

ROCO[®]

NEWSLETTER



Fall 2023

WHAT'S NEW?

In honor of Back-to-School season, we want to share the [ABSs of Ionic Liquids!](#) These unique substances are liquid salts with a wide range of potential applications, including energy storage, battery applications, additives, lubricants, polymer processing aids, and much more. The possibilities are endless, but the bottom line is that we love ionic liquids and want to share our appreciation of ionic liquids and their remarkable capabilities with the world! Please see pages 2 & 3 for more!



SPOTLIGHT ON ELECTROLYTES

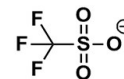
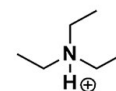
In our last newsletter, we talked about the addition of the product category of [Electrolytes](#) to our website. Electrolytes in ionic liquids have many potential applications in various energy storage devices, such as batteries, supercapacitors, and fuel cells. Below are a few select products we offer:

[RoCo | Triethylammonium trifluoromethanesulfonate, 99%](#)

PRODUCT CODE: FCE-6000HP

CAS NO: 35895-69-3

- Protic ionic liquid, triflates are strong non-oxidizing agents and have uses in esterification.



PRODUCT CATALOG

We are working on creating a complete catalog of all of the products we offer. This catalog will allow our customers to search by product category, cation, and anion. Stay tuned for details, and please [email us](#) if you need assistance finding a product now!

[RoCo | Triethylammonium methanesulfonate, 98%](#)

PRODUCT CODE: FCE-7000-HP

CAS NO: 75-75-2

- Protic ionic liquid used as a phase transfer agent, solvent and in fuel cells.



The ABCs of Ionic Liquids

A is for...Additives. ILs have multiple uses as an additive for polymer processing, electrolytes, and antimicrobials.

B is for...Batteries. Ionic liquids hold the potential to overcome the high voltage problems associated with Dual-Ion Batteries and can also be used in the development of [metal-free energy storage](#) devices.

C is for...Corrosion inhibitor. Our partner, IoLiTec GmbH, has tested several ionic liquids as promising [corrosion inhibitors](#). In this work, IoLiTec obtained optimal results with several acetate-based ILs.

D is for...Desalination. New research shows that ionic liquids can be used to desalinate seawater. This is critical for solving global water shortages.

E is for...Energy storage applications. At RoCo®, we have worked with industry giants in battery chemistry and developed electro-polymerized ionic liquids to form SEI (Solid Electrolyte Interphase) layers. These materials can improve the SEI layer and significantly improve the safety of lithium-ion batteries.

F is for...Fuel cells. Multiple ionic liquids have found uses as an electrolyte in fuel cells.

G is for...Green Solvent. Ionic liquids are considered more environmentally friendly alternatives to traditional solvents due to their low toxicity and ability to dissolve a wide range of compounds. They can be used as greener replacements for volatile organic solvents in industries such as pharmaceuticals, chemicals, and materials. ILs can be made from amino acids, which can be non-toxic.

H is for...Hydrophobic or Hydrophilic. ILs can be either hydrophobic or hydrophilic, depending on their chemical structure. The number of possible ionic liquids that can be accessed synthetically is estimated to be 10^{18} . That is a huge number! Commercially, [you can buy ~1000 ILs](#).

I is for...[Imidazolium](#). This class of Ionic Liquids is just one of many, but one of the most popular, due to their wide variety of applications.

J is for...Joule. It is the unit of energy in the International System of Units (SI). The use of ILs can save significant Joules in terms of energy consumption. That directly translates to \$\$

K is for...Potassium (K). Ionic Liquids have found applications in [Potassium-Ion Batteries\(KIB\)](#). Potassium-ion batteries are noteworthy for their abundant raw materials, high energy density, fast ion transport in the electrolyte, and lower cost. An advantage of potassium-ion batteries is that they can use more inexpensive and abundant materials such as potassium, iron, and aluminum instead of expensive ones like lithium, cobalt, and copper. Additionally, KIBs have a lower fire risk than lithium batteries, making them a safer option.

L is for...Lubricants. In recent years, ILs have found new applications as an additive to lubricants due to their strong adsorption properties.

M is for...[Metal Salts](#). Metal Salts, specifically Lithium, are becoming very popular. These products have a variety of uses, including battery applications and energy storage.

N is for...Non-Volatile. One property of ILs is that they are non-volatile, meaning they do not disperse VOC (volatile organic compounds) into the atmosphere. ILs are being used to develop to produce O₂ in [space applications](#) using lunar regolith.

O is for...Organic. The structure of an Ionic Liquid is an organic cation combined with either an organic or inorganic anion. ILs have found use in [organic synthesis](#).

P is for...Polarity. ILs are polar and non-polar groups coupled together. This coupling of polar and non-polar groups together gives them unique solubility properties.

N is for...Non-Volatile. One property of ILs is that they are non-volatile, meaning they do not disperse VOC (volatile organic compounds) into the atmosphere. ILs are being used to develop to produce O₂ in [space applications](#) using lunar regolith.

O is for...Organic. The structure of an Ionic Liquid is an organic cation combined with either an organic or inorganic anion. ILs have found use in [organic synthesis](#).

P is for...Polarity. ILs are polar and non-polar groups coupled together. This coupling of polar and non-polar groups together gives them unique solubility properties.

Q is for... Quinine. Quinine is a medication used to treat malaria and [babesiosis](#). There have been six ionic liquids synthesized from a [Quinine base](#). Who knows what applications they may bring?

R is for...[RoCo®](#). Our company has years of expertise in researching and developing ionic liquids, and we can create customizable ILs and Poly ILs. We are also the North American supplier of [IoLiTec GmbH](#).

S is for...Sensors. [Ionic liquid-based skin sensors](#) are an emerging type of pressure sensor capable of perceiving external stimuli of pressure, strain, and torsion and turning them into electrical signals. These ionic liquid sensors can be encapsulated in silicone and worn directly. When connected with smart devices, it effectively expands the ability of human beings to perceive and evaluate the external environment.

T is for...Thermal stability. Their thermal stability makes them ideal for various industries, such as energy storage, catalysis, and electrochemistry.

U is for...[Upcycling](#). RoCo® is committed to finding a solution to Polypropylene (PP) Recycling by developing innovative technologies that will aid in upcycling PP. Over 80 million metric tons of PP were made in 2021, and less than 2% was recycled. We are currently working on an ionic compatibilizer that is halide-free, non-toxic, and miscible with polyolefins, which make PP resilient to contaminants. This results in the upcycling of PP upon recycling.

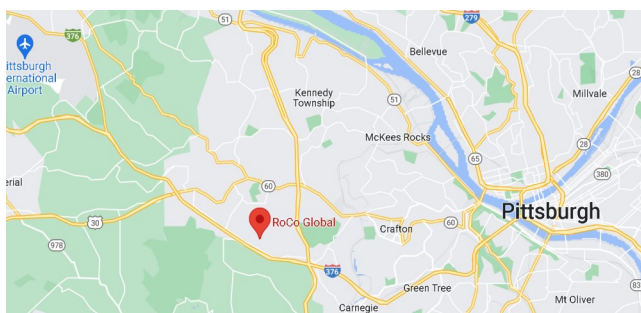
V is for...Vapor pressure. Traditional solvents can easily evaporate into the air, while ionic liquids remain in the liquid state even under atmospheric conditions due to their negligible vapor pressure.

W is for...Wide liquid range. Unlike most substances that have a specific melting and boiling point, ionic liquids can exist as liquids over a broad temperature range. Their liquid range can extend from below -100°C to well above 200°C, depending on the specific composition of the ionic liquid.

X is for... X-ray scattering. Small-angle X-ray scattering is an ideal technique for examining the structures of ILs due to its ability to review a relatively large sample volume. Scientists have found [nano-scale segregation](#) in ionic liquids using X-ray techniques.

Y is for...Ylide. Ylides are neutral dipolar molecules containing a negatively charged atom directly attached to a positively charged heteroatom. Phosphonium ylides are used in the Wittig reaction, a method used to convert ketones and especially aldehydes to alkenes.

Z is for...Zwitterion. A zwitterion is a molecule that contains both positively and negatively charged functional groups. These molecules are being used in a novel class of ILs for use in Lithium-Sulfur Batteries.



For More Information

Website: <https://roco.global>

Phone: 724-315-9170

Email: info@roco.global

