The Minerals, Metals & Materials Series
Preface

The symposium Materials Processing Fundamentals is hosted at the annual meeting of The Minerals, Metals & Materials Society (TMS) as the flagship symposium of the Process Technology and Modeling Committee. It is a unique opportunity for interdisciplinary presentations and discussions about, among others, processing, sensing, modeling, multi-physics, computational fluid dynamics, and thermodynamics.

The materials covered include ferrous and nonferrous elements, and the processes range from mining unit operations to joining and surface finishing of materials. Acknowledging that modern processes involve multi-physics, the symposium and its proceedings allow the reader to learn the methods and outcome of other fields modeling practices, often enabling the development of practical solutions to common problems. Modeling of basic thermodynamic and physical properties play a key role, along with computer fluid dynamics and multiphase transport and interface modeling.

Contributions to the proceedings include applications such as steel processing, modeling of steel and nonferrous alloys treatments for properties control, multi-physics, and computational fluid dynamics modeling for molten metal processes and properties measurement. Extractive, recovery, and recycling process modeling are also presented, completing a broad view of the field and practices of modeling in materials processing.

The engagement of TMS and committee members to chair sessions, review manuscript, and help TMS present current practices, makes this symposium and its proceedings possible. The editor and its coeditors acknowledge the invaluable support and contribution of these volunteers as well as TMS staff members, in particular, Patricia Warren, Trudi Dunlap, Carol Matty, and Matt Baker.

Guillaume Lambotte
Jonghyun Lee
Antoine Allanore
Samuel Wagstaff
Contents

Part I Steelmaking—Processing
The Effect of a Sulfur Addition on the Formation and Behavior of CaS Inclusions During a Secondary Refining Process
Without Using a Ca-Treatment ........................................... 3
Takanori Yoshioka, Yuta Shimamura, Andrey Karasev,
Yasuhide Ohba and Pär Göran Jönsson

Desulfurization of Copper-Iron Reduced from Copper Slag ........ 15
Bao-jing Zhang, Ting-an Zhang, Li-ping Niu, Zhi-he Dou,
Zhi-qiang Li and Dong-liang Zhang

Part II Steelmaking—Properties
Effects of Aging Treatment on the Microstructure and Mechanical Properties of a Nanoprecipitates-Strengthened Ferritic Steel ....... 27
Y. Zhao, Y. Cui, H. Guo, S. S. Xu, X. H. Wei and Z. W. Zhang

Part III Multiphysics—Process Modeling and Sensing
Convection-Diffusion Model of Lithium-Bismuth Liquid Metal Batteries ............................................................... 41
Rakan F. Ashour and Douglas H. Kelley

Study on Emulsion Phenomena and Field Flow Pattern in Side-Blown Copper Smelting Process ............................... 53
Xiao-long Li, Ting-an Zhang, Yan Liu and Dong-xing Wang

Study on Minimum Starting Energy of Self-stirring Reactor Driven By Pressure Energy ........................................... 65
Zimu Zhang, Qiuyue Zhao, Maoyuan Li, Xuhuan Guo, Dianhua Zhang and Ting-an Zhang
Part IV  Alloy Processing and Properties Modeling

Yield Strength Prediction in 3D During Local Heat Treatment of Structural A356 Alloy Components in Combination with Thermal-Stress Analysis ................................. 77
Tobias Holzmann, Andreas Ludwig and Peter Raninger

Thermodynamic Properties of Magnetic Semiconductors Ag$_2$FeSn$_2$S$_8$ and Ag$_2$FeSnS$_4$ Determined by the EMF Method .............. 87
Mykola Moroz, Fiseha Tesfaye, Pavlo Demchenko, Myroslava Prokhorenko, Daniel Lindberg, Oleksandr Reshetnyak and Leena Hupa

Effects of Heat Treatment on the Electrochemical Performance of Al Based Anode Materials for Air-Battery .......................... 99
Xingyu Gao, Jilai Xue, Xuan Liu and Gaojie Shi

Part V  Extractive and Recovery Processing

A Current Efficiency Prediction Model Based on Electrode Kinetics for Iron and Copper During Copper Electrowinning .......................... 111
Zongliang Zhang, Joshua Werner and Michael Free

The K$_2$SO$_4$–CaSO$_4$ System and Its Role in Fouling and Slagging During High-Temperature Processes ......................... 133
Fiseha Tesfaye, Daniel Lindberg and Leena Hupa

Waste Lithium-Ion Battery Recycling in JX Nippon Mining & Metals Corporation ........................................ 143
Yasufumi Haga, Katsumi Saito and Kazuhiro Hatano

Maryam Ghodrat, Pezhman Sharafi and Bijan Samali

Leaching Recovery of Silver from Used Radiographic Films .......... 163
A. A. Adeleke, A. N. Adebayo, B. O. Ibitoye and K. E. Oluwabunmi

The Study of Copper Leaching from Conichalcite and Chalcopyrite Using Alternative Lixiviants .......................... 171
Junmo Ahn, Isabel F. Barton, Doyun Shin and Jaeheon Lee

Effect of Chloride Ions on the Copper Extraction Using LIX 984N and Acorga M5910 .......... 181
M. C. Ruiz, J. Risso, R. Sanchez and R. Padilla

CaCl$_2$–O$_2$ Roasting of Stibnite and a Complex Copper Concentrate at 500–650 °C .......... 189
R. Padilla, G. Brito and M. C. Ruiz
Research on Sulfur Conversion Behavior in Oxygen Pressure Acid Leaching Process of High Indium Sphalerite .......................... 199
Yan Liu, Yang-yang Fan, Jun-fu Qi, Lei Tian and Ting-an Zhang

Part VI Poster Session

Hybrid Modeling for Endpoint Carbon Content Prediction in EAF Steelmaking .................................................. 211
Guang-sheng Wei, Rong Zhu, Lingzhi Yang and Tianping Tang

DEM Simulation of Dispersion of Cohesive Particles by Spontaneous Inter-particle Percolation in a 3D Random Packed Bed ................. 225
Heng Zhou, Sheng-li Wu, Ming-yin Kou, Shun Yao,
Bing-jie Wen, Kai Gu and Feng Chang

Author Index .......................................................... 237

Subject Index ....................................................... 239
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Dr. Lambotte is currently serving as the chair of the TMS Process Technology and Modeling Committee and was the recipient of the 2015 TMS EPD Young Leaders Professional Development Award. In 2015, Dr. Lambotte was one of the TMS representatives at the Emerging Leaders Alliance Conference.
**Jonghyun Lee** is an Assistant Professor in the Department of Mechanical Engineering at Iowa State University. He has been conducting multiple industry- and government-funded projects in the field of materials processing as PI and Co-I.

Dr. Lee was the recipient of the Young Leaders Professional Development Award in 2013 from The Minerals, Metals & Materials Society, where he has been serving as a co-organizer and coeditor of the Materials Processing Fundamentals Symposium since 2014 and as a vice-chair of the Process Modeling and Technology Committee since 2017.

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**Antoine Allanore** is an Associate Professor of Metallurgy in the Department of Materials Science and Engineering at MIT. He received his higher education in Nancy (France), where he earned a chemical process engineer diploma from Ecole Nationale Supérieure des Industries Chimiques and a M.Sc. and a Ph.D. from Lorraine University.

Dr. Allanore joined MIT in 2012 as a faculty member, leading a research group that develops sustainable materials extraction and manufacturing processes. He has developed numerous alternative approaches for metals and minerals extraction and processing. With an emphasis on electrochemical methods for both analytical and processing purposes, his group combines experimental and modeling approaches to promptly investigate the ultimate state of condensed matter, the molten state. He teaches thermodynamics and sustainable chemical metallurgy at both the undergraduate and graduate level.
He received the Vittorio de Nora Award from TMS in 2012, and the TMS Early Career Faculty Fellow Award in 2015.

Samuel Wagstaff has been working in the aluminum industry since age 14 with Novelis in Spokane, Washington. He received his B.S. from Cornell University in Mechanical and Aerospace Engineering in 2013. He continued his education at the Massachusetts Institute of Technology in the Department of Materials Science and Engineering.

His Ph.D. on the minimization of macrosegregation through jet erosion of a continuously cast ingot uses a turbulent jet to reduce the uneven distribution in aluminum alloy ingots by over 70%. Dr. Wagstaff finished his masters and doctorate at MIT in September 2016 after just 3 years. He has published more than a dozen articles on DC casting and macrosegregation, and holds 12 patents. He now works for Novelis in Sierre, Switzerland as an Automotive Development and Process Engineer.