MOLTEN 2021
VIRTUAL, KOREA

The 11th International Conference on

Molten Slags, Fluxes and Salts

Feb 21-25, 2021 **Virtual**

The next milestone for scientific knowledge

Hosted by THE KOREAN INSTITUTE OF METALS AND MATERIALS

Organized by BrainKorea21 BrainKorea21

Technically Co-Sponsored by The Chinese Society for Metals · The Iron and Steel Institute of Japan · TMS The Minerals, Metals & Materials Society

Sponsored by posco · LS-Nikko Copper · HYUNDAI STEEL · 한국철강협회 · SeAH Besteel · SeAH CSS · DONGKUK STEEL · SIMPAC · ECOMAISTER · DMR Convergence Research Center · Nonferrous Metallurgy Committee · STOLLBERG · SungEel HiMetal · posco C&C

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WELCOME MESSAGE

Let us take this wonderful opportunity to welcome all our local and foreign delegates to the 11th International Conference on Molten Slags, Fluxes and Salts (MOLTEN 2021) dated February 21-25, 2021

Thank you for your interest in MOLTEN 2021. Due to world-wide spreading of the coronavirus infections (COVID-19), we have decided to hold the MOLTEN 2021 not as an in-person conference as originally planned, but as an online virtual conference.

The conference aims to provide opportunities for researchers and engineers from around the world to present their works and share their ideas in the field of Molten Slags, Fluxes and Salts. Significant advancements in all aspects of research, development, and applications shall be covered within technical presentations and posters. Another aim of the conference is to enhance the relationships between member societies and to share common goals of research, development, and application in this important field of materials.

Specifically, MOLTEN 2021 explores the recent progress in slags, fluxes and salts research based on the rich heritage from 40 years of past endeavors providing the seed for another 40 years of research growth in our field of excellence. Regardless of the field of ferrous and non-ferrous communities, environment, or energy, we hope that researchers can discuss opportunities for the present and future.

We made every effort to make this conference very useful to all participants. Despite of this difficult situation, we hope most of you will participate in MOLTEN 2021 and strengthen our communication.

We thank you again for your participation and look forward to looking back at the 40-year history and discussing the 40 years to come with you at MOLTEN 2021.

Dong Joon MIN

Conference Chair, MOLTEN 2021
Yonsei University

Joo CHOI

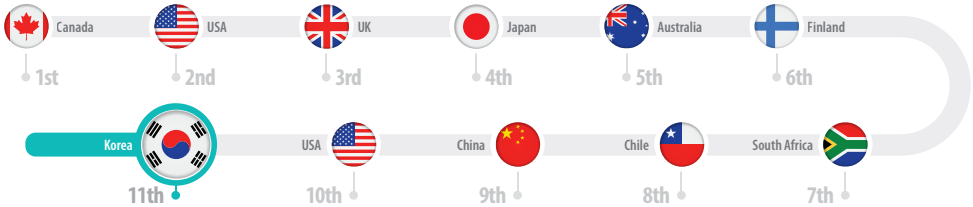
Conference Co-Chair, MOLTEN 2021
POSCO

OVERVIEW

1st Virtual Conference of MOLTEN in **40** Years

4 Plenary & **46** Keynote Talks by Prestigious Scholars

145 Oral & **50** Poster Presentations from **23** Countries



Title	The 11th International Conference on Molten Slags, Fluxes and Salts (MOLTEN 2021)
Date	February 21 (Sun) - 25 (Thu), 2021
Venue	Virtual, Korea
Program	FactSage Short Course, Plenary & Keynote & Oral & Poster Session, Discussion Session, Opening Ceremony
Hosted by	The Korean Institute of Metals and Materials
Organized by	Innovative Materials Convergence Education & Research Center at Hanyang University ERICA Education and Research Division for Futuristic Human-centric Materials, Yonsei University
Technically Co-Sponsored by	The Chinese Society for Metals The Iron and Steel Institute of Japan The Minerals, Metals & Materials Society
Sponsored by	POSCO, LS-Nikko Copper, Hyundai Steel, KOSA, SeAH Besteel, SeAH CSS, Dongkuk Steel, SIMPAC, ECOMAISTER, KIGAM, KIM Nonferrous Metallurgy Committee, Stollberg & Samil, SungEel HiMetal, POSCO C&C
Supported by	The Korean Federation of Science and Technology Societies, Seoul Metropolitan Government, Korea Tourism Organization
Website	www.molten2020.org

COMMITTEE

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Physical Chemistry Fundamentals

Joonho LEE	Korea University	Korea
Sridhar SEETHARAMAN	Colorado School of Mines	USA

Nonferrous & Ferroalloys

Joo Hyun PARK	Hanyang University	Korea
Jafar SAFARIAN	Norwegian University of Science and Technology	Norway

Ironmaking

Sung Mo JUNG	Pohang University of Science and Technology	Korea
Nurni VISWANATHAN	Indian Institute of Technology Bombay	India

Thermodynamic Modeling

In-Ho JUNG	Seoul National University	Korea
Evgueni JAK	University of Queensland	Australia

Steelmaking

Youn-Bae KANG	Pohang University of Science and Technology	Korea
Hiroyuki SHIBATA	Tohoku University	Japan

Recycling & Energy Saving

Il SOHN	Yonsei University	Korea
Jinichiro NAKANO	National Energy Technology Laboratory	USA

Continuous Casting Mold Fluxes

Jung Wook CHO	Pohang University of Science and Technology	Korea
Wanlin WANG	Central South University	China

Electrometallurgy & Molten Salts

Jong Hyeon LEE	Chungnam National University	Korea
Toru OKABE	University of Tokyo	Japan

Refractory

Yongsug CHUNG	Korea Polytechnic University	Korea
Muxing GUO	Katholieke Universiteit Leuven	Belgium

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Marie-Aline VAN ENDE	Seoul National University	Korea

CONFERENCE TOPICS

Ferroalloys slags	Physicochemical properties of slags
I. manganese ferroalloys slags	I. viscosity
II. physicochemical properties of ferroalloys slags	II. physical property and structure characterization
	III. multiphase crystallization
	IV. application to steelmaking
Refractories	**Characterization of slags**
I. refractory-slag reaction	I. in-situ observation
Electrochemical processing and molten salts	**Energy and environments**
I. molten salts for REM recovery	I. energy recovery and environmental protection
II. molten salts for metal production	
Recycling and sustainability	**Thermodynamics**
I. sustainable utilization of slag and refractory	I. phase diagrams and refining thermodynamics
II. slag valorization and processing for higher values	
III. novel processing of co-products	

Non-ferrous slags	Ferrous slags
I. phase equilibria of Cu smelting slag	I-1. ironmaking-1: iron ore reduction and slag formation
II. industrial applications	I-2. ironmaking-2: physicochemical properties of ironmaking slag
	II-1. steelmaking-1: primary steelmaking slag
	II-2. steelmaking-2: refining slag in HMP, BOF, EAF
Kinetics	II-3. steelmaking-3: secondary refining and steel quality
I. multiphase reaction kinetics	III-1. inclusion-1: clean steel practice
Ash and weld fluxes	III-2. inclusion-2: inclusion control by slag
I. coal ash	IV-1. mold flux-1: mold fluxes for high Al-steels
	IV-2. mold flux-2: mold flux fundamentals
Modeling	
I. measurement and modeling of physicochemical properties	
II. thermodynamic database development	

PROGRAM AT A GLANCE

FactSage Short Course

Feb 15-19, 2021

Installation of FactSage 8.1 Workshop Version

February 15 (Mon)

- FactSage is working only on Windows operation system. If the participants use Linux system, please install Windows operation system.

YouTube Videos for Self-Learning Instructions

February 15 (Mon) - 17 (Wed)

- Over 20 hrs of video clips for FactSage manuals and examples will be shared for self-learning of FactSage program.

Online Zoom Case Study Sessions

February 18 (Thu) - 19 (Fri)

- All the case studies will be collected from the participants by Feb 16 and demonstrated on Feb 18 and 19 through Zoom online meeting (or video-recording, if necessary).
- Zoom case study session schedule (Time: South Korean time zone)

Time Zones	Participant for Asia, India, Middle East	Participant from Europe, Africa and North & South America
Feb 18 (Thu)	Session #1 (10:00 AM - 3:00 PM)	Session #2 (10:00 PM - 2:00 AM)
Feb 19 (Fri)	Session #3 (10:00 AM - 3:00 PM)	Session #4 (10:00 PM - 2:00 AM)

- Four sessions will be opened and participants can choose any session (or all) which is more convenient.

Program Overview

Feb 22-25, 2021

Feb 22 (Mon)	Feb 23 (Tue)	Feb 24 (Wed)	Feb 25 (Thu)
Opening Ceremony **Congratulatory Speech**	**Discussion Session**	**Discussion Session**	**Discussion Session**
Plenary / Keynote / Oral / Poster Sessions			

- **All presentation VODs** will be opened on our virtual website **from February 20 to 25**.
- **A special discussion session will be opened via Zoom each day** at a specific time slot. Thus, everyone (including presenter, audience and moderator) will virtually meet through daily Zoom discussion session on difference timetables.

Inauguration Ceremony

Feb 22, 2021

Opening Address

Dong Joon MIN
Conference Chair, MOLTEN 2021

Welcoming Address

Kyung-Ho SHIN
President, KIM

Congratulatory Speech

Duk-Lak LEE
Vice President, POSCO

Congratulatory Speech

Suk-goo DOH
CEO, LS-Nikko Copper

40 Years Anniversary Celebration

- History of Molten Slag Conferences (Joohyun PARK, Hanyang University)
- Awarding a MOLTEN Appreciation Plaque to Former Chairmen

Chairman of MOLTEN 2000
Seshadri SEETHARAMAN
KTH Royal Institute of Technology, Sweden

Chairman of MOLTEN 2000
Lauri HOLAPPA
Aalto University School of Chemical Engineering, Finland

Chairman of MOLTEN 2004
P. Chris PISTORIUS
Carnegie Mellon University, USA

Chairman of MOLTEN 2009
Mario SANCHEZ
Universidad Andrés Bello, Chile

Chairman of MOLTEN 2012
Kuo-Chih CHOU
University of Science and Technology Beijing, China

Chairman of MOLTEN 2016
Ramana REDDY
The University of Alabama, USA

Presentation of Next Venue for MOLTEN 2024

Discussion Sessions (KST)

Feb 23-25, 2021

	February 23 (Tuesday)		
16:00-17:00	**Modeling I** (measurement and modeling of physicochemical properties)		
17:00-18:00	**Modeling II** (thermodynamic database development) (90min)	**Ferroalloys slags I** (manganese ferroalloys slags)	**Physicochemical properties of slags I** (viscosity)
18:00-19:00		**Ferroalloys slags II** (physicochemical properties of ferroalloys slags)	**Physicochemical properties of slags II** (physical property and structure characterization)
19:00-20:00	Break	Break	**Physicochemical properties of slags III** (multiphase crystallization)
20:00-21:00	**Thermodynamics I** (phase diagrams and refining thermodynamics) (90min)	**Non-ferrous slags I** (Phase equilibria of Cu smelting slag)	Break
21:00-22:00		**Non-ferrous slags II** (Industrial applications)	**Physicochemical properties of slags IV** (application to steelmaking)

	February 24 (Wednesday)		
16:00-17:00	**Ferrous slags I-1** (ironmaking-1: iron ore reduction and slag formation)	**Ferrous slags II-1** (steelmaking-1: primary steelmaking slag)	
17:00-18:00	**Ferrous slags I-2** (ironmaking-2: physicochemical properties of ironmaking slag)	**Ferrous slags II-2** (steelmaking-2: refining slags in HMP, BOF, EAF)	
18:00-19:00	Break	**Ferrous slags II-3** (steelmaking-3: secondary refining and steel quality) (90min)	**Characterization of slags I** (in-situ observation)
19:00-20:00			Break
20:00-21:00	**Ferrous slags III-1** (inclusion-1: clean steel practice)	Break	**Electrochemical processing and molten salts I** (molten salts for REM recovery)
21:00-22:00	**Ferrous slags III-2** (inclusion-2: inclusion control by slag)	**Kinetics I** (multiphase reaction kinetics)	**Electrochemical processing and molten salts II** (molten salts for metal production)

	February 25 (Thursday)	
16:00-17:00	**Ferrous slags IV-1** (mold flux-1: mold fluxes for high Al-steels)	**Refractories I** (refractory-slag reaction)
17:00-18:00	**Ferrous slags IV-2** (mold flux-2: mold flux fundamentals) (90min)	Break
18:00-19:00		**Energy and environments I** (energy recovery and environmental protection)
19:00-20:00		**Recycling and sustainability I** (sustainable utilization of slag and refractory)
20:00-21:00		**Recycling and sustainability II** (slag valorization and processing for higher values)
21:00-22:00	**Ash and weld fluxes I** (coal ash)	**Recycling and sustainability III** (novel processing of co-products)

Award & Event

MOLTEN 2021 Young Slag Scientist Award

Posters are judged by reviewers of the MOLTEN 2021 and consideration is given to scientific rigour, contribution to the field, relevance to the conference theme and overall presentation. All posters will be eligible for this award provided they meet the requirements listed below:

- The presentations should consist of well-prepared visual materials about the research.
- Selections will be based on the level of the research, quality of the poster and clarity of the presentation.

Join Exciting Events and Win Prizes

Be the Most Viewed Presenter

· Oral and poster presentations win the event.
· Take a chance to grab a total prize of USD 100.
· The number of clicks is limited to one per day with the same IP.
· Winners will be announced on the website after the conference.

Share Your Moment with Us

· Take any pictures or selfie during your participation in the conference.
· You can post a picture through the event board on our virtual page.
· Winners will be announced on the website after the conference.

International Participants | $30

Korean Participants | KRW 30,000

INTRODUCING OUR NEW PLATFORM

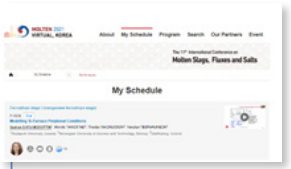
We are excited about our virtual platform and the experience it will provide. The new platform is sure to make the conference a remarkable experience.

Virtual Platform Access

- Participants who have completed registration can only access the virtual page with the registered login information.
- Click "Virtual conference" on the main page of the website (www.molten2020.org) to access the virtual page.

Sneak Peek of Virtual Platform

Our virtual website will help you have the best experience at MOLTEN 2021.



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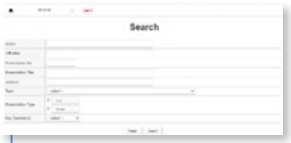


With a single click, you can find any presentations you want to watch.

Join the live streaming opening ceremony and participate in live discussion sessions.

Post a picture to share your moment and create memories at MOLTEN 2021.

Watch recent research from researchers and engineers around the world to enrich your knowledge and share ideas in the field of Molten Slags, Fluxes and Salts!

KEY SPEAKERS

Plenary Speakers

Structure of Aluminosilicate Melts

Bjorn MYSEN
Geophysical Laboratory, USA

Solid Oxide Membrane-Based Technologies for Energy and Environmental Sustainability

Uday PAL
Boston University, USA

The Structure and Properties of Molten Oxide Slags

Arthur PELTON
University of Montreal, Canada

Advancing Metallurgical Frontier through Slag Physical Chemistry

Toshihiro TANAKA
Osaka University, Japan

Keynote Speakers

Antoine ALLANORE

Massachusetts Institute of Technology, USA

Melts Electrochemistry: Theoretical and Experimental Insights

Mansoor BARATI

University of Toronto, Canada

Cold Fluid Physical Modeling of Air Blast Slag Atomization

Chenguang BAI

Chongqing University, China

Some Aspects on the Viscosity of the Slag Containing Titanium Oxide

Bart BLANPAIN

Katholieke Universiteit Leuven, Belgium

Slag Engineering and Valorization in the Framework of Sustainable Metallurgy

Jung Wook CHO

Pohang University of Science and Technology, Korea

Mold Flux for High Aluminium Containing Steels

Geoffrey BROOKS

Swinburne University of Technology, Australia

Towards a More Comprehensive Understanding of Slag Chemistry

Kuo-Chih CHOU

University of Science and Technology Beijing, China

New Progress in Calculating Physicochemical Properties from Limited Solubility Systems

Kenneth COLEY

Western University, Canada

Kinetics of MnO Reduction from Slag; Comparison of Carbon and Silicon as Reductants

Yongsug CHUNG

Korea Polytechnic University, Korea

Dissolution Phenomena of Refractory Raw Materials in Liquid Slags

Sichen DU

KTH Royal Institute of Technology, Sweden

The Laboratory Study of Metallurgical Slags and the Reality

Geir Martin HAARBERG

Norwegian University of Science and Technology, Norway

Electrodeposition of Silicon from Molten Salt Electrolytes

Timo FABRITIUS

University of Oulu, Finland

Physico-chemical Properties of Slag in Different Stages of Its Life Cycle - Case Studies from Recent Slag Research

Peter HAYES

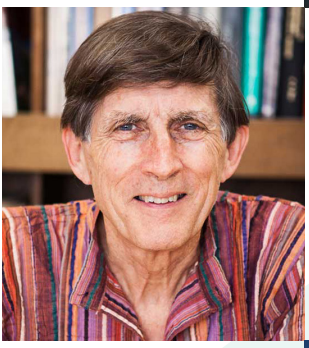
The University of Queensland, Australia

Solidification of Oxide Melts

Ryo INOUE

Akita University, Japan

Control of Hydration of Free Magnesia in Steelmaking Slag



Lauri HOLAPPA

Aalto University School of Chemical Engineering, Finland

A Review of Circular Economy Prospects for Stainless Steelmaking Slags

In-Ho JUNG

Seoul National University, Korea

Challenges in the Phase Diagram Study of Alkali Oxide Systems

Youn-Bae KANG

Pohang University of Science and Technology, Korea

Progress of Thermodynamic Modeling for Sulfide Dissolution in Molten Oxide Slags: Model Development, Interpretation, and Application

Sung Mo JUNG

Pohang University of Science and Technology, Korea

Formation and Reduction of NO from Nitrogen in the Combustion of the Fuels Used in the Sintering Process of Iron Ore

Joonho LEE

Korea University, Korea

Role of Hydrogen Gas in Blast Furnace Operation - Improved Wettability of Carbon by Molten Slag

Sung Keun LEE

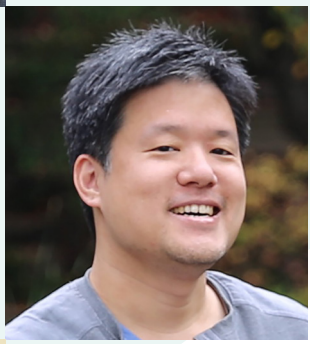
Seoul National University, Korea

Structure of Molten Oxides and Glasses above Mega-bar Pressures: Insights from High-resolution Solid-state NMR and Inelastic X-ray Scattering

JongHyeon Lee

Chungnam National University, Korea

Alternative Way of Producing Rare Metals by a Molten Salt Based Process of Oxide Feedstocks



Jean LEHMANN

ArcelorMittal Global R&D - Maizières-lès-Metz, France

Development of a Slag Model to Better Understand and Control Steelmaking Processes

Lev Medovar

National Academy of Science of Ukraine, Ukraine

Slag Metallurgy for Steel (on the Base of Electro Slag Refining and Remelting Process)

Zushu LI

University of Warwick, UK

BOS Slag: Formation, Reaction and Energy/ Materials Recovery

Kazuki MORITA

The University of Tokyo, Japan

Thermodynamics on Slag Refining of Molten Si and Si-based Alloys

Toru H. OKABE

The University of Tokyo, Japan

Recycling of Critical Metals by Utilizing Molten Salt

Viswanathan N. NURNI

Indian Institute of Technology Bombay, India

Static Liquid Holdup in the Blast Furnace Dripping Zone - A Fundamental Study

Oleg OSTROVSKI

University of New South Wales, Australia

Challenges in the Mould Flux Design

Joo Hyun PARK

Hanyang University, Korea

Physicochemical Properties of Slags for Improvement of Steel Cleanliness ; Case Studies of LF, RH and Tundish Conditions

Jong-Jin PAK

Hanyang University, Korea

Formation of Nitride and Oxide Inclusions in Ferritic Stainless Steel Melts

P. Chris PISTORIUS

Carnegie Mellon University, USA

Critical Issues in the Kinetics of Steel-slag-inclusion Reactions

Ramana G. REDDY

The University of Alabama, USA

Sulfide Capacities of Steel Making Slags

Eugene PRETORIUS

Nucor Steel, USA

The Role of Transient Slags in Steelmaking

Gudrun SAEVARSDOTTIR

Reykjavik University, Iceland

Reducing the Carbon Footprint: Primary Production of Aluminum and Silicon Metal with Changing Energy Systems and the Risk of Carbon Leakage

Johannes SCHENK

Montanuniversität Leoben, Austria

Processing and Utilization of Steelmaking Slags in the European Union

Mario SANCHEZ

Universidad Andrés Bello, Chile

Use of Copper Slag for Iron Alloys Fabrication. A Circular Economy Approach for the Chilean Metallurgical Industry

Seshadri SEETHARAMAN

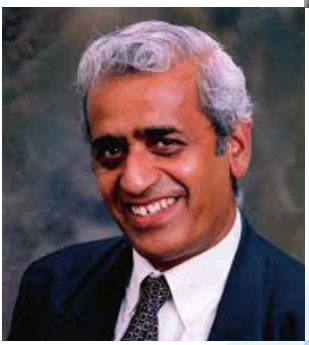
KTH Royal Institute of Technology, Sweden

Some Recycling Aspects of Molten Slags, Fluxes and Salts

Hiroyuki SHIBATA

Tohoku University, Japan

Thermophysical Properties of Silicate Melts and Glasses



Dieter SENK

RWTH Aachen University, Germany

Process Concept for the Dry Recovery of Thermal Energy of Liquid Ferrous Slags

Il SOHN

Yonsei University, Korea

Perspectives of Slag "Co-product" Zero Waste Full Utilization

Merete TANGSTAD

Norwegian University of Science and Technology, Norway

Slag Properties in the Primary Production Process of Mn-ferroalloys

Ryosuke O. SUZUKI

Hokkaido University, Japan

Metal Production after Sulfurization of Oxide

Xinhua WANG

Shougang Group Co., Ltd., China

Investigation on the Slag for Production of Extra-Low P Steels by "Slag-Remaining + Double-Slag" BOF Steelmaking Process

Sangho YI

POSCO, Korea

A Novel Process for the Smelting Reduction of Silicate Fluxed Chromite Ore Fines using FINEX® Platform Technology

Wanlin WANG

Central South University, China

Development of Non-reactive Mold Flux for the Casting of AHSS

Enno ZINNGREBE

Tata Steel Europe, Netherlands

Steel-sidewall Interfaces in a Steel Continuous Caster: An Interconnected System of Reaction Sites

MOLTEN 2021
VIRTUAL, KOREA

PRESENTATION LIST

Ferroalloys slags I

manganese ferroalloys slags

P-1036 Modelling Si-Furnace Operational Conditions
Gudrun SAEVARSDOTTIR[1], Merete TANGSTAD[2], Thordur MAGNUSSON[3], Yonatan TESFAHUNEGN[1]
[1]Reykjavik University, Iceland, [2]Norwegian University of Science and Technology, Norway, [3]Stakksberg, Iceland

P-0249 Foaming of Silicomanganese Slag during Carbothermic Reduction
Vincent CANAGUIER, Merete TANGSTAD
Norwegian University of Science and Technology, Norway

P-0907 Formation of Carbides, TiC and SiC in Industrial Production of SiMn Alloys
Eli RINGDALEN, Kai TANG
SINTEF Industry, Norway

P-0330 Slag Properties in the Primary Production Process of Mn-Ferroalloys
KEYNOTE
Merete TANGSTAD
Norwegian University of Science and Technology, Norway

P-0308 Investigation of Liquid Slag-Metal Behaviour at Elevated Temperature: Interaction between Liquid FeMn Slag and Liquid FeMn Metal
Sarina BAO[1], Martin SYVERTSEN[1], Merete TANGSTAD[2], Morten ONSØIEN[1], Kristian Etienne EINARSRUD[2], Sergey BUBLIK[2]
[1]SINTEF Industry, Norway, [2]Norwegian University of Science and Technology, Norway

P-0440 Molten Ferromanganese Slag Production from Mn-ores
Tichaona MUKONO, Maria WALLIN, Merete TANGSTAD
Norwegian University of Science and Technology, Norway

Ferroalloys slags II

physicochemical properties of ferroalloys slags

P-0972 KEYNOTE
A Novel Process for the Smelting Reduction of Silicate Fluxed Chromite Ore Fines Using FINEX® Platform Technology
Sangho YI, Youngseuk LEE, Hyunsoo KIM
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P-1414
Thermodynamic Analysis of Sulfur in Slag and Alloy Melt Produced from Spent Catalyst in Petroleum Refinery
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P-0201
Influence of Sulphur on the Interfacial Behaviour between FeMn Alloy-Slag and SiMn Alloy-Slag
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P-0127
Formation of Slag in Si and FeSi Furnaces
Marit Buhaug FOLSTAD[1], Merete TANGSTAD[1], Eli RINGDALEN[2]
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P-0530
The Production of Pig Iron and Calcium Aluminate Slags for Alumina Recovery from Bauxite Ore
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Physicochemical properties of slags I

viscosity

P-0647 Composition-Structure-Viscosity Relationship of $CaO-Al_2O_3-Fe_tO-SiO_2-MgO$ Slag
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P-0366 Some Aspects on the Properties of the Slag Containing Titanium Oxide
KEYNOTE
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P-0252 The Viscous Behavior of High FeO-bearing Slag Melts Considering Polymeric Unit of Slags
Joon Sung CHOI, Dong Joon MIN
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P-0132 Relation between Local Structure Environment of Iron Ions and Iron Oxide Activities in the $Na_2O-SiO_2-FeO-Fe_2O_3$ Slags
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P-0235 Physical Properties of Blast Furnace Slag with Full-Ratio V-Ti-Magnetite
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Physicochemical properties of slags II

physical property and structure characterization

P-0266 Thermophysical Properties of Silicate Melts and Glasses
KEYNOTE
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P-1108 Structure of Molten Oxides and Glasses above Mega-Bar Pressures: Insights from High-Resolution Solid-State NMR and Inelastic X-Ray Scattering
KEYNOTE
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P-0683 The Extent of Disorder in Iron-bearing $NaAlSi_3O_8$ and $CaAl_2Si_2O_8$ Glasses: Multi-Nuclear (^{29}Si, ^{27}Al, and ^{17}O) Solid-State NMR Study
Hyo-Im KIM, Sung Keun LEE
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P-0226 Effects of Atmosphere and Melting Time on Surface Tension of Iron Silicate Melt
Sohei SUKENAGA[1], Sakiko KAWANISHI[1], Masahito UCHIKOSHI[1], Shingo ISHIHARA[1], Shungo NATSUI[1], Ko-Ichiro OHNO[2], Noritaka SAITO[2], Kunihiko NAKASHIMA[2], Masanori TASHIRO[1], Hiroyuki SHIBATA[1]
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P-0890 Thermal Conductivity Model of the Oxide Melt
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P-1010 Thermal Conductivity Measurements of Solid Mattes Containing Fe-S-Ni-Cu-Co from 100-450°C
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Physicochemical properties of slags III

multiphase crystallization

P-0261 Characterization of Secondary Phases Dispersed in Molten Slags Utilizing Alternative Current Field
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P-0704 Solidification of Oxide Melts
KEYNOTE
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P-0451 Investigation on Crystallization of Steelmaking Slag and Mould Fluxes
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P-1129 Effect of TiO_2 and SiO_2 on the Crystal Morphology CaF_2-Al_2O_3-CaO Base Electroslag Remelting Slags
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P-0580 Effect of Crystallization on the Electrical Conductivity of CaO-Al_2O_3-SiO_2-MgO Slag under Isothermal Condition
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P-1139 A Method to Identify the Kinetics of Solid-Phase Growth during Slag Isothermal Crystallisation
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Physicochemical properties of slags IV

application to steelmaking

P-0899 Influences of DRI Addition and Bubble Sizes on the Foaming Behavior of EAF Slags

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P-0198 The Laboratory Study of Metallurgical Slags and the Reality

KEYNOTE

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P-0696 Optimization of Slag Composition for Efficient Dephosphorization and Slag Foamability

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P-0208 Physico-Chemical Properties of Slag in Different Stages of Its Life Cycle – Case Studies from Recent Slag Research

KEYNOTE

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P-0582 Interaction Behavior of Biocarbon with Electric Arc Furnace Slag

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Non-ferrous slags I

phase equilibria of Cu smelting slag

P-0186 Thermodynamic Behavior of Industrial Copper Production Slag Saturated with Copper and Iron
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P-0887 Characterisation of Complex Systems through Integrated Experimental and Thermodynamic Modelling Research for Pyrometallurgical Processing
Evgueni JAK, Maksym SHEVCHENKO, Denis SHISHIN, Peter HAYES
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P-0768 Experimental Investigation of Phase Equilibria in the "$CuO_{0.5}$"- MgO - SiO_2 System in Equilibrium with Liquid Cu Metal
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P-0731 Experimental Study of Slag/Matte/Metal/Tridymite Phase Equilibria in the Cu-Fe-O-S-Si System at 1200 °C
Svetlana SINEVA, Denis SHISHIN, Maksym SHEVCHENKO, Peter HAYES, Evgueni JAK
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P-0797 The Effect of MgO on High-Alumina Iron Silicate Slag - Spinel Equilibrium in Secondary Copper Smelting
Anna DANCZAK, Lassi KLEMETTINEN, Pekka TASKINEN, Daniel LINDBERG, Ari JOKILAAKSO
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Non-ferrous slags II

industrial applications

P-0303 Mechanical Copper Entrainment Related to Solid Phases within Smelting Slags
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P-0785 Pilot Scale Powder Injection Practice for Metal Recovery from Copper Slag
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P-0892 Development of Mitsubishi C-Furnace Simulation Model for Cu Converting Process and Its Industrial Applications
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P-1011 Behaviour of Silver and Molybdenum, as Minor Elements, during the Controlled Cooling Treatment of Copper Smelting Slag for Further Grinding and Froth Flotation
Camila PIZARRO, Leandro VOISIN, Julio OSSANDON
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P-0919 Phase Relations and Evolution of Gangue Minerals in the Black Top of a PGM Smelter
Oscar RIVERA LI KAO, Andrie GARBERS-CRAIG
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P-0312 A Qualitative Study on Matte/Slag/Copper Interactions with Water/MEG
Tijl CRIVITS, Thomas SUETENS, Lawrence BILLINGTON, Ans GOSSELÉ, Jonathan PELGRIMS, Tom HENNEBEL
Umicore, Belgium

Ferrous slags I-1

ironmaking-1: iron ore reduction and slag formation

P-0164 Role of Hydrogen Gas in Blast Furnace Operation - Improved Wettability of Carbon by Molten Slag
KEYNOTE
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P-0184 Characterization of Slag Formed by Melting DRI Phase Relationship Phosphorus Partition and Vanadium Partition
Amanda VICKERFÄLT, Oscar HESSLING, Johan MARTINSSON, Hedda POUSETTE, Du SICHEN
KTH Royal Institute of Technology, Sweden

P-0400 Comparison on Transient Shrinkage Behavior of Ternary-Component Slags in CO/H_2 Atmosphere under Simulated Blast Furnace Cohesive Zone Conditions
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P-0802 Effect of Melt Formation and Pore Structure on Reduction Rate of Iron Ore Sinter
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P-0340 Effect of Fluxing in the Iron Ore Pellets on the Capacity of Phosphorus Removal of the Self-Formed Slag by DRI Melting
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P-0506 Numerical Investigation of Slag Flow through a Coke Funnel and Packed Bed
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Ferrous slags I-2

ironmaking-2: physicochemical properties of ironmaking slag

P-0517 Static Liquid Holdup in the Blast Furnace Dripping Zone – a Fundamental Study
KEYNOTE
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P-0159 Effect of Coal and Coke Ash on Blast Furnace Slag Formation – Comparison between PCI, Charcoal, Fossil-based Coke and Bio-Coke
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P-0212 An Innovation Slag System for High Alumina Iron Ore in Blast Furnace Process
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P-1314 The Properties of Low MgO Slag in the Actual Blast Furnace Operation
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P-0156 Evaluation of Evaporation Kinetics of Potassium from Synthetic Blast Furnace Slag Using Full Factorial Design of Experiments
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P-0456 Perovskite Formation Mechanism in Hematite-Ilmenite Ore Sinter Blend in Argon Atmosphere by In-situ X-Ray Diffraction
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P-1158 The Relationship between Viscosity and Sulfide Capacity of BF Slag
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Ferrous slags II-1

steelmaking-1: primary steelmaking slag

P-0358 Towards a More Comprehensive Understanding of Slag Chemistry
KEYNOTE
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P-0941 Modeling Study on the Dynamic Evolution of Slag Foaming
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P-0329 Assessment of the Application Possibilities of Foaming Index on Industrial BOF Process Data
Lotte DE VOS[1], Inge BELLEMANS[1], Carina VERCRUYSSEN[2], Kim VERBEKEN[1]
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P-0192 The Impact of Solid Particles on Foams – Cold Model and High Temperature Experiments
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P-0262 BOS Slag: Formation, Reaction, and Energy and Materials Recovery
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P-0375 Evaluation of Dissolution Rate and Behaviour of MgO Carriers for Primary and Secondary Metallurgical Slag
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Ferrous slags II-2

steelmaking-2: refining slag in HMP, BOF, EAF

P-0956 How to Design Hot Metal Desulphurisation Slag with a High Sulphur Capacity and Low Iron Entrapment?

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P-0896 Improved Hot Metal Desulphurisation Performance through Intelligent Use of Slag Conditioner

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P-0200 **KEYNOTE** Investigation on the Slag for Production of Extra-Low P Steels by "Slag-Remaining + Double-Slag BOF Steelmaking Process

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P-0780 How Does Solid Phase Precipitation Affect the Evolution of Phosphorus Removal during the BOF Process? Thermochemical and Industrial Aspects

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P-0498 A Technology of Slag Making for Dephosphorization in Molten Steel during De-P Converter Process

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P-0113 Effect of Fluorspar on Dephosphorization Efficiency and Refractory Corrosion in EAF Process Using Dirct Reduced Iron (DRI)

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Ferrous slags II-3

steelmaking-3: secondary refining and steel quality

P-0738 Improvement of Desulfurization Efficiency by the Submaterial Addition in the Shaft Type EAF
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P-0652 Effect of Industrial Wastes on Desulfurization Behavior of Molten Steel
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P-0534 Thermo-Calc's TCOX10 database & Process Metallurgy Module
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P-0817 Thermochemical Process Simulations Using the Connected Local Equilibria Method – Applying SimuSage and ChemApp to Model Slag Behavior in Metallurgical Processes
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P-0170 Chromium Spinel Formation in Stainless Steel Slag
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P-1163 Numerical Modelling of AOD Slag Structure during Cooling
Ville-Valtteri VISURI, Eetu-Pekka HEIKKINEN, Aki KÄRNÄ, Petri SULASALMI, Timo FABRITIUS
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P-0560 Improvement of High Quality of the New Mold Steel by ESR
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P-0796 Slag Metallurgy for Steel (On the Base of Electro Slag Refining and Remelting Process)
KEYNOTE
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P-0678 Steel-Sidewall Interfaces in a Steel Continuous Caster: an Interconnected System of Reaction Sites
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Ferrous slags III-1

inclusion-1: clean steel practice

P-0436 The Spontaneous Emulsification of Entrained Inlcusions during Casting of High Aluminium Steels
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P-0553 Effect of Ladle Glaze on the Evolution of Non-Metallic Inclusions during LMF Operation
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P-0668 Formation of Nitride and Oxide Inclusions in Ferritic Stainless Steel Melts
KEYNOTE
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P-1277 Optimization the Slag Composition for Cleanliness in Ultra Low Carbon Steel
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P-0131 The Role of Transient Slags in Steelmaking
KEYNOTE
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P-1416 A Comprehensive Investigation of Oxide Particles Dissolution in the Metallurgical Slag: an Overview of In-Situ Observation Experiments and Theoretical Studies
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P-0485 Dissolution Rate of Al_2O_3 Inclusion into CaO-Al_2O_3-Fe_tO-MgO-SiO_2 Slag System and Its Kinetic Analysis
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Ferrous slags III-2

inclusion-2: inclusion control by slag

P-0598 Effect of Medium Basicity Refining Slag on the Cleanliness of High Grade Hot Rolled Steel
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P-0503 Influence of Slag Properties on the Behavior of Nonmetallic Inclusions
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P-0526 **KEYNOTE** Physicochemical Properties of Slags for Improvement of Steel Cleanliness ; Case Studies of LF, RH and Tundish Conditions
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P-1261 Effect of CaO/Al_2O_3 Ratio of the Slag on the Formation Behavior of Inclusions in the Al Killed Molten Steel
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P-1101 **KEYNOTE** Critical Issues in the Kinetics of Steel-Slag-Inclusion Reactions
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P-1055 Evolution of Non-Metallic Inclusions Due to Slag/Metal Reactions in Highly Alloyed Steels
Bryan WEBLER, Andrew HUCK
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P-0959 Study on Inclusion Composition during Ladle Refining Process of Tire Cord Steel
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Ferrous slags IV-1

mold flux-1: mold fluxes for high Al-steels

P-1132 Mold Flux for High Aluminium Containing Steels
KEYNOTE
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P-0351 Prediction of Al_2O_3 Content in Mold Flux during Continuous Casting
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P-0602 Development of Non-reactive Mold Flux for the Casting of Advanced High Strength Steels
KEYNOTE
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P-0394 Effect of Na_2O on Properties and Structure of CaO-Al_2O_3-Based Mould Fluxes
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P-0242 Investigation of Calcium Aluminate based Mold Slag Compositions
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P-0612 Investigation on Properties of Mold Fluxes during Continuous Casting of High-Al Containing Electrical Steels
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Ferrous slags IV-2

mold flux-2: mold flux fundamentals

P-0118 New Mold Slag Compositions for the Continuous Casting of Soft Steels
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P-0219 Effect of Li_2O on the Crystallization of Fluorosilicate Glass and Molecular Dynamics Simulation Analysis
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P-0193 Heat Transfer Control by Dispersed Metallic Particles in $CaO-Al_2O_3-CaF_2$-based Glassy Mold Flux Film for Continuous Steel Casting
Sung-Hee HYUN, Jung-Wook CHO
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P-0699 Uncertainty of Physical Property Measurement of Slag / Flux with Volatiles
Junxue ZHAO, Ze WANG, Zhongyu ZHAO, Liang NIU, Boqiao QU, Zexin TAN, Yaru CUI
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P-0545 Development of Experimental Techniques for Qualification of Mould Fluxes for Continuous Casting of Liquid Steel
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P-0353 Correlation of the High Temperature Viscous Behavior and Structure in Molten $CaO-SiO_2-CaF_2$ Slags Containing Na_2O and K_2O
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P-0265 Challenges in the Mold Fluxes Design
KEYNOTE
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P-1057 Modeling of non-Newtonian Mold Powders for Continuous Casting of Steel
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P-1082 Modelling the Performance of Casting Powders during Continuous Casting of Steel
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Refractories I

refractory-slag reaction

P-1096 Refractory Wear by Molten Copper Slag with Presence of Clays Minerals
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P-1046 **KEYNOTE** Dissolution Phenomena of Refractory Raw Materials in Liquid Slags
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P-0256 Dynamic Wetting of $CaO\text{-}SiO_2\text{-}MgO\text{-}FeO_x\text{-}Al_2O_3\text{-}MnO\text{-}TiO_2$ based Slags on MgO Substrates
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P-0772 A Fundamental Study on the Thermal Degradation of MgO-C in Steelmaking Process
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P-0848 Freeze Lining Behaviour in DC Smelting Furnaces: the Influence of Furnace Design and Operation
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P-0221 Determination of Bath/Freeze Lining Interface Temperature Based on the Rheology of the Slag
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P-0294 Effect of Crystallographic Property of MgO on Spinel Growth at Interface between $CaO\text{-}SiO_2\text{-}Al_2O_3$ Slag
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Characterization of slags I

in-situ observation

P-0816 In situ Study of the Smelting Phenomena for Pre-Reduced Ilmenite Pellet

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P-0669 In-situ Observation of Slag-Metal Separation Process of Niobium Concentrate

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P-0541 Sampling Procedure, Characterisation and Quantitative Analyses of Aluminium White Dross

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P-0274 In-situ Phase Determination of Primary Precipitated Compound from Molten Phosphorus-Containing Slag

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P-0185 Advanced Slag Analysis Methods – on-Line Optical Emission Spectrometry, Laser-Induced Breakdown Spectroscopy and Raman Spectroscopy

Matti AULA, Henri PAUNA, Avishek Kumar GUPTA, Francis GYAKWAA, Timo FABRITIUS

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P-1422 The Fast Analysis of Heterogeneous Materials Such as Slags without Sample Preparation – the Key to In-situ Instead of Post-Mortem Process Control

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Kinetics I

multiphase reaction kinetics

P-1103 Kinetics of MnO Reduction from Slag; Comparison of Carbon and Silicon as Reductants
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P-0707 Flux-Mediated Wetting of Alumina by Liquid Fe-Ti-C_{sat}
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P-0269 An Experimental Investigation of Vapour Explosions by Droplet Impingement of Aluminum in Water
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P-0468 Experimental Investigation of the Oxidation Kinetics of Molten Lead Silicate Slags
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P-0386 The Effect of Ca Alloy Content on the Mass Transfer of B between Si and SiO_2-CaO Slag
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P-1080 Investigating the Kinetics of Molten Salt Synthesis of La-based Perovskite Type Oxides
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Electrochemical processing and molten salts I

molten salts for REM recovery

P-0930 Recovery of Indium From In-Sn Alloy in Molten Fluoride Electrolyte

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P-1326 Recycling of Critical Metals by Using Molten Salt

KEYNOTE

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P-0220 Recovery and Extraction of Rare-Earth Element from Rare-Earth Permanent Magnet Waste by Molten Fluoride Electrolysis

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P-1150 Selective Recovery of Rare Earth Elements from Spent Nd-Fe-B Magnet Using Zinc Chloride

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P-0700 Alternative Way of Producing Rare Metals by a Molten Salt Based Process of Oxide Feedstocks

KEYNOTE

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Electrochemical processing and molten salts II

molten salts for metal production

P-1134 Melts Electrochemistry: Theoretical and Experimental Insights
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P-1125 Development of a Novel Electrolytic Process for Producing High-Purity Magnesium Metal Using Magnesium Oxide
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P-0982 Electrodeposition of Silicon from Molten Salt Electrolytes
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P-0374 Metal Production via Sulfide from Oxide
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P-0755 Electrochemical Mechanism of Desulfurization in $CaO\text{-}SiO_2\text{-}Al_2O_3$ System
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P-0397 Correlation between Applied Electricity and Electrochemical Desulfurization of Molten Iron by Molten Slag
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Energy and environments I

energy recovery and environmental protection

P-0945 Reducing the Carbon Footprint: Primary Production of Aluminum and Silicon Metal with Changing Energy Systems
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P-0967 Modification of Cr-bearing Molten Slag for Carbon Capture and Storage
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P-0288 Control of Hydration of Free Magnesia in Steelmaking Slag
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P-0464 Use of Oxygen Steelmaking Slag for Remediation of Metalloid-contaminated Water
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P-1110 Influence of Chelating Agent on the Elution Characteristic of Steelmaking Slag into Aqueous Environment
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P-0623 Process Concept for the Dry Recovery of Thermal Energy of Liquid Ferrous Slags
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P-1328 Air Granulation and Energy Recovery of Blast Furnace Slag
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P-0465 Formation and Reduction of NO from Nitrogen in the Combustion of the Fuels Used in the Sintering Process of Iron Ore
KEYNOTE
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Ash and weld fluxes I

coal ash

P-1120 Phase Equilibria and Viscosity of K_2O-CaO-SiO_2 Slags for Biomass Combustion and Gasification

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P-0811 Gaining Insight into the Behavior of Slags in Coal Combustion: Applying the Connected Local Equilibria Method Using ChemApp and SimuSage

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P-0445 Real Time Evolutions of Individual Industrial Coal Particles in Varied Oxygen Partial Pressure Environments

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P-0276 Properties of Eutectic Slags: Filling the Gaps for an Agglomeration Model

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Recycling and sustainability I

sustainable utilization of slag and refractory

P-0603 A Review of Circular Economy Prospects for Stainless Steelmaking Slags
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P-0174 A Computational Study on the Mixing and Reduction of Slags From Ferrochrome and Stainless Steel Production
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P-0264 Processing and Utilization of Steelmaking Slags in the European Union
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P-0376 Utilization of Waste Materials from the Pulp & Paper Inderstry as Raw Materials in the Steelmaking Industry
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P-1433 Some Recycling Aspects of Molten Slags, Fluxes and Salts
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Recycling and sustainability II

slag valorization and processing for higher values

P-1050 Phase Separation in Phosphorus-Containing System without CaO Saturation at Elevated Temperature

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P-0284 Phosphorus Segregation in Basic Oxygen Steelmaking Slags

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P-0328 Preliminary Numerical Study into Gravity Separation of Dicalcium Silicate from BOS Slag during Solidification

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P-0141 Influence of Al_2O_3 Addition on the Solidified Microstructure and Crystallization Kinetics of BOF Slag

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P-0449 Perspectives of Slag "Co-product" Zero Waste Full Utilization

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P-0974 Predicting Slag Properties for Reduced Risk in Mineral Wool Production

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P-0431 Slag Engineering and Valorization in the Framework of Sustainable Metallurgy

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Recycling and sustainability III

novel processing of co-products

P-0346 Cold Fluid Modeling of Air-Blast Slag Atomization
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P-0841 Controlled Evolution of Rare Earth Phosphate in Coal Ash Slag
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P-0944 Modeling of Powder Production during Centrifugal Atomization
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P-0144 The Behaviour of Zinc during the Recycling of BOS Filter Cake
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P-0861 Foamed Glass Materials Using Quartz from Copper Mine Tailings
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P-1432 Use of Copper Slag for Iron Alloys Fabrication. A Circular Economy Approach for the Chilean Metallurgical Industry
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Thermodynamics I

phase diagrams and refining thermodynamics

P-0824 Challenges in the Phase Diagram Study of Alkali Oxide Systems
KEYNOTE
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P-0150 Recent Developments in Experimental and Thermodynamic Modelling Techniques for the Characterisation of Phase Equilibria in Complex High Temperature Oxide Systems
Maksym SHEVCHENKO, Denis SHISHIN, Peter HAYES, Evgueni JAK
The University of Queensland, Australia

P-0903 Determination of Solubility and Activity Coefficient of Chromium Oxide in the $CaO\text{-}SiO_2\text{-}CrO_x$ System
Yoshinao KOBAYASHI, Zhi LI, Chisei KATO
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P-0702 Intergrated Experimental Phase Equilibria and Crystallisation Kinetic Study of the $FeO\text{-}Fe_2O_3\text{-}CaO\text{-}SiO_2\text{-}Al_2O_3$ System for the Iron-sintering Industry
Siyu CHENG, Maksym SHEVCHENKO, Eugene JAK, Peter HAYES
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P-1169 Thermodynamics on Slag Refining of Molten Si and Si-based Alloys
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P-0488 Effect of La_2O_3 Addition to $CaO\text{-}SiO_2$ Slag on B and P Removal from Sn-doped Si for Solar-Grade Silicon Production
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P-0827 A Literature Review on and Interpretation of the Properties of TiO_2 Slags
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P-1282 Custom-Designed Fluxes for Steelmaking and the Measurement of Slag Capacities
Yindong YANG[1], Yonggang WEI[2], Mansoor BARATI[1], Alex MCLEAN[1]
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P-0298 Solubility, Oxidation State and Activity of Vanadium Oxide
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Modeling I

measurement and modeling of physicochemical properties

P-0409 Towards More Realistic Simulations of Microstructural Evolution in Oxidic Systems
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P-0565 Rheological Properties of Ternary SiO_2-CaO-Al_2O_3 Silicate System
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P-1074 Structure Based Viscosity Model for Alumino-silicate Molten Slags
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P-0740 A Diffusion Model for Liquid Oxide Solutions
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[1]McGill University, Canada, [2]Indian Institute of Technology Gandhinagar, India, [3]Seoul National University, Korea

P-0862 Thermodynamic Modelling of Molten Slag, Matte, Metal and Speiss Phases for the Pyrometallurgy of Lead (Pb) Processing Systems
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P-0996 Experimental Gaps in Viscosity Modelling of Oxide Systems
Alex KONDRATIEV
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P-1307 New Progress in Ternary and Multicomponent Calculation from Binaries
KEYNOTE
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Modeling II

thermodynamic database development

P-0725 KEYNOTE
Progress of Thermodynamic Modeling for Sulfide Dissolution in Molten Oxide Slags: Model Development, Interpretation, and Application
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P-1073 KEYNOTE
Sulfide Capacities of Steel Making Slags
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P-1184
Thermodynamic Database for the Iron Ore Sintering Process
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P-0874
Coupled Phase Diagram Experiments and Thermodynamic Modeling of the Na_2O-B_2O_3-Fe_2O_3 System
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P-0511
Thermodynamic Modelling of V Containing Steelmaking Slags
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P-0856
Acceleration of Complex Equilibrium Calculations for Integration in High Temperature Models
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P-0125 KEYNOTE
Development of a Slag Model to Better Understand and Control Steelmaking Processes
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P-1278
Improving Steel Plant Operation Using FactSage
Sourav Kumar PANDA, Aida ABBASALIZADEH, Erwin HARBERS, Marleen WUESTENENK, Sander WILLEMSEN, Aart OVERBOSCH
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Poster Presentation

P-0335 Study on the Leachability of Metals from Industrial-Scale Modified Copper Slag
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P-0361 Study on the Influence of Various Fluxing in Goethite Composite Pellets
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Yonsei University, Korea

P-0388 Investigation of Surface Oxide Layer of Metallurgical Grade Silicon (MG-Si)
Erlend Lunnan BJØRNSTAD, Gabriella Maria TRANELL
Norwegian University of Science and Technology, Norway

P-0414 Effect of $Al_2O_3/TiO_2/Na_2O$ on Lime Dissolution in Steelmaking Slag
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University of Science and Technology Beijing, China

P-0423 Enrichment of Ti(C,N) by Adding Fe during Carbothermal Reduction of Ti-bearing BF Slag
Tingfang JIAN, Tongxiang MA, Mengjun HU, Liwen HU, Liangying WEN, Meilong HU
Chongqing University, China

P-0454 Effect of Basic Oxygen Furnace (BOF) Slag on NO_x Reduction in Iron Ore Sintering Process
Leonardo ROCHA, Sung-Mo JUNG
Pohang University of Science and Technology, Korea

P-0458 Computational Fluid Dynamics Study on the Zn Fuming Process in a Submerged Plasma Fumer
Zhongfu CHENG, Yannan WANG, Bart BLANPAIN, Muxing GUO
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P-0470 Long-term Dipping Corrosion Studies of Haynes 230 Alloy in High-Temperature $MgCl_2$-KCl Heat Transfer Fluid
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P-0473 Corrosion of Incoloy 800H Alloy in $MgCl_2$-KCl Salt with and without Zr Inhibitor at 800°C
Yuxiang PENG, Ramana REDDY
The University of Alabama, USA

P-0476 Effect of Oxygen Blowing Condition on Emulsification Behavior during Copper Converting Process
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Hanyang University, Korea

P-0480 Desulfurization Kinetics of Incoloy 825 Ni-based Superalloy Using $CaO-Al_2O_3-MgO-TiO_2$ Slags
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P-0557 Study on the Improvement of Tundish Middle Plate Refractory for Steelmaking Cost Reduction
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P-0680 Granulation Characteristics of Molten Blast Furnace Slag in Gas Quenching Dry Granulation Technique
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P-0688 Microstructure and Physicochemical Properties of Glass Ceramics Prepared from Stainless Steel Slag and Pickling Sludge
Yanling ZHANG, Shuai ZHANG, Zhancheng GUO
University of Science and Technology Beijing, China

P-0689 Thermodynamic Interactions between Tin and Alloying Elements in Molten Iron and Fe-Cr Alloy
Hideki ONO, Koga HORI
University of Toyama

P-0719 Recovery of Metals from Primary and Secondary Wastes Using Pyrometallurgy: Two Case Studies in Chile
Romina CAYUMIL[1], Fernando PARADA[2], Mario SANCHEZ[1], Sergio Roberto RIVERA[1]
[1]University of Andres Bello, Chile, [2]University of Concepcion, Chile

P-0747 Experimental Study of the Liquidus of the PbO-"FeO_x"-$CuO_{0.5}$-SiO_2 Containing Slag/Metal System and Sub-Systems
Xi Rui WEN, Maksym SHEVCHENKO, Evgueni JAK
The University of Queensland, Australia

P-0756 Fundamental Study on the LIB Pyrometallurgical Recycling
Oh-Sung KWON, Il SOHN
Yonsei University, Korea

P-0761 Effect of Alkali Oxide and CaO/Al_2O_3 Mass Ratio on the Crystallization Behavior of Calcium-Aluminate-Based Mold Fluxes for High-Al Steels
Gibeom KIM, Il SOHN
Yonsei University, Korea

P-0783 Manufacturing of Dendritic Titanium by Electrorefining from CuTi Alloy in Chloride Molten Salt
Vladislav RI[1], Youngjun LEE[2], Hayk NERSISYAN[1], Jonghyeon LEE[1]
[1]Chungnam National University, Korea, [2]ZIRON TECH, Korea

P-0799 Thermodynamic Properties of Liquid Binary and Ternary Alloys of Lanthanides with Al, In, Sn, Sb and Transition Metals

Valentina SUDAVTSOVA[1], Maksym SHEVCHENKO[2], Volodymyr KUDIN[3], Anton DUDNIK[1], Natalya PODOPRIGORA[1], Michael IVANOV[1]

[1]Institute for Problems of Materials Science, Ukraine, [2]The University of Queensland, Australia, [3]Taras Shevchenko National University of Kyiv, Ukraine

P-0836 Phase Equilibrium Behaviour of the Fe-V-O System under Reducing Conditions

Blessing MARAMBA[1], Xolisa Camagu GOSO[2], Johannes Hendrik ZIETSMAN[1]

[1]University of Pretoria, South Africa, [2]Mintek, South Africa

P-0878 A Study on the Possibility of Hybrid Inorganic Fiber Using Slag

Eun Jin JUNG[1], Sun-Joong KIM

[1]Research Institute of Industrial Science and Technology, Korea, [2]Chosun University, Korea

P-0879 Reduction Characteristics and Slag Formation in Composite Pellets Using Steel Industry Co-Products

Sanghyuk LEE, Il SOHN

Yonsei University, Korea

P-0882 Introduction of Lithium-Containing End-of-Life Products and Recycling Processes of Lithium Materials

Dong Ju SHIN[1], Sung-Ho JOO[1], Dong Seok LEE[2], Shun Myung SHIN[1,2]

[1]Korea Institute of Geoscience and Mineral Resources, Korea, [2]University of Science and Technology, Korea

P-0891 Ferro-Molybdenum Green Production via Electrochemical Reduction in K_2MoO_4-MoO_3 Melts at Moderately High Temperatures

Kwang Won PARK, Il SOHN

Yonsei University, Korea

P-0938 Effect of Sinter Basicity on Formation Fraction of CaO Based Liquidus Phases in Sintered Ores

Geun Yong RYU[1], Sun-Joong KIM[1], Ki Woo LEE[2], Ho Jun YOON[2]

[1]Chosun University, Korea, [2]Hyundai Steel, Korea

P-1059 Re-Assessment of Pseudo-Binary System Ca_2SiO_4-$Ca_3P_2O_8$ with High Phosphorus Content Formed at Elevated Temperature

Chiho WATANABE, Yu-Ichi UCHIDA

Nippon Institute of Technology, Japan

P-1173 What If the Materials Data You Need Doesn't Exist

A. Nicholas GRUNDY, Lina KJELLQVIST, Rui ZHANG, Qing CHEN, Ralf RETTIG, Johan JEPPSSON, Johan BRATBERG

Thermo-Calc Software AB, Sweden

P-1178 Effect of TiO_2 Content on the Corrosion Behavior of MgO-Based Refractories

Junmo JEON[1], Min-Kyu PAEK[1], Hyunsik PARK[2], Daniel LINDBERG[1]

[1]Aalto University, Finland, [2]Korea Institute of Geoscience and Mineral Resources, Korea

P-1198 Enhancement of Melt Formation in the FINEX Melter-Gasifier with Industrial By-Products
Minki KIM[1], Moo Eob CHOI[2], Taehyeok KIM[2], Joonho LEE[1]
[1]Korea University, Korea, [2]POSCO, Korea

P-1207 Corrosion Behavior of MgO-C Refractory in the Electric Arc Furnace Slag Added with Na_2O
Beomshin PARK, Juhun LEE, Yongsug CHUNG
Korea Polytechnic University, Korea

P-1211 Estimation of Hydrogen Content in Stainless Steel Using Hydroxyl Capacity of Molten Slag
Junik JANG, Jeonghun KIM, Youngjo KANG
Dong-A University, Korea

P-1253 Observation of the Dissolution Behavior of Alumina Particle in $CaO-Al_2O_3-SiO_2$ Slags
Sangrok YEO, Seungwon JEON, Yongsug CHUNG
Korea Polytechnic University, Korea

P-1255 Experimental Study on the Behavior of Different Inclusions in High Al Steel Reacted with Refining Slags
Shuo ZHAO[1], Zushu LI[2], Stephen SPOONER[2], Renze XU[3]
[1]Hebei University of Engineering, China, [2]University of Warwick, United Kingdom, [3]University of Science and Technology Beijing, China

P-1258 Cu, Pb, Zn and As Distribution in the Slag Treatment Process
Valery KAPLAN[1], Nurlan DOSMUKHAMEDOV[2], Erzhan ZHOLDASBAY[2], Aidar ARGYN[2]
[1]Weizmann Institute of Science, Israel, [2]Satbayev University, Kazakhstan

P-1287 Refinement of Zinc Chloride with Vacuum Distillation of Molten Salt
Gen KAMIMURA, Hiroyuki MATSUURA
The University of Tokyo, Japan

P-1290 Effect of Crystallization and Vitrification on F Stabilization of $CaO-SiO_2-Al_2O_3-MgO-CaF_2$ Slag System
Hongmin HA, Jung-Wook CHO
Pohang University of Science and Technology, Korea

P-1320 Assessment of Non-Metallic Inclusions in Different Ferroalloys and Their Influence on the Steel Cleanliness
Yong WANG, Andrey KARASEV, Pär G. JÖNSSON
KTH Royal Institute of Technology, Sweden

P-1322 Laser-Induced Breakdown Spectroscopy in the Characterization of Ilmenite Slags
Avishek Kumar GUPTA[1], Matti AULA[1], Timo FABRITIUS[1], Pasi MÄKELÄ[2]
[1]University of Oulu, Finland, [2]Outotec, Finland

P-1332 Numerical Study on the Open Eye Formation in a 150t Ladle
Yu LIU[1], Mikael ERSSON[1], Björn GLASER[1], Heping LIU[2], Pär G. JÖNSSON[1]
[1]KTH Royal Institute of Technology, Sweden, [2]Central Iron and Steel Research Institute, China

P-1337 Characterization of Non-Metallic Inclusions in the Steel by Using PDA/OES and Off-line Investigation Methods

Hongying DU[1], Annika YANG[2], Andrey KARASEV[1], Pär G. JÖNSSON[1]
[1]KTH Royal Institute of Technology, Sweden, [2]SSAB Special Steels, Sweden

P-1341 Mathematical Modelling of the Hump Height in an Uphill Teeming Ingot Casting Process

Jun YIN, Mikael ERSSON, Pär G. JÖNSSON
KTH Royal Institute of Technology, Sweden

P-1362 Mathematical Modelling and Plant Trial on Slagging Regime in a Ladle Refining Furnace for High-Efficiency Desulphurization

Zicheng XIN[1], Jiangshan ZHANG[1], Yu JIN[2], Jin ZHENG[2], Jiafeng CUI[2], Qing LIU[1]
University of Science and Technology Beijing, China, [2]Hebei Iron and Steel Co., Ltd., China

P-1363 Residual Elemental Behavior in the Carbothermal Reduction Process of Copper Slag

Zhi LI, Guojun MA, Xiang ZHANG, Yunyao YANG, Shengwei MA
Wuhan University of Science and Technology, China

P-1373 An Integrated Environmental Framework for Evaluating Long-term Leaching Prediction of Slag by Percolation-Controlled Scenario and Transfer Scenario Models

Inae KWON, Dongjun SHIN, Jungwon LEE, Sanghyung LEE
Hyundai Steel, Korea

P-1382 Study on Non-metallic Inclusions in Al Deoxidized Bearing Steel during EAF-LF-VD Steelmaking Process

Kai-Lun LI[1], Min JIANG[1], Ying WANG[2], Kun-Peng WANG[2], Jian-Fei XU[2], Xinhua WANG[1]
[1]University of Science and Technology Beijing, China, [2]Zenith Steel Group Co., Ltd., China

P-1411 Determination of Redox State of Steelmaking Slag Using Electrical Conductivity Measurement

Hamed MAZAHERI[1], Christian WEIß[2]
[1]K1-MET GmbH, Austria, [2]Montanuniversität Leoben, Austria

P-1461 Direct Smelting Method for Recovering Valuable Metals from the End-of-Life xEV Batteries Using Clean Slag Recycling

Ho Seok LEE, Jingu KANG, Eungbae KIM, Donghyun KANG, Namil MOON
Young Poong Research Institute of Metallurgy, Korea

P-1476 Experimental Phase Equilibria Studies in the "$CuO_{0.5}$"-CaO-SiO_2 System in Equilibrium with Metallic Copper

Georgii KHARTCYZOV, Maksym SHEVCHENKO, Siyu CHENG, Peter Charles HAYES, Evgueni JAK
The University of Queensland, Australia

DISCUSSION SESSION LIST

Explore the recent progress in slags, fluxes and salts research.
Regardless of the field of ferrous and non-ferrous communities, environment, or energy, we hope researchers can discuss opportunities for the present and future!

Online Discussion Session

Discussion Format

1) A session chair will introduce a presenter.
2) **A presenter will summarize its presentation for 2-3 min.**
   (We preferably recommend you to prepare 2-3 slides.)
3) Question(s) will be given to a presenter.
4) All presenters and audiences will have a discussion.

How to Join a Discussion Session

Way 1) A presenter will receive an email with a ZOOM link one day prior to the session.
Way 2) A presenter can access each discussion session room via the virtual website of MOLTEN 2021.

Other Important Notices

1) Please join the session 15 minutes before it starts.
2) Be careful not to make noise when you join a session.
3) Recommend using headset to deliver clearly. (Laptop audio significantly reduces the clarity of voice)
4) The ZOOM TEST ROOM opens from 10 a.m. to 3 p.m. on February 23-25 (KST).

Modeling I
(measurement and modeling of physicochemical properties)

DATE February 23 (Tuesday)

TIME 16:00-17:00 (Korea Standard Time)

CHAIRS Youn-Bae KANG (Pohang University of Science and Technology)
Inge BELLEMANS (Ghent University)

P-0409	Towards More Realistic Simulations of Microstructural Evolution in Oxidic Systems	Inge BELLEMANS (Ghent University)
P-0565	Rheological Properties of Ternary SiO_2-CaO-Al_2O_3 Silicate System	Kai TANG (SINTEF Industry)
P-1074	Structure Based Viscosity Model for Alumino-silicate Molten Slags	Ramana REDDY (The University of Alabama)
P-0740	A Diffusion Model for Liquid Oxide Solutions	Sun Yong KWON (McGill University)
P-0862	Thermodynamic Modelling of Molten Slag, Matte, Metal and Speiss Phases for the Pyrometallurgy of Lead (Pb) Processing Systems	Denis SHISHIN (The University of Queensland)
P-0996	Experimental Gaps in Viscosity Modelling of Oxide Systems	Alex KONDRATIEV (National Univ. of Sci. and Tech. MISIS)
P-1307 KEYNOTE	New Progress in Ternary and Multicomponent Calculation from Binaries	Kuo-Chih CHOU (USTB I Shanghai Univ.)

Modeling II
(thermodynamic database development)

DATE February 23 (Tuesday)

TIME 17:00-18:30 (Korea Standard Time)

CHAIRS In-Ho JUNG (Seoul National University)
Takahiko KOHTAKE (Nippon Steel Corporation)

P-0725 KEYNOTE	Progress of Thermodynamic Modeling for Sulfide Dissolution in Molten Oxide Slags: Model Development, Interpretation, and Application	Youn-Bae KANG (POSTECH)
P-1073 KEYNOTE	Sulfide Capacities of Steel Making Slags	Ramana REDDY (The University of Alabama)
P-1184	Thermodynamic Database for the Iron Ore Sintering Process	Takahiko KOHTAKE (Nippon Steel Corporation)
P-0874	Coupled Phase Diagram Experiments and Thermodynamic Modeling of the Na_2O-B_2O_3-Fe_2O_3 System	Min-Kyung KIM (Seoul National University)
P-0511	Thermodynamic Modelling of V Containing Steelmaking Slags	Chunlin CHEN (CSIRO)
P-0856	Acceleration of Complex Equilibrium Calculations for Integration in High Temperature Models	Willem Abraham ROOS (University of Pretoria)
P-0125 KEYNOTE	Development of a Slag Model to Better Understand and Control Steelmaking Processes	Jean LEHMANN (ArcelorMittal)
P-1278	Improving Steel Plant Operation Using FactSage	Sourav Kumar PANDA (Tata Steel Europe)

Thermodynamics I
(phase diagrams and refining thermodynamics)

DATE February 23 (Tuesday)

TIME 20:00-21:30 (Korea Standard Time)

CHAIRS In-Ho JUNG (Seoul National University)
Kazuki MORITA (The University of Tokyo)

P-0824 KEYNOTE	Challenges in the Phase Diagram Study of Alkali Oxide Systems	In-Ho JUNG (Seoul National University)
P-0150	Recent Developments in Experimental and Thermodynamic Modelling Techniques for the Characterisation of Phase Equilibria in Complex High Temperature Oxide Systems	Maksym SHEVCHENKO (The University of Queensland)
P-0903	Determination of Solubility and Activity Coefficient of Chromium Oxide in the $CaO\text{-}SiO_2\text{-}CrO_x$ System	Zhi LI (Tokyo institute of Technology)
P-0702	Intergrated Experimental Phase Equilibria and Crystallisation Kinetic Study of the $FeO\text{-}Fe_2O_3\text{-}CaO\text{-}SiO_2\text{-}Al_2O_3$ System for the Iron-sintering Industry	Siyu CHENG (The University of Queensland)
P-1169 KEYNOTE	Thermodynamics on Slag Refining of Molten Si and Si-based Alloys	Kazuki MORITA (The University of Tokyo)
P-0488	Effect of La_2O_3 Addition to $CaO\text{-}SiO_2$ Slag on B and P Removal from Sn-doped Si for Solar-Grade Silicon Production	Mengyi ZHU (Norwegian Univ. of Sci. and Tech.)
P-0827	A Literature Review on and Interpretation of the Properties of TiO_2 Slags	Hanlie KOTZE (University of Pretoria)
P-1282	Custom-Designed Fluxes for Steelmaking and the Measurement of Slag Refining Capacities	Yindong YANG (University of Toronto)
P-0298	Solubility, Oxidation State and Activity of Vanadium Oxide	Elin ASTROM (LKAB)

Ferroalloys slags I
(manganese ferroalloys slags)

DATE February 23 (Tuesday)

TIME 17:00-18:00 (Korea Standard Time)

CHAIRS Xuewei LV (Chongqing University)
Gudrun SAEVARSDOTTIR (Reykjavik University)

P-1036	Modelling Si-Furnace Operational Conditions	Gudrun SAEVARSDOTTIR (Reykjavik University)
P-0249	Foaming of Silicomanganese Slag during Carbothermic Reduction	Vincent CANAGUIER (Norwegian Univ. of Sci. and Tech.)
P-0907	Formation of Carbides, TiC and SiC in Production of SiMn Alloys	Eli RINGDALEN (SINTEF Industry)
P-0330 KEYNOTE	Slag Properties in the Primary Production Process of Mn-Ferroalloys	Merete TANGSTAD (Norwegian Univ. of Sci. and Tech.)
P-0308	Investigation of Liquid Slag-Metal Behaviour at Elevated Temperature: Interaction between Liquid FeMn Slag and Liquid FeMn Metal	Sarina BAO (SINTEF Industry)
P-0440	Molten Ferromanganese Slag Production from Mn-ores	Tichaona MUKONO (Norwegian Univ. of Sci. and Tech.)

Ferroalloys slags II
(physicochemical properties of ferroalloys slags)

DATE February 23 (Tuesday)

TIME 18:00-19:00 (Korea Standard Time)

CHAIRS Merete TANGSTAD (Norwegian University of Science and Technology)
Sangho YI (POSCO)

P-0972 KEYNOTE	A Novel Process for the Smelting Reduction of Silicate Fluxed Chromite Ore Fines Using FINEX® Platform Technology	Sangho YI (POSCO)
P-1414	Thermodynamic Analysis of Sulfur in Slag and Alloy Melt Produced from Spent Catalyst in Petroleum Refinery	Jong-Jin PAK (Hanyang University)
P-0201	Influence of Sulphur on the Interfacial Behaviour between FeMn Alloy-Slag and SiMn Alloy-Slag	Sergey BUBLIK (Norwegian Univ. of Sci. and Tech.)
P-0127	Formation of Slag in Si and FeSi Furnaces	Marit Buhaug FOLSTAD (Norwegian Univ. of Sci. and Tech.)
P-0530	The Production of Pig Iron and Calcium Aluminate Slags for Alumina Recovery from Bauxite Ore	Adamantia LAZOU (Norwegian Univ. of Sci. and Tech.)

Non-ferrous slags I
(phase equilibria of Cu smelting slag)

DATE February 23 (Tuesday)

TIME 20:00-21:00 (Korea Standard Time)

CHAIRS Daniel LINDBERG (Aalto University)
Tijl CRIVITS (Umicore)

P-0186	Thermodynamic Behavior of Industrial Copper Production Slag Saturated with Copper and Iron	Eric KLAFFENBACH (Aurubis AG)
P-0887	Characterisation of Complex Systems through Integrated Experimental and Thermodynamic Modelling Research for Pyrometallurgical Processing	Evgueni JAK (The University of Queensland)
P-0768	Experimental Investigation of Phase Equilibria in the "$CuO_{0.5}$"- MgO-SiO_2 System in Equilibrium with Liquid Cu Metal	Hamed ABDEYAZDAN (The University of Queensland)
P-0731	Experimental Study of Slag/Matte/Metal/Tridymite Phase Equilibria in the Cu-Fe-O-S-Si System at 1200 °C	Svetlana SINEVA (The University of Queensland)
P-0797	The Effect of MgO on High-Alumina Iron Silicate Slag - Spinel Equilibrium in Secondary Copper Smelting	Anna DANCZAK (Aalto University)

Non-ferrous slags II (industrial applications)

DATE February 23 (Tuesday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Evgueni JAK (The University of Queensland)
Seung Hwan AHN (LS-Nikko Copper Inc.)

P-0303	Mechanical Copper Entrainment Related to Solid Phases within Smelting Slags	Lassi KLEMETTINEN (Aalto University)
P-0785	Pilot Scale Powder Injection Practice for Metal Recovery from Copper Slag	Seung Hwan AHN (LS-Nikko Copper Inc.)
P-0892	Development of Mitsubishi C-Furnace Simulation Model for Cu Converting Process and Its Industrial Applications	Soo Sang PARK (LS-Nikko Copper Inc.)
P-1011	Behaviour of Silver and Molybdenum, as Minor Elements, during the Controlled Cooling Treatment of Copper Smelting Slag for Further Grinding and Froth Flotation	Camila PIZARRO (University of Chile)
P-0919	Phase Relations and Evolution of Gangue Minerals in the Black Top of a PGM Smelter	Oscar RIVERA LI KAO (University of Pretoria)
P-0312	A Qualitative Study on Matte/Slag/Copper Melt Interactions with Water/MEG Coolants	Tijl CRIVITS (Umicore)

Physicochemical properties of slags I (viscosity)

DATE February 23 (Tuesday)

TIME 17:00-18:00 (Korea Standard Time)

CHAIRS Hiroyuki SHIBATA (Tohoku University)
Il SOHN (Yonsei University)

P-0647	Composition-Structure-Viscosity Relationship of CaO-Al_2O_3-Fe_tO-SiO_2-MgO Slag	Tae Sung KIM (Hanyang University)
P-0366 KEYNOTE	Some Aspects on the Properties of the Slag Containing Titanium Oxide	Chenguang BAI (Chongqing University)
P-0252	The Viscous Behavior of High FeO-bearing Slag Melts Considering Polymeric Unit of Slags	Joon Sung CHOI (Yonsei University)
P-0132	Relation between Local Structure Environment of Iron Ions and Iron Oxide Activities in the Na_2O-SiO_2-FeO-Fe_2O_3 Slags	Miyuki HAYASHI (Tokyo Institute of Technology)
P-0235	Physical Properties of Blast Furnace Slag with Full-Ratio V-Ti-Magnetite	Zhengde PANG (Chongqing University)

Physicochemical properties of slags II (physical property and structure characterization)

DATE February 23 (Tuesday)

TIME 18:00-19:00 (Korea Standard Time)

CHAIRS Jung-Wook CHO (Pohang University of Science and Technology)
Sohei SUKENAGA (Tohoku University)

P-0266 KEYNOTE	Thermophysical Properties of Silicate Melts and Glasses	Hiroyuki SHIBATA (Tohoku University)
P-1108 KEYNOTE	Structure of Molten Oxides and Glasses above Mega-Bar Pressures: Insights from High-Resolution Solid-State NMR and Inelastic X-Ray Scattering	Sung Keun LEE (Seoul National University)
P-0683	The Extent of Disorder in Iron-bearing $NaAlSi_3O_8$ and $CaAl_2Si_2O_8$ Glasses: Multi-Nuclear (^{29}Si, ^{27}Al, and ^{17}O) Solid-State NMR Study	Hyo-Im KIM (Seoul National University)
P-0226	Effects of Atmosphere and Melting Time on Surface Tension of Iron Silicate Melts	Sohei SUKENAGA (Tohoku University)
P-0890	Thermal Conductivity Model of the Oxide Melt	Taehyoung KIM (Seoul National University)
P-1010	Thermal Conductivity Measurements of Solid Mattes Containing Fe-S-Ni-Cu-Co from 100-450°C	Rodney HUNDERMARK (Anglo American)

Physicochemical properties of slags III (multiphase crystallization)

DATE February 23 (Tuesday)

TIME 19:00-20:00 (Korea Standard Time)

CHAIRS Miyuki HAYASHI (Tokyo Institute of Technology)
Qifeng SHU (Aalto University)

P-0261	Characterization of Secondary Phases Dispersed in Molten Slags Utilizing Alternative Current Field	Noritaka SAITO (Kyushu University)
P-0704 KEYNOTE	Solidification of Oxide Melts	Peter HAYES (The University of Queensland)
P-0451	Investigation on Crystallization of Steelmaking Slag and Mould Fluxes	Qifeng SHU (University of Oulu)
P-1129	Effect of TiO_2 and SiO_2 on the Crystal Morphology CaF_2-Al_2O_3-CaO Base Electroslag Remelting Slag	Jing GUO (Univ. of Sci. and Tech. Beijing)
P-0580	Effect of Crystallization on the Electrical Conductivity of CaO-Al_2O_3-SiO_2-MgO Slag under Isothermal Condition	Ling ZHANG (Katholieke Universiteit Leuven)
P-1139	A Method to Identify the Kinetics of Solid-Phase Growth during Slag Isothermal Crystallisation	Alex KONDRATIEV (National Univ. of Sci. and Tech. MISIS)

Physicochemical properties of slags IV (application to steelmaking)

DATE February 23 (Tuesday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Youn-Bae KANG (Pohang University of Science and Technology)
Timo FABRITIUS (University of Oulu)

P-0899	Influences of DRI Addition and Bubble Sizes on the Foaming Behavior of EAF Slags	Won Yeong SON (Dong-A University)
P-0198 KEYNOTE	The Laboratory Study of Metallurgical Slags and the Reality	Du SICHEN (KTH Royal Institute of Technology)
P-0696	Optimization of Slag Composition for Efficient Dephosphorization and Slag Foamability	Jungho HEO (LS-Nikko Copper Inc.)
P-0208 KEYNOTE	Physico-Chemical Properties of Slag in Different Stages of Its Life Cycle – Case Studies from Recent Slag Research	Timo FABRITIUS (University of Oulu)
P-0582	Interaction Behavior of Biocarbon with Electric Arc Furnace Slag	Xianai HUANG (Natural Resources Canada)

Ferrous slags I-1
(ironmaking-1: iron ore reduction and slag formation)

DATE February 24 (Wednesday)

TIME 16:00-17:00 (Korea Standard Time)

CHAIRS Xuewei LV (Chongqing University)
Joonho LEE (Korea University)

P-0164 KEYNOTE	Role of Hydrogen Gas in Blast Furnace Operation - Improved Wettability of Carbon by Molten Slag	Joonho LEE (Korea University)
P-0184	Characterization of Slag Formed by Melting DRI Phase Relationship Phosphorus Partition and Vanadium Partition	Amanda VICKERFÄLT (KTH Royal Institute of Technology)
P-0400	Comparison on Transient Shrinkage Behavior of Ternary-Component Slags in CO/H_2 Atmosphere under Simulated Blast Furnace Cohesive Zone Conditions	Junyi DENG (Chongqing University)
P-0802	Effect of Melt Formation and Pore Structure on Reduction Rate of Iron Ore Sinter	Kengo KATO (Osaka University)
P-0340	Effect of Fluxing in the Iron Ore Pellets on the Capacity of Phosphorus Removal of the Self-Formed Slag by DRI Melting	Oscar HESSLING (KTH Royal Institute of Technology)
P-0506	Numerical Investigation of Slag Flow through a Coke Funnel and Packed Bed	Xue Feng DONG (University of Wollongong)

Ferrous slags I-2
(ironmaking-2: physicochemical properties of ironmaking slag)

DATE February 24 (Wednesday)

TIME 17:00-18:00 (Korea Standard Time)

CHAIRS Noritaka SAITO (Kyushu University)
Viswanathan N. NURNI (Indian Institute of Technology Bombay)

P-0517 KEYNOTE	Static Liquid Holdup in the Blast Furnace Dripping Zone – a Fundamental Study	Viswanathan Neelakantan NURNI (Indian Inst. of Tech. Bombay)
P-0159	Effect of Coal and Coke Ash on Blast Furnace Slag Formation – Comparison between PCI, Charcoal, Fossil-based Coke and Bio-Coke	Anne HEIKKILÄ (University of Oulu)
P-0212	An Innovation Slag System for High Alumina Iron Ore in Blast Furnace Process	Xuewei LV (Chongqing University)
P-1314	The Properties of Low MgO Slag in the Actual Blast Furnace Operation	Dong-Geun KIM (Hyundai Steel)
P-0156	Evaluation of Evaporation Kinetics of Potassium from Synthetic Blast Furnace Slag Using Full Factorial Design of Experiments	Anton ANDERSSON (Luleå University of Technology)
P-0456	Perovskite Formation Mechanism in Hematite-Ilmenite Ore Sinter Blend in Argon Atmosphere by In-situ X-Ray Diffraction	Edson Kugara CHIWANDIKA (POSTECH)
P-1158	The Relationship between Viscosity and Sulfide Capacity of BF Slag	Sunghee LEE (POSCO)

Ferrous slags III-1
(inclusion-1: clean steel practice)

DATE February 24 (Wednesday)

TIME 20:00-21:00 (Korea Standard Time)

CHAIRS Joohyun PARK (Hanyang University)
Wangzhong MU (KTH Royal Institute of Technology)

P-0436	The Spontaneous Emulsification of Entrained Inclusions during Casting of High Aluminium Steels	Akalya RAVIRAJ (University of Warwick)
P-0553	Effect of Ladle Glaze on the Evolution of Non-Metallic Inclusions during LMF Operation	Deepoo KUMAR (Indian Inst. of Tech. Bombay)
P-0668 KEYNOTE	Formation of Nitride and Oxide Inclusions in Ferritic Stainless Steel Melts	Jong-Jin PAK (Hanyang University)
P-1277	Optimization the Slag Composition for Cleanliness in Ultra Low Carbon Steel	Geun-Ho PARK (Hyundai Steel)
P-0131 KEYNOTE	The Role of Transient Slags in Steelmaking	Eugene PRETORIUS (Nucor Steel)
P-1416	A Comprehensive Investigation of Oxide Particles Dissolution in the Metallurgical Slag: an Overview of In-Situ Observation Experiments and Theoretical Studies	Wangzhong MU (KTH Royal Institute of Technology)
P-0485	Dissolution Rate of Al_2O_3 Inclusion into CaO-Al_2O_3-Fe_tO-MgO-SiO_2 Slag System and Its Kinetic Analysis	Youngjoon PARK (POSTECH)

Ferrous slags III-2
(inclusion-2: inclusion control by slag)

DATE February 24 (Wednesday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Youn-Bae KANG (Pohang University of Science and Technology)
Bryan WEBLER (Carnegie Mellon University)

P-0598	Effect of Medium Basicity Refining Slag on the Cleanliness of High Grade Hot Rolled Steel	Huixiang YU (Univ. of Sci. and Tech. Beijing)
P-0503	Influence of Slag Properties on the Behavior of Nonmetallic Inclusions	Dali YOU (Montanuniversität Leoben)
P-0526 KEYNOTE	Physicochemical Properties of Slags for Improvement of Steel Cleanliness ; Case Studies of LF, RH and Tundish Conditions	Joohyun PARK (Hanyang University)
P-1261	Effect of CaO/Al_2O_3 Ratio of the Slag on the Formation Behavior of Inclusions in the Al Killed Molten Steel	Jaehong SHIN (KITECH)
P-1101 KEYNOTE	Critical Issues in the Kinetics of Steel-Slag-Inclusion Reactions	Petrus Christiaan PISTORIUS (Carnegie Mellon University)
P-1055	Evolution of Non-Metallic Inclusions Due to Slag/Metal Reactions in Highly Alloyed Steels	Bryan WEBLER (Carnegie Mellon University)
P-0959	Study on Inclusion Composition during Ladle Refining Process of Tire Cord Steel	Gobinath RAJAVEL (JSW Steel Ltd Salem)

Ferrous slags II-1
(steelmaking-1: primary steelmaking slag)

DATE February 24 (Wednesday)

TIME 16:00-17:00 (Korea Standard Time)

CHAIRS Ville-Valtteri VISURI (University of Oulu)
Johan MARTINSSON (KTH Royal Institute of Technology)

P-0358 KEYNOTE	Towards a More Comprehensive Understanding of Slag Chemistry	Geoffrey BROOKS (Swinburne Univ. of Tech.)
P-0941	Modeling Study on Dynamic Evolution of Slag Foaming	Ruifang WANG (Northeastern University)
P-0329	Assessment of the Application Possibilities of Foaming Index on Industrial BOF Process Data	Lotte DE VOS (Ghent University)
P-0192	The Impact of Solid Particles on Foams – Cold Model and High Temperature Experiments	Johan MARTINSSON (KTH Royal Institute of Technology)
P-0262 KEYNOTE	BOS Slag: Formation, Reaction, and Energy and Materials Recovery	Zushu LI (University of Warwick)
P-0375	Evaluation of Dissolution Rate and Behaviour of MgO Carriers for Primary and Secondary Metallurgical Slag	Elizaveta CHEREMISINA (K1-MET GmbH)

Ferrous slags II-2
(steelmaking-2: refining slag in HMP, BOF, EAF)

DATE February 24 (Wednesday)

TIME 17:00-18:00 (Korea Standard Time)

CHAIRS Zushu LI (University of Warwick)
Jea-Bok CHOI (POSCO)

P-0956	How to Design Hot Metal Desulphurisation Slag with a High Sulphur Capacity and Low Iron Entrapment?	Frank N. H. SCHRAMA (Tata Steel Europe)
P-0896	Improved Hot Metal Desulphurisation Performance through Intelligent Use of Slag Conditioner	Raj Kumar YADAV (JAMIPOL)
P-0200 KEYNOTE	Investigation on the Slag for Production of Extra-Low P Steels by "Slag-Remaining + Double-Slag" BOF Steelmaking Process	Xinhua WANG (Shougang Group Co., Ltd.)
P-0780	How Does Solid Phase Precipitation Affect the Evolution of Phosphorus Removal during the BOF Process? Thermochemical and Industrial Aspects	Sabrine KHADHRAOUI (SMS group GmbH)
P-0498	A Technology of Slag Making for Dephosphorization in Molten Steel during De-P Converter Process	Jea-Bok CHOI (POSCO)
P-0113	Effect of Fluorspar on Dephosphorization Efficiency and Refractory Corrosion in EAF Process Using Dirct Reduced Iron (DRI)	Minkyo OH (Hanyang University)

Ferrous slags II-3
(steelmaking-3: secondary refining and steel quality)

DATE February 24 (Wednesday)

TIME 18:00-19:30 (Korea Standard Time)

CHAIRS Youngjo KANG (Dong-A University)
Jaka BURJA (Institute of Metals and Technology)

P-0738	Improvement of Desulfurization Efficiency by the Submaterial Addition in the Shaft Type EAF	Jungmin YOO (Dongkuk Steel)
P-0652	Effect of Industrial Wastes on Desulfurization Behavior of Molten Steel	Tae Su JEONG (Hanyang University)
P-0534	Thermo-Calc's TCOX10 database & Process Metallurgy Module	A. Nicholas GRUNDY (Thermo-Calc Software AB)
P-0817	Thermochemical Process Simulations Using the Connected Local Equilibria Method – Applying SimuSage and ChemApp to Model Slag Behavior in Metallurgical Processes	Stephan PETERSEN (GTT-Technologies)
P-0170	Chromium Spinel Formation in Stainless Steel Slag	Jaka BURJA (Institute of Metals and Technology)
P-1163	Numerical Modelling of AOD Slag Structure during Cooling	Ville-Valtteri VISURI (University of Oulu)
P-0560	Improvement of High Quality of the New Mold Steel by ESR	D. K. JANG (SeAH Changwon Integrated Special Steel)
P-0796 KEYNOTE	Slag Metallurgy for Steel (On the Base of Electro Slag Refining and Remelting Process)	Lev MEDOVAR (E.O. Paton EWI NASU)
P-0678 KEYNOTE	Steel-Sidewall Interfaces in a Steel Continuous Caster: an Interconnected System of Reaction Sites	Enno ZINNGREBE (Tata Steel Europe)

Kinetics I
(multiphase reaction kinetics)

DATE February 24 (Wednesday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Joonho LEE (Korea University)
Kenneth COLEY (Western University)

P-1103 KEYNOTE	Kinetics of MnO Reduction from Slag; Comparison of Carbon and Silicon as Reductants	Kenneth COLEY (Western University)
P-0707	Flux-Mediated Wetting of Alumina by Liquid Fe-Ti-C_{sat}	Thomas BRITT (Carnegie Mellon University)
P-0269	An Experimental Investigation of Vapour Explosions by Droplet Impingement of Aluminum in Water	Arne SIMONS (Ghent University)
P-0468	Experimental Investigation of the Oxidation Kinetics of Molten Lead Silicate Slags	Olivier VERGOTE (Ghent University)
P-0386	The Effect of Ca Alloy Content on the Mass Transfer of B between Si and SiO_2-CaO Slag	Erlend Lunnan BJØRNSTAD (Norwegian Univ. of Sci. and Tech.)
P-1080	Investigating the Kinetics of Molten Salt Synthesis of La-based Perovskite Type Oxides	Yonatan YEVILEVICH (Ben-Gurion Univ. of the Negev)

Characterization of slags I (in-situ observation)

DATE February 24 (Wednesday)

TIME 18:00-19:00 (Korea Standard Time)

CHAIRS Yongsug CHUNG (Korea Polytechnic University)
Masanori SUZUKI (Osaka University)

P-0816	In situ Study of the Smelting Phenomena for Pre-Reduced Ilmenite Pellet	Hossein SALEHI (Norwegian Univ. of Sci. and Tech.)
P-0669	In-situ Observation of Slag-Metal Separation Process of Niobium Concentrate	Zhuang MA (Inner Mongolia Univ. of Sci. and Tech.)
P-0541	Sampling Procedure, Characterisation and Quantitative Analyses of Aluminium White Dross	Cathrine Kyung Won SOLEM (Norwegian Univ. of Sci. and Tech.)
P-0274	In-situ Phase Determination of Primary Precipitated Compound from Molten Phosphorus-Containing Slag	Masanori SUZUKI (Osaka University)
P-0185	Advanced Slag Analysis Methods – on-Line Optical Emission Spectrometry, Laser-Induced Breakdown Spectroscopy and Raman Spectroscopy	Matti AULA (University of Oulu)
P-1422	The Fast Analysis of Heterogeneous Materials Such as Slags without Sample Preparation – the Key to In-situ Instead of Post-Mortem Process Control	Alexander SCHLEMMINGER (SECOPTA analytics GmbH)

Electrochemical processing and molten salts I (molten salts for REM recovery)

DATE February 24 (Wednesday)

TIME 20:00-21:00 (Korea Standard Time)

CHAIRS Ryosuke O. SUZUKI (Hokkaido University)
Jungshin KANG (Korea Institute of Geoscience and Mineral Resources)

P-0930	Recovery of Indium from In-Sn Alloy in Molten Fluoride Electrolyte	Kyoung Tae PARK (Korea Inst. of Industrial Tech.)
P-1326 KEYNOTE	Recycling of Critical Metals by Using Molten Salt	Toru H. OKABE (The University of Tokyo)
P-0220	Recovery and Extraction of Rare-Earth Element from Rare-Earth Permanent Magnet Waste by Molten Fluoride Electrolysis	Yusheng YANG (Inner Mongolia Univ. of Sci. and Tech.)
P-1150	Selective Recovery of Rare Earth Elements from a Spent Nd-Fe-B Magnet Using Zinc Chloride	Jungshin KANG (KIGAM)
P-0700 KEYNOTE	Alternative Way of Producing Rare Metals by a Molten Salt Based Process of Oxide Feedstocks	Jonghyeon LEE (Chungnam National University/ ZIRON TECH, Co., Ltd.)

Electrochemical processing and molten salts II (molten salts for metal production)

DATE February 24 (Wednesday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Jonghyeon LEE (Chungnam National University)
Antoine ALLANORE (Massachusetts Institute of Technology)

P-1134 KEYNOTE	Melts Electrochemistry: Theoretical and Experimental Insights	Antoine ALLANORE (Massachusetts Inst. of Tech.)
P-1125	Development of a Novel Electrolytic Process for Producing High-Purity Magnesium Metal Using Magnesium Oxide	Tae-Hyuk LEE (KIGAM)
P-0982 KEYNOTE	Electrodeposition of Silicon from Molten Salt Electrolytes	Geir Martin HAARBERG (Norwegian Univ. of Sci. and Tech.)
P-0374 KEYNOTE	Metal Production via Sulfide from Oxide	Ryosuke O. SUZUKI (Hokkaido University)
P-0755	Electrochemical Mechanism of Desulfurization in CaO-SiO_2-Al_2O_3 System	Sang Hoon LEE (Yonsei University)
P-0397	Correlation between Applied Electricity and Electrochemical Desulfurization of Molten Iron by Molten Slag	Dong-Hyun KIM (POSTECH)

Ferrous slags IV-1
(mold flux-1: mold fluxes for high Al-steels)

DATE February 25 (Thursday)

TIME 16:00-17:00 (Korea Standard Time)

CHAIRS Il SOHN (Yonsei University)
Irmtraud MARSCHALL (K1-MET GmbH)

P-1132 KEYNOTE	Mold Flux for High Aluminium Containing Steels	Jung-Wook CHO (POSTECH)
P-0351	Prediction of Al_2O_3 Content in Mold Flux during Continuous Casting	Kenji TSUZUMI (JFE Steel Corporation)
P-0602 KEYNOTE	Development of Non-reactive Mold Flux for the Casting of Advanced High Strength Steels	Wanlin WANG (Central South University)
P-0394	Effect of Na_2O on Properties and Structure of CaO-Al_2O_3-based Mould Fluxes	Qi WANG (The University of New South Wales)
P-0242	Investigation of Calcium Aluminate based Mold Slag Compositions	Irmtraud MARSCHALL (K1-MET GmbH)
P-0612	Investigation on Properties of Mold Fluxes during Continuous Casting of High-Al Containing Electrical Steels	Jun-Yong PARK (POSCO)

Ferrous slags IV-2
(mold flux-2: mold flux fundamentals)

DATE February 25 (Thursday)

TIME 17:00-18:30 (Korea Standard Time)

CHAIRS Jung-Wook CHO (Pohang University of Science and Technology)
Oleg OSTROVSKI (The University of New South Wales)

P-0118	New Mold Slag Compositions for the Continuous Casting of Soft Steels	Nathalie KÖLBL (Montanuniversität Leoben)
P-0219	Effect of Li_2O on the Crystallization of Fluorosilicate Glass and Molecular Dynamics Simulation Analysis	Tae-min YEO (POSTECH)
P-0193	Heat Transfer Control by Dispersed Metallic Particles in CaO-Al_2O_3-CaF_2-based Glassy Mold Flux Film for Continuous Steel Casting	Sung-Hee HYUN (POSTECH)
P-0699	Uncertainty of Physical Property Measurement of Slag / Flux with Volatiles	Junxue ZHAO (Xi'an Univ. of Architecture and Tech.)
P-0545	Development of Experimental Techniques for Qualification of Mould Fluxes for Continuous Casting of Liquid Steel	Ashok KAMARAJ (National Metallurgical Laboratory)
P-0353	Correlation of the High Temperature Viscous Behavior and Structure in Molten CaO-SiO_2-CaF_2 Slags Containing Na_2O and K_2O	Minseok SEO (Yonsei University)
P-0265 KEYNOTE	Challenges in the Mould Fluxes Design	Oleg OSTROVSKI (The University of New South Wales)
P-1057	Modeling of non-Newtonian Mold Powders for Continuous Casting of Steel	Hyunjin YANG (Swerim AB)
P-1082	Modelling the Performance of Casting Powders during Continuous Casting of Steel	Pavel Ernesto RAMIREZ LOPEZ (Swerim AB)

Ash and weld fluxes I (coal ash)

DATE February 25 (Thursday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Sun-Joong KIM (Chosun University)
Stephan PETERSEN (GTT-Technologies)

P-1120	Phase Equilibria and Viscosity of K_2O-CaO-SiO_2 Slags for Biomass Combustion and Gasification	Daniel LINDBERG (Aalto University)
P-0811	Gaining Insight into the Behavior of Slags in Coal Combustion: Applying the Connected Local Equilibria Method Using ChemApp and SimuSage	Stephan PETERSEN (GTT-Technologies)
P-0445	Real Time Evolutions of Individual Industrial Coal Particles in Varied Oxygen Partial Pressure Environments	Anna NAKANO (National Energy Technology Laboratory)
P-0276	Properties of Eutectic Slags: Filling the Gaps for an Agglomeration Model	Nicole BOND (Natural Resources Canada)

Refractories I
(refractory-slag reaction)

DATE February 25 (Thursday)

TIME 16:00-17:00 (Korea Standard Time)

CHAIRS Sun-Joong KIM (Chosun University)
Yongsug Chung (Korea Polytechnic University)

P-1096	Refractory Wear by Molten Copper Slag with Presence of Clays Minerals	Julio OSSANDON (University of Chile)
P-1046 KEYNOTE	Dissolution Phenomena of Refractory Raw Materials in Liquid Slags	Yongsug CHUNG (Korea Polytechnic University)
P-0256	Dynamic Wetting of $CaO-SiO_2-MgO-FeO_x-Al_2O_3-MnO-TiO_2$ based Slags on MgO Substrates	Ai Thi Diem NGUYEN (University of Wollongong)
P-0772	A Fundamental Study on the Thermal Degradation of MgO-C in Steelmaking Process	Gi Ho LA (Yonsei University)
P-0848	Freeze Lining Behaviour in DC Smelting Furnaces: the Influence of Furnace Design and Operation	Johannes Hendrik ZIETSMAN (University of Pretoria)
P-0221	Determination of Bath/Freeze Lining Interface Temperature Based on the Rheology of the Slag	Samant NAGRAJ (Metallo Belgium N.V.)
P-0294	Effect of Crystallographic Property of MgO on Spinel Growth at Interface between $CaO-SiO_2-Al_2O_3$ Slag	Cheol Min YOON (Yonsei University)

Energy and environments I
(energy recovery and environmental protection)

DATE February 25 (Thursday)

TIME 18:00-19:00 (Korea Standard Time)

CHAIRS Eun Jin JUNG (Research Institute of Industrial Science and Technology)
Hiroyuki MATSUURA (The University of Tokyo)

P-0945 KEYNOTE	Reducing the Carbon Footprint: Primary Production of Aluminum and Silicon Metal with Changing Energy Systems	Gudrun SAEVARSDOTTIR (Reykjavik University)
P-0967	Modification of Cr-bearing Molten Slag for Carbon Capture and Storage	Qing ZHAO (Northeastern University)
P-0288 KEYNOTE	Control of Hydration of Free Magnesia in Steelmaking Slag	Ryo INOUE (Akita University)
P-0464	Use of Oxygen Steelmaking Slag for Remediation of Metalloid-contaminated Water	Somnath BASU (Indian Institute of Technology Bombay)
P-1110	Influence of Chelating Agent on the Elution Characteristic of Steelmaking Slag into Aqueous Environment	Hiroyuki MATSUURA (The University of Tokyo)
P-0623 KEYNOTE	Process Concept for the Dry Recovery of Thermal Energy of Liquid Ferrous Slags	Dieter SENK (RWTH Aachen University)
P-1328	Air Granulation and Energy Recovery of Blast Furnace Slag	Santiago FAUCHER (Ecomaister Co., Ltd.)
P-0465 KEYNOTE	Formation and Reduction of NO from Nitrogen in the Combustion of the Fuels Used in the Sintering Process of Iron Ore	Sung-Mo JUNG (POSTECH)

Recycling and sustainability I
(sustainable utilization of slag and refractory)

DATE February 25 (Thursday)

TIME 19:00-20:00 (Korea Standard Time)

CHAIRS Youngjae KIM (Korea Institute of Geoscience and Mineral Resources)
Johannes SCHENK (Montanuniversität Leoben)

P-0603 KEYNOTE	A Review of Circular Economy Prospects for Stainless Steelmaking Slags	Lauri HOLAPPA (Aalto University)
P-0174	A Computational Study on the Mixing and Reduction of Slags from Ferrochrome and Stainless Steel Production	Eetu-Pekka HEIKKINEN (University of Oulu)
P-0264 KEYNOTE	Processing and Utilization of Steelmaking Slags in the European Union	Johannes SCHENK (Montanuniversität Leoben)
P-0376	Utilization of Waste Materials from the Pulp & Paper Inderstry as Raw Materials in the Steelmaking Industry	Tova JARNERUD (KTH Royal Institute of Technology)
P-1433 KEYNOTE	Some Recycling Aspects of Molten Slags, Fluxes and Salts	Seshadri SEETHARAMAN (KTH Royal Inst. of Technology)

Recycling and sustainability II
(slag valorization and processing for higher values)

DATE February 25 (Thursday)

TIME 20:00-21:00 (Korea Standard Time)

CHAIRS Eetu-Pekka HEIKKINEN (University of Oulu)
Il SOHN (Yonsei University)

P-1050	Phase Separation in Phosphorus-Containing System without CaO Saturation at Elevated Temperature	Yu-Ichi UCHIDA (Nippon Institute of Technology)
P-0284	Phosphorus Segregation in Basic Oxygen Steelmaking Slags	Brian MONAGHAN (University of Wollongong)
P-0328	Preliminary Numerical Study into Gravity Separation of Dicalcium Silicate from BOS Slag during Solidification	Thi Bang Tuyen NGUYEN (The University of Newcastle)
P-0141	Influence of Al_2O_3 Addition on the Solidified Microstructure and Crystallization Kinetics of BOF Slag	Muxing GUO (Katholieke Universiteit Leuven)
P-0449 KEYNOTE	Perspectives of Slag "Co-product" Zero Waste Full Utilization	Il SOHN (Yonsei University)
P-0974	Predicting Slag Properties for Reduced Risk in Mineral Wool Production	Hanlie KOTZE (Consensi Consulting)
P-0431 KEYNOTE	Slag Engineering and Valorization in the Framework of Sustainable Metallurgy	Bart BLANPAIN (Katholieke Universiteit Leuven)

Recycling and sustainability III (novel processing of co-products)

DATE February 25 (Thursday)

TIME 21:00-22:00 (Korea Standard Time)

CHAIRS Muxing GUO (Katholieke Universiteit Leuven)
Jinichiro NAKANO (National Energy Technology Laboratory)

P-0346 KEYNOTE	Cold Fluid Modeling of Air-Blast Slag Atomization	Mansoor BARATI (The University of Toronto)
P-0841	Controlled Evolution of Rare Earth Phosphate in Coal Ash Slag	Jinichiro NAKANO (National Energy Tech. Laboratory)
P-0944	Modeling of Powder Production during Centrifugal Atomization	Sabita SARKAR (Indian Institute of Technology Madras)
P-0144	The Behaviour of Zinc during the Recycling of BOS Filter Cake	Raymond James LONGBOTTOM (University of Wollongong)
P-0861	Foamed Glass Materials Using Quartz from Copper Mine Tailings	Lina M. URIBE (University of Talca)
P-1432 KEYNOTE	Use of Copper Slag for Iron Alloys Fabrication. A Circular Economy Approach for the Chilean Metallurgical Industry	Mario SANCHEZ (University of Andres Bello)

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