

Ionic Liquids Today

www.iolitec.com

Issue 1-09, Friday, 06nd February, 2009.

Worldwide more than 5.000 recipients!



- >>> (1) ACS Fall Meeting @ Philadelphia
- >>> (2) EUCHEM 2008 @ Kopenhagen
- >>> (3) Green Solvents @ Friedrichshafen
- >>> (4) APCIL-Conference @ Beijing
- >>> Bunsen Discussion Meeting @ Clausthal
- >>> Novel types of fluorinated anions: TFESK



Content:

1	Editorial	1
2	236 th ACS National Meeting and Exposition @ Philadelphia, USA, August 17 th -21 st , 2008	3
3	Impressions from the EUCHEM 2008 Conference @ Kopenhagen, Denmark, August 24 th -29 th , 2008	5
4	Impressions from the Green Solvents Conference @ Friedrichshafen, Germany, September 28 th - October 1 st	7
5	1 st Asia Pacific Conference on Ionic Liquids and Green Processes, Beijing, China, November 5 th -8 th 2008	7
6	Impressions from the International Bunsen Discussion Meeting, November 23 rd -25 th , Clausthal, Germany	8
7	IOLITEC goes America	9
8	New Ionic Liquids available	10
9	New Price List for Ionic Liquids and Key Intermediates	12
10	Examples for Applications of Ionic Liquids	14
11	Community	17

1 Editorial

by Thomas J. S. Schubert.

It seems to me like that the world is not the same since we released our last issue of Ionic Liquids Today (March 8th, 2008): At that time the world wide economy seemed to be red hot, prices for oil and other raw materials were close to reach their all-time-high marks. Just within a few months a complete turnaround took place, caused by the financial crisis.

As a consequence, we have again moderate prices for nearly all types of crude materials. Nevertheless, the development before the beginning of the crisis was just a preview what will happen at the next boom of the economy: Again high prices for nearly any type of raw materials that become more and more rare. So there's no alternative to "sustainable development", "green chemistry" and "clean technologies", these are topics that are really worth to think about. I am sure that the work of scientists, who can think in an interdisciplinary way, in combination with entrepreneurs, who are willing to translate science into business, which are financed by reliable partners, following up a long-term strategy, has a chance to solve the challenges of a world with limited resources. From my decent point of view as a scientist and business man, I think it's our responsibility to enable that.

Ionic Liquids Today, 01-09

Friday, February 06th, 2009



One of the largest resources or energy is simply to save energy, because energy is wasted everywhere we look. It is well demonstrated in Ernst Ulrich Weizsäcker's book "Factor 4", who just won the "Deutsche Umweltpreis 2008" (German Environmental Award 2008, endowed with 500.000 €), that we can double our standard of living by just consuming the half of the resources.

And it's exactly here where ionic liquids can bring sometimes important contributes in a number of different applications, e.g. like

- **thermodynamic applications** (heat storage media, sorption cooling...),
- **electrochemical applications** (supercaps, batteries, DSSCs...),
- **organic/inorganic synthesis and catalysis** (recycled use of solvents, enhanced efficiency of processes...),
- **functional fluids** (lubricants, surfactants...).

All these applications are far away from something that we can call "being sufficiently optimized". On a global scale even micro effects can save large amounts of resources. It's no surprise that the money that poured into the cleantech sector reached 4.1 billion US dollar in 2008 (2005: 0.5 billion dollar, source: C&EN, February 2nd/ National Venture Capital Association, Thompson Financial), and this will surely (or hopefully?) not the top of the mountain!

Though there might be a risk in some cleantech investments, it's surely lower than any kind of investment in any of those speculations that led to the global financial crisis, but the value for everyone is definitely higher. In this context we at IOLITEC are proud that we have found in the Germany-based "Zukunftsfonds Heilbronn" a financial partner that is in the position to finance our growth in a sustainable way.

Starting with the next issue of Ionic Liquids Today we'll inform you about latest developments in the field of cleantech applications.

Best regards,

Thomas J.S. Schubert, CEO, IOLITEC.



2 236th ACS National Meeting and Exposition @ Philadelphia, USA, August 17th-21st, 2008

by Thomas J. S. Schubert.

In August I visited the 236th ACS meeting at Philadelphia, where the I&EC division (Division of Industrial & Engineering Chemistry) had a session (Organized by Joan Brennecke, Robin Rogers, and Ken Seddon) with the header "Ionic Liquids: From Knowledge to Application". The low ceilings of the two ballrooms at the Radisson Plaza Hotel could not keep the scientists away from presenting very interesting talks with remarkable results from 9 different fields of recent ionic liquids research:

- | | |
|-------------------------------|---------------------------------|
| 1. Gas Separations | 2. Liquid Separations |
| 3. Interfacial Properties | 4. Use in Sensors and Actuators |
| 5. Material Synthesis in IL's | 6. Thermophysical Properties |
| 7. Molecular Simulations | 8. Pharmaceutical Applications |
| 9. Industrial Applications | 10. General Session |

The sessions "Interfacial Properties", "Thermophysical Properties", and "Molecular Simulations" had a stronger academic, more basic research oriented background than the other sessions, and represented more the important "knowledge" necessary to design and develop new applications.

Though it was impossible to cover all types of ionic liquids applications, the selection represented a well-balanced insight into the transfer from science to industrial applications. Gas and liquid separations using ionic liquids are among the first and most intensive investigated areas of research in the history of ionic liquids. At the sessions theoretical and practical research results were presented. The use of the COSMO[®] RS-model to predict gas solubility by *Rooney et al.* is surely an interesting theoretical approach.

Interesting experimental results in the field of gas separations were e.g. deep desulfurization (Wasserscheid), capture of CO₂ (Zhang, Brennecke), the combination of supercritical CO₂ with ILs for separations (Scurto), or ionic liquids as reversible gas absorbers for SO₂ (Fehrmann). In the field of liquid separations results for the successful separation of aliphatic and aromatic hydrocarbons using ionic liquids were presented by *Meindersma*. This technology is already transferred to the pilot plant



scale. Domanska-Zelzna reported newest results for the metal-extraction using ionic liquids.

The sensors and actuators session put some light onto applications of ionic liquids that need small quantities of ionic liquids. In different talks it was demonstrated that the possibility that ionic liquids can be tuned to interact with different materials in a different way can lead to sensors for the detection of varieties of substances. This is certainly a field where we'll see soon the first products! Furthermore, *Watanabe* presented actuators (also with a small movie!) based on polymer gels containing on ionic liquids.

In my opinion one of the most underestimated fields of applications is the *synthesis of materials in ionic liquids*. In the related session it was shown in an impressive way that a number of materials and/or composites with different size and/or shapes can be synthesized by (electro-)chemical methods using ionic liquids as directing media. Everyone should keep an eye on this amazing field of ionic liquid research!

My personal highlight at the pharmaceutical application session was the "Protein denaturation by ionic liquids and the Hofmeister series", presented by *Weingärtner*. Is it probably possible to control folding/defolding of proteins by ionic liquids? It seems as if that works somehow. Interested people should look careful on upcoming papers on this topic.

Finally, at the "Industrial applications"-session different companies presented their latest results from their labs. Very impressive was *Shifflet's* talk about Dupont's sorption cooling research. The talk had both, a very high academic and a didactic value.

And what's about us? IOLITEC was proud to get five talks in summary, although this was truly a little bit exhausting for me to present these talks in just one week:

- The commercialization of ionic liquids: the view of an established start-up company (@ the "Industrial Applications"-session)
- Ionic Liquids in Inorganic Synthesis and their Influence on the Preparation of Nanoparticles (@ the "Material Synthesis in ILs"-session)
- Inverse Gas Chromatography – A Versatile Tool for Gas Separation Tests Using Ionic Liquids (@ the "Gas Separations"-session)

Ionic Liquids Today, 01-09

Friday, February 06th, 2009



- Ionic liquids as electrolytes for electrochemical sensing (@ the "Use in Sensors and Actuators"-Session)
- Ionic Liquids as solvents for the synthesis of active pharmaceutical ingredients (@ the "Pharmaceutical Applications"-session)

For those who are interested in a copy (PDF-format) of these talks, please contact science@iolitec.de.

During the poster session at the Philadelphia Convention Center I was impressed about the very intensive discussions. I by myself had a couple of interesting conversations with young scientists.

I'm really looking forward to participate in another ionic liquids related session at an upcoming ACS meeting!

3 Impressions from the EUCHEM 2008 Conference @ Kopenhagen, Denmark, August 24th-29th, 2008

By Thomas J. S. Schubert.

In Kopenhagen the Molten Salts Community met the Ionic Liquid Community at the beautiful and well organized EUCHEM 2008 conference. The introduction was given by Ken Seddon with his plenary lecture "Ionic Liquids: From Earth to Moon". The headline of Seddon's talk corresponds with Roger's paper in *Nature*,¹ where a liquid mirror, based on ionic liquid technology, was described. Seddon's talk also was a review what has been reached so far, but also included were some critical words about the quality of some papers and publications.

In eight sessions very interesting topics of actual ionic liquid research were presented:

¹ R. D. Rogers, *Nature* **2007**, *447*, 917.



- Session 1: Modelling and Computational Studies
- Session 2: New Materials and Compounds
- Session 3: Syntheses and Catalysis
- Session 4: Sustainable and Environmental Technologies
- Session 5: Electrochemical and Nuclear Applications
- Session 6: Structure, Spectroscopy and Thermodynamics
- Session 7: Separation and Transport Processes
- Session 8: Industrial and Future Applications

As one week before in Philadelphia it was shown that *in silico* studies on ionic liquids can help more and more to predict properties of ionic liquids. From the understanding of the role of H-bonding to the prediction of fundamental physical properties like the melting points, viscosities, conductivities etc., much more is understood today than at the beginning of this century.

As I mentioned already at my remarks on the ACS meeting before, it is no surprise for me that also at Copenhagen a "New Materials and Compounds"-session took place. In this context definitely one of the highlights: The ionothermal synthesis, presented by *Bojdys* from *Antonietti's* group! The "Electrochemical and Nuclear Applications"-session with just six talks was in my opinion a little bit short, since there is a strongly increasing number of publications in particular in the field of electrochemistry.

Another surprising extension of my personal knowledge was *Angell's* keynote lecture about "Primitive Protic Ionic Liquids" and their potential influence on early earth biology. This fascinating talk played with the hypothesis that simple ionic liquid could have had some influence on the evolution of biomolecules.

Other milestones of ionic liquids research at the keynote lectures were *Ohno's* superior talk about ionic liquids for polymers and biopolymers, *MacFarlane's* fundamental insight about liquid ion pairs, *Davis'* demonstration of the power of functionalized ionic liquids, and *Wasserscheid's* contribution about applications of ionic liquids beyond green solvents.

IOLITEC had a talk in the "Synthesis and Catalysis"-session: "The Influence of Ionic Liquids on the Synthesis of Nanostructured Materials". For interested people, this talk is available if you mail to science@iolitec.de.



4 Impressions from the Green Solvents Conference @ Friedrichshafen, Germany, September 28th- October 1st

By Thomas J. S. Schubert.

Just within six weeks this was the third conference, where ionic liquids played a more or less important role. Well organized by the DECHEMA it was held at Friedrichshafen at the Lake Constance, Germany.

Though water, supercritical CO₂, and “no solvents” played also a role at the conference, it was more than the “Green Solvents”-conferences before dominated by ionic liquids.

Our company was represented with a talk about “Ionic Liquids for Electrochemical Applications – From basic principles towards ready-to-use electrolytes”, this talk is available if you mail to science@iolitec.de, and for the first time with a booth at the accompanying exhibition.

5 1st Asia Pacific Conference on Ionic Liquids and Green Processes, Beijing, China, November 5th-8th 2008

By Dr. Tom Beyersdorff

In the beginning of November 2008 the “1st Asia Pacific Conference on Ionic Liquids and Green Processes” was held at the Fragrant Hill Hotel in Beijing. Under the topic “From Fundamental Properties to Engineering and Applications” almost 60 speakers from all over the world presented their work on ionic liquids in two parallel sessions. The topics of the sessions have been divided into the four general subjects

- “Structure-Properties and Molecular Design”,
- “Design and Synthesis of Novel Materials”,
- “Energy and Environment” and
- “Process System Engineering and Industrial Applications”.

Many interesting presentations within these sessions gave a good overview on research and applications in all fields. A poster session on the afternoon of the second day completed the scientific program of the conference.



My talk at this event about the "Commercialization of Ionic Liquids – Recent Improvements in Industrial Applications", is available if you mail to science@iolitec.de.

Besides the academic program a free afternoon provided the opportunity for free activities such as walking through the Fragrant Hills Park, sightseeing in Beijing or visiting the Great Wall of China. With a typical Chinese dinner at the final conference banquet, which has been accompanied by an impressive entertainment program, a successful and well organized conference came to an end.

In conclusion the 1st APCIL offered researchers from industry and academia the chance for an intensive scientific exchange and the possibility to establish new contacts with researchers from abroad. At this point I would like to thank the organizers for the perfect organization and the invitation to participate in the conference. In addition, I would like to thank all people who have been working behind the scenes and made it possible that the 1st APCIL became a complete success.

6 Impressions from the International Bunsen Discussion Meeting, November 23rd-25th, Clausthal, Germany

By Thomas J. S. Schubert.

A selection of high class scientists, with 5 chemists from the 2008 top ten in publishing (by number), coming from different parts of the world was invited by *Endres* to the wintery town of Clausthal (Germany's only University having no access to the German railway net!). It was not a surprise that this meeting had a strong focus on the physical chemistry of ionic liquids.

As during the physical chemistry session in 2006 at the ACS meeting in San Francisco it was shown in an impressive way that understanding the physical properties of ionic liquids and the dynamic processes possible in ionic liquids leads directly to new, enhanced, or at least better understood. IOLITEC's CEO Dr. Thomas J. S. Had also a talk on "Ionic Liquids for the Use in Energy Transformations and Energy Storage - Scope and Limitations", which is available if you mail to science@iolitec.de.



7 IOLITEC goes America

By Tom F. Beyersdorff.

Serving customers all over the world for nearly 6 years now, we at IoLiTec are always anxious to improve our services in order to meet our customer's needs. As a consequence IoLiTec is in negotiations about founding a subsidiary at the Bama Technology Incubator in co-operation with Prof. Robin Rogers and Prof. Ken Seddon to increase the level of services in the NAFTA region.

Starting in the first quarter of 2009 IoLiTec-USA will offer well selected ionic liquids from a new catalogue for all customers in the USA, Canada and Mexico with the major advantages of reduced shipping costs as well as the elimination of duties. Besides the selected products from the catalogue all IoLiTec products in the well known *IoLiLyte* quality will be available through IoLiTec-USA with longer delivery times.

The business will be established by me. I hope that my meanwhile more than 4 years experience in synthesis, production, and sales of ionic liquids should help customers to find the right ionic liquids. In addition, I like to establish with customer and Universities a scientific exchange leading to joint R&D-projects.

More detailed information on the start of IoLiTec-USA as well as the new catalogue will be provided in the beginning of 2009. All customers from the NAFTA region who are interested in more information are welcome to contact [Dr. Beyersdorff](#).



8 New Ionic Liquids available

Pyridinium-based NTf₂-salts

By Tom F. Beyersdorff.

Due to their low viscosity, high conductivity and thermal as well as electrochemical stability NTf₂-based ionic liquids have gained large interest for various applications during recent years.

After having extended our portfolio by imidazolium-based NTf₂ salts in early 2007 by obtaining a license for patent EP0718288 from Hydro-Quebec, IoLiTec now signed also a licence agreement with **Covalent Associates**, allowing us to supply **imidazolium NTf₂ salts as well as pyridinium NTf₂ salts** to our customers. In conclusion, we extended our standard portfolio starting September 1st by different pyridinium based ionic liquids with the NTf₂ anion.

Starting offers for the most common materials are valid until December 31st, 2008. If you require variations of the listed products i.e. alkylchain homologues, don't hesitate to request for a quotation at info@iolitec.de.

New type of fluorinated Anions: TFESK and TFESA

By Thomas J. S. Schubert.

Novel types of fluorinated anions were rarely over the past years. This new potassium salt of the tetrafluoroethanesulfonic acid was designed by Dupont and is now available in our portfolio of key intermediates. The biodegradability is better compared to the bis(trifluoromethanesulfonates)amides, the formation of hydrophobic ionic liquids is also possible and is currently under our investigation.

In the second quarter of 2009 IOLITEC will also release novel types of ionic liquids based on this interesting anion.

For further information about this product, please contact us at info@iolitec.de.

Ionic Liquids Today, 01-09

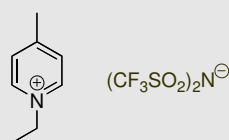
Friday, February 06th, 2009



1-Ethyl-4-methylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0217-HP [712355-03-8] C₁₀H₁₂F₆N₂O₄S₂ MW 402.33

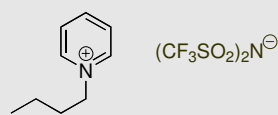


25 g	105.00 €
50 g	140.00 €
100 g	237.50 €
250 g	505.00 €
500 g	860.00 €
1 kg	1460.00 €
5 kg	6570.00 €

1-Butylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0213-HP [187863-42-9] C₁₁H₁₄F₆N₂O₄S₂ MW 416.36

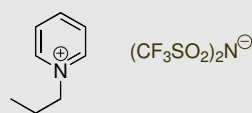


25 g	105.00 €
50 g	140.00 €
100 g	240.00 €
250 g	507.50 €
500 g	862.50 €
1 kg	1465.00 €
5 kg	6592.50 €

1-Propylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0212-HP [---] C₁₀H₁₂F₆N₂O₄S₂ MW 402.33

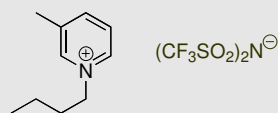


25 g	115.00 €
50 g	152.50 €
100 g	257.50 €
250 g	550.00 €
500 g	932.50 €
1 kg	1585.00 €
5 kg	7132.50 €

1-Butyl-3-methylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0216-HP [344790-86-9] C₁₂H₁₆F₆N₂O₄S₂ MW 430.39

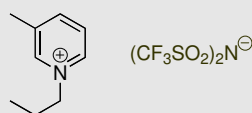


25 g	99.00 €
50 g	135.00 €
100 g	227.50 €
250 g	482.50 €
500 g	820.00 €
1 kg	1395.00 €
5 kg	6277.50 €

3-Methyl-1-propylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0215-HP [817575-06-7] C₁₁H₁₄F₆N₂O₄S₂ MW 416.36

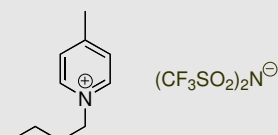


25 g	110.00 €
50 g	147.50 €
100 g	250.00 €
250 g	527.50 €
500 g	897.50 €
1 kg	1525.00 €
5 kg	6862.50 €

1-Butyl-4-methylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0219-HP [475681-62-0] C₁₂H₁₆F₆N₂O₄S₂ MW 430.39

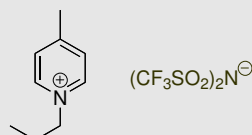


25 g	99 €
50 g	132.50 €
100 g	225.00 €
250 g	475.00 €
500 g	805.00 €
1 kg	1370.00 €
5 kg	6165.00 €

4-Methyl-1-propylpyridinium bis(trifluoromethylsulfonyl)imide, 99%

NEW

IL-0218-HP [---] C₁₁H₁₄F₆N₂O₄S₂ MW 416.36

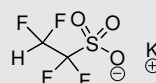


25 g	110.00 €
50 g	145.00 €
100 g	245.00 €
250 g	525.50 €
500 g	890.00 €
1 kg	1510.00 €
5 kg	6795.00 €

Potassium tetrafluoroethanesulfonate, 98%

NEW

KI-0043-HP C₂F₄HKSO₃ MW 219.92



25 g	100.00 €
50 g	160.00 €
100 g	285.00 €
250 g	475.00 €
500 g	850.00 €
1 kg	1'520.00 €



9 New Price List for Ionic Liquids and Key Intermediates

By Tom F. Beyersdorff.

With the beginning of February 2009 IOLITEC releases new price lists for Ionic Liquids and Keyintermediates. Once again our catalogue has been extended by a number of interesting new materials. In addition, many products have been reduced in price significantly.

In order to provide a better overview on the large number on imidazolium and pyridinium based ionic liquids in our catalogue, we changed the sorting from alphabetical to an anion classification of these products.

Due to increased production capacities many products are available from stocks in quantities up to 250 g can be shipped within 2-3 days. Larger quantities up to 1 kg are in most cases available within 1 week. Delivery times for certain products and quantities will be given on request.

If you are looking for a product that is not listed in the catalogue or if you need an official quotation or a quotation for quantities that exceed 5 kg please contact us at info@iolitec.de. Both price lists are attached to this email. All previous price lists become void. If you have not received the price list please contact us at info@iolitec.de.

On the occasion of the release of the new price list 10 products form the list are offered for a special discount price until March 31st 2009. To inquiry for a quotation or to order these products please refer to the following promotion code: **ILT0109.**

All inquiries and orders should be sent to IOLITEC by fax (+49 (0)7666 9129345) or email (info@iolitec.de or order@iolitec.de). Orders by email are preferred. Every order will be confirmed within 48 hours. If you have not received a confirmation within this time, please contact us.

All special offers are valid until March 31st, 2009.

All prices are FOB Denzlingen, costs for shipping and handling and custom charges are not included in the prices and are payable by customer.



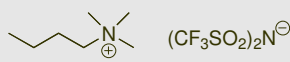
Ionic Liquids Today, 01-09

Friday, February 06th, 2009

Butyltrimethylammonium bis(trifluoromethylsulfonyl)imide, 99% **REDUCED**

IL-0032-HP [258273-75-5] C₉H₁₈F₆N₂O₄S₂ MW 396.37

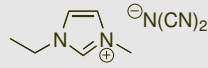
25 g	72.50 €
50 g	92.50 €
100 g	167.50 €
250 g	325.00 €
500 g	527.50 €
1 kg	945.00 €
5 kg	4'080.00 €



1-Ethyl-3-methylimidazolium dicyanamide, >98% **REDUCED**

IL-0003-HP [370865-89-7] C₈H₁₁N₅ MW 177.21

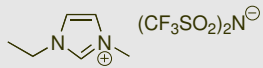
25 g	85.50 €
50 g	115.00 €
100 g	197.50 €
250 g	412.50 €
500 g	697.50 €
1 kg	1'187.50 €
5 kg	on request



1-Ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide, 99% **REDUCED**

IL-0023-HP [174899-82-2] C₈H₁₁F₆N₃O₄S₂ MW 391.31

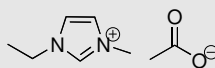
25 g	52.50 €
50 g	72.50 €
100 g	115.00 €
250 g	247.50 €
500 g	420.00 €
1 kg	705.00 €
5 kg	2'830.00 €



1-Ethyl-3-methylimidazolium acetate, >95% **NEW**

IL-0189-HP [143314-17-4] C₈H₁₄N₂O₂ MW 170.21

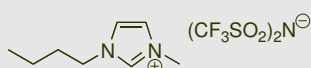
25 g	57.50 €
50 g	72.50 €
100 g	110.00 €
250 g	165.00 €
500 g	252.50 €
1 kg	375.00 €
5 kg	1'500.00 €



1-Butyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide, 99% **REDUCED**

IL-0029-HP [174899-83-3] C₁₀H₁₅F₆N₃O₄S₂ MW 419.37

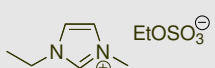
25 g	57.50 €
50 g	72.50 €
100 g	122.50 €
250 g	262.50 €
500 g	445.00 €
1 kg	755.00 €
5 kg	3'025.00 €



1-Ethyl-3-methylimidazolium ethyl sulfate, 99%

IL-0033-HP [342573-75-5] C₈H₁₆N₂O₄S MW 236.29

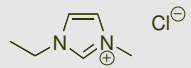
25 g	30.00 €
50 g	37.50 €
100 g	67.50 €
250 g	90.00 €
500 g	122.50 €
1 kg	185.00 €
5 kg	740.00 €



1-Ethyl-3-methylimidazolium chloride, >98% **REDUCED**

IL-0093-HP [65039-09-0] C₆H₁₁ClN₂ MW 146.62

25 g	75.00 €
50 g	90.00 €
100 g	115.00 €
250 g	242.50 €
500 g	415.00 €
1 kg	697.50 €
5 kg	2'970.00 €




Filled into bottles as crystalline solid!

1-Methyl-1-propylpyrrolidinium bis(trifluoromethylsulfonyl)imide, 99% **REDUCED**

IL-0044-HP [223437-05-6] C₁₀H₁₈F₆N₂O₄S₂ MW 408.38

25 g	62.50 €
50 g	80.00 €
100 g	117.50 €
250 g	237.50 €
500 g	390.00 €
1 kg	697.50 €
5 kg	2'795.00 €





10 Examples for Applications of Ionic Liquids

By Thomas J. S. Schubert.

Ionic Liquids in microemulsions

Z. Qiu, J. Texter*, *Curr. Opin. Colloid Interface Sci.* **2008**, *13*, 252.

The use of ionic liquids as solvents is surely their most common and established application. Over the past years the use of microemulsions as reaction media for chemical reactions raised more and more interest.

In this review by *Texter* and *Qui* examples are given for the formation microemulsions of water and IL, IL and oil, and for the use as ILs as surfactants. Surely every synthetic chemist, who has tried to synthesize some ILs, has already observed that sometimes it need days for the phase separation between ILs, water and organic solvents.

Applications are e.g. the synthesis of nano-particles, microemulsion polymerizations or the microemulsion electrokinetic chromatography (MEEKC).

Anionic polymerization of styrene in ionic liquids

R. Vijayaraghavan *, J.M. Pringle, D.R. MacFarlane, *European Polymer Journal* **2008**, *44*, 1758.

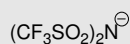
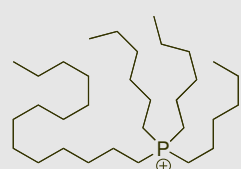
Vijayaraghavan, *Pringle* and *MacFarlane* presented the first example of an anionic polymerization. It is well known that the living anionic polymerization leads typically to tailor-made model compounds with a well defined polymer architecture. As substrate they used styrene, which is made commercially by classical free radical polymerization processes. Using the phosphonium-based ionic liquid $[P_{6,6,6,14}]NTf_2$ as solvent they observed with *s*-butyl Li as initiator and by addition of the zwitterion 1-butylimidazolium-3-butanefulfonate after 140 hours nearly complete conversion (94%, $M_n = 400,000$ g/mol), while in molecular solvents like THF or cyclohexane only traces of polystyrene where formed.



Trihexyltetradecylphosphonium bis(trifluoromethylsulfonyl)imide, >98%

NEW

IN-0021-HP [460092-03-9] C₃₄H₆₈F₆NO₄PS₂ MW 763.24



25 g	65.00 €
50 g	85.00 €
100 g	155.00 €
250 g	365.00 €
500 g	695.00 €
1 kg	1'315.00 €
5 kg	5'255.00 €

A product of Cytec Industries Inc. (CYPHOS® IL-109)

Facile, environmentally friendly fabrication of porous silver monoliths using the ionic liquid *N*-(2-hydroxyethyl)ammonium formate

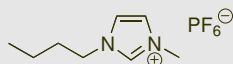
K. Richter, T. Bäcker, A.-V. Mudring*, *Chem. Comm.*, **2009**, 301.

This is another example for the use of ionic liquids as solvent for inorganic synthesis. *Mudring* and co-workers, who organized the materials session at the ACS-meeting, used a comparable simple, ammonium-based ionic liquid (*N*-(2-hydroxyethyl)ammonium formate) for the synthesis of porous silver monoliths. The combination ionic liquid together with microwave irradiation enabled the fast synthesis (only 5 min) of porous silver from silver nitrate with a specific surface area of 2.52 m² g⁻¹ under mild conditions (80°C).

1-Butyl-3-methylimidazolium hexafluorophosphate, 99%

REDUCED

IL-0011-HP [174501-64-5] C₈H₁₅F₆N₂P MW 284.18



25 g	40.00 €
50 g	60.00 €
100 g	95.00 €
250 g	180.00 €
500 g	325.00 €
1 kg	585.00 €
5 kg	2'225.00 €



A Thermoreversible Micellization-Transfer-Demicellization Shuttle between Water and an Ionic Liquid

Z. Bai, Y. He, N. P. Young, T. P. Lodge*, *Macromol.* **2008**, *41*, 6615.

The use of stimuli-sensitive polymeric micelles are generally interesting because one can control micellization-demicellization and hence loading/release via external triggers, such as temperature.

Lodge et. al described a fully reversible micellization-transfer-demicellization shuttle between water and the hydrophobic ionic liquid 1-butyl-3-methylimidazolium hexafluorophosphate (BMIM PF₆). As polymer they used poly(N-isopropylacrylamide-block-ethylene oxide). At a certain temperature (T_m) this polymer starts to form micelles in water, which are transferred at the transfer temperature (T_t) to the hydrophobic ionic liquid. A further increase of the temperature leads at T_d (temperature of demicellization) to a demicellization inside the ionic liquid.

Further investigations of this fascinating system using other ionic liquids and mixtures thereof were promised by the authors.

1-Butyl-3-methylimidazolium hexafluorophosphate, 99%		REDUCED	
IL-0011-HP	[174501-64-5]	C ₈ H ₁₅ F ₆ N ₂ P	MW 284.18
		25 g	40.00 €
		50 g	60.00 €
		100 g	95.00 €
		250 g	180.00 €
		500 g	325.00 €
		1 kg	585.00 €
	5 kg	2'225.00 €	

Electrochemical and Electrochromic Properties of Octathio[8]circulene Thin Films in Ionic Liquids

T. Fujimoto, M. M. Matsushita, H. Yoshikawa, K. Awaga*, *J. Am. Chem. Soc.* **2008**, *130*, 15790.

Organic and molecular electronics and their applications in printable electronics or novel types of displays represent billion dollar future markets. In this context, Octathio[8]circulene, a condensed antiaromatic thiophene, better known as



“sunflower”, attracted much attention. *Awaga* and co-workers described in JACS the electrochemical and electrochromic properties in thin films of this material in ionic liquids (DEME TFSI). During the electrochemical oxidation of this compound it showed a significant electrochromism.

11 Community

by Tom F. Beyersdorff & Thomas J.S. Schubert.

Is there a need for an IL-application conference?

Following up an initiative from Dr. Emil Aust from Merck KGaA, Germany, we believe that the concept of ionic liquids has “learned to walk” already. The knowledge about this amazing technology still increases rapidly, but there are already a number of examples that now have to be transferred from science to business. We at IOLITEC have a couple of examples that are commercialized or are very close to commercialization and we’re sure that the other players have also made their homework very well.

If you are interested in the concept of an IL-application conference, please do not hesitate to contact us!

Top publishing authors 2008

According to our recherche Peter Wasserscheid (University of Erlangen), entered the crown of the most publishing author in the ionic liquids scene, followed by Doug MacFarlane (Monash University), Tom Welton (Imperial College London), and Robin Rogers (University of Alabama). The total number of publications in 2008 was 3’727.

Upcoming Exhibitions and Conferences:

May 29th to June 4th: 3rd Conference on Ionic Liquids, Cairns, Australia (<http://www.coil-3.org/>).

Ionic Liquids Today, 01-09

Friday, February 06th, 2009



September 7th to 10th: 9th Conference on Iminium Salts, St. Bartholomä, Germany.

Meet our new colleague **Dr. Boyan Iliev** at this conference with his talk "Ionic Liquids - Innovative Materials for Cleantech Applications".

Achema 2009, May 11th-15th 2009, Frankfurt a. M., Germany.

Meet IOLITEC's CEO Dr. Thomas J. S. Schubert at this major event at different sessions with the following talks:

"The production of high purity ionic liquids using continuous flow micro reactors", May, 12th 4:30 pm, Harmonie 3, CMF.

"Ionic liquids in inorganic synthesis: their influence on the preparation of nanoparticles and nanoparticle dispersion", May 13th 11:00 am, Harmonie 2, CMF

"Inverse gas chromatography (IGC) as a versatile tool for gas separation tests using ionic liquids", May 14th 11:00 am, Alliance, Hall 4C.

44th International wfk Detergency Conference 2009, May 12th to 14th, 2009, Hilton Hotel, Düsseldorf, Germany

Meet our new colleague **Dr. Frank Stiemke** from IOLITEC at this conference with his talk

„Ionic liquids as antistatic additives in surface cleaning processes“

and at the corresponding poster session with his two posters

"Ionic liquid applications: antistatic cleaning additives"

"Ionic liquids - an innovative cross-sectional technology"

Pease keep us informed about other interesting events we could highlight in Ionic Liquids Today.

Ionic Liquids Today, 01-09

Friday, February 06th, 2009



Imprint

© Ionic Liquids Technologies GmbH, Heilbronn, Germany.

Ionic Liquids Today will be released 2 times a year.

Contact:

IoLiTec

Ionic Liquids Technologies GmbH

Ferdinand-Porsche-Strasse 5/1

D-79211 Denzlingen, Germany

phone: +49 (0) 7666 913929

fax: +49 (0) 7666 9129345

info@iolitec.de

www.iolitec.com

If you don't like to receive the upcoming issues, please send an e-mail to info@iolitec.de containing "Unsubscribe".