

The 1st Workshop
on
Reactive Metal Processing
– Recent Progress of Materials Processing –

March 17-19, 2006

Massachusetts Institute of Technology,

Cambridge, MA, USA



Supported by Core to Core Program “Active Metal Processing”,
Japan Society for the Promotion of Science (JSPS)

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Welcoming Remarks

It is a great pleasure to welcome all of you to the 1st Workshop on Reactive Metal Processing subtitled “Recent Progress of Materials Processing” to be held at the Massachusetts Institute of Technology (MIT) from March 17 to 19, 2006. The workshop is jointly organized by the Sadoway Laboratory at MIT and the Okabe Laboratory at the University of Tokyo (UT); it is held under the auspices of an international program titled “Core to Core Program,” supported by the Japan Society for the Promotion of Science (JSPS).

The workshop is intended to construct a global research center for reactive metal processing by exchanging the latest high-quality scholarly information and releasing excellent research findings to the world; this intention will be realized together with highly active researchers and graduate students invited from overseas. Today, we are truly pleased that we could invite many leading researchers from research fields in materials processing from the world. We believe that this workshop will lead to a close connection between all the participants and fruitful results on research through your contribution.

The 2nd and 3rd workshops are tentatively scheduled from November 16 to 17, 2006, in Tokyo and from March 2 to 3, 2007, at MIT in Boston, respectively. We hope that this workshop will continue and uphold the spirit of cooperation that exists between the Department of Materials Science and Engineering, MIT; the Institute of Industrial Science and the Department of Materials Engineering, UT.

Finally, we hope that you obtain useful knowledge and active partnership from this workshop. Further, we express our sincere appreciation toward all the participants for their academic contribution, the administrative staff and students in MIT and UT for their assistance, and JSPS for its financial support.



Toru H. Okabe
Associate Professor
University of Tokyo



Donald R. Sadoway
John F. Elliott Professor
Massachusetts Institute of Technology

Workshop Program

Chipman Room (35-410)

March 17 (Friday), 2006

PM1 Session Chair: Prof. A.C. Powell IV

- 13:00–13:10 **Opening Remarks**
 Prof. D.R. Sadoway, Massachusetts Institute of Technology
- 13:10–13:35 **“Viscosity Behavior of Molten Nickel Alloys”**
 Prof. Y. Sato, Tohoku University
- 13:35–14:00 **“Recent Progress on Production Process of Reactive Metals”**
 Prof. T.H. Okabe, University of Tokyo
- 14:00–14:25 **“Towards Cost-effective Sustainable Metal Production
 by Molten Oxide Electrolysis”**
 Prof. D.R. Sadoway, Massachusetts Institute of Technology
- 14:25–14:45 **Break**

PM2 Session Chair: Prof. T.H. Okabe

- 14:45–15:10 **“Recent Progress in Reactive Metal Processing”**
 Prof. H. Zhu, University of Science & Technology Beijing
- 15:10–15:35 **“Recent Researches on Ti Processing in Molten Salt”**
 Prof. T. Takenaka, Toyohashi University of Technology
- 15:35–16:00 **“Thermodynamics-Based Modeling of Phase Boundary Motion
 in Reactive Metal Processing”**
 Prof. A.C. Powell IV, Massachusetts Institute of Technology
- 16:00–16:25 **“Recent Progress on Dry Processes for f-element Materials”**
 Prof. N. Sato, Tohoku University
- 16:25–16:35 **Break**
- 16:35–17:30 **Poster Session** (Ms. Zheng, Mr. Obana, Mr. Takeda, etc.)
- 18:00–20:30 **Workshop Banquet at MIT Museum**

March 18 (Saturday), 2006

AM1 Session Chair: Dr. M. Miyake

- 10:00–10:15 **“Phase Field Modeling of Metal-Electrolyte Interface Shape and Topology Changes in the Transport-Limited Electrochemical Reaction”**
Ms. W. Pongsaksawad, Massachusetts Institute of Technology
- 10:15–10:30 **“Production of Titanium Subchloride Employing Molten Salt as a Reaction Medium”**
Mr. O. Takeda, University of Tokyo
- 10:30–10:45 **“Electrochemical Extraction of Iron from a Martian Simulant”**
Dr. C. Dealwis, Massachusetts Institute of Technology
- 10:45–11:00 **“Direct Electrolytic Reduction of Solid SiO₂ in Molten CaCl₂ for Solar Grade Si Production”**
Dr. K. Yasuda, Kyoto University
- 11:00–11:15 **“Recent Progress of Active Metal Processing in Wuhan University”**
Dr. Dihua Wang, Massachusetts Institute of Technology
- 11:15–11:50 **Open Discussion**
- 11:50–12:00 **Closing Remarks**
Prof. D.R. Sadoway, Massachusetts Institute of Technology
- 12:00–13:30 **Workshop Lunch**
- Social event
- 13:30–16:00 **MIT Campus Tour**
Lab Tours: Prof. Sadoway’s group, Prof. Powell’s group

Digest of Oral Presentations

- “Viscosity Behavior of Molten Nickel Alloys”,**
Y. Sato Document A
- “Recent Progress on Production Process of Reactive Metals”,**
T.H. Okabe Document B
- “Towards Cost-effective Sustainable Metal Production
by Molten Oxide Electrolysis”,**
D.R. Sadoway Document C
- “Recent Progress in Reactive Metal Processing”**
H. Zhu Document D
- “Recent Researches on Ti Processing in Molten Salt”,**
T. Takenaka Document E
- “Thermodynamics-Based Modeling of Phase Boundary Motion
in Reactive Metal Processing”,**
A.C. Powell IV Document F
- “Recent Progress on Dry Processes for f-element Materials”,**
N. Sato, Document G
- “Phase Field Modeling of Metal-Electrolyte Interface Shape and Topology
Changes in the Transport-Limited Electrochemical Reaction”,**
W. Pongsaksawad and A.C. Powell IV Document H
- “Production of Titanium Subchloride by Employing Molten Salt
as a Reaction Medium”,**
O. Takeda and T.H. Okabe Document I
- “Electrochemical Extraction of Iron from a Marsian Simulant”,**
C. Dealwis and D.R. Sadoway Document J

“Direct Electrolytic Reduction of Solid SiO₂ in Molten CaCl₂ for Solar Grade Si Production”,

K. Yasuda, T. Nohira, K. Takahashi, R. Hagiwara,
and Y.H. Ogata

Document K

“Recent Progress of Active Metal Processing”,

D. Wang and D.R. Sadoway

Document L

Digest of Poster Presentations

“Production of Titanium Powder Directly from Titanium Ore by Preform Reduction Process”,

H. Zheng and T.H. Okabe

Document M

“Selective Chlorination of Titanium Ore by Electrochemical Method”,

I. Obana and T.H. Okabe

Document N

“Titanium Production Based on the Magnesiothermic Reduction of Titanium Subhalides”,

O. Takeda and T.H. Okabe

Document O

“Electrochemical Pulverization of Bulk Metal for Producing Fine Niobium Powder”,

B. Yuan and T.H. Okabe

Document P

“New Recovery Process of Precious Metals Using Reactive Metal Chloride Vapor Treatment”,

C. Ohkawa and T.H. Okabe

Document Q

List of Participants and Contact Information

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