

Program

Metal Separation Technologies III

*Symposium in Honor of Professor Lauri E. Holappa
of the Helsinki Institute of Technology*

Copper Mountain, Colorado

June 20-24, 2004

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Royal Institute of Technology, Sweden

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Sunday, June 20, 2004

16:00 – 18:00	Registration
18:00 – 18:30	Reception
18:30 – 19:30	Dinner
19:30 – 20:30	Social Hour

NOTES

- **Please observe “No Smoking” at ECI technical sessions, meals and social hours.**
- **Speakers should allow time at the end of their presentation for questions and discussion.**
- **Please silence cell phones at all technical sessions.**

Monday, June 21, 2004

07:30 – 08:30 Breakfast

Session Chairs: K. C. Mills & J. W. Evans

Plenary Session

08:30 **T. Emi**, Yonsei University, Korea
Changing Paradigm of Metal Separation Technology for Steel Production

09:00 **A. W. Cramb**, Carnegie Mellon University, USA
Observation and Measurement of Bubble Separation at Liquid Steel-Slag Interfaces

09:30 Coffee and Tea

General Metallurgy I

10:00 **L. E. Holappa**, Helsinki University of Technology, Finland
Glimmers of Research in Metallurgy

10:30 **R. Boom**, Delft University of Technology, Netherlands
Metal Refining with Fractional Crystallization: State-of-the-art and future prospects

11:00 **P. Taskinen**, Outokumpu Research Oy, Finland
Industrial Slag Chemistry- A Case Study of Computational Thermodynamics

11:30 Stretch Break

Session Chairs: R. Boom & V. Sahajwalla

Fundamentals of Pyrometallurgy I

11:45 **F. Kongoli**, FLOGEN Technologies Inc., Canada
Thermodynamic Models for Phase Separation Processes: An Analysis and Critical Review

12:15 **M. Bobadilla**, IRSID – ARCELOR, France
General Thermodynamic Description of Liquid Steels by the “Central Atoms” Model

12:45 **T. Miki**, Tohoku University, Japan
Formulation on Deoxidation Equilibria of Molten High Alloys with Quadratic Formalism and Redlich-Kister Type Polynomial

13:15 Lunch

ad hoc Sessions / Free time

Session Chairs: A. W. Cramb & M. Gaune-Escard

Iron and Steelmaking I

17:30 **K. Nagata**, Tokyo Institute of Technology, Japan
Rapid Pig-Iron Making from Iron Ore Powder at Low Temperature

Monday, June 21, 2004 (continued)

- 18:00 **H. Saxén**, Åbo Akademi University, Finland
Dynamic Model of Liquid Levels in the Blast Furnace Hearth
- 18:30 **K. Naito**, Nippon Steel Corporation, Japan
Recent Change in Refining Process in Nippon Steel Corporation and the Metallurgical Phenomenon in the New Process
- 19:00 **V. Seshadri**, Universidade Federal de Minas Gerais, Brazil
Physical Modeling Simulations of Refining Processes in Brazilian Steel Industry
- 19:30 Dinner
- 21:00 Poster Session and Social Hour

Tuesday, June 22, 2004

07:30 – 08:30 Breakfast

Session Chairs: L. E. Holappa & H. G. Lee

Plenary Session

08:30 **J. W. Evans**, University of California - Berkeley, USA
Copper Electrodeposition onto extended Surface Area Electrodes and the Treatment of Copper Containing Waste Streams

09:00 **M. Gaune-Escard**, Ecole Polytechnique, France
Thermodynamics of Lanthanide Halides and Application to High Temperature Processes

09:30 Coffee and Tea

Molten Salt Technologies

10:00 **T. Tanaka**, Osaka University, Japan
Evaluation of Surface Properties of Liquid Alloys and Molten Ionic Mixtures for Metals Separation Technology

10:30 **R. G. Reddy**, University of Alabama, USA
Aluminum Electrolysis in Ionic Liquids at Low Temperature

11:00 **B. Mishra**, Colorado School of Mines, USA
Separation of Reactive Metals Using Molten Salt Processes

11:30 Stretch Break

Session Chairs: P. Hayes & T. Tanaka

General Metallurgy II

11:45 **H. Jalkanen**, Helsinki University of Technology, Finland
Thermodynamic Modeling of Ammoniacal Nickel Sulphate Solutions

12:15 **P. Scheller**, Freiberg University of Mining and Technology, Germany
Network Between Metallurgy of Steel and Zinc

12:45 **S. Seetharaman**, Royal Institute of Technology, Sweden
Hydrogen Reduction of Complex Oxides- A novel Route Towards the Production of Nano-Grained Alloys and Intermetallics

13:15 Lunch

Conference Excursion

18:00 Dinner

Session Chairs: K. Nagata & R. I. L. Guthrie

Tuesday, June 22, 2004 (continued)

Fundamentals of Pyrometallurgy II

- 19:00 **S. Sun**, CSIRO Mineral, Australia
Critical Condition for Slag Droplet Entrainment in Liquid Metal - A study on Liquid Silver and Alkali Borate Melts at 1000 ° C
- 19:30 **C. Pistorius**, University of Pretoria, South Africa
Kinetics of Carbothermic Reduction Reactions under Heat Transfer Control
- 20:00 **K. Morita**, The University of Tokyo, Japan
Interfacial Reaction of Nitrogen with Molten Fe-S Alloys
- 20:30 **M. Görnerup**, Royal Institute of Technology, Sweden
Foam in Pyrometallurgy
- 21:00 Social Hour

Wednesday, June 23, 2004

07:30 – 08:30 Breakfast

Session Chairs: K. Osseo-Asare & Du Sichen

Plenary Session

08:30 **R.I.L. Guthrie**, McGill University, Canada
Modelling Shrouded Supersonic Jets in BOF Steelmaking

09:00 **M. Hasegawa**, Kyoto University, Japan
Activities of Phosphorous in Copper, Nickel and Cobalt

09:30 Coffee and Tea

Iron and Steelmaking II

10:00 **J. Härkki**, University of Oulu, Finland
Effect of Fluid Flows on Refractory Wear in AOD

10:30 **V. Sahajwalla**, University of New South Wales, Australia
Carbon/slag Interactions During Metal Processing: Wettability and Reactivity Investigations

11:00 **P. Jönsson**, Royal Institute of Technology, Sweden
Presence of Metal Droplets in Slags and their Importance During Ladle Treatment

11:30 Stretch Break

Session Chairmen: S. Sun & J. Zhang

Iron and Steelmaking III

11:45 **K. C. Mills**, Imperial College, UK
Metal Separation Problems in the Continuous Casting of Steel: A Review

12:15 **K. Mukai**, Kyushu Institute of Technology, Japan
Motion of Fine Particles in Liquid Caused by Interfacial Tension Gradient in Relation to Metal Separation Technologies

12:45 **J. A. G. Gnecci**, Instituto Tecnológico de Morelia
Design and Construction of a Pilot Scale Solid/Liquid Separation Plant for Electrical Impedance Measurements

13:15 Lunch

ad hoc Sessions / Free time

16:30 Poster session

Wednesday, June 23, 2004 (continued)

Session Chairs: H. Jalkanen & M. Görnerup

Inclusions I

- 17:30 **Du Sichen**, Royal Institute of Technology, Sweden
Formation and Chemical Development of Non-metallic Inclusions in Steel in Ladle Treatment
- 18:00 **S. Sridhar**, Carnegie Mellon University, USA
Separation of Al_2O_3 Inclusions Across Interfaces Between Molten Steel and Ladle-, Tundish- and Mold-Slags
- 18:30 **H. G. Lee**, Pohang University of Science and Technology, Korea
Inclusion Control in Steels Containing Si, Mn, Ti, Mg and/or Al: Thermodynamic Prediction and Experimental Confirmation
- 19:00 **M. K. Cho**, Yonsei University
Thermodynamic Behavior of Nickel, Cobalt and Phosphorus in CaO-SiO₂-FeO/MnO-(MgO) Slag System
- 19:30 Dinner
- 21:00 Poster Session and Social Hour

Thursday, June 24, 2004

07:30 – 08:30 Breakfast

Session Chairs: P. Taskinen & R. E. Aune

Prof. Takeda Memorial Session

08:30 **K. Nagata**, JSPS, Japan

08:40 **P. Kongoli**, FLOGEN Technologies Inc., Canada

08:50 **M. Sanchez**, Universidad de Concepcion, Chile

Plenary Session

09:00 **M. Sanchez**, Universidad de Concepcion, Chile
Direct Reduction of Chilean Copper Slags: A Waste Treatment Project Process

09:30 **K. Osseo-Asare**, Pennsylvania State University, USA
Complex Liquids in Solvent Extraction: Extractants and Microemulsions, Polymers and Aqueous Two-Phase Systems

10:00 Coffee and Tea

Session Chairs: J. Härkki & P. Scheller

Non-Ferrous Extraction Metallurgy

10:30 **P. C. Hayes**, The University of Queensland, Australia
Kinetics of Reduction of Lead Smelting Slags With Solid Carbon

11:00 **J. Zhang**, University of Science & Technology Beijing, China
A Process Analysis of Pierce-Smith Converter

11:30 **R. H. Eric**, University of the Witwatersrand, South Africa
Separation, Settling and Flow Phenomena in Electric Matte Smelting of Cu-Ni Concentrates

12:00 Stretch Break

12:15 **K. Yamaguchi**, Iwate University, Japan
Phase Equilibrium and Thermodynamics Properties of SiO₂-CaO-FeO_x Slags for Copper Smelting – Research Achievements of Prof. Yoichi Takeda

12:45 Conference Close

13:15 Lunch