
E0496 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Tetrafluoroborate
CAS RN: 143314-16-3

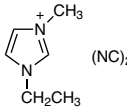
E0543 5g 25g

mp 74 °C
1-Ethyl-3-methylimidazolium Bromide
CAS RN: 65039-08-9

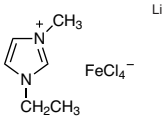
E0556 5g 25g

mp 79 °C
1-Ethyl-3-methylimidazolium Iodide
CAS RN: 35935-34-3

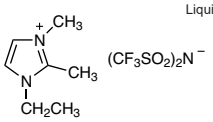
E0599 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 174899-82-2

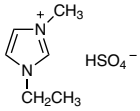
E0650 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Ethyl Sulfate
CAS RN: 342573-75-5

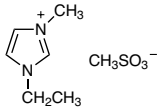
E0651 5g 25g

Solid
1-Ethyl-3-methylimidazolium *p*-Toluenesulfonate
CAS RN: 328090-25-1

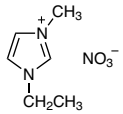
E0680 1g 5g

Liquid
1-Ethyl-3-methylimidazolium Dicyanamide
CAS RN: 370865-89-7

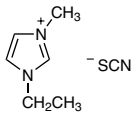
E0706 5g

Liquid
1-Ethyl-3-methylimidazolium Tetrachloroferrate
CAS RN: 850331-04-3

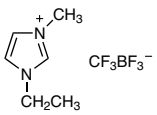
E0753 5g 25g

Liquid
1-Ethyl-2,3-dimethylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 174899-90-2

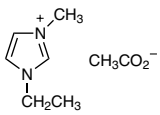
E0754 5g

Liquid
1-Ethyl-3-methylimidazolium Hydrogen Sulfate
CAS RN: 412009-61-1

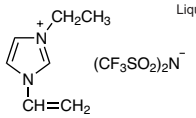
E0755 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Methanesulfonate
CAS RN: 145022-45-3

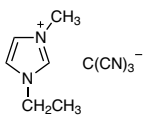
E0775 5g 25g

Solid
1-Ethyl-3-methylimidazolium Nitrate
CAS RN: 143314-14-1

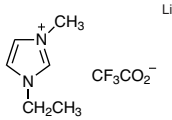
E0776 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Thiocyanate
CAS RN: 331717-63-6

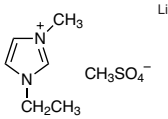
E0836 5g

Liquid
1-Ethyl-3-methylimidazolium Trifluoro(trifluoromethyl)borate
CAS RN: 681856-28-0

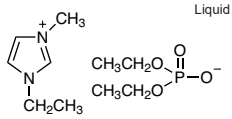
E0883 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Acetate
CAS RN: 143314-17-4

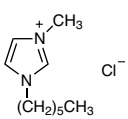
E1280 5g

Liquid
3-Ethyl-1-vinylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 319476-28-3

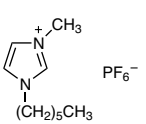
E1298 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Tricyanomethanide
CAS RN: 666823-18-3

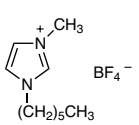
E1307 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Trifluoroacetate
CAS RN: 174899-65-1

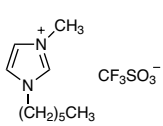
E1308 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Methyl Sulfate
CAS RN: 516474-01-4

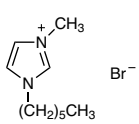
E1309 5g 25g

Liquid
1-Ethyl-3-methylimidazolium Diethyl Phosphate
CAS RN: 848641-69-0

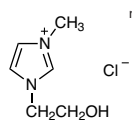
H1097 5g 25g

Liquid
1-Hexyl-3-methylimidazolium Chloride
CAS RN: 171058-17-6

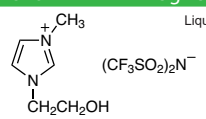
H1098 5g 25g

Liquid
1-Hexyl-3-methylimidazolium Hexafluorophosphate
CAS RN: 304680-35-1

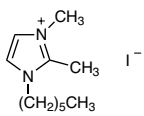
H1099 5g 25g

Liquid
1-Hexyl-3-methylimidazolium Tetrafluoroborate
CAS RN: 244193-50-8

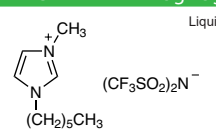
H1100 5g

Liquid
1-Hexyl-3-methylimidazolium Triflate
CAS RN: 460345-16-8

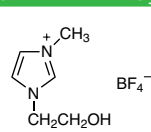
H1227 5g 25g

Liquid
1-Hexyl-3-methylimidazolium Bromide
CAS RN: 85100-78-3

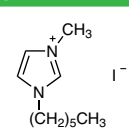
H1254 5g 25g

mp 83 °C
1-(2-Hydroxyethyl)-3-methylimidazolium Chloride
CAS RN: 61755-34-8

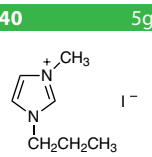
H1670 5g 25g

Liquid
1-(2-Hydroxyethyl)-3-methyl-imidazolium Bis(trifluoromethane-sulfonyl)imide
CAS RN: 174899-86-6

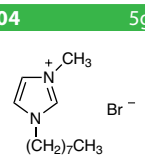
H1286 5g

Solid
1-Hexyl-2,3-dimethyl-imidazolium Iodide
CAS RN: 288627-94-1

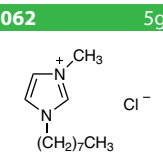
H1423 5g 25g

Liquid
1-Hexyl-3-methylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 382150-50-7

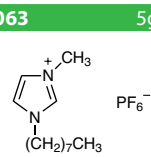
H1492 5g 25g

Liquid
1-(2-Hydroxyethyl)-3-methyl-imidazolium Tetrafluoroborate
CAS RN: 374564-83-7

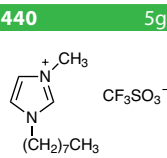
H1633 5g 25g

Liquid
1-Hexyl-3-methylimidazolium Iodide
CAS RN: 178631-05-5

M1440 5g 25g

Liquid
1-Methyl-3-propylimidazolium Iodide
CAS RN: 119171-18-5

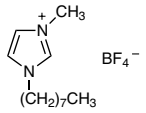
M1904 5g 25g

Liquid
1-Methyl-3-*n*-octyl-imidazolium Bromide
CAS RN: 61545-99-1

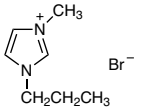
M2062 5g 25g

Liquid
1-Methyl-3-*n*-octyl-imidazolium Chloride
CAS RN: 64697-40-1

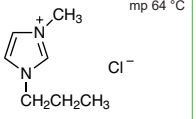
M2063 5g 25g

Liquid
1-Methyl-3-*n*-octylimidazolium Hexafluorophosphate
CAS RN: 304680-36-2

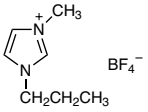
M2440 5g 25g

Liquid
1-Methyl-3-*n*-octyl-imidazolium Triflate
CAS RN: 403842-84-2

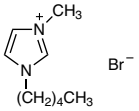
Please inquire for pricing and availability of listed products to our local sales representatives.

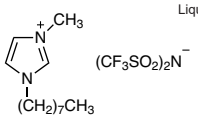
M2732 5g 25g
Liquid

1-Methyl-3-*n*-octylimidazolium Tetrafluoroborate
CAS RN: 244193-52-0

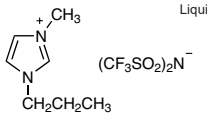
M3034 5g 25g
Liquid

1-Methyl-3-propylimidazolium Bromide
CAS RN: 85100-76-1

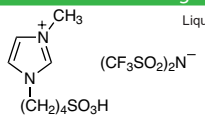
M3035 5g 25g
mp 64 °C

1-Methyl-3-propylimidazolium Chloride
CAS RN: 79917-89-8

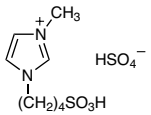
M3036 5g 25g
Liquid

1-Methyl-3-propylimidazolium Tetrafluoroborate
CAS RN: 244193-48-4

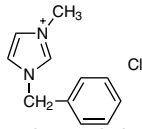
M3037 5g 25g
Liquid

1-Methyl-3-pentylimidazolium Bromide
CAS RN: 343851-31-0

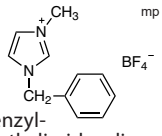
M3039 5g 25g
Liquid

1-Methyl-3-*n*-octylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 178631-04-4

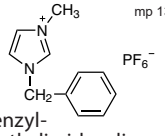
M3059 5g 25g
Liquid

1-Methyl-3-propylimidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 216299-72-8

M3119 1g 5g
Liquid

1-Methyl-3-(4-sulfobutyl)-imidazolium Bis(trifluoromethanesulfonyl)imide
CAS RN: 909390-59-6

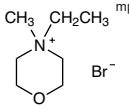
M3120 5g 25g
Liquid

1-Methyl-3-(4-sulfobutyl)-imidazolium Hydrogen Sulfate
CAS RN: 827320-59-2

B5543 5g 25g
Solid

1-Benzyl-3-methyl-imidazolium Chloride
CAS RN: 36443-80-8

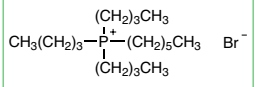
B5725 5g 25g
mp 62 °C

1-Benzyl-3-methylimidazolium Tetrafluoroborate
CAS RN: 500996-04-3

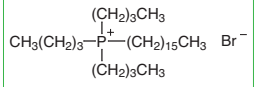
B5726 5g 25g
mp 132 °C

1-Benzyl-3-methylimidazolium Hexafluorophosphate
CAS RN: 433337-11-2

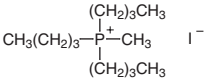
Morpholinium Salts

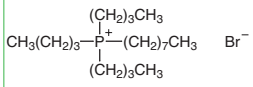
E1166 5g 25g
mp 177 °C

4-Ethyl-4-methylmorpholinium Bromide
CAS RN: 65756-41-4

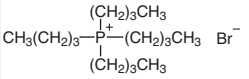
Phosphonium Salts

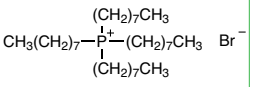
T3840 5g 25g
Liquid

Tributylhexylphosphonium Bromide
CAS RN: 105890-71-9

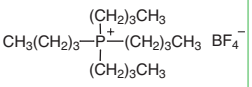
H1047 25g
mp 61 °C

Tributylhexadecylphosphonium Bromide
CAS RN: 14937-45-2

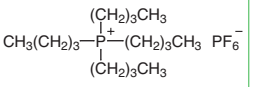
M1455 5g 25g
Solid

Tributylmethylphosphonium Iodide
CAS RN: 1702-42-7

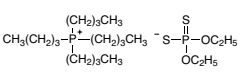
O0297 25g
Solid

Tributyl-*n*-octylphosphonium Bromide
CAS RN: 57702-65-5

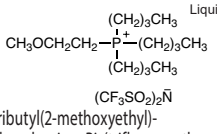
T1124 25g 100g 500g
mp 104 °C

Tetrabutylphosphonium Bromide
CAS RN: 3115-68-2

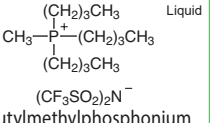
T1650 25g
mp 42 °C

Tetra-*n*-octylphosphonium Bromide
CAS RN: 23906-97-0

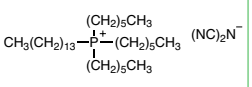
T2006 25g
mp 95 °C

Tetrabutylphosphonium Tetrafluoroborate
CAS RN: 1813-60-1

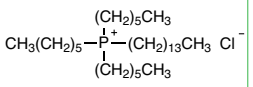
T2007 5g 25g
Solid

Tetrabutylphosphonium Hexafluorophosphate
CAS RN: 111928-21-3

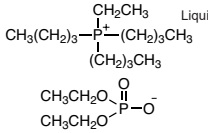
T3946 25g 100g
Liquid

Tetrabutylphosphonium *O,O*-Diethyl Phosphorodithioate
CAS RN: 96131-57-6

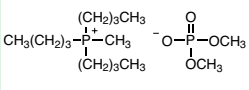
T2564 5g 25g
Liquid

Tributyl(2-methoxyethyl)-phosphonium Bis(trifluoromethanesulfonyl)imide
CAS RN: 959698-44-3

T2680 5g
Liquid

Tributylmethylphosphonium Bis(trifluoromethanesulfonyl)-imide
CAS RN: 324575-10-2

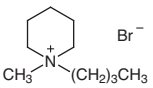
T3534 5g 25g
Liquid

Trihexyl(tetradecyl)-phosphonium Dicyanamide
CAS RN: 701921-71-3

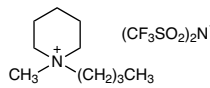
T3623 5g 25g
Liquid

Trihexyl(tetradecyl)-phosphonium Chloride
CAS RN: 258864-54-9

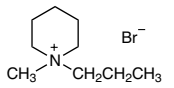
T3641 5g 25g
Liquid

Tributyl(ethyl)phosphonium Diethyl Phosphate
CAS RN: 20445-94-7

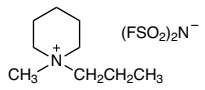
T3945 25g 100g
mp 17 °C

Tributyl(methyl)phosphonium Dimethyl Phosphate
CAS RN: 20445-88-9

Piperidinium Salts

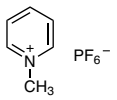
B3424 5g 25g
Solid

1-Butyl-1-methylpiperidinium Bromide
CAS RN: 94280-72-5

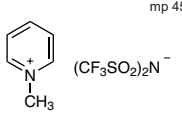
B4844 5g 25g
Liquid

1-Butyl-1-methylpiperidinium Bis(trifluoromethanesulfonyl)-imide
CAS RN: 623580-02-9

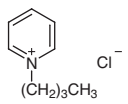
M1976 5g 25g
Solid

1-Methyl-1-propylpiperidinium Bromide
CAS RN: 88840-42-0

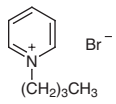
M2981 1g
Liquid

1-Methyl-1-propylpiperidinium Bis(fluorosulfonyl)imide
CAS RN: 911303-46-3

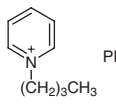
Pyridinium Salts

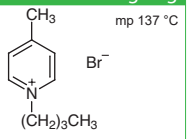
M3195 5g 25g
mp 196 °C

1-Methylpyridinium Hexafluorophosphate
CAS RN: 117029-34-2

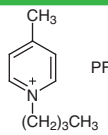
M3199 5g
mp 45 °C

1-Methylpyridinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 742086-10-8

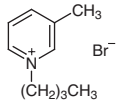
B1329 10g 25g
mp 132 °C

1-Butylpyridinium Chloride
CAS RN: 1124-64-7

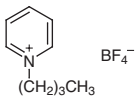
B1743 5g 25g
mp 104 °C

1-Butylpyridinium Bromide
CAS RN: 874-80-6

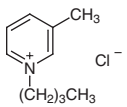
B2196 5g 25g
mp 75 °C

1-Butylpyridinium Hexafluoro-phosphate
CAS RN: 186088-50-6

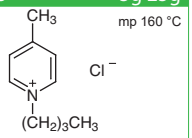
B2700 5g 25g
mp 137 °C

1-Butyl-4-methylpyridinium Bromide
CAS RN: 65350-59-6

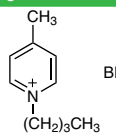
B2701 5g 25g
mp 42 °C

1-Butyl-4-methylpyridinium Hexafluorophosphate
CAS RN: 401788-99-6

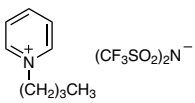
B3104 5g 25g
Solid

1-Butyl-3-methylpyridinium Bromide
CAS RN: 26576-85-2

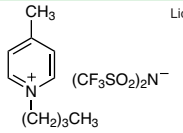
B3232 5g 25g
Liquid

1-Butylpyridinium Tetrafluoro-borate
CAS RN: 203389-28-0

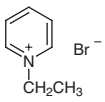
B3425 1g 5g
Solid

1-Butyl-3-methylpyridinium Chloride
CAS RN: 125652-55-3

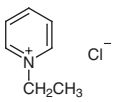
B3426 5g 25g
mp 160 °C

1-Butyl-4-methylpyridinium Chloride
CAS RN: 112400-86-9

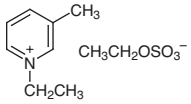
B5570 5g 25g
Liquid

1-Butyl-4-methylpyridinium Tetrafluoroborate
CAS RN: 343952-33-0

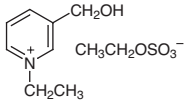
B5571 5g 25g
Liquid

1-Butylpyridinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 187863-42-9

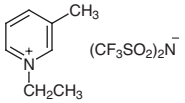
B5763 1g 5g
Liquid

1-Butyl-4-methylpyridinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 475681-62-0

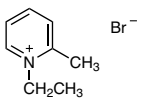
E0171 25g
mp 120 °C

1-Ethylpyridinium Bromide
CAS RN: 1906-79-2

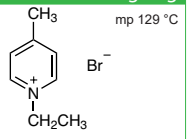
E0544 5g 25g
Solid

1-Ethylpyridinium Chloride
CAS RN: 2294-38-4

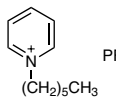
E0681 5g 25g
Liquid

1-Ethyl-3-methylpyridinium Ethyl Sulfate
CAS RN: 872672-50-9

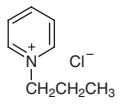
E0682 5g
Liquid

1-Ethyl-3-(hydroxymethyl)-pyridinium Ethyl Sulfate

E0756 5g
Liquid

1-Ethyl-3-methylpyridinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 841251-37-4

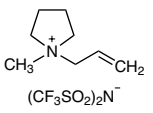
E1240 1g 5g
mp 95 °C

1-Ethyl-2-methylpyridinium Bromide
CAS RN: 32353-50-7

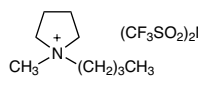
E1272 5g 25g
mp 129 °C

1-Ethyl-4-methylpyridinium Bromide
CAS RN: 32353-49-4

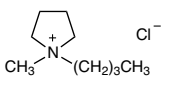
H1424 5g 25g
mp 48 °C

1-Hexylpyridinium Hexafluorophosphate
CAS RN: 797789-00-5

P1393 5g
Solid

1-Propylpyridinium Chloride
CAS RN: 23271-47-8

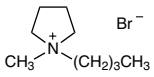
Pyrrolidinium Salts

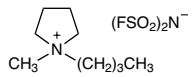
A3089 5g
Liquid

1-Allyl-1-methylpyrrolidinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 1059624-23-5

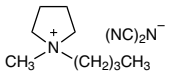
B2851 5g 25g
Liquid

1-Butyl-1-methylpyrrolidinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 223437-11-4

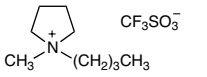
B3358 5g 25g
Solid

1-Butyl-1-methylpyrrolidinium Chloride
CAS RN: 479500-35-1

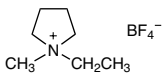
Please inquire for pricing and availability of listed products to our local sales representatives.

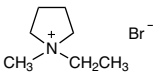
B3427 5g 25g
Solid

1-Butyl-1-methylpyrrolidinium Bromide
CAS RN: 93457-69-3

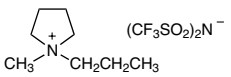
B5398 5g
Liquid

1-Butyl-1-methylpyrrolidinium Bis(fluorosulfonyl)imide
CAS RN: 1057745-51-3

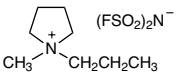
B5453 5g 25g
Liquid

1-Butyl-1-methylpyrrolidinium Dicyanamide
CAS RN: 370865-80-8

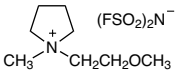
B5568 5g 25g
Liquid

1-Butyl-1-methylpyrrolidinium Triflate
CAS RN: 367522-96-1

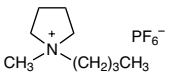
E0977 5g 25g
Solid

1-Ethyl-1-methylpyrrolidinium Tetrafluoroborate
CAS RN: 117947-85-0

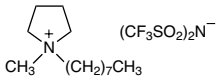
E1050 5g 25g
Solid

1-Ethyl-1-methylpyrrolidinium Bromide
CAS RN: 69227-51-6

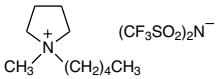
M2098 5g 25g
Liquid

1-Methyl-1-propylpyrrolidinium Bis(trifluoromethanesulfonyl)imide
CAS RN: 223437-05-6

M2980 5g
Liquid

1-Methyl-1-propylpyrrolidinium Bis(fluorosulfonyl)imide
CAS RN: 852620-97-4

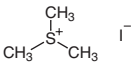
M2998 1g 5g
Liquid

1-(2-Methoxyethyl)-1-methylpyrrolidinium Bis(fluorosulfonyl)imide
CAS RN: 1235234-47-5

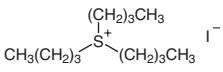
B6039 5g 25g
mp 86 °C

1-Butyl-1-methylpyrrolidinium Hexafluorophosphate
CAS RN: 330671-29-9

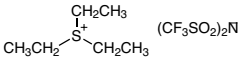
M3117 5g 25g
mp -12 °C

1-Methyl-1-*n*-octylpyrrolidinium Bis(trifluoromethanesulfonyl)-imide
CAS RN: 927021-43-0

M3118 1g 5g
mp 8 °C

1-Methyl-1-pentylpyrrolidinium Bis(trifluoromethanesulfonyl)-imide
CAS RN: 380497-17-6

Sulfonium Salts

T1056 25g 500g
Solid

Trimethylsulfonium Iodide
CAS RN: 2181-42-2

T1564 1g
mp 93 °C

Tributylsulfonium Iodide
CAS RN: 18146-62-8

T2314 5g
Liquid

Triethylsulfonium Bis(trifluoromethanesulfonyl)-imide
CAS RN: 321746-49-0

The melting points are shown as the reference value. These are not specification value.
The salts that form liquid or solid state at room temperature are given the description “liquid” or "solid".

Ordering and Customer Service

TCI AMERICA
Tel : 800-423-8616 / 503-283-1681
Fax : 888-520-1075 / 503-283-1987
E-mail : Sales-US@TCIchemicals.com

TCI EUROPE N.V.
Tel : +32 (0)3 735 07 00
Fax : +32 (0)3 735 07 01
E-mail : Sales-EU@TCIchemicals.com

TCI Deutschland GmbH
Tel : +49 (0)6196 64053-00
Fax : +49 (0)6196 64053-01
E-mail : Sales-DE@TCIchemicals.com

Tokyo Chemical Industry UK Ltd.
Tel : +44 (0)1865 784560
Fax : +44 (0)1865 784561
E-mail : Sales-UK@TCIchemicals.com

TCI Chemicals (India) Pvt. Ltd.
Tel : 1800 425 7889 / 044-2262 0909
Fax : 044-2262 8902
E-mail : Sales-IN@TCIchemicals.com

梯希爱(上海)化成工业发展有限公司
Tel : 800-988-0390 / 021-67121386
Fax : 021-6712-1385
E-mail : Sales-CN@TCIchemicals.com

TOKYO CHEMICAL INDUSTRY CO., LTD.
Tel : +81 (0)3-5640-8878
Fax : +81 (0)3-5640-8902
E-mail : globalbusiness@TCIchemicals.com