

The 5th Workshop on Reactive Metal Processing

18-19 February 2010, Seattle, WA

Red Lion Hotel on Fifth Avenue, meeting room "Bainbridge" (3rd floor)
1415 Fifth Avenue, Seattle, WA 98101

Organizers

Donald R. Sadoway

Massachusetts Institute of Technology

Toru H. Okabe

Institute of Industrial Science, the University of Tokyo

The 5th Workshop on Reactive Metal Processing

February 18 (Thursday) - February 19 (Friday), 2010, Seattle, WA

Time:

- 1st day: on Feb 18 (afternoon only 13:30-18:00 and 18:30- Banquet)
- 2nd day: on Feb 19 (entire day 09:00-17:00)

Venue:

Red Lion Hotel on Fifth Avenue, meeting room "Bainbridge" (3rd floor)

1415 Fifth Avenue, Seattle, WA 98101

(<http://www.seattlredlionfifthavenue.com/>)

Workshop Organizers:

Prof. D. R. Sadoway, Massachusetts Institute of Technology,

Prof. T. H. Okabe, Institute of Industrial Science, the University of Tokyo

Sponsor:

A part of the workshop is financially supported by the Rare Metal Research Workshop (RC-40: directed by Prof. Okabe), one of the Special Research Group organized by the Foundation for the Promotion of Industrial Science (FPIS).

Program

Afternoon, February 18 (Thursday), 2010 Meeting Room "Bainbridge"

13:30–13:40 **Opening Remarks**
Prof. Donald R. Sadoway, Massachusetts Institute of Technology

PM1, Session Chair: Prof. T. H. Okabe

13:40–14:25 **Plenary lecture**
“Nonaqueous Electrolytes for Electrolytic Production of Metal and Storage of Electrical Energy”
Prof. Donald R. Sadoway, Massachusetts Institute of Technology

14:25–15:10 **Plenary lecture**
“Oxide Anodes and Carbon Cathodes”
Prof. Derek J. Fray, Cambridge University

15:10–15:30 **Break**

PM2, Session Chair: Prof. D. J. Fray

- 15:30–16:00 **“Upgrade and Electrochemical Reduction of TiO₂-rich Slag to Titanium”**
Prof. Qian Xu, Northeastern University
- 16:00–16:20 **“Electrochemical Production of Titanium from Titanium Oxycarbide Anodes”**
Mr. Ole Kjos, Norwegian University of Science and Technology (Haarberg Lab.)
- 16:20–16:45 **“Molten Oxide Electrolysis for Lunar Oxygen Generation using in Situ Resources”**
Dr. James Yurko, Electrolytic Research Corporation
- 16:45–17:05 **“Microscopy Study of Carbon Cathodes from Industrial Aluminium Electrolysis Cells”**
Mr. Oyvind Ostrem, Norwegian University of Science and Technology (Rosenkilde Lab.)
- 17:05–17:15 **Announcement on the Sadoway 60 Symposium**
Prof. Toru H. Okabe, the University of Tokyo
- 17:15–17:30 **Photo Session**
- 18:30–21:00 **Workshop Banquet**
Hotel ÄNDRA, 2000 fourth Avenue, Seattle, WA 98121
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Morning, February 19 (Friday), 2010

Meeting Room "Bainbridge"

- 9:00–9:10 **Greetings**
Prof. Donald R. Sadoway, Massachusetts Institute of Technology
- AM1, Session chair: Dr. Yoshitaro Nose
- 9:10–9:40 **“Sustainable Electrolysis for Electrowinning and Electrorefining of Metals”**
Prof. Geir M. Haarberg, Norwegian University of Science and Technology
- 9:40–10:00 **“Dissolution of Precious Metal Alloys Containing Zinc in Acid Solution”**
Mr. Hideaki Sasaki, the University of Tokyo (Maeda Lab.)
- 10:00–10:20 **“New Process for Separation and Recovery of Platinum Group Metals”**
Mr. Tsuyoshi Yukawa, the University of Tokyo (Okabe Lab.)
- 10:20–10:35 **Break**
- AM2, Session chair: Prof. G. M. Haarberg
- 10:35–11:05 **“Mixing Molten Salts and Slags”**
Prof. Georges J. Kipouros, Dalhousie University
- 11:05–11:30 **“Measurement of Ca Activity in Molten Bi”**
Dr. Dane A. Boysen, Massachusetts Institute of Technology

11:30–11:50 **“Thermodynamic Measurement of Rare Earth Metal Systems by Knudsen Cell Mass Spectrometry”**

Mr. Sho Shirai, the University of Tokyo (Maeda Lab.)

11:50–12:10 **“Solubility and Dissolution Behavior of Ru in Silicate Slag”**

Mr. Hiroshi Shuto, the University of Tokyo (Morita Lab.)

12:15–13:30 **Lunch**

Afternoon, February 19 (Friday), 2010

Meeting Room "Bainbridge"

PM1, Session chair: Prof. G. J. Kipouros

13:35–14:05 **“Synthesis of Nitride Composite and Their Properties”**

Prof. Hongmin Zhu, University of Science and Technology Beijing

14:05–14:30 **“Synthesis of I-III-VI₂ Semiconductor Colloidal Quantum Dots”**

Dr. Katsuhiko Nose, the University of Tokyo (Okabe Lab.)

14:30–14:55 **“Electrodeposition of Silicon Thin Films from Ionic Liquids”**

Dr. Ana Maria Martinez, SINTEF Materials and Chemistry

14:55–15:10 **Break**

PM2, Session chair: Prof. H. Zhu

15:10–15:40 **“Computer-aided Experiments in Containerless Processing of Materials”**

Prof. Robert Hyers, University of Massachusetts

15:40–16:05 **“Electric Arcs in Material Processing - Effect of Gas Composition on Arc Characteristics”**

Assistant Prof. Guðrún Sævarsdóttir, Reykjavik University

16:05–16:25 **“Synthesis of Lanthanum Orthophosphate and Polyphosphate in Condensed Phosphoric Acid Solutions”**

Mr. Naoyuki Hatada, Kyoto University (Uda Lab.)

16:25–16:50 **“Liquid Metals, Business Opportunities for Societal Impact”**

Dr. Luis Ortiz, Massachusetts Institute of Technology (Sadoway Lab.)

16:50–16:55 **Closing Remarks**

Prof. T. H. Okabe, Institute of Industrial Science, the University of Tokyo

Venue Guide

Red Lion Hotel on Fifth Avenue
1415 Fifth Avenue, Seattle, WA 98101
TEL: 206-971-8000



Hotel ÄNDRA
2000 fourth Avenue, Seattle, WA 98121
TEL: 206-448-8600



Map



List of Participants

Aune, Ragnhild, Professor, Norwegian University of Science and Technology

Boysen, Dane A., Postdoctoral Associate, Department of Materials Sciences and Engineering, Massachusetts Institute of Technology

Dring, Kevin, Chief Technology Officer, Norsk Titanium AS

Fray, Derek J., Professor Emeritus, Department of Materials Chemistry, Cambridge University

Haarberg, Geir M., Professor, Norwegian University of Science and Technology

Hatada, Naoyuki, Graduate Student, Uda Lab., Department of Materials Science and Engineering, Kyoto University

Hyers, Robert, Associate Professor, University of Massachusetts

Kipouros, Georges J., Professor, Dalhousie University

Kjos, Ole, Graduate Student, Haarberg Lab., Norwegian University of Science and Technology

Martinez, Ana Maria, Ph.D. Research Scientist, SINTEF Materials and Chemistry

Nagai, Takashi, Project Research Associate, Institute of Industrial Science, the University of Tokyo

Nishimoto, Hiroshi, Graduate Student, Morita Lab., Institute of Industrial Science, the University of Tokyo

Nose, Katsuhiro, Project Researcher, Institute of Industrial Science, the University of Tokyo

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Okabe, Toru H., Professor, Institute of Industrial Science, the University of Tokyo

Ortiz, Luis, Director of Research, Massachusetts Institute of Technology

Oye, Bjarte, SINTEF Materials and Chemistry

Ostrem, Oyvind, Graduate Student, Rosenkilde Lab., Norwegian University of Science and Technology

Powell, Adam, C. IV, Opennovation

Sadoway, Donald R., John F. Elliott Professor, Department of Materials Sciences and Engineering,
Massachusetts Institute of Technology

Skybakmoen, Egil, Research Manager, SINTEF Materials and Chemistry

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Sævarsdóttir, Guðrún, Assistant Professor, Reykjavik University

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Shuto, Hiroshi, Graduate Student, Morita Lab., Institute of Industrial Science, the University of Tokyo

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Yukawa, Tsuyoshi, Graduate Student, Okabe Lab., Institute of Industrial Science, the University of Tokyo

Yurko, James, Electrolytic Research Corporation

Zhu, Hongmin, Professor, University of Science and Technology Beijing

Administrative staff

Noda, Junpei, Administrative staff, Institute of Industrial Science, the University of Tokyo

Oda, Kenta, Administrative staff, Institute of Industrial Science, the University of Tokyo

Summary of Participants and Lectures

Participants:

32 people

Participating countries:

7 countries

(Canada, China, Iceland, Japan, Norway, UK and USA)

Lectures:

19 lectures

(12 professional researchers and 7 graduate students)