



Minutes of Meeting

General Meeting in Danish Battery Society

Location: Biografen, Haldor Topsøe A/S,
Nymøllevej 91, DK-2800 Kgs. Lyngby
Time: 8.30 am, 28 February 2014

Agenda

1. Welcome by administrators Jon Fold von Bülow and Jonathan Højberg from Haldor Topsøe A/S
2. Election of referent and chairman of the meeting
3. Chairman's report
4. Election of auditor
5. Presentation and approval of accounts
6. Proposals from board and members
 - a. Change of statutes regarding the authority to bind the company
7. Election of board members
 - a. Lars Barkler, CEO, Lithium Balance A/S stands for re-election
 - b. Tejs Vegge, Head of Section, DTU Energy Conversion stands for re-election
 - c. Bo Brummerstedt Iversen, Professor, Department of Chemistry, Aarhus University stands for re-election
8. Any other business



Members present:

Each company/institution can be represented by up to 5 representatives (only 3, if the company/institution has a 'less than 250 employees' membership). If a company/institution was represented by more people than allowed, only the voting representatives are listed.

Lithium Balance:

Lars Barkler
Andreas Elkjær Christensen

Chemical Department, Aarhus University:

Yanbin Shen
Martin Søndergård
Steinar Birgisson

Haldor Topsøe A/S:

Frederik Flemming
Jon Fold von Bülow
Karen Wonsyld
Kinson Kam
Karl Gustavsson

Department of Energy Technology, Aalborg University:

Søren Knudsen Kjær
Søren Hjul Andreasen
Maciej Swierczynski

Danish Technological Institute:

Kjeld Nørregaard
Bjarne Johnsen
Martin Brorholt Sørensen
Peter Sommer-Larsen

DTU Energy Conversion, Technical University of Denmark:

Eugene Stamate
Tejs Vegge
Søren Højgaard Jensen
Reza Younesi
Mie Møller Storm

Department of Chemical Engineering, Biotechnology and Environmental Technology, University of Southern Denmark:

Eivind Skou

GN ReSound A/S:

Kim Rasmussen



Ad 1. Jon Fold von Bülow and Jonathan Højberg introduced the program of the general meeting. They pointed out that attendance of more than 50 participants at the second annual meeting is seen as an acknowledgement of the function of the Society.

Ad 2. Jonathan Højberg was elected chairman of the meeting and referent of the meeting without any objections.

Ad 3. Chairman of the board, Søren Højgaard Jensen (DTU Energy Conversion), presented the activities of the previous year. The full report is appended.

Ad 4. Board member, Frederik Flemming (Haldor Topsøe A/S), from the board and Bjarne Johnsen (Danish Technological Institute) were unanimously elected as internal and external auditor, respectfully.

Ad 5. The accounts were presented by Jonathan Højberg and approved unanimously. The approved accounts are appended.

Ad 6. The suggested reformulation of paragraph 11 was:
The society shall be bound by the chairman of the board or any two board members. The board may grant powers of procuration to the treasurer and/or one or more persons in the secretariat described in paragraph 5.
The statutory change was approved unanimously.

Ad 7. The three board members standing for re-election were all elected unanimously. The board is now constituted by:

Chairman

Søren Højgaard Jensen (2013-2015)
Senior scientist, DTU Energy Conversion, Technical University of Denmark

Treasurer

Lars Barkler (2014-2016)
CEO, Lithium Balance A/S

Board members

Bo Brummerstedt Iversen (2014-2016)
Professor, Department of Chemistry, Aarhus University

Tejs Vegge (2014-2016)
Associate professor and Head of Section, DTU Energy Conversion, Technical University of Denmark

Frederik Flemming (2013-2015)
Technology supervisor, Haldor Topsøe A/S

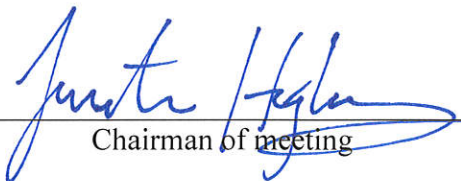
Søren Juhl Andreassen (2013-2015)
Associate professor, Department of Energy Technology, Aalborg University



Ad 8. It was decided unanimously to maintain the contingent at

Personal members:	DKK 200
Institutional members (Less than 250 employees):	DKK 1000
Institutional members (More than 250 employees):	DKK 2000
Student members:	DKK 50

The general meeting ended at 9.10.


Chairman of meeting



Chairman's report

by Søren Højgaard Jensen

First, thank you for participating in the symposium and the Danish Battery Society activities. For me, it has been really interesting to be part of the various activities we have had during the last year. Our first year! I would like to present an overview of the activities we have had so far:

We have made a nice homepage which provides an overview of ongoing activities: www.batterysociety.dk. The website contains profiles of the management board and of people who have contributed in the activities. Furthermore, a payment platform (PayPal) has been implemented.

We have prepared and tested a PhD network which will be further implemented during the Symposium. Jonathan Højberg will say some more about this on the symposium.

We held two discussion sessions.

1. The first discussion session was on electrochemical impedance spectroscopy was held at DTU Energy Conversion. The day started with presentations by **Søren Højgaard Jensen** on general electrochemistry such as electrode-electrolyte interfaces and basic electrochemical theory. Then he discussed equivalent circuit models and the theory behind modeling impedance spectra. After this, **Kristian Knudsen** showed how to use a Gamry Reference 600 potentiostat to measure the impedance responses from simple electric circuits, based on resistors and capacitors, and a lithium-ion battery. After enjoying lunch outside in the sun **Johan Hjelm** elaborated further on equivalent circuits for EIS measurements and how they are linked to the chemical processes. Johan then presented how to interpret the EIS measurements from batteries followed by **Andreas Christensen** showing EIS data obtained from a lithium-ion battery and the data integrity of these measurements. The following discussion transitioned to the next presentation which was Johan explaining how to use Kramers-Krönig relations to verify the data integrity from impedance measurements. Next up **Ane Christiansen** showed EIS measurements made on batteries that she herself had produced, and she also showed EIS measurements on the individual components of the battery to understand how EIS measurement are linked to the different physical components. Finally the group was given a guided tour through the facilities at DTU Energy Conversion.



2. The second discussion session was about material synthesis at Aarhus University: **Martin Søndergaard** gave a general introduction to the battery group at Aarhus University and a description of how they take advantage of a closely integrated feedback loop between synthesis, structure characterization and electrochemical properties. The battery test cells used in the group is described, including the in-situ split flat cell used to do in-situ XRD tests.

Mette Filsø introduced a new method to visualize Li-ion pathways in Li-ion battery intercalation materials. The method is based on the framework Procrystal that calculates the migration barrier for Lithium inside the crystal. The calculation is based on the unit cell dimensions, space group and atomic positions. The method is still not quantitative, but it has succeeded in predicting the Lithium pathways in several common battery materials. **Yanbin Shen** described the benefits and challenges of working with Na-based materials rather than Li-materials. The Na-ion is bigger than the Li-ion which reduces the anti-site effect. Because of this, many Li-ion materials are actually synthesized using Na-precursors with a subsequent ion-exchange step. Working with Na-ion enables a wider range of cathode materials. In the latter part of the talk, Yanbin pointed out practical tips and tricks to improve cycling and how to handle Na-foil. **Kirsten M.Ø. Jensen** presented one of the core competences of the group, namely measurement and analysis of total scattering. With the methods presented, it is possible to look at local order with X-rays and obtain information on nanocrystalline and amorphous materials and quantification of crystalline phases. Kirsten gave an example, where a co-precipitation synthesis was followed in-situ. **Troels L.**

Christiansen gave a presentation on characterizing the structure of LiMn_2O_4 nanoparticles and discussed layered vs. Spinel structures. **Morten B. Ley** presented his work on LiBH_4 -like materials as solid state electrolytes. The electrolytes are tested in a catholyte, where the electrolyte is mixed with LiCoO_2 . Initial experiments showed poor performance and the suggested reason is a non-conducting interface layer between the electrolyte- and cathode material. It was speculated that this effect may be suppressed with an interface layer. The day ended with a guided tour through the facilities at the Center for Materials Crystallography.

We also had a public talk on battery powered trains given by Uffe Palludan. It was interesting to hear about the possibilities for battery trains in Denmark and that battery powered trains hold a potential to become significantly cheaper than implementing overhanging wires. In UK Network Rail and its partners have begun work to create a prototype battery-powered train, part of an industry study into the feasibility of using electric trains on parts of the network which have not been



electrified. Working closely with Derby-based train manufacturer Bombardier and operator Greater Anglia, the project will use one of the operator's Class 379s as a test-bed to determine future battery requirements and what kind of train might be needed. This train will be adapted by Bombardier and fitted with two different forms of batteries: lithium (iron magnesium) phosphate and hot sodium nickel salt.

We expect to have two public talks in 2014. The subjects are not defined yet.

The Company/Institutes that became members of the Danish Battery Society during the last year are:

Danish Power Systems
Lithium Balance
Biologic
Danish National Metrology Institute
Chemical Department, Aarhus University
Haldor Topsøe A/S
GN ReSound
DTU Energy Conversion, Technical University of Denmark
Department of Energy Technology, Aalborg University
Danish Technological Institute

With this I want to thank you all again and I wish you and Danish Battery Society a fruitful 2014.

Sincerely
Søren Højgaard Jensen, Chairman



Danish Battery Society

Financial statements 2013

Approved at the general meeting of the Society
28 February 2014

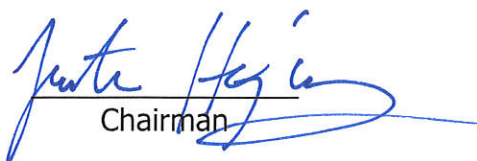

Chairman



Table of Contents

Association information	3
Approval of the accounts 2013.....	4
Income statement for 1/1 2013 – 31/12 2013.....	5
Balance 31/12 2013	6
Operations and liquidity budget 2014	7



Association information

Society Danish Battery Society
att: Jonathan Højberg
Frederiksborgvej 399
DK-4000 Roskilde

Board Søren Højgaard Jensen
Lars Barkler
Frederik Flemming
Søren Juhl Andreasen
Bo Brummerstedt Iversen
Tejs Vegge



Approval of accounts 2013

The undersigned have submitted the accounts 2013 for the Danish Battery Society.

In our opinion the financial statements give a true and fair view of the assets, liabilities and financial position at 31/12 2013 as well as the Society's activities for the financial year 1/1 2013 - 31/12 2013.

No events have occurred after year-end that could significantly affect the assessment of the association's financial position.

The financial statements are setup for approval by the General Meeting.

Lyngby, 28 February 2014

Board:

Søren Højgaard Jensen

Lars Barkler

Frederik Flemming

Søren Juhl Andreasen

Tejs Vegge

Bo Brummerstedt Iversen



Income statement 1/1 2013 – 31/12 2013

	<u>2013</u>
<u>Income</u>	
Sponsorship of annual meeting	5,000.00
Membership	0.00
Symposium payments	<u>6,200.00</u>
	<u>11,200.00</u>
<u>Expenses</u>	
Website domain and maintenance	2,036.49
Invited speakers	0.00
Dinner after symposium	10,800.00
Support of DBS events	<u>0.00</u>
	<u>12,836.49</u>
<u>Profit for the year</u>	<u><u>-1,636.49</u></u>



Balance 31/12 2013

<u>Assets</u>	<u>2013</u>
<u>Current assets</u>	
Receivables	
Membership fee	0.00
Other receivables	0.00
Total receivables	<u>0.00</u>
Cash	<u>400.00</u>
<u>Current assets total</u>	<u>400.00</u>
Assets total	<u><u>400.00</u></u>

<u>Liabilities</u>	<u>2013</u>
<u>Equity</u>	
Reserve	
Transferred profit of the year	-1,636.49
Equity total	<u>-1,636.49</u>
<u>Current liabilities</u>	
Short term liabilities	
Web-page and maintenance	2,036.49
	<u>2,036.49</u>
Current liabilities total	<u>2,036.49</u>
Liabilities total	<u><u>400.00</u></u>



Operations and liquidity budget 2014

	Statement 2013	Budget 2014
<u>Income</u>		
Sponsorship of annual meeting	5,000.00	3,750.00
Membership	0.00	15,000.00
Symposium payments	6,200.00	22,000.00
	11,200.00	40,750.00
<u>Expenses</u>		
Website domain and maintenance	2,036.49	2,000.00
Invited speakers	0.00	15,000.00
Dinner after symposium	10,800.00	15,000.00
Support of DBS events	0.00	5,000.00
	12,836.49	37,000.00
<u>Profit for the year</u>	-1,636.49	3,750.00