Application Sheet

io·li·tec
Ionic Liquids Technologies

Electrodeposition

Electrodeposition is an electrochemical process, which today is commonly used in a number of industrial applications. Typically the deposition of a metal layer on an another surface should lead to improved and/or complementary properties of the underlying surface.

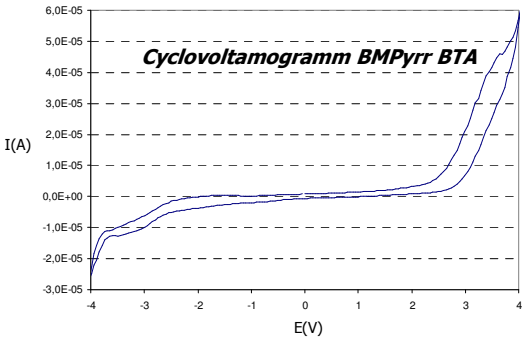
Aluminium-coated screw for corrosion protection

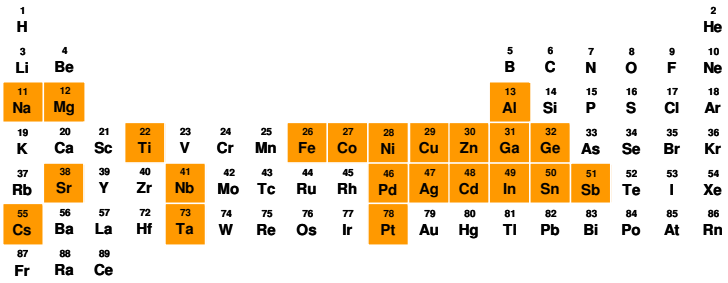
In this context, the electrodeposition from aqueous media has been used for years to deposit metals like copper, nickel, zinc or silver. Nevertheless, aqueous solutions cannot be used for the electrodeposition of all less noble metals and semiconductors because of the limited electrochemical window of water.[1-3]

Ionic liquids represent a class of novel, aprotic media for the electrodeposition of metals and alloys[4]. Their wide electrochemical windows (up to 6 V) makes them suitable media for the electrodeposition of metals like aluminium or tantalum. For example, the electrodeposition of aluminium from different ionic liquids leads to remarkable results.[1,2] Since their price is naturally above water-based electrolytes, it's important to know that ionic liquids can be recycled easily and reused.

The reason for this revolution in electrodeposition technology is their unique mix of properties of ionic liquids:

- **chemical and thermal stability**
- **non volatility**
- **low melting points (< 100°C)**
- **good ionic conductivities**
- **large electrochemical windows**





Electrodeposition reported in literature

Furthermore, the use of ionic liquids was also considered for the electrodeposition of more noble metals, which can also be deposited from aqueous media: If aprotic ionic liquids are used instead of aqueous media as an electrolyte, there is no hydrogen formation and dissolution in the metal, influencing the mechanical properties as well as the morphology and appearance of the deposited metal.

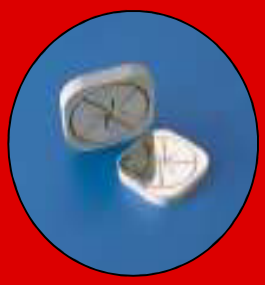
Iolitec offers a well-sorted selection of different high-quality ionic liquids for electrodeposition processes. In addition, based on its long-standing experience, IOLITEC offers R&D services to apply this technology for customer's needs.

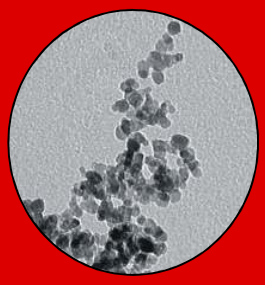
Product Code	Compound	Quantities
IL-0014-HP	1-Butyl-3-methylimidazolium chloride, 99%	25 g to bulk
IL-0029-HP	1-Butyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide, 99%	25 g to bulk
IL-0093-HP	1-Ethyl-3-methylimidazolium chloride, >98%	25 g to bulk
IL-0023-HP	1-Ethyl-3-methylimidazolium bis(trifluoromethylsulfonyl)imide, 99%	25 g to bulk
IL-0035-HP	1-Butyl-1-methylpyrrolidinium bis(trifluoromethylsulfonyl)imide, 99%	25 g to bulk
IL-0075-HP	1-Butyl-1-methylpyrrolidinium chloride, 99%	25 g to bulk

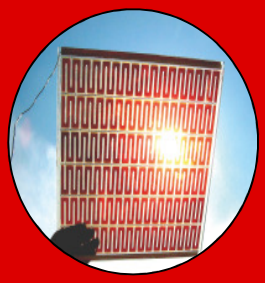
References:

[1] P.K. Lai, M. Skyllas-Kazacos, *J. Electroanal. Chem.* **1988**, *248*, 431.
[2] F. Endres, *Chemphyschem* **2002**, *3*, 144.
[3] N. Borisenko, S. Zein El Abedin, F. Endres, *J. Phys. Chem. B* **2006**, *110*, 6250.
[4] F. Endres, D. MacFarlane, A. Abbott, *Electrodeposition from Ionic Liquids*, Wiley-VCH **2008**.

© IOLITEC, 2010.







IoLiTec GmbH
Salzstrasse 184
74076 Heilbronn
Germany
www.iolitec.com
☎ +49 (7131) 898390
✉ info@iolitec.de