

Expected Talk Titles

Plenary Lectures

- A novel closed-carbon-loop technology based on inprocess carbon dioxide splitting for decarbonising energy- and-carbon-intensive industry
- Strategies and Challenges for the Global Steel Industry to Achieve Carbon Neutrality
- The Challenge of Japanese Steel Industry to achieve Carbon Neutrality
- Climate Change and the Global Steel Industry
- Update on the development of POSCO's hydrogen-based ironmaking process, HyREX
- The Northern Lights project
- Development of a New Pattern of Low-carbon Green Ironmaking In China

Iron and steelmaking industry

- Carbon Neutralization of Direct Reduction Process by Applying Carbon Recycling
- Effect of cooling rate on the microstructure and reducibility of iron ore sinter analogues under CO and H₂
- Carbon Recycling Ironmaking Process using Deposited Carbon and Iron Ore Composite
- Investigation in Carbon Recycling Reducing Agent Suitable for Injection into Blast Furnace
- Kinetics modelling and micro-CT analysis of coke reactivity and degradation during H₂O and CO₂ gasification
- Advanced Carbon and Energy Carrier Utilization: Application Planning in Taiwan's Iron and Steel Industry
- Influence of the Presence of Metallic Iron and Molten Slag in Pre-reduced Lump Ore on the Softening
- Analysis of Carbon and Exergy Flows in Steelworks using Carbon Recycling Blast Furnace
- Technical and economic evaluation of the integration of biomass pyrolysis and methanation in oxygen blast furnace ironmaking
- Design of High Temperature CO₂ Recovery Reactor Using Honeycomb-shaped Lithium Silicate for Carbon Recycling Blast Furnaces
- Formation of mesh-like fine iron in foaming slag containing iron oxide
- Low-temperature regenerable water-lean solvent for energy efficient CO₂ capture
- Effect of metallic interlayer on wettability of molten iron and carbon materials immediately after contact
- Comprehensive study on low carbon iron making technology of top gas recycling oxygen blast furnace
- Molten iron oxide electrolysis using thermal plasma as electrode
- Effect of direct reduced iron produced by MIDREX on smelting behavior of blast furnace
- Reaction Mechanism and Kinetic Analysis of Carbon Generation in Direct Reduced Iron by Boudouard Reaction
- Possibility of Biomass as Alternative Carbon Source for FINEX Coal briquettes.
- Analysis of a cleaner blast furnace practice based on combined hydrogen fuel gas and pulverized charcoal injection
- CO₂ Emission Reduction Technology Development Status in Blast Furnace Process in Korea
- Research on advanced technology of low-carbon iron ore sintering through hydrogen-rich gas injection
- Enhancement of Cu migration from molten iron by molten oxide electrolysis
- Changes and Control of Hearth Activity in Hydrogen-rich Blast Furnace
- Analyzing the pulverized charcoal injection as an alternative for cleaner blast furnace operation applying a multiphase mathematical model
- Production of metallurgical coke from biomass and lignite: A review
- Research on the reduction swelling mechanism of Bayan Obo ore acid pellets under different reduction atmospheres
- Transitional path to low carbon emission steel production: Direct reduction and electric smelting of Australian Pilbara iron ores
- A single pellet kinetic model for the reduction of iron ore with hydrogen
- State diagram of carbon deposition for H-C-O system
- Thermodynamic Analysis on Slag/Metal Reactions in Steelmaking Process Using Steel Scraps and Hydrogen-based Direct Reduced Iron with high-P Content

- Consolidation behavior of Fe_2O_3 in the Fe_3O_4 -CaO-MgO-SiO₂ system for fluxed pellet production: Phase transformations and morphology evolution
- Effect of solidification end heavy reduction on the microstructure property of continuous casting slab and its heredity of rolled thick steel plate
- Simulation of the use of HBI (2%C and 4.5%C) in the Blast Furnace with a view to Decarbonization
- Hydrogen production via reaction of molten zinc and water vapor
- Absorption and Desorption Behaviors of Ammonia on Calcium Chloride based Ammonia Absorbent
- Development of PdCu composite H₂-permeable membranes by a reverse build-up method
- Reaction Mechanism of Ammonia Formation from Iron Nitride and Carbonated Water
- Effect of amino acid addition on supercooling of erythritol
- Performance evaluation of an indirect heated fixed-bed reactor using molten salt for thermochemical energy storage with calcium hydroxide

Megatrends in industrial sector & sector coupling

- Mechanism of Low-temperature Reduction Disintegration of Self-fluxing Pellets in a Hydrogen-Enriched Blast Furnace
- Microstructure of metallic iron phase in iron ore produced by hydrogen reduction
- Analyzing How Net Zero Emission Trends are Transforming the Global Aluminum Industry
- Development of hydrogen based shaft furnaces in China
- A Comparative Study on Environmentally Friendly Ironmaking Process through Air to Oxygen
- Thermodynamic analysis and experimental study of coke oven gas self-reforming in gas-based shaft furnace
- Effect of temperature on degradation behaviors during CO₂ and H₂O gasification reactions of coke
- GHG reduction by utilizing rice straw in steelmaking process: estimation of the effect of varying the amount of plowing
- The impact of biocarbon on low-carbon ironmaking processes
- Effects of cooling rate on precipitation of copper sulfide in low carbon steels
- Thermochemical energy storage performance of an indirect fixed-bed reactor using calcium oxide-based composite
- Thermodynamic Analysis of Novel Direct Iron Ore Reduction Systems using Biomass Chemical Looping
- Numerical analysis of composite materials using calcium hydroxide and ceramic honeycomb supports of silicon-impregnated silicon carbide
- Numerical investigation of an indirect heat fixed-bed reactor with multi reaction tubes for calcium oxide/water-based thermochemical energy storage

CO₂ capture/separation technologies

- Enhancement of Gas Absorption Rate Using Spinning Horizontal Column Half Immersed into Liquid Absorbent
- Carbon dioxide fixation method by seawater concentration using semipermeable membrane
- Development of vacuum pressure swing adsorption process designed for CO₂ capture and utilization
- Development of poly-generation system using various fuels with CO₂ capture
- Post-combustion CO₂ Capture Membrane Process for Carbon Neutrality
- Uncertainty analysis in measuring properties of amine-based aqueous solution for CO₂ capture
- Study of Piperazine-CO₂ System Using Theoretical Calculation and Kinetics Simulation
- Demonstration of New Highly durable, Low-emission Amine Solvent Conducted at Commercial CO₂ Capture Plant at Saga City Incineration Plant
- Performance analysis of pressure swing adsorption using flexible metal-organic framework by multi-objective optimization
- Development of CO₂ solid absorbent using diamine bearing an aminocyclohexyl group.

CO₂ conversion processes

- Membrane Reactors for methanol Synthesis Using LTA-type Zeolite Membranes
- Alkaline hydrothermal reduction of CO₂ with levoglucosan for formic acid production

- Performance Evaluation of the Reverse Water-Gas Shift Reaction via Chemical Looping with Alloy-Based Phase Change Material as Thermal Regulator
- Study on the Competitive Reactions between CO₂-O₂ and Fe-C Melts by Isotope Tracing Method
- Development of integrated process for CO₂ capture and conversion to syngas using transition-metal-free dual-function material
- Development of industrial-scale CO₂ electrolyzer toward sustainable manufacturing
- Zeolite Membrane Reactor for Direct FT Synthesis Using CO₂ over Fe-Catalyst
- Development of zeolite membrane reactor for low-temperature reverse water gas shift
- Industrial application of e-methane produced by IHI methanation technology
- Effects of different cell layers on performance in solid oxide electrolysis cells for carbon dioxide reduction process in carbon recycling ironmaking system

CO₂ utilization/sequestration technologies

- Recycling calcium carbonate from steelmaking slag using carbon dioxide
- Effects of Solid-State Microstructure for CO₂ Fixation Reaction Using Iron and Steel
- Development of one-step synthesis process for polycarbonate diol from CO₂
- Synthesis of CaCO₃ from steelmaking slag in glycerol solution via two-step precipitation
- Kawasaki CO₂ Capture (KCC) from Post-Combustion Gas and Air with Solid Sorbent
- Development of CCS Projects in Japan
- Preparation and characterization of steelmaking slag-based hollow spherical calcium carbonate particles by spray-drying method
- Synthesis of siderite particles from iron powder and carbon dioxide
- Conditions for CaCO₃ precipitation from calcium-containing glycerol solution extracted from steelmaking slag using CO₂ reaction

Hydrogen and derived energy carriers & Generation and utilization of heat and power

- Absorption and Desorption Behaviors of Ammonia on Fluorocomplex Salts by the Pressure-Swing Method
- Ammonia Dehydrogenation over Ru Catalysts: Effect of CeO₂ Support Preparation Methods
- Development of Metal Alloys Based Microencapsulated Phase Change Materials for Thermal Energy Storage Applications
- CO₂ Capture unit with heat pump system
- Development of high working temperature Al-Si alloy phase change material via mechanical microencapsulation method
- Cold Thermal Battery System for Effective Utilization of Unused Thermal Energy
- Development of composites for thermochemical energy storage based on calcium hydroxide and silicon-impregnated silicon carbide foams

System modeling and analysis

- Numerical analysis of low carbon blast furnace operation by coke oven and hydrogen gases injection in experimental blast furnace
- key technology of intelligent blast furnace ironmaking based on big data technology
- Model for gas and burden distribution estimation based on in-burden probe data in the blast furnace
- Emissions abatement potential of the DRI-ESF process route
- Challenges brought by H₂ direct reduction shaft furnace and possible countermeasures based on numerical analysis

Please note that above list is subject to change.