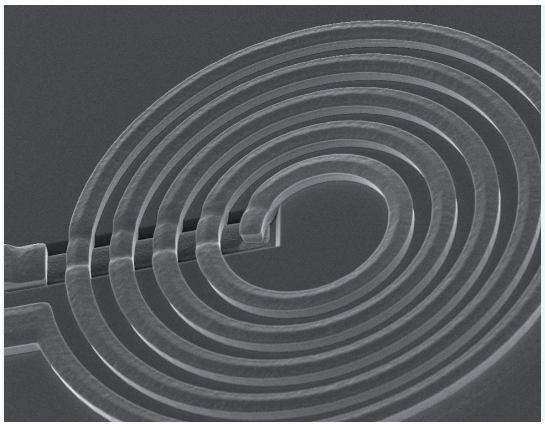
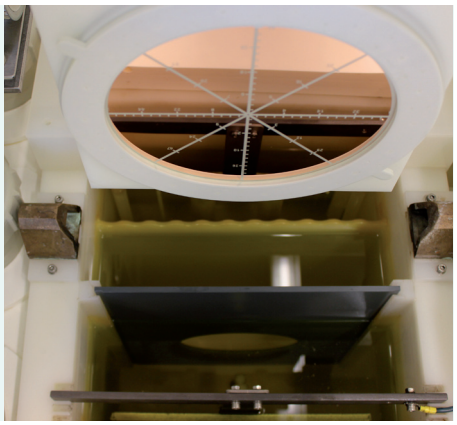
ELECTROCHEMICAL DEPOSITION FROM IONIC LIQUIDS





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Ionic liquids (ILs) are supercooled molten salts which are liquid at temperatures below 100 °C. ILs consists of an anion (e.g. Cl-, PF6-) and an organic cation (e.g. dialkylimidazole). The properties of ILs depends on their composition. Thus, the electrical conductivity or the electrochemical window depends on the combination of cation and anion. The properties of ILs provide new opportunities to produce metal layers through electrochemical deposition (ECD). The ECD of metals with a negative standard potential to hydrogen, like Al, Ti or Li, is possible at moderate temperatures (< 100 °C). Furthermore, metals like Cu, Pd, Ag or Ni can be deposit from ILs. The opportunities are nearly endless.

At Fraunhofer ENAS, the ILs are currently used for the ECD of Al and Pd. Due to their moisture sensitivity, the ILs have to be handled in an inert gas atmosphere (N_2) in a glove box. Therefore, almost all electrical conductive materials can be coated electrochemically. Future developments will cover a wide range of materials deposited out of IL.

Properties of ILs:

- Broad electrochemical window (2 – 6 V)
- Pure ionic conductivtiy (0.1 – 18 mS/cm)
- Water and solvent free
- High chemcial and thermal stability
- Very low vapour pressure
- Higher viscosity than water based electrolytes (10 – 500 mPa s)

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