

Electrodeposition of macroporous materials and of free standing nanowires from ionic liquids

Frank Endres
Clausthal University of Technology
Institute of Electrochemistry
38678 Clausthal-Zellerfeld, Germany
frank.endres@tu-clausthal.de

Ionic liquids represent a meanwhile well accepted class of electrolytes which due to their wide electrochemical windows are interesting for research in electrochemistry. Usually they have a negligible vapor pressure which allows electrochemical studies under the conditions of an ultrahigh vacuum. Furthermore, they have quite low surface tensions enabling them to wet well a variety of different materials including different polymers.

In this lecture it will be shortly shown that ionic liquids allow to make 3-dimensional macroporous (3DOM) materials and free standing nanowires by electrochemical means. The focus is set on 3DOM zinc and on free standing zinc nanowires, as they are of potential interest as a host material for Li-ion batteries, but also for dye sensitized solar cells if the zinc is carefully oxidized to ZnO.

It is also shortly discussed that such liquids can be well mixed with water, and a 50/50 v-% mixture with water behaves electrochemically rather like an aqueous solution whereas the interfacial behavior is rather the one of an ionic liquid.

References:

- 1 Z. Liu, A. Prowald, S. Zein El Abedin, F. Endres, *Journal of Solid State Electrochemistry* 17 (2013) 1185
- 2 Z. Liu, S. Zein El Abedin, M.S. Ghazvini, F. Endres, *Phys. Chem. Chem. Phys.*, DOI:10.1039/C3CP51325D