

Session Program (Tentative)

Basic Science

14:00-15:40

Chairpersons : Yakamasa Ishigaki, Christos Aneziris

- 14-A-11 **Rheological Behavior of Organic Binders for Blast Furnace Taphole Clay**
Shougo Miyajima*
- 14-A-12 **Mechanical Properties of In-situ Calcium Hexaluminate Castables with Difference Microstructure**
Jiraprabha Khajornboon*, Kouichiro Washijima, Takeshi Shiono
- 14-A-13 **Experimental Study and Thermodynamic Modeling of Li₂O-Al₂O₃-ZrO₂ System**
Xintong Du, Sun Yong Kwon, In-Ho Jung*
- 14-A-14 **Numerical Modeling of Wedge Splitting Test by Discrete Element Approach: Flat Joint Contact Model**
Farid Asadi*, Damien Andre, Sacha Emam, Pascal Doumalin, Marc Huger
- 14-A-15 **Microstructure and Grain Growth of Mullite by Reaction Sintering of α -Alumina with Rhyolite**
Toru Fukuoka*, Yoshiyuki Harada, Aya Okubo, Yusuke Moriyoshi, Kenji Tamura, Yujiro Watanabe

16:00-17:40

Chairpersons : Kohji Kageyama, Michel Rigaud

- 14-A-16 **Influence of Al₂O₃ Content on Microstructure and Mechanical Properties of Al₂O₃-MgO Castables**
Kouichiro Washijima*, Kaname Hayashi, Jiraprabha Khajornboon, Takeshi Shiono
- 14-A-17 **Thermodynamic Approach on Continuous Growth of Spinel between Slag and Solid MgO and MgAl₂O₄**
Cheol Min Yoon*, Dong Joon Min
- 14-A-18 **Effect of K₂O Addition on Formation of Tridymite Phase from Quartz**
Tomoko Kitani*, Takayuki Sano, Takeshi Shiono
- 14-A-19 **Effect of Sodium Polyphosphate Addition on Alumina-Spinel Castable Expansion**
Kosuke Ota*, Kazuya Nakabo, Shigefumi Nishida
- 14-A-20 **Phase Formation of Y₂O₃ Nano-size Powders through Rapid Cooling Process**
Takamasa Ishigaki*, Sharif Abdullah Al-Mamun

New Development

14:00-15:40

Chairpersons : Toshiaki Hashimoto, Reto Schwegler

- 14-B-11 **High Temperature Low Bio-persistence Fiber with FeO Resistance**
Tsuyoshi Maeda*, Kenji Komatsu
- 14-B-12 **Development and Application of Advanced Refractory Systems for Improved Mechanical and Corrosion Resistance**
James G. Hemrick*
- 14-B-13 **Slag Resistance of No-Cement Refractory Castables**
Hong Peng*, Jun Liu, Qinghu Wang, Bjorn Myhre, Yawei Li
- 14-B-14 **Towards a New Generation of Dry Vibrating Materials Dedicated to Coreless Induction Furnace : A Boron Free Solution**
Romain Techer*, Dirk Holl, Patrick Malkmus
- 14-B-15 **Assessment of a New Magnesia-based Binder Concept for Refractory Castables**
Christoph Wohrmeyer*, Frederic Lacoue, Lauri Thomas, Magali Szepezdyn, Chris Parr

16:00-18:00

Chairpersons : Koji Asakawa, Xinyu Liu

- 14-B-16 **The Application of Ti-Max Phase in Low Carbon Refractories and Elucidating Its Related Role**
Junfeng Chen*, Nan Li, Yaowu Wei, Shaowei Zhang
- 14-B-17 **Splintered versus Cubic Grains in High Alumina Castables - Part I: Examination of the Impact of the Particle Shape on the Explosion Resistance**
Laura Erbar*, Olaf Krause, Tobias Steffen, Erwan Brochen, Christian Dannert
- 14-B-18 **Splintered Versus Cubic Grains in High Alumina Castables - Part II: Influence of Aggregate Shapes on Thermomechanical and Microstructural Changes During the Initial Heat-up**
Sandra Abdelouhab, Pascal Pilate*, Erwan Brochen, Christian Dannert
- 14-B-19 **Splintered Versus Cubic Grains in High Alumina Castables - Part III: Assessment of the Failure Tendency in the Wear Lining of a Modelled Steel Ladle Using the Drucker-Prager Failure Criterion**
Erwan Brochen*, Maren Sollbach, Christian Dannert, Olaf Krause, Laura Erbar, Sandra Abdelouhab, Pascal Pilate
- 14-B-20 **Reinforcement of the Support Structure for Ceramic Fiber Blocks in a Reheat Furnace**
Takuya Matsumoto*, Motokuni Itakusu, Hiroshi Imagawa
- 14-B-21 **Design of Hydratable Alumina-bonded Castables with Optimized Drying Behavior**
A. P. Luz*, B. P. Bezerra, M. H. Moreira, V. C. Pandolfelli

Session Program (Tentative)

Refractories for Iron and Steel Making - BOF

14:00-15:40

Chairpersons : Hisatake Okumura, Yong Lee

- 14-C-11 **Improvement of Tolerance of Converter by Improving Material of MHP**
Hideya Masaki*, Satoru Shimizu , Atsuhisa Iida
- 14-C-12 **MgO-C Bricks for BOF's: Challenges from the Past and Perspectives for the Future**
Carlos Pagliosa*, Tom Vert
- 14-C-13 **Improvement of MgO-C Bricks for the Charging Sidewall of the BOF in Kashima Steel Works**
Kensuke Kato*, Satoru Ito
- 14-C-14 **Investigation of MHP Wear Pattern and Advanced MHP Refractory for BOF**
Gaku Shimada*, Masayoshi Kakihara, Ryoma Fujiyoshi, Hiroki Yoshioka, and Atsuhisa Iida
- 14-C-15 **Improved Mechanical Properties and Thermal Shock Resistance of Low Carbon MgO-C Refractories via the Catalytic Formation of Nanocarbons and Ceramic Bonding Phases**
Tianbin Zhu*, Yawei Li, Shaobai Sang

16:00-17:00

Chairpersons : Atsushi Torigoe, Thomas Schemmel

- 14-C-16 **Technical Follow-up of BOF MgO-C Supplies: Quality Controls of Refractories and Analysis of Process Parameters**
Tiphaine Cordonnier*, Valerie Blaise, Guillaume Brosse
- 14-C-17 **Reduction of Refractory Repair Materials Used in the BOF Converter**
Shigeto Sawai*, Koji Yamada, Yasuhiro Yamada
- 14-C-18 **Development of Innovative Basic Gunning Mixes and Methods to Determine Their Practical Performance**
Ronald Lanzenberger*, David Wappel, RHI Magnesita GmbH, Technology Center Leoben, Austria

Refractories for Iron and Steel Making - Ladle and Secondary Refining

17:00-18:00

Chairpersons : Atsushi Torigoe, Thomas Schemmel

- 14-C-19 **Bonding Mechanisms of Basic Refractories for RH Snorkels**
Zongqi Guo*, Ying Ma
- 14-C-20 **New High-Grade Refractory Castable Applied to RH Degasser Snorkels**
Daniela Fonseca*, Arthur Mangualde, Mauro Verona, Modestino Brito
- 14-C-21 **Novel Tempered MgO-Cr₂O₃ Bricks with Zero C Binder for RH Degasser**
Carlos Pagliosa*, Adão Campos, Barbara Borges, Vanderlucio Madalena, Victor Carlos Pandolfelli

Refractories for Iron and Steel Making -Continuous Casting

14:00-15:20

Chairpersons : Noriaki Yamauchi, Helge Jansen

- 14-D-11 **Development of High Al Content Al₂O₃-C SV Plate**
Naohide Hamamoto*, Takayuki Matsunaga, Koji Moriwaki
- 14-D-12 **Development of High Performance Slide Gate Plate with Composite Structure**
Zenta Ohmaru*, Kenichi Oki, Yuji Nakamoto, Hidetoshi Kamio, Katsumi Morikawa
- 14-D-13 **Surface Abrasion Appeared on the Slide Gate Plate**
Keiichiro Akamine*, Arito Mizobe, Kiyoshi Goto, Katsumi Morikawa
- 14-D-14 **Proposal of Robot Application for the Ladle Slide Gate Brick Replacement**
Mamoru Yoshimura*, Yusuke Yamaguchi, Toshihiro Imahase, Junichi Funato, Haruyuki Ohba

Collaboration among Customers, Manufactures and Academia

16:00-18:00

Chairpersons : Kiyoshi Goto, A K Chattopadhyay

- 14-D-16 **Refractory Lifetime Prognosis for RH Degassers**
Andreas Viertauer, Nikolaus Mutsam, Franz Pernkopf, Andreas Gantner, Georg Grimm, Waltraud Winkler, Gregor Lammer, Alexander Ratz, Magnus Persson
- 14-D-17 **Interactions of Steel Ladle Refractories with Ladle Slags in Atmospheric and Lowered Pressures**
Eetu-Pekka Heikkinen*, Jukka Vatanen, Miika Sihvonen, Heikki Parkka, Henna Tahtila, Riku Mattila, Timo Fabritius
- 14-D-18 **Refractory without Carbon for the Production of Ultra-low Carbon Steels**
Loise Bonfim Zaidan*, Carlos Pagliosa, Adao Adelcio Campos, Robson Arnaldo Dettogne Nascimento, Marlon Jose dos Anjos Silva, Marcio Jose Verissimo
- 14-D-19 **Practical Numerical Simulation and Experimental Setup for Speeding up the Drying Behavior of Calcium Aluminate Cement (CAC)-bonded Refractory Castables**
M. H. Moreira*, A. P. Luz, T. M. Cunha, H. Lemaistre, J. M. Auvray, C. Parr, R. Ausas, V. C. Pandolfelli
- 14-D-20 **Corrosion Behavior of a Pressure Slip Casted Spider Brick During Ingot Casting**
Nora Gerlac, Patrick Gehre*, Christos G. Aneziris, Leandro Schottler
- 14-D-21 **New Anti-oxidation Technology for Trough and Runners Castables, Part II: Hot Adhesion Material and the Successful Results at CSN Blast-Furnace #02**
E. Y. Sako*, W. Alves, F. P. Netto, N. Janeiro, D. F. Galesi, G. A. Alves, H. Fujiwara, T. Komatsu, L. A. Nascimento, P. R. Fusco

Session Program (Tentative)

Refractories for Iron and Steel Making - Coke Ovens and Blast Furnace

14:00-15:40

Chairpersons : Isao Sasaka, Patrick Tassot

- 14-E-11 **The Influence of Crystallisation on Thermal Shock Behaviour of a Fused Silica Refractory Castable Concrete**
Vahid Tadaion*, Kirill Andreev, Thorsten Tonnesen, Rainer Telle
- 14-E-12 **Newly Developed Low Cement and Cement-free Castables Based on Silica**
Lucie Kersnerova*, Karel Lang, Stanislav Dvorak
- 14-E-13 **Enhancing Thermal Conductivity of Anthracite-based Carbon Blocks for Blast Furnace**
Yawei Li*, Tongsheng Wang, Shaobai Sang
- 14-E-14 **A Thermodynamic Understanding of Alkali Oxide Accretion on the Castable Refractories in Ironmaking**
Dong-Geun Kim, In-Ho Jung*
- 14-E-15 **Use of High Durability Carbon Blocks for Blast Furnace Bottom Lining**
Shohsei Miyamoto*, Keisuke Hatakeyama, Michio Nitta

Refractory Engineering Systems and Design

16:00-18:00

Chairpersons : Eiji Ishihara, Martin Geith

- 14-E-16 **Modeling of Nonlinear Behavior at High Temperature of Refractory Masonries Without Mortar**
Nassima Yahmi*, Alain Gasser, Eric Blond
- 14-E-17 **Thermomechanical Modelling of Refractory Mortarless Masonry Wall Subjected to Biaxial Compression**
Mahmoud Ali*, Thomas Sayet, Alain Gasser, Eric Blond
- 14-E-18 **Optimization of Magnesite Castables by Introduction of Pre-synthesized Magnesium Silicate Hydrate**
Yu Zhang*, Yawei Li, Junfeng Chen
- 14-E-19 **Approaches Towards a Digital Tool for Optimising Lining Design – Case Studies of Channel Induction Furnace and Steel Ladle**
Shengli Jin, Aidong Hou, Harald Harmuth, Dietmar Gruber*
- 14-E-20 **Anti-crack and Corrosion Resistance Lining for BF Main Trough Skimmer**
Chien-Nan Pan*, Kun-Ming Chen
- 14-E-21 **Design, Fabrication and Slag Behaviors of Lightweight Raw Materials**
Lyping Fu*, Huazhi Gu, Ao Huang, Yongshun Zou, Meijie Zhang, Hongwei Ni

Session Program (Tentative)

Refractories for Glass and Cement Production

9:00-10:40

Chairpersons : Hitoshi Toda, Stefan Schriebl

- 15-A-1 **Energy Saving Design with High Thermal Resisting and Insulating Monolithic Refractory around Glass Furnace**
Toshiro Tanimoto*
- 15-A-2 **Influence of Glassy Phase Composition on Glass Exudation of AZS Fused Cast Refractories**
Kuniyuki Yanagawa*, Toshiro Tanimoto, Kenji Matano
- 15-A-3 **Formation of Bubbles at the Interface between Borosilicate Glass and Dense Zircon Refractory**
Hiroki Akahane*, Takeshi Shiono
- 15-A-4 **Bonded High-zirconia Refractories for Glass**
M. D. Patil*, M. J. Dejneka, J. S. Sutherl, A. Zellet-Lukaso
- 15-A-5 **Cement-free Refractory Concretes with Balanced Thermomechanical Properties in Highly Loaded Areas of the Cement Clinker Burning Process**
Hans-Jurgen Klischat, Kai Beimdiek*

11:00-12:20

Chairpersons : Takeshi Yamamoto, Sanat Hazra

- 15-A-6 **Effect of Minor Components on the Properties of Magnesia-Spinel Brick for Cement Rotary Kilns**
Hitoshi Toda, Mikako Fujii, Makoto Ohno,
- 15-A-7 **Hybrid Spinel Technology - Basic Refractories for Cement Rotary Kiln Linings with Optimised Flexibility**
M. Geith*, S. Jörg, R. Krischanitz
- 15-A-8 **Basic Refractories Enabling Ecological Cement and Lime Production under Difficult Conditions**
Hans-Jurgen Klischat, Holger Wirsing*
- 15-A-9 **Improvement of Magnesia-Spinel Bricks in Each Zone of Cement Rotary Kiln**
Tsuyoshi Suwa, Yoshihiro Toda, Koichi Igabo, Tamiatsu Koyake

Basic Science

14:00-15:20

Chairpersons : Fumitada Iguchi, Dana Goski

- 15-A-11 **Effect of Catalysts on Microstructure and Thermo-mechanical Properties of Al₂O₃-C Refractories**
Chaofan Yin*, Xiangcheng Li, Chen Bai, Wei Gong, Pingan Chen, Boquan Zhu
- 15-A-12 **Aging Behaviour of Deflocculated Low Cement and Self-Flow Castables - Influence of Materials, Additives and Atmospheric Conditions**
C. J. Dileep Kumar*, Gaurav Sinha, Shushavon Sarkar, Suparna Basu, Saumen Sinha, Santanu Basak
- 15-A-13 **The Compressive Strength of Sintered Alumina by Molecular Dynamics Simulation**
Yosuke Kataoka*, Kiyoshi Goto, Hironori Ogata, Yusuke Moriyoshi
- 15-A-14 **Influence of Magnesium Aluminate Spinel on the Thermomechanical Properties of Alumina-Spinel Castables**
Karina Tyrała, Jakub Ramult, Ryszard Prorok, Dominika Madej*

High Temperature Engineering Ceramics

16:00-18:00

Chairpersons : Takeshi Shiono, Michel Rigaud

- 15-A-16 **Low Temperature Synthesis of α -Si₃N₄ Powders via High-energy Ball Milling Combined with Salt-assisted Nitridation**
Li Hongxia*, Liu Guoqi, Zhang Jing, Gu Qiang
- 15-A-17 **Spark Plasma Sintering of Aluminum Nitride Ceramics**
Toshiyuki Nishimura*
- 15-A-18 **Residual Strain in the Composites of Oxygen Ionic Conductors and Oxides**
Ryosuke Kuwabara, Keiji Yashiro, Takashi Nakamura, Fumitada Iguchi*
- 15-A-19 **Improvement in Corrosion Resistance of Silicon Nitride / Boron Nitride Composite Ceramics and Application to Atomizing Spray Nozzle**
Nobuhiro Otsuka, Atsushi Makiya
- 15-A-20 **3-dimensional Observation of Coarse Pore Evolution During Sintering in Alumina Ceramics**
Satoshi Tanaka*, Tsuyoshi Hondo
- 15-A-21 **Microstructure and Phase Evolution of Corundum-Spinel Based Castables Containing Nano Phases**
Xiangcheng Li*, Hui Zhu, Pingan Chen, Chen Bai, Boquan Zhu

Refractories for Petrochemical Industry

9:00-10:20

Chairpersons : Koji Goda, Florian Holleyn

- 15-B-1 **Testing Refractories for Direct Contact Steam Generation**
Nicole Bond, Marc Duchesne*, Robin Hughes
- 15-B-2 **Corrosion Behavior of Chrome Oxide Free Refractories by Coal Slags under Gasification Conditions**
Shixian Zhao*, Hongxia Li, Binli Cai, Honggang Sun, Lan Wang, Gang Wang
- 15-B-3 **Alumina Refractory Vaporization in Secondary Reformer & Auto-thermal Reformer in Syngas Plants**
Manabendra Maity*
- 15-B-4 **Phase Composition, Structure, Properties of (CaO+MgO)-stabilized Zirconia on Phosphate Binder at the Temperatures up to 2200 °C for Carbon Black Reactors Lining**
Ph. D. Valery V. Martynenko, Ph. D. Pavel A. Kushchenko, Dr. Sc. Vladimir V. Primachenko

Session Program (Tentative)

Environmental Sustainability and Recycling

11:00-12:00

Chairpersons : Hiroyasu Niitsuma, James Hemrick

- 15-B-6 **Recycled Raw Materials in Refractory Castables - Part 1 of 3: Water Soluble Ions from Recycled Refractory Raw Materials in Alkaline Solution**
Johannes Kasper*, Christian Dannert, Alexandra Koch, Olaf Krause
- 15-B-7 **Recycled Raw Materials in Refractory Castables - Part 2/3: Influence of Water Soluble Ions From Recycled Refractory Raw Materials on the Dispersion and Coagulation of the Matrix Suspension of CAC-Bonded Refractory Castables**
Johannes Kasper*, Christian Dannert, Alexandra Koch, Olaf Krause
- 15-B-8 **Recycled Raw Materials in Refractory Castables - Part 3/3: Influence of Water-soluble Ions from Recycled Refractory Raw Materials on the Coagulation and Hydration Velocity of CAC-bonded Refractory Castables**
Alexandra Koch*, Olaf Krause, Johannes Kasper, Christian Dannert

Advances in Manufacturing, Installation and Equipment

12:00-12:40

Chairpersons : Hiroyasu Niitsuma, James Hemrick

- 15-B-9 **Study on Explosion Resistance of Dense Refractory Castables with Different Bonding Systems**
Zhanmin Wang *, Xiyang Cao, Xujing Yang, Lingyan Yu, Jianjun Chen
- 15-B-10 **Preparation of Masses for Isostatic Pressed Products for Steel Casting by Using the Original Eirich Preparation Technology**
Ralf Loebe*, Stefan Vucic

Raw Materials

14:00-15:40

Chairpersons : Yoshinobu Ushijima, Carkis De Ferrari

- 15-B-11 **Performance of a New Aluminate Binder Adapted to Dry Gunning**
Bruno Touzo*, Simon Gao, Christoph Wohrmeyer, Chris Parr
- 15-B-12 **Evaluation of Acheson Silicon Carbide for High Demanding Oxidation Resistance Environments**
Felipe Semeghin*, Daniel Moreira, Vinicius Borges, Daniel Vale
- 15-B-13 **New Alternatives in the Manufacturing of Sintered 70%-Alumina Cement**
Andre Luis Pereira, Milli Aline Sant'Anna, Leonardo Curimbaba Ferreira*, Peter Miura Nakachima
- 15-B-14 **Low Temperature Decarbonation of LimesTone under Vacuum**
Yuki Mihashi*, Akihiko Shibuya, Tetsuo Umegaki, Yoshiyuki Kojima
- 15-B-15 **Research and Application of Microcrystalline Magnesite in China's Tibet**
Runtang Feng*, Baikuan Liu, Xiaoli Tian, Zhenxin Gao, Tianqing Li, Zhixun Li

Refractories for Iron and Steel Making - Hot Metal Transport

16:00-18:00

Chairpersons : Atsuhisa Iida, Yawei Li

- 15-B-16 **Improvement of Steel Productivity in Consolidating Upstream Processes Into Kakogawa Works**
Koichiro Takeno*, Kazumasa Adachi, Hitoshi Sawada, Norio Sakaguchi, Atsuhiko Yoshida
- 15-B-17 **Development of Refractories for Torpedo Ladles**
Ricardo Couto*, Braulo Hemetrio, Roselaine Magalhaes, Marco Antonio Quintela
- 15-B-18 **Improvement of the Lance Refractories for Desiliconization of Molten Iron in Torpedo Cars**
Masato Shiokawa*, Kunihiro Watanabe
- 15-B-19 **Performance Optimization of Torpedo Ladles Through Innovative Product Development and Design**
Prof. Dr. Helge Jansen, Dr. Thomas Schemmel*, Dr. Ujjwal Sengupta
- 15-B-20 **On the Thermal Management of Torpedo Ladle Car Logistics at Tata Steel in IJmuiden**
Paul van Beurden*, Joeri Liefhebber, Peter Sentveld, Frank Kerkhoven
- 15-B-21 **Improvements of Hot Metal Ladle Refractory Material and Design in Order to Reduce Specific Consumption, Increase Ladle Availability and Reduce Operational Cost**
Daniele Fonseca de Lima*, Sandro Souza Santos, Odair Jose Kirmse, Camila B Albani, Katia C F

Refractories for Iron and Steel Making - Ladle and Secondary Refining

9:00-10:40

Chairpersons : Yoshihiro Tamura, Carlos Pagliosa Neto

- 15-C-1 **Cracking Behavior on Throat Refractory of RH Degasser**
Yong M Lee*, Alan Sutliff, Xin Zhang
- 15-C-2 **Improvement in Refractory Life of Smelting Reduction Furnace**
Kengo Matsuda*, Koichi Takahashi, Daisuke Kondo, Sohei Takagaki, Keisuke Adachi, Masanori Nishikori
- 15-C-3 **Improvement of Refractory Lifetime for RH Degasser**
Sanghyeon Yoon*, Chang-su Ha
- 15-C-4 **Evaluation of Reduction Resistant Magnesite Chrome Bricks**
Kenji Tamaki*, Kiyoshi Goto, Katsumi Morikawa
- 15-C-5 **Development of New Optimized Material for Lower Vessel of RH Degasser**
Hisashi Tomiya*, Koichi Igabo, Kentaro Hirayama

Session Program (Tentative)

11:00-12:40

Chairpersons : Takahimi Imaeda, Erwan Gueguen

- 15-C-6 **Indigenously Developed Mag Dolo Refractory for Steel Ladles as an Alternate to Imported Mag-C - A Risk Mitigation Strategy**
Kshitish Kumar Jena, Amit Banerjee, Navneet Sinha, Brijender Singh*, Subir Biswas, Sudhansu Pathak
- 15-C-7 **Improvement of MgO-Al₂O₃-C Brick for Ladle Bottom and Metal Zone**
Keisuke Morita*, Tomoyuki Terasaka, Seiichi Takada, Masayuki Egami, Manabu Kimura
- 15-C-8 **Impact of Composition Changes of Alumina-rich Slags on the Corrosion of Refractories Found in Steel Ladles**
Camille Reynaert*, Edyta Sniezek, Thorsten Tonnesen, Jacek Szczerba
- 15-C-9 **Forecasting of the Wear of Selected Refractory Material of the MgO-C Type in the Slag Zone of a Steel Ladle Using Dimensional Analysis**
Wiesław Zelik*, Zak.ady Magnezytowe
- 15-C-10 **Development of High Creep MgO-C Brick at High Temperature**
Kentaro Hirayama*, Atsuhisa Iida, Masakazu Iida, Hisashi Tomiya, Kazuhiro Inoue, Koyo Murakami

14:00-15:40

Chairpersons : Yoshitoshi Saitoh, David Wappel

- 15-C-11 **Thermomechanical Behaviour of an Alumina Spinel Refractory for Steel Ladle Applications**
Robert Kaczmarek*, Jean-Christophe Dupre, Pascal Doumalin, Ion Octavian Pop, Lucas Breder-Teixeira, Jean Gillibert, Eric Blond, Marc Huger
- 15-C-12 **Thermal Shock Resistance of Fired Corundum-Spinel Brick and Spinel-Containing LCC**
S. Darban*, R. Prorok, D. Madej, J. Szczerba
- 15-C-13 **Influence of Submicron-Size α -Al₂O₃ Powders on Slag Resistance of Corundum-Spinel Bricks in Ladle Metal Zone**
Tianqing Li, Qixiu Zuo, Jie Gao, Houxing Zhang, Baikuan Liu
- 15-C-14 **Global and Indian Perspectives of Alumina-Spinel Lining Concepts in a Steel Ladle**
Andreas Buhr*
- 15-C-15 **Development of Burnt Alumina-Magnesia-Spinel Brick for Steel Ladle Lining**
S.K.Hazra*, Avishek Mitra, Birendra Prasad, Ingo Gruber, Shankha Chatterjee

16:00-17:40

Chairpersons : Masayuki Egami, Lionel Rebouillat

- 15-C-16 **C-free Refractory for Reducing the Steel Ladle Energy Consumption: Numerical Analysis and In-situ Measurements**
M. F. Santos*, M. H. Moreira, M. G. G. Campos, R. A. Angelico, E. Y. Sako, V. P. S. Ramos, D. F. Galesi, V. C. Pandolfelli
- 15-C-17 **Improvement in Steel Ladle Life at LD# Shop 1...Hitting a Century**
Navneet Sinha*, Sudhansu Pathak, Brijender Singh, Rajeev Ranjan, Amit Banerjee
- 15-C-18 **Melting Phase Formation in MgO-CMA-C and Their Impact on Protective Slag Layer Formation for Steel Ladle Application**
Patrick Gehre*, Theresia Preisker, Stefan Guhl, Nora Brachhold, Gert Schmidt, Christos G. Aneziris, Christoph Wohrmeyer,
- 15-C-19 **Thermal Properties Characterization of Refractory Materials Used in the Insulation Layer of Steel Ladles**
Diana Vitiello*, David Smith, Benoit Nait-Ali, Nicolas Tessier-Doyen, Thorsten Tonnesen, Luis Laim, Lionel Rebouillat
- 15-C-20 **An Industrial Study of the Change in Behaviour of Microporous Insulation in Teeming Ladles**
Liam Cotton*, Dr. Shahin Mehraban, Dr. Ria Mitchell, Dr. Tom Dunlop, Mark Griffiths, Dr Zakaria Abdallah, Prof. Cameron Pleydell-Pearce, John Madill, Dr Szymon Kubal

Collaboration among Customers, Manufactures and Academia

9:00-10:40

Chairpersons : Toshio Horiuchi, Tom Vert

- 15-D-1 **Benefits of the Addition of a Structural Insulation Layer in the Refractory Lining of Rotary Kiln: Thermomechanical Modeling and In-plant Results**
Dan Cole, Eric Stover, Shengli Jin, Lionel Rebouillat*
- 15-D-2 **Discrete Element Modeling - A Promising Method for Refractory Application**
M. G. G. Campos*, M. F. Santos, M. H. Moreira, R. A. Angelico, P. van Beurden, P. Put, P. Tamis, V. C. Pandolfelli, S. Sinnema
- 15-D-3 **Earlier Sintering of High-alumina Refractory Castables by Using Alternative Calcium Sources**
A. P. Luz*, L.B. Consoni, C. Pagliosa, V. C. Pandolfelli
- 15-D-4 **Comparison of Cement- and Hydratable Alumina-bonded Alumina-Spinel Materials for Steel Ladle Purging Plugs**
Bin Long*
- 15-D-5 **Koblenz University of Applied Science, Department of Materials Engineering, Glass and Ceramics Launched a Praxis-integrated Bachelor-degree Programme**
O. Krause*, B. Schwarz

Session Program (Tentative)

Energy Saving and Insulation

11:00-12:40

Chairpersons : Kenji Komatsu, Ao Huang

- 15-D-6 **Characterization of Wool and Product Made by Alkaline Earth Silicate**
Yusuke Kishigawa*, Yasuo Shiraishi, Toshiaki Hashimoto
- 15-D-7 **Study on Preparation and Properties of Calcium Hexaaluminate Porous Ceramics**
Wang Gang*, Zhang Qi, Han Jianshen, Yuan Bo, Li Hongxia
- 15-D-8 **Reduction of Heat Loss in Steelmaking Process**
Yoshiyuki Nakamura*, Seiji Hosohara, Akihiko Inoue, Kai Taniguchi, Katsunori Takahashi
- 15-D-9 **High Emissivity Coatings for Basic Refractory Bricks**
Jindaporn Juthapakdeeprasert*, Wirat Lerdprom, Domingos De Sousa Meneses, Doni D. Jayaseelan, William E Lee
- 15-D-10 **Eco Design of Insulating Ceramic Foams for High Temperature Application**
V. R. Salvini*, V. C. Pandolfelli, J. A. Rodrigues, T. Santos Jr., O. H. Borges, J. R. Binoto

14:00-15:40

Chairpersons : Yasuo Shiraishi, Lucie Keršnerová

- 15-D-11 **Impact of Distinct Ca²⁺ Sources on the Physical Properties of Alumina-based Macroporous Refractories for Thermal Insulation at High Temperature**
O. H. Borges*, T. Santos Jr., R. R. B. de Oliveira, V. R. Salvini, V. C. Pandolfelli
- 15-D-12 **Development of Al₂O₃-CAC Refractory Macroporous Ceramics Derived from Ultrastable Foams and CAC Aqueous Suspensions**
T. Santos Junior*, O. H. Borges, V.V.S. Machado, V.R. Salvini, C. Parr, V.C. Pandolfelli
- 15-D-13 **Novel Innovative High Temperature Insulating Material Damping Capacity Based on Acoustic Emission Algorithms Based on Renewable Raw Material**
Dr. Volker Stein*, Dr. Thomas Schemmel, Dr. Petra Stein
- 15-D-14 **Improvement of High Temperature Properties of Ceramic Fiber Board Using Silica-sol Slurry with Ceramic Powders**
Naoya Takahashi*, Shinobu Hashimoto, Yusuke Daiko, Sawao Honda, Yuji Iwamoto
- 15-D-15 **Development of Insulating Firebrick Through a Gelation Freezing Method**
Mikako Fujii*, Ayumi Matsuoka, Yosuke Tanaka, Fumihito Ozeki, Manabu Fukushima, Yuichi Yoshizawa

16:00-18:00

Chairpersons : Yoshiyuki Nakamura, Gang Wang

- 15-D-16 **Optimization of Porous Alumina Ceramic Structure and Properties Using Different Sol-treated Walnut Shells as Pore Formers**
Shujing Li*, ZhiPeng Wei, Yuanbing Li, Ruofei Xiang, Qingye Wu
- 15-D-17 **Calcium Hexaluminate Lightweight Refractory Bricks: Manufacturing, Properties, Application**
Ph.D. Valery V. Martynenko*, Dr. Sc. Vladimir V. Primachenko, Ph.D. Nataliya M. Kaznachejeva
- 15-D-18 **Influence of Temperature on the Phase and Microstructural Evolutions of Mullite in a Reducing Atmosphere**
Ruofei Xiang*, Yuanbing Li, Zhengliang Xue, Zhiyong He
- 15-D-19 **Microporous Insulation Materials with High Heat Resistance**
Takeshi Miyake*, Yasuo Shiraishi, Toshiaki Hashimoto
- 15-D-20 **Effect of a Ceramic Coating on the Heat Loss Through the Refractory Walls and on the Hot Refractory Surface Stability of a Ceramic Roller Kiln**
R. Simmat, C. Dannert, S. Otto, V. Finke, A. Mezquita, S. Ferrer, I. Celades, L. Guaita
- 15-D-21 **High Temperature Ceramic Coatings for Energy Saving Applications**
Eric Y. Sako*, Heloisa D. Orsolini, M. Moreira, V. C. Pandolfelli

Refractories for Iron and Steel Making - Coke Ovens and Blast Furnace

9:00-10:40

Chairpersons : Yozo Yukino, Mike Alexander

- 15-E-1 **Development of Taphole Clay with New Generation Resin Binder**
Yuji Otsubo*, Yoshinobu Ushijima, Koji Yonemoto, Yutaka Kitazawa
- 15-E-2 **High Performance Tap Hole Clay - A Key for Blast-Furnace Hearth Protection and a Tool for Cost Reduction**
E. Y. Sako*, D. C. F. Hespanhol, A. M. Souza, N. Januario, D. F. Galesi, D. Tanaka, T. Kageyama
- 15-E-3 **Behavior of Fe-Si₃N₄ in Taphole Mix Texture after Long-time Heating**
Yuga Yamamoto*, Daisuke Tanaka, Tatsuya Kageyama
- 15-E-4 **Development of High-performance Eco-friendly Tap-hole Clay(THC) with Carbonized Organic Matter**
Tae-Wan Kim*, Jae-Hoon Lee, Jin-Seog Go, Won-Gab Kim
- 15-E-5 **Behaviour of Tap-hole Clays Against Slag Corrosion: A Key to assure Safe and Regular Emptying of Blast Furnaces**
P.Hubert*, N.Eliazord, B. Buchberger

Session Program (Tentative)

11:00-12:40

Chairpersons : Hatsuo Taira, Kai Beimdiek

- 15-E-6 **Influence of Carbon Raw Materials on Characteristics of Blast Furnace Trough Slag Line Castable after Thermal Cycle**
Tsuneyuki Iikuni*, Daisuke Tanaka, Masatsugu Kitamura
- 15-E-7 **Investigation of Main Trough ML Castable Wear Rate under Different Temperature Conditions**
Yoshihisa Morimoto*, Kosuke Yasuo
- 15-E-8 **The Roles of Matrix Aluminas on the Properties of Blast Furnace Trough Castables**
A. K. Samanta, R. Swain, A. Tripathi, T. Matsunaga, K. Tsuyuguchi, P. B. Panda, Shankha Chatterjee, Smita Satrathy*
- 15-E-9 **Application of Silica-Sol for Trough Castables Containing Spinel**
Ryusuke Funakoshi*, Yasuhiro Oba
- 15-E-10 **Effort to Prevent Cracks by Changing the Runner Structure at the Tip of Iron Runner**
Tatsuya Nakagawa*, Toshio Komatsu

Testing of Refractories

14:00-15:40

Chairpersons : Hiroaki Morii, Christian Dannert

- 15-E-11 **Three-Dimensional Analysis of Porous Plug Structure Using X-ray CT**
Keisuke Yamada*, Takafumi Oishi, Shigefumi Matsumoto, Tatsuya Ouchi, Kouji Gouda, Katsumi Morikawa
- 15-E-12 **Influence of Carbon Content of Molten Steel on the Corrosion of ZrO₂-C Refractories**
Shigefumi Matsumoto*, Tamotsu Wakita, Koji Goda, Kiyoshi Goto, Katsumi Morikawa
- 15-E-13 **Effect of Creep on Refractory Masonry Wall Subjected to Cyclic Temperature Loading**
Pratik N. Gajjar, Joao M. Pereira, Paulo B. Lourenco
- 15-E-14 **Characterization of Carbon-bonded Alumina by Mercury Intrusion and Extrusion Porosimetry for Steel Applications**
Claudia Voigt*, Jana Hubalkova, Herbert Giesche, Christos G. Aneziris
- 15-E-15 **How to Design and Implement a Safe and Effective Industrial Trial for Refractories in Order to Get a Reliable Test Result**
Thomas Vert*

Refractory Engineering Systems and Design

16:00-18:00

Chairpersons : Kazuhiko Takeuchi, Soumen Sinha

- 15-E-16 **Matrix Design in High-alumina Refractory Castables - Part I: Enhanced Sintering at Low Temperatures in Service, Long-term Investigations and Microstructure Evolution**
Florian Holleyn*, Olaf Krause, Erwan Brochen, Christian Dannert
- 15-E-17 **Matrix Design in High Alumina Refractory Castables - Part II: Assessment of the Brittle-ductile Transition Temperature and Ways to Influence It**
Erwan Brochen*, Christian Dannert, Olaf Krause, Florian Holleyn
- 15-E-18 **The Characterization of Joint Behaviour in Mortarless Refractory Masonry**
Rafael Oliveira*, Joao Rodrigues, Joao Correia
- 15-E-19 **Thermomechanical Design Considerations for Blast Furnace Hearth Refractory System**
Chad Van der Woude, Hamid Ghorbani*
- 15-E-20 **A New Algorithm Concept of Refractory forecasting in Main Runner at Blast Furnace**
Min-Gyu Song*, Sang-Ahm Lee, Jae-Il Jung
- 15-E-21 **Influence of the Particle Size Distribution on the Properties of Refractory Castables Installed by Shotcrete**
Vitor G. Domiciano*, Gerado J. Reis, Aloisio S. Ribeiro, Modestino A. M. Brito

Session Program (Tentative)

Basic Science

9:00-10:00

Chairpersons : Masakazu Iida, Tom Vert

- 16-A-1 **Separation and Recovery of Gallium Oxide from Discarded Led Device by Thermal Reduction and Oxidation Using Spouted Bed**
Takaya Akashi*, Yuka Sakai
- 16-A-2 **Microstructure and Mechanical Properties of Lightweighting Magnesite Refractories Containing Porous Aggregates**
Wen Yan*, Guiyuan Wu, Guangqiang Li, Nan Li
- 16-A-3 **Thermal Changes of Mullite Based Castable Heated in Hydrogen Atmosphere**
Shuya Shiomi*, Nobuyuki Takeuchi, Yasuhiro Ohba

Refractories for Non-ferrous Metal Industry

11:00-12:20

Chairpersons : Katsumi Murata, Daniela Fonseca

- 16-A-6 **Comparison between Different Taphole Clays for Metal Tapholes of Fe-alloy Reduction Furnaces**
Tomas Oliveira*, Wagner Silva, Humberto Bassalo, Aloisio Ribeiro and Modestino Brito
- 16-A-7 **The Interfacial Wetting/Infiltration Behavior in Si/Si₃N₄/SiO₂ Ternary System: Influence of Oxygen Content in α -Si₃N₄ Coating**
Qinghu Wang*, Jiangtao Li, Yawei Li
- 16-A-8 **Optimizing Thermomechanical Properties of Investment Casting Shell Molds**
Aliz Pinto Mora *, Moustapha Coulibaly, Wen Zhang, Nicolas Tessier-Doyen, Elsa Thune, Marc Huger
- 16-A-9 **Application of Zircon Castable for Aluminum Melting Furnace**
Masato Kawasaki*

14:00-15:20

Chairpersons : Katsumi Morikawa, Ujjal Sengupta

- 16-A-11 **Influence of Constituents of Modern Aluminium Alloys on Alumina Refractory Lining**
Wanja Reichert*, Vadim Sannikow, Thorsten Tonnesen, Rainer Telle
- 16-A-12 **Ceramic Joining Material for Repairing Carbon Block**
Jae-won Kim*, Byeong-su Kim
- 16-A-13 **Shaped Refractories and Castables Based on Calcium Zirconate for Titanium Metallurgy**
Stefan Schaffner*, Christos G. Aneziris, Constantin Jahn, Miriam Bach, Helge Jansen, Christoph Vonderstein, Bernd Friedrich
- 16-A-14 **Titanium Casting Using Functionalized Calcium Zirconate Molds and Crucibles for Improved Corrosion Resistance and Surface Quality**
Lisa Freitag*, Christos G. Aneziris, Florian Bulling, Ulrich E. Klotz, Stefan Schaffner

Raw Materials

9:00-10:40

Chairpersons : Masayoshi Kakihara, Bin Li

- 16-B-1 **Effect of Preheating Temperature of Andalusite Aggregate on the Properties of Mullite-based Refractory**
Qingfeng Wang*, Xianhui Li, Guihua Liao, Gan Shi, Huimin Liu, Xiaoyu Wang, Guotian Ye
- 16-B-2 **A New Approach to Improve the Sintering of Cr₂O₃ with a Controllable Grain Size**
Hang Ye, Suzhe Yao, Enhui Wang, Enxia Xu, Xinmei Hou*, Kuochih Chou
- 16-B-3 **Synthesis of Aluminum Silicon Carbide Particles by Using Carbonized Natural Ligneous Sources**
Hatsuo Taira, Tomoyuki Maeda*, Tomohiro Nishikawa, Yasuhiro Hoshiyama, Shigeki Uchida
- 16-B-4 **Corrosion Modeling of the Magnesite Aggregates in Contact with Molten Slags**
Wenxuan Zhang, Ao Huang*, Yongshun Zou, Huazhi Gu, Lyping Fu
- 16-B-5 **Relationship between Chemical Composition of Synthetic Dead Burned Magnesite Used as Raw Material of Shaped Refractories and Corrosion of Shaped Bricks by Alkali Sulfate**
Naoto Nishida*, Ikuya Umamoto, Takashi Arase, Akira Yoshida, Yuuzou Katou

11:00-12:40

Chairpersons : Yasuhisa Nishigami, Volker Stein

- 16-B-6 **Mullitisation and Dryout Behaviour of Sol-gel Based Bauxite and Andalusite NCCs with Sillimanite/Kyanite**
T. Leber*, T. Tonnesen, R. Telle
- 16-B-7 **Fabrication of the Highly Porous Alumina Aggregate by High-temperature Evaporation of Na₂O-B₂O₃-SiO₂ Glass Flux and Its Application to Castable Materials**
Daimu Muto*, Shinobu Hashimoto, Sawao Honda, Yusuke Daiko
- 16-B-8 **Refractory Raw Materials - Current Trends and Prospects to 2024**
Kerry Satterthwaite*
- 16-B-9 **Influence of CA₂ Lightweight Raw Materials on Properties of Corundum-based Castables with TiO₂ Additions**
Danyang Zhang, Chunxue Li, Jianying Gao, Bruno Touzo, Wenjie Yuan*
- 16-B-10 **The Changing Behaviors of Microstructure Morphologies According to Different Viscous Carbon Source**
Jae-Eun Kim, Sang-Ahm Lee, Jae-Il Jung*, Jens Stiegert, Christoph Jacob

Session Program (Tentative)

Refractories for Waste Incineration and Others

14:00-15:40

Chairpersons : Yoshimasa Miyagishi, Dana Goski

- 16-B-11 **Alkali and Slag Resistance of Calcium Hexa-aluminate Raw Material**
Mouna Sassi*, Emmanuel de Bilbao, Jacques Poirier
- 16-B-12 **Chromium Free Special-impregnated Bricks for Special Waste Incineration**
Christina Stimpfl*, RHIMagnesita
- 16-B-13 **Influence of the Basicity of Waste Molten Slag on Alumina-Chromia Brick for Waste Melting Furnaces**
Hitoshi Chiba, Hitoshi Toda, Makoto Ohno, Fumihito Ozeki
- 16-B-14 **Development of Explosion Resistant Refractory Castables for Rotary Kilns**
Chinami Hirate*, Shun Kawaguchi, Hitoshi Chiba, Ohno Makoto
- 16-B-15 **Preparation of SiC Bricks with In-situ Lamellar Al₄SiC₄ Coatings on SiC Aggregates by Induction Heating**
Ding Chen*, Huazhi Gu, Ao Huang

16:00-17:20

Chairpersons : Hitosi Chiba, Pablo Valenzuela

- 16-B-16 **Corrosion of Fireclay and High Alumina Refractories by Aggressive Vapours (Alkali, Sulphur, HCl, HF, ...) in Secondary Combustion Chambers for Hazardous Waste Incineration: Mechanisms and Recommendations**
Adrian Villalba Weinberg, Cyrille Varona, Xavier Chaucherie, Dominique Goeuriot, Jacques Poirier*
- 16-B-17 **Corrosion Resistance of Lime Rotary Kiln Bricks for Pulp and Paper Industry**
Sankar Kannabiran*, Minghua Zhang
- 16-B-18 **Utilization of Al₂O₃-CaO-Cr₂O₃ Refractory Castables System Without Cr(VI) Generation**
Mithun Nath, Tengeng Xu, Ning Liao, Yaqi Wang, Shengqiang Song, Yawei Li*
- 16-B-19 **The New Low Cement Castable for Dry Gunning**
Satoshi Umeda*, Ippei Katouda, Hiroshi Yamada, Yoshimasa Miyagishi

Refractories for Iron and Steel Making - Ladle and Secondary Refining

9:00-10:40

Chairpersons : Hironori Ogata, Scot Graddick

- 16-C-1 **Comparing the Corrosion Resistance of Permanent Lining Refractories for Steel Ladles**
Shiori Kimura*, Yushi Tsutsui, Yuichi Kato, Takayuki Inuzuka
- 16-C-2 **Study on Corrosion Mechanism of Spinel-containing Alumina Castables with Different Types of Slag**
Dominika Madej*, Klaudia Wisniewska, Jakub Ramult, Karina Tyrala, Ryszard Prorok
- 16-C-3 **Matrix Engineered ULC High Alumina-Spinel Castable Developments for Steelmaking Applications**
Vladnilson Peter S. Ramos*, Eric Y. Sako, Silvio C. Frasson, Douglas F. Galesi, Haysler A. A. Lima
- 16-C-4 **Improvement of the Refractory Lining Life of Steel Ladle**
Yutaro Iio*, Hiroki Tsukigase, Satoru Ito, Mitsuo Satoh
- 16-C-5 **Development of Injection Lance in BOF Slag Modification Technique**
Jyun Yi Wu*, Li-Te William Chao

11:00-12:20

Chairpersons : Kei Taniguchi, Runtang Feng

- 16-C-6 **Evaluation Method of Porous Plug Durability Simulating Actual Condition**
Kazunobu Ogata*, Takahiro Kago, Koji Matsumura
- 16-C-7 **Comparison of Operational Properties of Various Types of Purging Plugs for Steel Ladles**
Zbigniew Czapka*, Zak.ady Magnezytowe
- 16-C-8 **Development of Improved Castable in Al₂O₃-MgAl₂O₄-Cr₂O₃ System for Different Application**
Manidip Jana, Arup Kumar Samanta, Yasuaki Shin, Takashi Matsunaga, Priyabrata Panda, Shubbasis Paul*
- 16-C-9 **Vibrational Determination of Gas Purging Regime and Efficiency in a Water Model and Validation by a High-speed Camera**
Bernd Trummer*, Christian Manhart, Wolfgang Fellner

Refractories for Iron and Steel Making -Continuous Casting

14:00-15:20

Chairpersons : Yukimasa Iwamoto, Kaiqi Liu

- 16-C-11 **Mechanical and Physical Characterization of Al₂O₃-C Foam Filters Produced by Distinct Processing Routes: The Role of the Strut Morphology**
Bruno Luchini, Enrico Storti*, Tony Wetzig, Christoph Settgast, Martin Abendroth, Jana Hubalkova
- 16-C-12 **Exchangeable Carbon-bonded Alumina Foam Filters for Continuous Casting of Steel**
Tony Wetzig*, Bruno Luchini, Steffen Dudczig, Jana Hubalkova, Christos G. Aneziris
- 16-C-13 **Effect of Si Addition on Heat Transfer Characteristics of Mould Flux for Continuous Steel Casting Process**
Rie Endo*, Yo Kan, Takashi Watanabe, Miyuki Hayashi, Masahiro Susa
- 16-C-14 **Tundish MgO Spray Material That Be Well Attached on Internal Castable Materials**
Dong-Ha Lee*, Je-ha Lee, Byeong-su Kim
- 16-C-15 **Wear Behavior of BN Composite Refractories in Steelmaking Process**
Oh Seong Kweon*, Young Ju Lee, Yun Ki Byeun, Dong Su Kang

Session Program (Tentative)

16:00-17:20

Chairpersons : Rie Endo, Andreas Buhr

- 16-C-16 **Coating Material for Tundish with Improved Workability, Drying Property and Dismantlability**
Yuto Suzuki*, Shigefumi Nishida, Kiyoyuki Komatsubara
- 16-C-17 **Evaluations of Mold Powder Crystallization from Solid and Molten Slag**
Shoji Takahashi*, Masanori Okada, Junya Itoh
- 16-C-18 **Improvement of Steelmaking Productivity by Changing Tundish Refractories**
Shunsuke Matsui*, Yasushi Tsutsui, Shinichiroh Tagawa, Keisuke Shibasaki
- 16-C-19 **Cold Setting Mixes with Higher Preheating Stability**
David Wappel*, Bernd Petritz, Martin Kumar, Micheal Freiler

Refractories for Iron and Steel Making -Continuous Casting

9:00-10:20

Chairpersons : Junya Itoh, Hongxia Li

- 16-D-1 **Reactivity of Metallic Additives and Their Influence on the Key Thermomechanical Properties of Steel Flow Control Refractories**
Andrzej Warcha*, Damien Andre, Duane DeBastiani, Marc Huger, Stefano Martelli, Stephane Mazerat, Severine Romero Baivier
- 16-D-2 **Development of High-Density and High-strength Zirconia Refractories**
Tsukasa Miyake*, Hirokatsu Hattanda, Tomohiro Yotabun, Tomomi Soeda
- 16-D-3 **Improvement of Tundish Re-oxidation by Developing Non-lancing during Ladle Shroud Nozzle Connection Operation**
JungMin Lee*, Hyeok Jang, WoongGan Ki, TaeJun Ha
- 16-D-4 **Tundish Upper Nozzle with Gas Purging Function by Multi-layered Structure**
Tatsuya Ouchi*, Masaki Yamamoto, Taro Makino, Arito Mizobe
- 16-D-5 **Main Corrosion Mechanisms of Stopper Rod by Al Killed Steel**
Silvia Camelli*, Pablo Marinelli, Jesus Gonzalez, Maria Lujan Dignani, Adrian Vazquez

11:00-12:40

Chairpersons : Keisuke Inukai, Duane DeBastiani

- 16-D-6 **Addition of Zirconium Silicide to Zirconia-Carbon Refractories for Powder Line Part of Submerged Entry Nozzle**
Kouhei Takami*, Kiyoshi Goto, Katsumi Morikawa
- 16-D-7 **Key Phase Diagram Experiments in the $\text{Li}_2\text{O-ZrO}_2$ System and Thermodynamic Modeling of the $\text{Li}_2\text{O-SiO}_2\text{-ZrO}_2$ System**
Sun Yong Kwon, Wan-Yi Kim, In-Ho Jung*
- 16-D-8 **Improvement of SEN's Outletport to Prevent Alumina Adhesion**
Genta Matsuo*, Takayuki Matsunaga, Kanae Nishio
- 16-D-9 **Development of Novel Material for Continuous Casting Nozzle**
Ling Li*, Kiyoshi Goto, Katsumi Morikawa
- 16-D-10 **Coating Restrain Destabilizing of ZrO_2 Particles at Glaze**
Keita Okada*, Shigeaki Takahashi, Noriaki Yamauchi, Masahiro Shinato, Keisuke Kachi

Industrial Refractories Applications

14:00-15:20

Chairpersons : Kenichi Oki, Ronald Lanzenberger

- 16-D-11 **Monolithic Basic Unshaped Materials for the Steel Industry**
Patrick Tassot *, Thomas Schemmel
- 16-D-12 **Improvement in Refractory Lining Life of Rotary Kiln for Iron Ore Pelletizing**
Elias Tiburcio*, Mohammed Khan, Alexandre Loyola, Marcus Fernandes
- 16-D-13 **Refractories for Fluidized Bed Alumina Calciners: Planned Selection, Testing and Implementation to Improve the Materials' Performance**
M. A. L. Braulio*, J. R. Cunha, A. J. Maxwell, D. Whiteman, V. C. Pandolfelli
- 16-D-14 **Characteristics of Zirconia Refractories for High Temperature Melting**
AKM Aziz Ahamed*, Kouichi Ando, Takashi Hori

16:00-17:00

Chairpersons : Kenji Matano, Zhanmin Wang

- 16-D-16 **Phase Transition and Microstructural Evaluation of Aluminosilicate Refractories Used in Anode Baking Furnaces - A Case Study**
J. P. Nayak, B. Ghosh, A. K. Samanta, K.C. Khan, K. Tsuyuguchi, P. B. Panda, A. Patra, Dibyendu Parui*
- 16-D-17 **Countermeasure for Reduction of Boron in Cast Iron for Refractories of Channel Induction Furnaces**
Yoshihiro Teraura*, Hiroyuki Suzuki, Atsuhito Naka, Toshikazu Nagai, Dr. Yuechu Ma
- 16-D-18 **Refractory Management Program for Smelting Furnaces**
Mitchell Henstock, Afshin Sadri*, Winnie Ying

Session Program (Tentative)

Testing of Refractories

9:00-10:40

Chairpersons : Nobuyuki Takeuchi, Olaf Krause

- 16-E-1 **Evaluation Method of Thermal Shock Resistance of Refractories under Mechanical Constraint**
Yuya Tomita*, Ryota Hosogi, Hidetoshi Kamio, Kiyoshi Goto, Katsumi Morikawa
- 16-E-2 **Analysis of Thermal Shock Behavior by Digital Image Correlation Method and Finite Element Method**
Hidetoshi Kamio*, Ryota Hosogi, Yoichi Tsuji, Koji Goda, Katsumi Morikawa
- 16-E-3 **Thermal Shock Resistance of Monolithic Refractories with Coarse Grained Aggregates under Constraint Condition**
Yoichi Tsuji*, Ryota Hosogi, Hidetoshi Kamio, Kiyoshi Goto, Katsumi Morikawa
- 16-E-4 **Creep Characterization of Refractory Materials at High Temperatures Using the Integrated Digital Image Correlation**
Lucas Teixeira*, Jean Gillibert, Eric Blond, Thomas Sayet
- 16-E-5 **Contributions to Refractories Creep Characterisation**
Dietmar Gruber*, Shengli Jin, Stefan Schachner, Martin Stuckelschweiger, Harald Harmuth

11:00-12:40

Chairpersons : Hidetoshi Kamio, Hans-Jürgen Klischat

- 16-E-6 **Determination of Damage Limits in Refractories of Different Brittleness and Damping Capacity Based on Acoustic Emission Algorithms**
Naveen Shetty*, Maure De Smedt, Els Verstryngne, Kirill Andreev
- 16-E-7 **Corrosion of Polycrystalline Wool by Alkaline Vapor**
Takuya Naeshirozako*, Mikiya Fujii, Masaru Sugiyama, Nobuyuki Takeuchi
- 16-E-8 **Alumina-Spinel Castables under Thermal Cycling Conditions - In Situ Characterisation**
Ilona Kieliba*, Thorsten Tonnesen, Rainer Telle, Marc Huger, Erwan Gueguen, Chris Parr
- 16-E-9 **Correlation between the Amount of Amorphous Phase and the High-temperature Properties of Alumina Refractory Castables Considering the Grain Shape**
S. Etzold*, K. Wickel, T. Tonnesen, R. Telle
- 16-E-10 **New Insights into the Nature of Bond in Refractory Materials Using Soft X-ray Emission Spectroscopy for SEM Applications**
J. Kehren*, O. Krause

14:00-15:40

Chairpersons : Toshiyuki Nishimura, Christoph Wöhrmeyer

- 16-E-11 **Influence of Additives on the Crystallization and Dehydration of Calcium-Aluminate-Hydrate Phases . Part I: The Change of Hydrate Phase Formation as a Function of Surface-active Substances in Refractory Castables Investigated by Field Emission Scanning Electron Microscopy**
O. Krause, L. Erbar, C. Ulbrich, T. Stein, S. Simmat, C. Dannert
- 16-E-12 **Influence of Additives on the Crystallization and Dehydration of Calcium-Aluminate-Hydrate Phases in Refractory Castables - Part II: Dehydration Observed by Monotonic Heating**
R. Simmat, C. Dannert, O. Krause, L. Erbar, C. Ulbrich, T. Stein
- 16-E-13 **Time-dependent Changes of the Mineral Population in Calcium Aluminate Cements (CAC) after the Addition of Water Studied in Situ with Hyperspectral Raman Imaging**
Sinje Zimmer*, O. Krause
- 16-E-14 **Hyperspectral Raman Imaging: A Powerful Tool for Time-, Space-, and Temperature-resolved in Situ Studies Using the Example of the CaO-SiO₂-System**
J. Kehren*, K. Hauke, S. Zimmer, T. Geisler
- 16-E-15 **Radar Based Investigation of the Decomposition of Hydrate Phases in Calcium Alumina Concrete**
T. Stein*, O. Krause

16:00-17:40

Chairpersons : Makoto Ohno, Ronghui Zhang

- 16-E-16 **Refractory Testing Standards - Current Gaps and Future Developments**
Philip Walls*
- 16-E-17 **Progress of Young's Modulus of High Alumina Castables During Corrosion Process**
T. Tonnesen*, W. Reichert, R. Telle, P. Leto, R. Haubner
- 16-E-18 **The Capillary Forces: Pretty often Forgotten, Always Involved in Castables Dewatering as well as in Corrosion by Slag**
- 16-E-19 **Microstructure Observation of Refractories after Simultaneous Contact with Molten Steel and Slag Utilizing Crucible Method**
Kanae Nishio*, Tomoyuki Maeda, Yasuhiro Hoshiyama, Shigeyuki Takanaga, Tamiatsu Koyake, Masakazu Iida
- 16-E-20 **Setting Shrinkage Measurement During Cement Hydration**
Stefan Kuiper*, Geert Wams, Alexandra Spies, Jerry Dutton