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)

Contents

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.

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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 SiO_2 in Molten $CaCl_2$ 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 SiO_2 in Molten $CaCl_2$ 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

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