1F

Dear Friends,

The Baltic Electrochemistry Conference is collecting researchers dedicated to the science and technology of electrochemistry around the Baltic. This conference, now the sixth in the series, will provide a forum for individuals from research organisations and companies to learn about the latest developments in this rapidly evolving field, to discuss with renowned experts and to build their networks in an informal and friendly atmosphere. The conference will cover all forms of electrochemistry, including, but not limited to experimental and theoretical aspects of charge transfer at electrochemical interfaces, electrochemical materials science and electrocatalysis. In addition, emergent technologies like, electrodeposition of nanomaterials and functionalized electrodes, and electrochemical nanostructuring will feature along with related poster presentation sessions.

It is now almost two decades since the very first Baltic Electrochemistry Conference was held in Kääriku Sport Centre in Otepää, Estonia on the subject of Interfacial Electrochemistry: structure, electrical properties and electrochemical reactivity. Since then there have been many advances in the areas of physical electrochemistry and materials as the need for sustainable energy and more environmental process technologies has expanded.

BEC16 will be held in the beautiful capital region of Finland and we look forward to welcoming you to enjoy fruitful discussions in the Finnish summer sunshine by the Baltic Sea in 2016!

Lasse Murtomäki, Ben Wilson and Kirsi Yliniemi

On behalf of the organising committee

Call for Abstracts

The organising committee of BEC16 would be pleased to receive high quality papers on all subjects concerned with electrochemistry, interfaces and materials. Oral and poster presentations are welcomed on the following topics:

- *Ionic liquids*
- *Electrochemical energy conversion & storage*
- *Medical applications*
- *Nanoscale electrochemistry*
- *Hydrometallurgy & Industrial Scale Electrolysis*
- *Functionalized electrodes and sensors*
- *Electrodeposition and redox replacement*
- *Novel techniques in electrochemistry*
- *Liquid|Liquid interfaces*
- *Transport processes*
- *Theoretical & computational electrochemistry*

Submission of Abstracts

Abstracts should be submitted in Microsoft Word (doc/docx) or PDF format by email to the Local Organisers at baltic2016@aalto.fi no later than **31st January 2016.**

The official language of the conference will be English.

The conference is sponsored by International Society of Electrochemistry (ISE) and a selection of papers from the conference will be published in a Special Volume of Electrochimica Acta.

Organising Committee

Dr. Benjamin Wilson
Dr. Kirsi Yliniemi
Prof. Mari Lundström
Prof. Päivi Laaksonen
Prof. Tanja Kallio
Prof. Eero Kontturi

Aalto University
School of Chemical Technology

Scientific Committee

Prof. Lasse Murtomäki, Aalto University (Chair), Finland
Prof. Elisabet Ahlberg, University of Gothenburg, Sweden
Prof. Johan Bobacka, Åbo Akademi University, Finland
Prof. Mathias Brust, University of Liverpool, UK
Dr. Daren Caruana, University College London, UK
Prof. Robert Dryfe, University of Manchester, UK
Prof. Göran Lindbergh, KTH, Sweden
Dr. Rasa Pauliukaite, FTMC, Lithuania
Prof. Magdalena Skompska, University of Warsaw, Poland
Prof. Kaido Tammeveski, Tartu University, Estonia
Prof. Sannakaisa Virtanen, University of Erlangen-Nuremberg, Germany
Prof. Mikhail Vorotyntsev, Moscow State University, Russia
Dr. Jingdong Zhang, DTU, Denmark

Registration Fees (including conference dinner)

Registration Fees	Until 31st March	After 31st March
Regular	450€	500€
Student	300€	350€

For more information on one day and accompanying persons rates please contact us or see our website for more information

Important Deadlines:

Deadline for abstract submission: **31st January 2016**

Final registration: 15th April 2016

For more information about the conference venue and accommodation please visit

chemistry.aalto.fi/en/current/6th_electrochemistry_meeting/

Photo: Joni Rousku/Visit Helsinki

2F

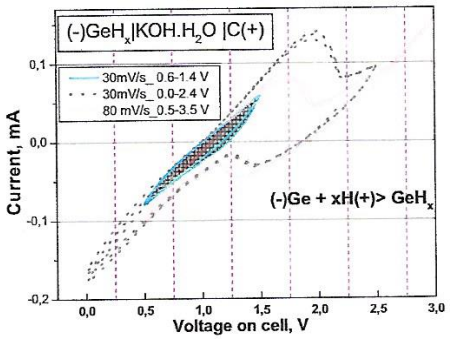
UNUSUAL ELECTROCHEMICAL CELL "GERMANIUM - MONOHYDRATE OF POTASSIUM HYDROXIDE – GRAPHITE" AS SMALL-SIZED AND LOW-POWER SOURCES AT ROOM TEMPERATURES

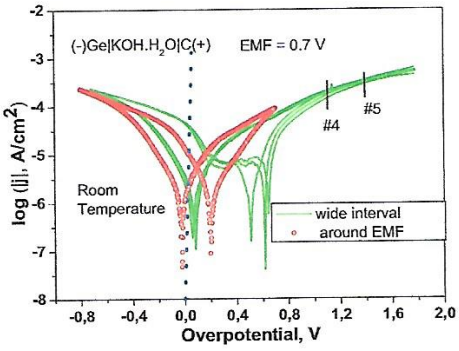
Yu.M. Baikov, M.E. Kompan

Ioffe Institute, Solid State Physics, St-Petersburg, Russia

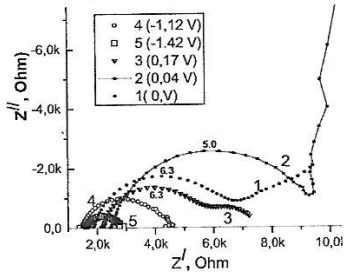
baikov.solid@gmail.com

The search for and development of electrochemical cells with new electrolytes or new electrode–electrolyte assemblies is based on fundamental investigations of the electrochemical activity of materials. This poster present a search, the novelty of which is determined by the previously unknown combination of well-known materials as membrane–electrode assembly. These are a solid electrolyte based on potassium hydroxide monohydrate and a negative semiconducting electrode (germanium). We have prepared electrochemically active cells of the formula(–)Ge|KOH·nH2O|C(+). Ge-electrode was the thin plate of *p*-Ge(28 Ω.cm). The solid electrolyte (KOH monohydrate) studied by us since 2007[1,2]. As the member of a family of water–potassium hydroxide system it is well and long known in the physical chemistry. Our interest was devoted to KOH · nH2O solid hydrates with n = 0.5, 1.0, 2.0. Graphite (C) is well known as a multifunctional electrode .





Recently, it has been shown [2] that silicon exhibitsi in heterostructures with solid potassium hydroxide mono- and dihydrate electrochemical activity, the character of which depends on the doping level. It was naturally of interest to expand the group of previously studied electrode materials (C, Si, and Sn) in contact with solid hydroxide proton conductors by including another group-IV element Ge. On three figures electrochemical data by different types are shown. Top left are cyclic voltamograms at different ranges of cell voltage and rates. The middle picture allows to evaluate the exchange currents in a cell. On the bottom figure EIS are shown at some overpotential relatively e.m.f.=0.7 V.



References

[1]Yu.M. Baikov, Solid State Ionic 208 (2012) 17.

[2] http://www.solidionic.com

Poster 3F

UNUSUAL

ELECTROCHEMICAL CELL "GERMANIUM - MONOHYDRATE OF POTASSIUM HYDROXIDE – GRAPHITE"

as SMALL-SIZED and LOW-POWER SOURCES at ROOM TEMPERATURES

Yu.M. Baikov, M.E. Kompan
Ioffe Institute, Solid State Physics, St-Petersburg

The UNUSUALNESS *of presented cell*

(-)p-Ge | KOH·H_2O | C(+)

Plate from crystal | Solid, m.p. 146°C | graphite

Is due to three "reasons" *highlighted above*

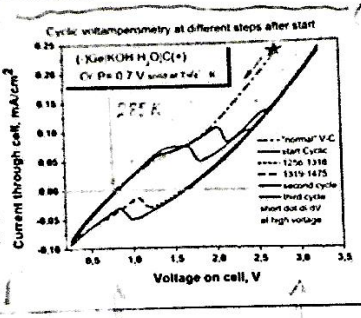
1..a.....KOH·H_2O as *hydroxide's compound;*

b.....KOH·H_2O as *solid electrolyte;*

2.. |.....electrochemically active boundary *"Ge - solid hydroxide electrolyte";*

3.. |.....electrochemically active boundary *"graphite - solid hydroxide electrolyte".*

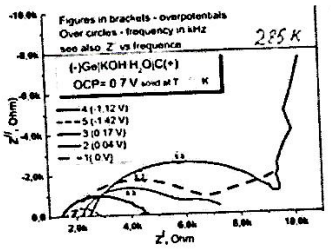
Besides, OCP or E M F of this cell is 0.7 V. This cell could produce not only VOLTAGE but also the CURRENT in temperature interval 250 – 350 K.



n.1 Usual ('normal')V-C curve was revealed for just now prepared cell, i.d. after cooling to room temperature, and checking that OCP≈0.7V.

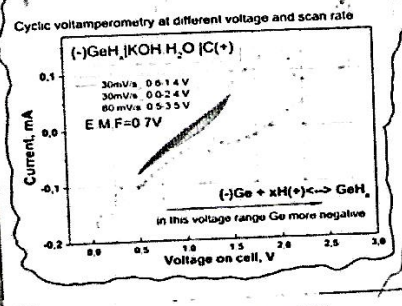
Start of next operation indicate by★:
2.7 V on cell, 0.4 mA, 20mV/s .

After relax 1 hour Cycling was switched on. On this figure first three cycles are shown. From fourth step the picture was stable, like slide **n.2**



n.2. Stable Cyclic CV at different voltage and scan rate

It is evident remarkable distinction of Ge response to changing of an overpotential



n.4. CV curve of the sample used for Impedance Spectroscopy at different load of electrochemical cell:

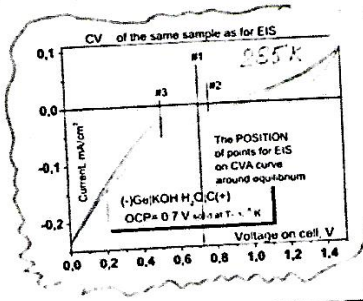
#1 - factually equilibrium;

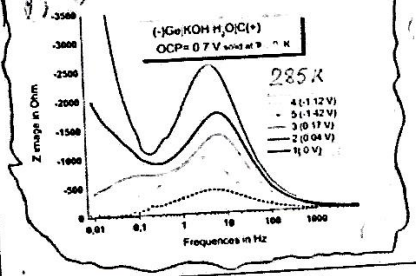
#2 - slightly higher negative over-potential of Ge (sooner flat CV curve here)

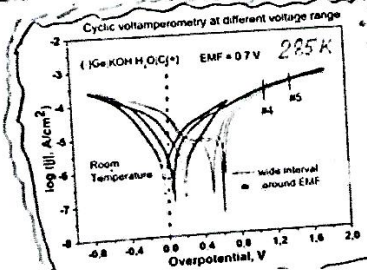
#3 – positive over-potential of Ge corresponding discharging regime of cell, if it is considered as a battery with OCP=0.7 V.

n.5. Nyquist diagrams at different loads on the cell

n.6. The same as on Fig.5 to present frequency dependence of image part at different load of cell. Strong capacitive effect near equilibrium point is evident







n.3. Analysis of cyclic CV (n.2.) to determine the exchange current of Ge-electrode

VC curve from n.2. presented in coordinates log |j(mA/cm^2)| vs η (overpotential of Ge)

At relative narrow range η around OCP there is subtle difference back and forth lines. In contrary, in the case for relatively higher deviation η toward negative Ge there are two different states (Δη 0.5V).

Most probably they correspond Ge and GeH.

Guide for reading poster

There are 6 figures & 4 pages with special explanation what are where

Fig 1 and text n.1 experimental data V-C

Fig.2 and text n.2: experimental data V-C

Fig.3 and text n.3: analysis of data on n.1&2

Fig 4 and text n.4: what points on VC measured by impedance spectroscopy.

Fig.5 & text n.5: experiment EIS for Z'' vs Z'

Fig.6 & text n.6: experiment EIS for Z'' vs ω

Copies of couple corresponding papers on Ge electrode and on KOH H_2O electrolyte are free.

Besides, the information could be found on http://www.solidionic.com and from baikov.solid@gmail.com