

Technical Program of ISR2024

SYMPOSIUM OPENING

Date: October 16th

AM 08:00–08:25

Place: Grand Ballroom, 1st Floor

Opening Remarks

Hongxia Li Chairman of ISR2024

Welcome Address

Xinjiang Wang The Chinese Society for Metals

PLENARY LECTURES

Date: October 16th, AM 08:25–12:00

Place: Grand Ballroom, 1st Floor

Chairs: Hongxia Li and Chris Parr	
08:25–08:50	Towards Carbon Neutrality: High-quality Utilization of Recycled Steel Materials Xinping Mao University of Science and Technology Beijing
08:50–09:15	Better Together? Cross-industry Collaboration, Transforming Challenges into Opportunities Dana Goski Allied Mineral Products, LLC
09:15–09:40	待定 Shaoming Dong Shanghai Institute of Ceramics, Chinese Academy of Sciences
Coffee Break	
Chairs: Zhanmin Wang and Dana Goski	
10:20–10:45	The Andalusite Advantage for Sustainable Refractory Materials Chris Parr Imerys SA
10:45–11:10	Towards Low Carbon Green Development—Opportunity and Challenge for Refractory Materials Hongxia Li State Key Laboratory of Advanced Refractories
11:10–11:35	Sustainability in the Production of Refractory Products—the Transformation of the Industry to a Greener Approach Thomas Prietl RHI Magnesita
11:35–12:00	Tight Dependency of Steel Cleanliness on Lining Refractory Lifeng Zhang North China University of Technology

PLENARY LECTURES

Date: October 16th, PM 14:00–18:00

Place: Grand Ballroom, 1st Floor

Chairs: Yawei Li and Thomas Prietl	
14:00–14:25	Microcracked Refractory Microstructures Investigations by EBSD and Synchrotron Facilities Marc Huger University of Limoges
14:25–14:50	Innovation and Development of China's Refractories Industry Baikuan Liu Puyang Refractories Group Co., Ltd.
14:50–15:15	Challenges and Opportunities Facing the Development of China's Refractories Industry Yongquan Li The Association of China Refractories Industry
15:15–15:40	State-of-the-art of Development of High Performance Refractories for Iron and Steel Making Zhanmin Wang Sinosteel Luonai Materials Technology Corporation
Coffee Break	
Chairs: Yongquan Li and Marc Huger	
16:20–16:45	Progress of Innovative Aggregates in Optimizing the Performance of Refractories Yawei Li Wuhan University of Science and Technology
16:45–17:10	Application Analysis and New Technologies of Tundish Refractories for Variety Steel Continuous Casting Feifang Gan Baoshan Iron & Steel Co., Ltd.
17:10–17:35	Research on Properties of Al–Al ₂ O ₃ Composites for Steel Making Yong Li University of Science and Technology Beijing
17:35–18:00	Enhancement of Thermal Shock Resistance of Refractories by Interfacial Layer Between Aggregates and Matrix Guoqing Xiao Xi'an University of Architecture and Technology

PARALLEL SESSIONS

Date: October 17th, AM 08:00–12:00

Session I , Orleans, 1st Floor

Refractories for Iron and Steel Industry	
Chairs: Yong Li	
08:00–08:20 Keynote	The Latest Progress of Intelligent Technology for Steel Ladles Wendong Qiu Baowu Equipment Intelligent Technology Co., Ltd.
08:20–08:40 Keynote	A PURMETALL Review of Ladle Well Filler Dynamics in Steel Making Process Tim Breitzmann Purmetall GmbH & Co. KG
08:40–09:00	Preparation and Super-nonwetting Behavior for High-temperature Melts of Carbon Nanotubes-functionalized MgO-based Castables Haijun Zhang Wuhan University of Science and Technology
09:00–09:20	Discussion on the Trend of Refractory Materials for Blast Furnace Inner Lining Ronghui Zhang Beijing Allied Rongda Engineering Material Co., Ltd.
09:20–09:40	Hot Blast Stoves and Choice of Refractories Stanislav Dvorak Independent Consultant
09:40–10:00	Holistic Approach to Develop High Longevity Ladle Shroud for Continuous Casting of Steel Garrette Bai Vesuvius
Coffee Break	
Refractories for Iron and Steel Industry	
Chairs: Gang Wang	
10:20–10:40 Keynote	Role of Nano-oxides for Improvement Properties of Al ₂ O ₃ –ZrO ₂ –C Materials Xinhong Liu Zhengzhou University
10:40–11:00 Keynote	Combustion Synthesis of Composite Powders with Nanostructures and Their Effects on Thermal Shock Resistance of Refractories Donghai Ding Xi'an University of Architecture and Technology
11:00–11:20	New Application Technologies of Green and Low-carbon Emission Refractories for Refining Steel Ladle Binxiang Fang Zhejiang Zili High Temperature Technology Co., Ltd.
11:20–11:40	Thermocarbon Organic Binder Powders with Low PAH for Refractory Bricks and Monolithics Jianying Gao Imerys (Tianjin) New Material Technology Co., Ltd.
11:40–12:00	Effects of SiC/ZrO ₂ Ratio on the Key Service Performance of BN–ZrO ₂ –SiC Composites Guoqi Liu Shanghai University

PARALLEL SESSIONS

Date: October 17th, AM 08:00–12:00

Session II, Georgia, 1st Floor

Refractory Raw Materials//Monolithic Refractories	
Chairs: Yajie Dai	
08:00–08:20	A Novel Technology Enabling the Valorization of Magnesia Powder as Binder for Refractories Christoph Wöhrmeyer Imerys Technology Center
08:20–08:40	Study on the Dispersant's Influence of Installation Conditions to Castable Placement Behaviors Kai Huang Wuhan Sanndar Chemical Co., Ltd.
08:40–09:00	A Study on Gelling and Strength Development of Colloidal Silica Castables in Correlation to the Humidity and Setting Conditions Simon Horn Chemische Fabrik Budenheim
09:00–09:20	Preventing Crack Formation in Magnesia Castables Using Novel Binder System and Drying Agent Hong Peng Elkem Silicon Products Development
09:20–09:40	Properties and Application Prospects of Different Grades of Mullite Zhilin Shan Guizhou Huaxin New Materials Co., Ltd.
Coffee Break	
Advanced Techniques and Equipment for Production, Testing, Evaluation and Installation of Refractories	
Chairs: Christoph Wöhrmeyer	
10:00–10:20 Keynote	Development and Application of Low-carbon Solid Heat Storage Materials Kaiqi Liu Institute of Process Engineering, Chinese Academy of Sciences
10:20–10:40 Keynote	Bulk Density Measurement of Refractory Raw Materials—Faster and Better with a Spin Dryer Shankha Chatterjee ALMATIS
10:40–11:00 Keynote	New Insight into the Dynamic Thermo-mechanical Failure of Alumina–magnesia Castables Yajie Dai Wuhan University of Science and Technology
11:00–11:20	Damage Analysis of Thermal-shock Failure in Isostatically Pressed Carbon-oxide Refractories for Continuous Casting of Steel Kaoutar Anrhour Vesuvius
11:20–11:40	Innovative Arc Plasma Devices for Material Processing: Mechanisms and Applications for Producing Superior Ceramic Powders Deping Yu Sichuan University
11:40–12:00	Selection and Application of Mixers for Monolithic Refractories and Shaped Refractory Products Guolong Zhai Qingdao CO-NELE Machinery Co., Ltd.

PARALLEL SESSIONS

Date: October 17th, AM 08:00–12:00

Session III, Boston, 1st Floor

Refractories for Nonferrous, Cement, Glass and Other Industries // Fundamentals, Education, Standardization, and Patent on Refractories	
Chairs: Johannes Greinacher	
08:00–08:20 Keynote	Low Carbon Refractory Solutions for the Glass Industry Hilmar Schulze-Bergkamen RHI Magnesita
08:20–08:40 Keynote	Flexibility of Various Spinel-containing Basic Refractories for Cement Rotary Kilns Zongqi Guo Xi'an University of Architecture and Technology
08:40–09:00 Keynote	Investigation of Refractory Bricks and Oxide Materials Heated in Hydrogen Reduction Condition Sangbae Choi Chosun Refractories Co., Ltd.
09:00–09:20 Keynote	Basic Theory and Application of Service Evaluation of Refractories Under the Low-carbon Background Xinmei Hou University of Science and Technology Beijing
09:20–09:40	Research on Structure and Properties of the Fused Cast AZCS Refractory Limin Mao Ruitai Materials Technology Co., Ltd.
Coffee Break	
Fundamentals, Education, Standardization, and Patent on Refractories	
Chairs: Hang Ye	
10:00–10:20 Keynote	Insights into Hydration and Hydrate Evolution of CAC-bonded Castables Guotian Ye City University of Zhengzhou
10:20–10:40 Keynote	Radical Involved Reaction and Weak Magnetic Effect Between Alumina Refractory and High Alumina Containing Slags Ao Huang Wuhan University of Science and Technology
10:40–11:00 Keynote	Toughening Mechanism and Practice of Refractories—Microcracking Renhong Yu Henan University of Science and Technology
11:00–11:20 Keynote	Discrete Element Modeling Towards Understanding of Refractory Fracture Shengli Jin Wuhan University of Science and Technology
11:20–11:40	Numerical Understanding and Machine Learning of Magnesia Refractory Damage Behavior in Metallurgical Reactors Qiang Wang Wuhan University of Science and Technology
11:40–12:00	Investigation of the Alumina–magnesia Reactive Sintering Kinetics for Innovative Refractory Ceramics at High Temperatures Molla Yehualaw Ewnete Arts et Metris

PARALLEL SESSIONS

Date: October 17th, PM 14:00–18:20

Session I , Orleans, 1st Floor

Routes for Low Carbon Development of High Temperature Industries and Refractories Industry	
Chairs: Anirbandip Dasgupta	
14:00–14:20	Progress and Green Development of Refractory Industry in Henan Province Quanli Jia The Association of Henan Refractory Industry
14:20–14:40	Application of Environmentally Friendly Fibers and Their Products in Energy Conservation and Emission Reduction Quan Zhu Morgan Thermal Ceramics (Shanghai) Co., Ltd.
14:40–15:00	Research Progress of Refractories for Hydrogen Metallurgy Ning Liao Wuhan University of Science and Technology
15:00–15:20	Fabrication, Properties of Dense CA ₆ Refractory and Its Reaction Behavior with Titanium Aluminum Alloy Suzhen Han Wuhan University of Science and Technology
15:20–15:40	Comprehensive Performance of Composite Materials Based on Forsterite and Chloride Salts with SiO ₂ Nanoparticles for Thermal Energy Storage Wenyuan Liu Wuhan University of Science and Technology
15:40–16:00	Corrosion Mechanisms of Alumina–chromia Refractory in Bottom-blown Copper Converting Furnace: A Post-mortem Analysis Junxia Li Xi'an University of Architecture and Technology
Coffee Break	
Refractory Raw Materials	
Chairs: Shankha Chatterjee	
16:20–16:40	Synthesis and Application of Heavy-density Calcium Hexaluminate Lin Yan Shandong Higiant High-purity Alumina Technology Co. Ltd.
16:40–17:00	Application and Development of Carbon Nanotubes/Calcium Aluminate Cement Yunfei Zang Henan University of Science and Technology
17:00–17:20	Preparation of Bauxite Based Low-alumina Mullite and Its Influence on Energy-saving Long-life Refractory Materials for Cement Kilns Jiancheng An Beijing Jinyu Tongda Refractory Technology Co., Ltd.
17:20–17:40	Effect of Calcination System on the Performance of Flotation Magnesite to Prepare High-purity Sintered Magnesia Jiachen Qin University of Science and Technology Liaoning
17:40–18:00	Research Progress on Ti ₂ O ₃ Containing Refractories Yue Liu University of Science and Technology Beijing
18:00–18:20	Purification of Salt Lake Brine by Dissolution Precipitation Method and Preparation of Light Burned Magnesia and Sintered Magnesia Jiaqi Zhu Northeastern University

PARALLEL SESSIONS

Date: October 17th, PM 14:00–18:00

Session II, Georgia, 1st Floor

Monolithic Refractories	
Chairs: Hong Peng	
14:00–14:20	Effect of CA ₂ on the Properties of High Purity Corundum Castables Bin Li Shengchuan Advanced Material Technology Co., Ltd.
14:20–14:40	Metallothermic Reduction Combustion Synthesis of h-BN Composite Powders and Its Application in Refractories Yanjun Li Xi'an University of Architecture and Technology
14:40–15:00	Improvement of Al ₂ O ₃ -SiC-C Castable by Si-N-O Composite Micropowder Youqi Li Jiangsu Jingxin New Materials Co., Ltd.
15:00–15:20	A Novel and Easy-to-use NCC Binder Technology Chunfeng Liu Imerys Technology Center-Tianjin
15:20–15:40	Design of a New Ceramic Castable for Investment Casting of Turbine Blades Michiel Smedes Montanuniversität Leoben
Coffee Break	
Advanced Techniques and Equipment for Production, Testing, Evaluation and Installation of Refractories	
Chairs: Ronghui Zhang	
16:00–16:20	Eirich Advanced Preparation Technology for Refractory Industry Ralf Loebe Maschinenfabrik Gustav Eirich GmbH & Co. KG
16:20–16:40	Effect of Slag Composition on the Degradation Behavior of Tundish Lining and Stainless Steel Cleanliness Shengchao Duan North China University of Technology
16:40–17:00	Application of X-ray Computed Tomography in Testing of Shaped Refractories Jiashuang Zhi University of Science and Technology Beijing
17:00–17:20	Novel Preparation of SiO ₂ /C Foams with Tailored Porosity by Emulsion Template Method and SiO ₂ Sol-gel Technology Wenzhe Dong Luoyang Institute of Science and Technology
17:20–17:40	Development of Novel β-Si ₃ N ₄ Coating for Photovoltaic Si Growth: Wettability and Infiltration of Molten Si on Porous Si ₃ N ₄ Coating Covered SiO ₂ Substrate Xiaowei Zhang Wuhan University of Science & Technology
17:40–18:00	Preliminary Exploration of an Eco-friendly Binder for MgO-C Bricks and Its Performance Evaluation Jianfei Xi University of Science and Technology Liaoning

PARALLEL SESSIONS

Date: October 17th, PM 14:00–18:20

Session III, Boston, 1st Floor

Life Cycle Assessment and Recycling Solutions for Refractories//Monolithic Refractories	
Chairs: Ao Huang	
14:00–14:20 Keynote	Circular Economy as a Driver for Tackling the Sustainability Challenge in the Refractory Industry Erwan Guéguen RHI Magnesita
14:20–14:40 Keynote	A Preliminary Investigation into the Utilization of Boron-containing Industrial Waste in MgO–C Refractories Chengji Deng Wuhan University of Science and Technology
14:40–15:00 Keynote	Problems and Countermeasures of Magnesite Prepared by Flotation Concentrate Powder of Magnesite Ling Zhang University of Science and Technology Liaoning
15:00–15:20	Recycling and Reuse of Washed Waste Silica Bricks Tieyan Chen Anshan Yuyao Refractories Technology Co., Ltd.
15:20–15:40	Preparation and Properties of Oriented Steel Fiber Refractory Castable Minghui Li Anhui University of Technology
15:40–16:00	Mechanical Properties and Gas Permeability of Silica-gel Modified Hydratable Magnesium Carboxylate Bonded Refractory Castables in Drying Process Luyan Sun Xi'an University of Architecture and Technology
Coffee Break	
Fundamentals, Education, Standardization, and Patent on Refractories	
Chairs: Tim Breitzmann	
16:20–16:40	Phenolic Resin and the Application in Refractories Mingji Wang High Temperature Resin Research Institute, SQ Group
16:40–17:00	Application of High-calcium Magnesite with Low Silica & Low Ferric Oxide and Its Purification Effect on Molten Steel Xiaoli Tian Puyang Refractories Group Co., Ltd.
17:00–17:20	Microstructure Evolution in Sintering of Refractory Materials: Phase-field-micromechanics Modeling Qingcheng Yang Shanghai University
17:20–17:40	Heat Transfer Mechanism of Refractory Oxides Bianlei Hao Institute of Process Engineering, Chinese Academy of Sciences
17:40–18:00	Interpretation of the Chinese National Standard—Green Product Assessment—Refractory Materials Lina Deng China Testing & Certification International Group Co., Ltd.
18:00–18:20	The Influence of Adding Recycled Refractories on the Mechanical Strength and Thermal Shock Resistance of Al ₂ O ₃ –C Refractory Formed by Isostatic Pressing Zhi Gao Puyang Refractories Group Co., Ltd.

PARALLEL SESSIONS

Date: October 18th, AM 08:00–12:20

Session I , Orleans, 1st Floor

Refractories for Iron and Steel Industry	
Chairs: Donghai Ding	
08:00–08:20	Performance Optimization of Cement Free Alumina Magnesia Dry Gunning for Steel Ladle Yitao Wang Calderys China Co., Ltd.
08:20–08:40	Enhanced Thermal Shock Resistance of Corundum–spinel Castables by Dip-coating of Lanthanum Hexa-aluminate on Corundum Aggregates Yuan Feng Xi'an University of Architecture and Technology
08:40–09:00	Microstructure Evolution and Performance Enhancement of MgO–C Refractories by the Addition of MA90 Spinel Micro-powder Hutang Zhong Wuhan University of Science and Technology
09:00–09:20	Enhanced Oxidation Resistance and Thermal Shock Resistance of Low-carbon MgO–C Refractories with Addition of Ti(C,N) Powders Qilong Chen Puyang Refractories Group Co., Ltd.
09:20–09:40	The Effect of <i>in situ</i> -synthesized Y ₂ SiO ₅ on the Thermal Shock Resistance of Y ₂ O ₃ Ceramic Materials Pingtao Fang Wuhan University of Science and Technology
09:40–10:00	Preparation and Properties of Mullite–silicon Carbide Refractory with Low Content of Silicon Carbide Cangjuan Han MCC5 Group Shanghai Corporation Limited
Coffee Break	
Refractories for Iron and Steel Industry	
Chairs: Ning Liao	
10:20–10:40	Preparation of ZrO ₂ -coated Magnesia Aggregates <i>via</i> Impregnation–sintering and Its Impact on the Properties of MgO–C Refractories Endong Jin Xi'an University of Architecture and Technology
10:40–11:00	Mathematical Modeling on Corrosion Mechanism of Al ₂ O ₃ –MgO Refractory by CaO–Al ₂ O ₃ –MeO Slag Chang Liu Wuhan University of Science and Technology
11:00–11:20	Improvement of Performance of Runner Bricks Used in Special Steel Guiyan Xin Sinosteel Luonai Materials Technology Corporation
11:20–11:40	Y ₂ O ₃ –Al Composite Material: Enhanced with <i>in-situ</i> Generation of Secondary Reinforcing Phase Haokai Song Wuhan University of Science and Technology
11:40–12:00	Brittleness Reduction of Low-carbon Al ₂ O ₃ –C Refractories with <i>in-situ</i> Formation MgAl ₂ O ₄ /CNTs Layer Between Aggregate and Matrix Jiyuan Luo Xi'an University of Architecture and Technology
12:00–12:20	Effect of Microporous Corundum Aggregates on Thermal Shock Resistance of Corundum Spinel Castables for Setting Block Sisi Zhang Puyang Refractories Group Co., Ltd.

PARALLEL SESSIONS

Date: October 18th, AM 08:00–12:20

Session II, Georgia, 1st Floor

Refractories for Nonferrous, Cement, Glass and Other Industries	
Chairs: Jianying Gao	
08:00–08:20	Development of Lightweight Periclase–hercynite Bricks for Cement Kiln Gege Sun University of Science and Technology Liaoning
08:20–08:40	Effect of Fe–TiCN Powder on the Properties of Corundum–mullite–silicon Carbide-based Refractory Castables Containing Spherical Aggregate Used for Waste Incinerator Mengyao Yang China University of Geosciences (Beijing)
08:40–09:00	Effects of SiC _{nw} /Al ₂ O ₃ Composite Powders on Properties of Al ₂ O ₃ –SiC Refractory Castables Xiaochuan Chong Xi’an University of Architecture and Technology
09:00–09:20	Silicon Carbide Reticulated Porous Ceramics with Enhanced Infrared Radiation <i>via</i> Coatings Design for Porous Medium Combustion Xiong Liang Wuhan University of Science and Technology
09:20–09:40	Comparison of Corrosion Behavior of Primary/Modified Nickel Slag with Semi-rebonded Periclase–chromite Refractory Yuchi Liu Xi’an University of Architecture and Technology
09:40–10:00	Effect of Pre-synthesis LaNbO ₄ Phase Additive on the Thermal Shock Resistance of Y ₂ O ₃ /LaNbO ₄ Composite Materials Zhenghuang Quan Wuhan University of Science and Technology
10:00–10:20	Finite Elements Simulation of Thermal Shock Resistance of Cordierite–mullite Kiln Furniture Materials Prepared by Introducing Potassium Feldspar Le Ma Xi’an University of Architecture and Technology
Coffee Break	
Routes for Low Carbon Development of High Temperature Industries and Refractories Industry	
Chairs: Renhong Yu	
10:40–11:00	Influence of Cr ₂ AlC on the Thermal Shock and Corrosion Resistance of Low Carbon Al ₂ O ₃ –C Refractory Zihao Wu Wuhan University of Science and Technology
11:00–11:20	Effect of Al ₂ O ₃ /SiO ₂ on the Structure and Properties of Porous Forsterite–spinel–periclase Ceramics Zhenni Huang Zhengzhou University
11:20–11:40	Dynamic Failure of Magnesite–carbon Refractories under Dynamic Impact Loading Zhenjingwen Fu Wuhan University of Science and Technology
11:40–12:00	Enhanced Thermal Shock Resistance of Low-carbon Al ₂ O ₃ –C Refractories <i>via</i> CNTs/MgAl ₂ O ₄ Whiskers Chunzhuo Feng Xi’an University of Architecture and Technology
12:00–12:20	Novel Entropy-stabilized Spinel Materials and Their Potential Application in High-temperature Industry: [(Mg _x Zn _{(1-x)/2} Cu _{(1-x)/2})(Al _{0.9} Fe _{0.1}) ₂ O ₄] Bokang Li Wuhan University of Science and Technology

PARALLEL SESSIONS

Date: October 18th, AM 08:00–12:20

Session III, Boston, 1st Floor

Refractories for Nonferrous, Cement, Glass and Other Industries	
Chairs: Minghui Li	
08:00–08:20	Phase and Microstructure Evolutions of Fiber Reinforced Aerogel Composites with Thermal Insulation Degradation Pengtao Zhai Henan Ruitai Refractory Materials Technology Co., Ltd.
08:20–08:40	The Characteristics of Typical Calcium Aluminate Cement and Its Influence on Hardening of Ablation Resistant Materials Hanyu Wang Beijing Jinyu Tongda Refractory Technology Co., Ltd.
08:40–09:00	Low-cost Preparation of Titanium and Titanium Alloys with a Refractory Crucible Yixin Fu Shanghai University
09:00–09:20	Effects of $\text{La}_2\text{Ce}_2\text{O}_7$ on the Phase Composition, Microstructure, Wetting Behaviour and Corrosion Resistance of Magnesia Refractory Peng Ji Northeastern University
09:20–09:40	Influence of Metakaolin on the Mechanical Properties of Aluminum–silicon Materials Hua Zheng Beijing Jinyu Tongda Refractory Technology Co., Ltd.
09:40–10:00	Effect of ICLR on Slag Fluidity and Corrosion Resistance of High Chromium Materials Jiayi Hou Ningxia University
Coffee Break	
Refractories for Iron and Steel Industry	
Chairs: Xiaoli Tian	
10:20–10:40	Comparative Study on Microstructures and Properties of Al_2O_3 – MgAl_2O_4 –C Ceramic Filter and Al_2O_3 –C Ceramic Filter Jinwen Song Wuhan University of Science and Technology
10:40–11:00	Effect of Magnesia Purity on Non-metallic Inclusions in Steel Yaoyao Lou Xi'an University of Architecture and Technology
11:00–11:20	Influence of Al_2O_3 Content on Microstructure and Oxidation Resistance of Glass–ceramic Coatings for 06Ni9DR Alloy Steel Qibao Yang Wuhan University of Science and Technology
11:20–11:40	Corrosion of RH Refining Refractory in Steelmaking Process Rensheng Chu Shougang Group Co., Ltd.
11:40–12:00	Microstructural Evolution and Properties Enhancement of MgO–CaO Materials by Doping Different Rare Earth Oxides Yunjie Dong Wuhan University of Science and Technology
12:00–12:20	Thermal Stress Analysis of Ladle Refractory Under Coupled Temperature and Stress Fields Based on ANSYS Software Chongchong Xie University of Science and Technology Liaoning