ECIC 2024

European Coke and Ironmaking Congress

Bardolino · Italy · 16-18 October 2024

Advance Programme

Organised by
ASSOCIAZIONE ITALIANA DI METALLURGIA

Sponsored by
SMS group
PRIMETALS TECHNOLOGIES

www.aimnet.it/ecic
<table>
<thead>
<tr>
<th>Time</th>
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<tr>
<td>08:00</td>
<td>Registration</td>
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<td><strong>GARDENIA ROOM</strong></td>
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<tr>
<td>09:00</td>
<td><strong>Opening Session</strong></td>
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<td>10:50</td>
<td>Coffee break</td>
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<td>11:15</td>
<td>H2 and Syngas exploitation I</td>
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<tr>
<td>13:00</td>
<td>Lunch</td>
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<tr>
<td>14:00</td>
<td>H2 and Syngas exploitation II</td>
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<td>15:20</td>
<td>Coffee break</td>
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<tr>
<td>15:45</td>
<td>CO2 mitigation including CCUS</td>
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<tr>
<td>18:30</td>
<td>Welcome cocktail</td>
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**Thursday 17 October 2024**

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<th>Time</th>
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<tr>
<td>08:30</td>
<td>Direct reduction and smelting reduction I</td>
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<tr>
<td>14:00</td>
<td>Direct reduction and smelting reduction III</td>
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<td>15:40</td>
<td>Coffee break</td>
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<tr>
<td>16:00</td>
<td>Direct reduction and smelting reduction IV</td>
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<td>19:30</td>
<td>Social event</td>
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**Friday 18 October 2024**

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<tr>
<th>Time</th>
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<tbody>
<tr>
<td>08:30</td>
<td>Blast furnace ironmaking - operations III</td>
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<td>10:10</td>
<td>Coffee break</td>
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<td>10:35</td>
<td>Biocoal</td>
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<td>11:40</td>
<td>Blast furnace ironmaking - equipment II</td>
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<td>13:00</td>
<td>Closing remarks</td>
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AIM is glad to announce the 9th European Coke and Ironmaking Congress (ECIC) to be held in Bardolino, Italy, on 16–18 October 2024.

ECIC 2024 will focus on the newest technologies in coke making, sintering, pelletizing, pyrolyzing the biomasses and ironmaking (blast furnaces, direct reduction and carbon–based smelting processes).

The 2050 goal of carbon neutrality and the related intensive efforts of the steel industry will significantly affect the technologies for iron ore reduction. In this perspective, the shortage of iron ores matching the requirement for direct reduction by gas and for melting in electric arc furnace makes important proposal of new technologies and devices that can ensure the carbon neutrality even for the coal based routes.

This Congress will focus on technologies that can achieve such a goal improving the efficiency of the existing process, applying the devices that avoid a net emission of green house gases and to point out new routes based on exploitation of biomasses whose net emission is intrinsically neutral.

BACKGROUND

The Coke and Ironmaking events started separately as the European Ironmaking Congress (EIC) in 1986 in Aachen, Germany, and in 1991 in Glasgow, Scotland, and as the International Cokemaking Congress (ICMC) in 1987 in Essen, Germany, and in 1992 in London, England.

The merger of these two events took place in 1996 as the European Coke and Ironmaking Congress (ECIC) in Gent, Belgium.

1st EIC – Aachen, 1986
1st ICMC – Essen, 1987
2nd EIC – Glasgow, 1991
2nd ICMC – London, 1992
3rd ECIC – Gent, 1996
4th ECIC – Paris, 2000
5th ECIC – Stockholm, 2005
6th ECIC – Düsseldorf, 2011
7th ECIC – Linz, 2016
8th ECIC – Bremen, 2022
CONGRESS CHAIRPERSONS
Prof. Carlo Mapelli – Politecnico di Milano, Italy
Prof. Johannes Schenk – Montanuniversität Leoben, Austria

SCIENTIFIC AND STEERING COMMITTEE
Christian Boehm – Primetals Technologies Austria, Austria
Martin Gantenberg – Paul Wurth, Luxembourg
Peter Lissio – thyssenkrupp Steel, Germany
Hans Bodo Lüngen – Lüngen Consulting, Germany
Luca Orefici – Pipex Energy, Italy
Franz Reufer – Paul Wurth Deutschland, Germany
Lena Sundqvist – Swerim, Sweden
Jan van der Stel – Tata Steel Nederland Research & Development, Netherlands
Reinoud van Laar – Danieli Corus, Netherlands
Olena Volkova – Institute for Iron and Steel Technology, TU Bergakademie Freiberg, Germany

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Federica Bassani – Associazione Italiana di Metallurgia, Italy
Sabrina De Donato – Associazione Italiana di Metallurgia, Italy
Carlo Mapelli – Politecnico di Milano, Italy
Silvano Panza – Associazione Italiana di Metallurgia, Italy

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Italy
Tel. +39 0276021132 or 0276397770
E-mail: aim@aimnet.it
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<tr>
<td>8:00</td>
<td>Registration of attendees</td>
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<tr>
<td>9:00</td>
<td><strong>OPENING SESSION</strong></td>
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<td>Welcome addresses by</td>
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<td></td>
<td>Silvano Panza – AIM President</td>
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<td>Johannes Schenk, Carlo Mapelli – Conference Chairpersons</td>
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<tr>
<td>9:20</td>
<td>[ecic_097] The way the European steel industry wants to become carbon</td>
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<td>neutral</td>
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<td>H. B. Lüngen – Germany</td>
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<td>P. Schmöle – Germany</td>
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<td>9:50</td>
<td>[ecic_114] Iron ore for direct reduction: future challenges and solutions</td>
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<td>C. Barrington – International Iron Metallics Association, United Kingdom</td>
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<td>10:20</td>
<td>[ecic_115] Hydrogen perspectives in iron and steelmaking</td>
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<td>C. Mapelli – Politecnico di Milano, Italy</td>
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<td>10:50</td>
<td>Coffee break</td>
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<tr>
<td></td>
<td><strong>Session H₂ AND SYNGAS EXPLOITATION I</strong></td>
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<tr>
<td>11:15</td>
<td>Keynote [ecic_094] Hydrogen ironmaking to decarbonise the steel</td>
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<tr>
<td></td>
<td>industry. Fundamentals and current progress</td>
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<td></td>
<td>F. Patisson, O. Mirgaux – University of Lorraine, France</td>
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<td>11:40</td>
<td>[ecic_081] The impact of hydrogen-enriched atmospheres: reduction of</td>
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<td>iron ore sinter and pellets in CO-CO2-N2 and CO-CO2-H2-H2O-N2 reducing</td>
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<td>gases across blast furnace zones</td>
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<td>A. Abdelrahim, M. Iljana, M. Aula, T. Fabritius – University of Oulu, Finland</td>
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<tr>
<td>12:00</td>
<td>[ecic_090] Circular ironmaking: transforming byproducts into DRI with</td>
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<td>hydrogen reduction</td>
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<td>M. Leuchtenmüller – Montanuniversität Leoben, Austria</td>
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<td>12:20</td>
<td>[ecic_104] On the influence hydrogen-bearing injected fuels in a blast</td>
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<td>furnace</td>
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<td>S. Nielson, T. Okosun, O. Ugarte, C. Q. Zhou – Purdue University Northwest, USA</td>
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<td>K. Leontaras, J. Entwistle – US Steel, USA</td>
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<td>12:40</td>
<td>[ecic_116] Hydrogen production technology from Solid-oxide electrolysis</td>
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<td>using waste heat from the ironmaking process</td>
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<td>Y. Yang, H. Kim, J. Ahn – POSCO N.EX.T Hub, Korea</td>
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<td>13:00</td>
<td>Lunch</td>
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| 11:15  | **Keynote** [ecic_058] Influence of metallic iron structure and molten slag formation on softening behavior of pre-reduced pellets under high temperature loading condition in inert atmosphere | K-i. Ohno, T. Kon – Kyushu University, Japan  
T. Orimoto, N. Yasuda – Nippon Steel Corporation, Japan |
| 12:00  | [ecic_016] Atomic-scale structural analysis of calcium ferrite in sintered ore by scanning transmission electron microscopy | K. Takehara, K. Ikeda, T. Kawano, T. Higuchi – JFE Steel, Japan |
| 12:20  | [ecic_002] Effects of gradual substitution of coke breeze with charcoal on the sinter process | J. Eisbacher-Lubensky, F. Kittinger, S. Pichler, C. Weiß – Montanuniversität Leoben, Austria  
H. Stocker, S. Wegscheider – voestalpine Stahl Donawitz, Austria |
P-c. Cheng – National Cheng Kung University, Taiwan and China Steel Corporation, Taiwan  
J-S. Shiau – China Steel Corporation, Taiwan  
H-l. Chen – National Pingtung University of Science and Technology, Taiwan |
| 13:00  | Lunch                                                                         |                                           |
Wednesday 16 October 2024
Gardenia room

**Session H₂ AND SYNGAS EXPLOITATION II**

14:00 [ecic_026] Production of hot hydrogen-rich syngas in integrated plants for efficient injection in the blast furnace and CO₂ mitigation
M. Gili, E. Faraci – Rina–Centro Sviluppo Materiali, Italy
A. Oblanca Gutierrez – Arcelor Mittal, Spain
C. Morelli, L. Micheletti – Paul Wurth Italia, Italy
D. Garot – CRM Group, Belgium

14:20 [ecic_110] CO₂-free hydrogen production technology from ammonia/methane using direct reduced iron
S. Joo, C. H. Rhee, B-S. Kim, G. Kwon, Y. Yang, H. W. Park – POSCO N.EX.T Hub, Korea

14:40 [ecic_077] Influence of a higher hydrogen based reduction share from coke oven gas injection on the blast furnace process
H. Bartusch, T. Hauck – VDEh-Betriebsforschungsinstitut, Germany
F. Demirci, A. Janz – Hüttenwerke Krupp Mannesmann, Germany

15:00 [ecic_100] The pyrolysis of natural gas as a source of hydrogen and carbon
R. Leonardi, L. Latterini, G. Quaglia, L. Tomassoli – Università di Perugia, Italy
G. Dall’Osto, C. Mapelli, D. Mombelli – Politecnico di Milano, Italy

15:20 Coffee break
14:00 [ecic_083] Comparative analysis of different sinter strand modeling techniques in flowsheeting: insights for steelmaking optimization
A. V. Walk – Technische Universität Wien, Austria and K1-MET
B. Weiss – Primetals Technologies Austria, Austria
W. Wukovits – Technische Universität Wien, Austria

14:20 [ecic_084] Investigating the oxidation behaviour of magnetite ore: impact of particle size fraction and mineralogical composition
A. Laarich, C. Andersson, H. Ahmed – Lulea University of Technology, Sweden
T.K Sandeep Kumar, D. Marjavaara, K. Wiegel – LKAB, Sweden
S. Richter – Outotec & Co., Germany
J-O. Wikström – Kaunis Iron, Sweden

14:40 [ecic_054] Development of convergence engineering simulation technique based on the image data obtained by X-ray computed tomography for ironmaking packed bed deformation
S. Natsui, R. Honda, H. Nogami – Tohoku University, Japan

15:00 [ecic_121] Reduction of NO and SO2 from the sintering process through the use of new hearth layer materials
L. Tomas Da Rocha, S. Cho, B-J. Chung, S-M. Jung – POSTECH, Korea

15:20 Coffee break
Session CO2 MITIGATION INCLUDING CCUS

15:45 [ecic_109] Keynote How ironmaking holds the key to the green steel evolution
T. Hansmann – SMS group, Germany

16:10 [ecic_012] Options for reducing CO2 for iron and steel plants and energy efficiency considerations
S. Kumar, Y. Gordon, P. Krawchuk, R. Maia – Hatch, Canada

16:30 [ecic_057] Integration of carbon capture and utilization process in a steel mill during the transition phase towards net zero emissions
C. Mühlegger, O. Maier, A. Sasiain Conde – K1-MET, Austria
A. Spanlang, T. Keplinger – voestalpine Stahl, Austria
A. Werner – TU Wien, Austria

16:50 [ecic_067] Technologies and status of hydrogen, syngas, and carbon capture usage in ironmaking processes
J. von Scheele, P. Mathur – Linde, Germany

17:10 [ecic_061] New ways to harness the CO2 footprint in sintering
E. Fehringer, M. Böberl – Primetals Technologies Austria, Austria

17:30 [ecic_112] Biolron™ - The development of a low CO2 emissions ironmaking process utilising raw biomass as a reductant and microwaves as an energy source
D. Leigh, M. Buckley – Rio Tinto, Australia

17:50 [ecic_085] Transforming blast furnace into environmentally friendly EASYMelt through the utilization of ammonia and carbon capture for achieving net-zero emissions
F. Mauret, M. Baniasadi, J. Ji, P. Kinzel – SMS Group, Germany
H. Saxén – Åbo Akademi University, Finland

18:10 [ecic_120] New insights of blast furnace pulverized coal injection and raceway behaviour in a high productivity blast furnace and it’s necessity to surpass the transition period: outcome of a European RFCS project Sparerib
S. Born, J. van der Stel, V. Pridhivi, L. Bleijendaal, P. Gupta – Tata Steel, Netherlands

18:30 Welcome cocktail
Session COKEMAKING I

15:50 [ecic_060] Effect of coal blending and pretreatment on coke quality and its reactivity
W-J. Lee, D-M. Jang, J-O. Park, G-H. Ra – POSCO Technical Research Lab, Korea

16:10 [ecic_063] Measurement and analysis of semi-coke contraction
S. Khoshk Rish, D. R. Jenkins, A. Tahmasebi – NIER University of Newcastle, Australia

16:30 [ecic_050] Mechanisms of coke formation and structural development in stamp-charged cokemaking
S. Khoshk Rish, A. Wang, B. Brooks, M. De Sousa Felix, A. Tahmasebi – CIMR/NIER University of Newcastle, Australia

16:50 [ecic_055] Measurements of coke quality
R. Pearson, D. Pearson – Pearson Coal Petrography, USA

17:10 [ecic_064] Biocoke under blast furnace atmosphere with increased amounts of hydrogen
A. Heikkilä, J. Haapakangas, A. Koskela, T. Fabritius – University of Oulu, Finland

17:30 [ecic_082] High temperature shrinkage measurement development as a tool to extend lifetime of coke ovens
A. Oudhuis, B. Gols, J. van der Plas, B. van Vliet – Tata Steel, Netherlands

17:50 [ecic_111] Demonstration of CO2 utilization in ironmaking industries: CO2 reaction with unused hot carbon in coking chamber
H. W. Park, S. Joo, B-S. Kim, G. Kwon, C. H. Rhee – POSCO N.EX.T Hub, Korea

18:10 [ecic_036] Mineral effects on coke performance at high temperatures: reactivity and dissolution
R. J. Longbottom, B. J. Monaghan – University of Wollongong, Australia

18:30 Welcome cocktail
Thursday 17 October 2024
Gardenia room

Session  DIRECT REDUCTION AND SMELTING REDUCTION I

8:30  [ecic_045] The role of Australian iron ores for the green transition
G. Wimmer, R. Millner, B. Hiebl, Ch. Boehm – Primetals Technologies Austria, Austria

8:50  [ecic_070] Hlsarna for processing almost all waste materials, an option for ironmaking?

9:10  [ecic_011] Green steel and vanadium production in Uzbekistan
Z. Adilov, T. Kodirov, D. Atakhanov – Enter Engineering, Uzbekistan
M. Bodley, M. Sidawi, S. Thakurdin, Y. Gordon, G. Dressel, S. Kumar – Hatch, Canada

9:30  [ecic_003] Hy3 (Hy-CUBE): Hyundai Steel's initiative for carbon avoidance steelmaking
H. Kim, M. Sun – Hyundai Steel, Korea

9:50  [ecic_019] Coolbrook’s RotoDynamic Heater™ - electrifying high-temperature process heat and reducing fossil fuel emissions in the steel industry
T. Paananen – Coolbrook, Finland

10:10 [ecic_096] Minimizing environmental impact of pelletizing and direct reduction plants
T. Steinparzer, T. Plattner, P. Trunner – Primetals Technologies Austria, Austria

10:30 Coffee break
8:30 [ecic_098] Mechanism for iron burden reduction of blast furnace process-a laboratory scale simulation
J-S. Shiau – China Steel Corporation (CSC), Taiwan
H-l. Chen – National Pingtung University of Science and Technology, Taiwan
S-k. Lin – National Cheng Kung University, Taiwan and China Steel Corporation (CSC), Taiwan

8:50 [ecic_034] First steps in the endeavour to determine particle properties in the direct reduction of iron ore pellets
S. La Manna, D. Barletta, M. Poletto – Università di Salerno, Italy
K. Qyteti, V. Scherer – Ruhr-University Bochum, Germany

9:10 [ecic_033] Reduction disintegration behavior of self-fluxing pellet at 600°C and 700°C under high hydrogen blast furnace condition
K. Momma, T. Murakami – Tohoku University, Japan

9:30 [ecic_053] Mineral phase and structural evaluation of the influence of iron ore concentrate on melting and assimilation phenomena in the sintering process
S. Yamazaki, T. Adachi, H. Taguchi, K. Koga, K. Miyagawa – Kobe Steel, Japan

9:50 [ecic_052] The effect of gangue phase existing state on gangue removal behavior in the iron ore upgrading process by reduction-crushing-separation
T. Adachi – Kobe Steel, Japan

10:10 [ecic_041] Utilization of biocarbon in iron-ore sintering for CO2 reduction
I. Song, Y. Lee, J. Lee – Hyndai Steel, Korea

10:30 Coffee break
Session  DIRECT REDUCTION AND SMELTING REDUCTION II

11:00  [ecic_072] Arc stability in the Hydrogen Plasma Smelting Reduction (HPSR) process for steelmaking: evaluation of voltage noise and implications on process optimisation
       C. R. Quick, E. Reichel – K1-MET, Austria

11:20  [ecic_013] The behavior of trace elements in the smelter
       A. Pfeiffer, B. Voraberger, G. Wimmer – Primetals Technologies Austria, Austria

11:40  [ecic_006] Electric smelting furnace technology and implementation readiness
       K. Chomyn, S. Ge, T. Koehler – Hatch, Canada
       C. Walker – Hatch-Kuettner, Germany

12:00  [ecic_004] Estimating heat and material balances in direct reduction plants under various operating conditions
       M. Sun, H. Kim – Hyundai Steel, Korea

12:20  [ecic_037] Smelter - A new Pathway for green iron making
       G. Wimmer, A. Pfeiffer, B. Voraberger – Primetals Technologies Austria, Austria

12:40  [ecic_025] Quantitative study for the COG-based production of DRI of high carbon content in a fluidized bed reactor
       J. O. Jo, J. R. Lee – Hyungdae Steel, Dangjin City, Korea
       H. Kim – Pukyong National University, Korea
       K. Yoo – Korea Maritime & Ocean University, Korea

13:00  Lunch
Session BLAST FURNACE IRONMAKING - EQUIPMENT I

10:55 Keynote
A. Fleischanderl – Primetals Technologies Austria, Austria

11:20 [ecic_105] Optimizing burner topology in hot blast stoves using computational fluid dynamics for enhanced thermal efficiency and pollution reduction
S. Ramalingam, V. van Straaten, P. Klut – Danieli-Corus, Netherlands

11:40 [ecic_087] Material tracking
C. Dengler, X. Ross – Paul Wurth, Luxembourg
D. I. Durneata, L. Wu – AG der Dillinger Hüttenwerke, Germany

12:00 [ecic_018] Benefits of wear resistant copper staves
E. Long, D. Osborne – Primetals Technologies, United Kingdom

12:20 [ecic_074] 37 year campaign of IJmuiden blast furnace no. 6
J. Stuurwold, B. Nugteren, G. Tijhuis, F. Kerkhoven – Tata Steel, Netherlands
R. van Laar – Danieli Corus, Netherlands

12:40 [ecic_015] Method evaluation for understanding the reduction behaviour of cold-agglomerated pellets
M. Bennett, R. Joyce, P. Warren – Binding Solutions, United Kingdom

13:00 Lunch
Session DIRECT REDUCTION AND SMELTING REDUCTION III

14:00 [ecic_071] Influence of some operating parameters on the direct reduction of iron ore by hydrogen in a shaft furnace
A. Marsigny, O. Mirgaux, T. Quatravaux, F. Patisson – Institut Jean Lamour, France

14:20 [ecic_103] Exploring the effects of lateral hydrogen injection in the hydrogen plasma smelting reduction process
D. Ernst – Montanuniversitaet Leoben, Austria

14:40 [ecic_092] Investigation of the behaviour of phosphorus, sulfur and copper during the hydrogen plasma smelting reduction process
B. Adami – K1-MET, Austria
D. Ernst, J. Schenk – University of Leoben, Austria

15:00 [ecic_113] Carbon–free electrodes in hydrogen plasma smelting reduction: an innovative approach for low emission steelmaking
M. Zarl, M. Farkas – K1-MET
D. Ernst – University of Leoben, Austria

15:20 [ecic_021] Hydrogen based reduction behavior of MgO rich magnetite pellets
P. Garg, H. Ahmed, C. Andersson – Luleå University of Technology, Sweden
C. Samuelsson – Future Eco North, Sweden
J–O. Wikström – Kaunis Iron, Sweden

15:40 Coffee break
Thursday 17 October 2024
Iris+Lilium room

Session COKE MAKING II

14:00 [ecic_086] The role of the coke dry quenching technology in the frame of the transition to the green steel
F. Strobino, A. Fabbri, A. Ferraris, R. Calcagno – Paul Wurth Italia, Italy

14:20 [ecic_028] Optimizing coal blending in coke production: A logistic approach
S.J. Lee, D.M. Jang, H.M. Jeong – POSCO, Korea
J.K. Kim – POSCO Holdings, Korea

Session BLAST FURNACE IRONMAKING – OPERATIONS I

14:40 [ecic_031] Innovative ultra low carbon ironmaking technology with massive HBI charging in blast furnace
M. Yakeya, A. Kasai, M. Sakamoto, T. Tagawa, K. Miyata – Kobe Steel, Japan

15:00 [ecic_088] Techno-economic assessment of ammonia and HBI as flexible green energy carrier for BF-BOF steel making
J. Ji, E. Taktak, M. Baniasadi, F. Mauret, P. Kinzel – SMS Group, Germany

15:20 [ecic_122] Coke behavior with H2O in a hydrogen-enriched blast furnace: A review
K. Li, F. Zhou - University of Science and Technology Beijing, China

15:40 Coffee break
Session  DIRECT REDUCTION AND SMELTING REDUCTION IV

16:00  [ecic_038] H2 DRI production with BORIS Furnace  
Y. Graz, Y. Maurice, A. Husson, R. Santos Ferreira, O. Nechyporuk, J. Barros – Arcelormittal Maizières Research, France

16:20  [ecic_009] The Extended Discrete Element Method (XDEM) as a common simulation framework for traditional and green steelmaking  
B. Peters – University of Luxembourg, Luxembourg

16:40  [ecic_078] Simulation of Direct Reduction Processes to be included in a process chain multipurpose simulation toolkit  
I. Matino, V. Colla, A. Vignali – Scuola Superiore Sant'Anna, TeCIP, ICT-COISP, Italy

17:00  [ecic_024] Refractory lining concepts and challenges from established to hydrogen ready operation in Direct reduced iron shaft kiln technologies  
D. Gavagnin, E. Kyriilis – RHI Magnesita, Austria  
E. Estrada Ospino – RHI Canada, Canada  
M. Spreij – RHI Magnesita Trading, Netherlands  
S. Postrach – RHI Magnesita Sales Germany, Germany
17:20 [ecic_022] Blast furnace transition towards DRP, CO2 reduction and hydrogen usage in ENERGIRON® plants
M. Lapasin, D. Pauluzzi, M. Mahmoud – Danieli & C. Officine Meccaniche, Italy

17:40 [ecic_089] Effects of pressure on direct reduction process
S. Magnani, B. Antonucci – Paul Wurth Italia, Italy
T. Astoria, M. Michishita – MIDREX

18:00 [ecic_117] Fe3C as an alternative iron source to DRI
Y. Sasaki – Tohoku University, Japan
K. Ikeda, H. Kubo – Fukuoka Institute of Technology, Japan

18:20 [ecic_059] Factors underpinning the gasification reactivity of coke RMDC and IMDC with CO2
H. Lomas, S. Khoshk Rish, A. Jayasekara, A. Tahmasebi – University of Newcastle, Australia
T. Congo, K. Steel – University of Queensland, Australia

19:30 Social event
Session BLAST FURNACE IRONMAKING – OPERATIONS II

16:00 [ecic_046] The green transformation in the Chinese ironmaking industry
J. Zhang – University of Science and Technology Beijing, China and University of Queensland, Australia
K. Li, Z. Liu, T. Yang – University of Science and Technology Beijing, China

16:20 [ecic_051] Evaluation of the conversion behavior of Alternative Reducing Agents in a test rig under raceway conditions
T. Nanz, M. Boesenofer – K1-Met, Austria and TU Wien, Austria
J. Rieger – K1-Met, Austria
H. Stocker – voestalpine Stahl Donawitz, Austria
C. Feilmayr – voestalpine Stahl, Austria | M. Harasek – TU Wien, Austria

16:40 [ecic_005] Softening and melting behaviour of ferrous burden under simulated blast furnace process conditions
Y. Xiao et al. – Tata Steel, Netherlands

17:00 [ecic_023] CFD investigation of blast furnace raceway: Effect of the co-injection of coke-oven gas (COG) and the injection method in the tuyere level
A. Islas, M. Baniasadi, P. Goedert, P. Bermes – SMS group (Paul Wurth), Luxembourg
A. Feiterna, D. Durneata – AG der Dillinger Hüttenwerke, Germany
A. Janz, F. Demirci – Hüttenwerke Krupp Mannesmann (HKM), Germany
Thursday 17 October 2024
Iris+Lilium room

Session BLAST FURNACE IRONMAKING – OPERATIONS II

17:20 [ecic_039] Influence of blast furnace technology and design features on heat losses in the cooling system and coke consumption for compensation of them
O. Chaika, B. Kornilov, A. Moskalyna – National Academy of Sciences of Ukraine (ISI NASU), Ukraine
M. Alter – ALTER Blast Furnace Consulting, USA
V. Naboka, S. Safonov – PJSC “Zaporozhstal” Iron & Steel Works, Ukraine

17:40 [ecic_118] Strategies and enabler for high PCI rate in blast furnace at JSW Steel limited

18:00 [ecic_076] BF-BOF steelmaking CO2 emission reduction options
R. van Laar, D. Verma – Danieli Corus, Netherlands

18:20 [ecic_119] Recovery of a blast furnace to normal operation after a ‘chilled hearth’ event
M. Alter – ALTER Blast Furnace Consulting, USA
O. Chaika – Iron and Steel Institute National Academy of Sciences of Ukraine (ISI NASU)

19:30 Social event
Session BLAST FURNACE IRONMAKING – OPERATIONS III

8:30 [ecic_062] CO2 reduction technology through COG injection and low-reduced iron charging to the blast furnace
S-H. Yi – POSTECH, Korea

8:50 [ecic_029] Start-up and usage of coke oven gas at HKM on our mission to green steel and CO2 reduction
F. Perret, F. Demirci, A. Janz, R. Peter – HKM, Germany
T. Semleit, S. Schulte – tkSE, Germany

9:10 [ecic_068] Insights into the segregation in the blast furnace charging system: from the stockhouse to top hoppers
A. Hadi, Y. Pang, D. Schott – Delft University of Technology, Netherlands
A. Adema, J. van der Stel – Tata Steel Europe, Netherlands

9:30 [ecic_027] Spotlight on Na2O and K2O behaviour in blast furnace operation
P. Warren – Binding Solutions, United Kingdom
M. Geerdes – Geerdes Advies, Netherlands

9:50 [ecic_014] Application of slag model to minimize the end-to-end cost of hot metal production
Y. Gordon – Hatch, Canada
N. Iziumskiy, G. Matveenko, P. Zhabrovets – Association of Pig Iron Producers, Ukraine

10:10 Coffee break
8:30 [ecic_010] EMF-timeseries analysis implemented as predictive tool in BF-tapping control  
S. Moll, J. Eisbacher-Lubensky, C. Weiß – Montanuniversität Leoben, Austria  
J. Felser – voestalpine Stahl Donawitz, Austria  
G. Lengauer – voestalpine Stahl, Austria

8:50 [ecic_102] Transparent AI - key element for successful ironmaking process optimization  
D. Bettinger, H. Fritschek, A. Klinger, P. Krahwinkler, M. Schaler, C. Tauber – Primetals Technologies Austria, Austria  
C. Feilmayr, C. Staudinger – voestalpine, Austria  
M. Schatzl – K1-Met, Austria  
R. P. Goldberg – Midrex Technologies, USA

9:10 [ecic_007] Campaign life extension of COREX furnaces  
W.L. Ying, Y. Gordon, A. Sadri, S. Kumar – Hatch, Canada

9:30 [ecic_035] Development of a monitoring system for residual refractories of main runner in the blast furnace  

9:50 [ecic_017] Integrated steel plants challenges during transition to green steel - a holistic quantitative valuation of CO2 reduction potentials using digital twins in m.simtop  
B. Weiss, R. Millner, H. Völkl, B. Hiebl – Primetals Technologies Austria, Austria

10:10 Coffee break
10:35 **Keynote [ecic_093]** Production of high-quality biocarbon and utilization in the metallurgical industry  
K. Rigas, M. Gemvik, T. Brink – Envigas, Sweden

11:00 **[ecic_056]** Biomass for cokemaking decarbonization  
A. Sorino, R. Attrotto, A. Vecchio – Acciaierie d’Italia, Italy

11:20 **[ecic_106]** Bio–coke for manganese ferroalloys production - results of the BioCoke4FAI R&D project implementation  
M. Rejdak, A. Sobolewski, M. Wojtaszek-Kalaitzidi, B. Mertas – Institute of Energy and Fuel Processing Technology, Poland  
M. Książek – SINTEF, Norway  
S. Y- Larsen – Eramet, Norway  
P. Szecówka – Koksownia Częstochowa Nowa, Poland

11:40 **[ecic_065]** Assessing biochar functionality for electric arc furnace use  
G. Seenivasan, A. Andersson, H. Ahmed, L. Sundqvist-Őqvist – Luleå University of Technology, Sweden

12:00 **[ecic_080]** Modelling of processes for upgrading biomass before its use in steel industry  
I. Matino, V. Colla, O. Toscanelli – Scuola Superiore Sant’Anna, TeCIP, ICT- COISP, Italy

12:20 **[ecic_040]** Research on the potential role of biocarbon in future ironmaking process  
G. Kim, H-S. Oh, J. Lee, Y. Lee, J. Hyup Lee – Hyundai Steel, Korea

12:40 **[ecic_049]** Bio-reductants in smelting of direct reduced iron  
A. Phiri, K. Vallo, J. Hamuyuni, T. Rönnberg, T. Haimi – Metso Metals, Finland

13:00 **Closing remarks**  
Johannes Schenk, Carlo Mapelli – Conference chairpersons
Session MEASURING TECHNOLOGIES AND INDUSTRY 4.0 II

10:40 [ecic_048] Advanced HD thermal camera technology for tuyere raceway temperature measurement
P. Warren – Binding Solutions (ex British Steel), United Kingdom
I. Scott, S. Ibrahim – Pyroptik, United Kingdom
T. Stoakes – British Steel, United Kingdom

11:00 [ecic_008] Monitoring strategies for blast furnaces and electric arc furnaces
W.L. Ying, Y. Gordon, S. Kumar, A. Sadri – Hatch, Canada

11:20 [ecic_032] A soft measurement model construction method based on machine learning and CFD
Y. Wang, J. Zhang, Z. Liu – University of Science and Technology Beijing, China

Session BLAST FURNACE IRONMAKING – EQUIPMENT II

11:40 [ecic_047] How are Ironmakers investing in existing blast furnace assets?
D. Osborne, R. Horwood, G. Jemison – Primetals Technologies, United Kingdom

12:00 [ecic_091] Innovative two-stage blast furnace gas cleaning technology implemented at Blast Furnace no 2 in ArcelorMittal Poland Dąbrowa Górnicza plant
M. Czaplicka – Polish Academy of Sciences, Poland
M Niesler – Upper Silesian Institute of Technology, Poland
A. Ryfa – Silesian University of Technology, Poland
M. Kocot – ArcelorMittal, Poland

12:20 [ecic_073] Danieli Top Charging Technology: installation, operation and maintenance
A. Glazer – Danieli Corus, Netherlands

12:40 [ecic_075] Latest generation dry blast furnace gas cleaning technology: improved energy efficiency and carbon footprint
P. Klut – Danieli Corus, Netherlands
[ecic_030] Molecular and supramolecular structure of individual fractions of low-metamorphised coal
A. Starovoit, Y. Sorokin, Y. Malyi – USUST, Ukraine
Y. Zingerman – Independent cokemaking expert, Ukraine

[ecic_042] Iron ore sintering tests for direct reduction in H2-containing atmosphere
M. Niesler, J. Stecko, J. Marcisz, W. Szulc – Łukasiewicz - Górnośląski Instytut Technologiczny, Poland

[ecic_043] Characterization of sinters after reduction in hydrogen containing atmosphere
K. Radwański, A. Janik, M. Niesler, J. Stecko – Łukasiewicz - Górnośląski Instytut Technologiczny, Poland

[ecic_066] Increasing the temperature of the hot blast by improving the heat disposal system of waste flue gases of air heaters
V. Vereshchak – KOSH LLC, Ukraine
N. Petryakov – Zaporizhstal Iron & Steel Works, Ukraine
L. Gres, O. Gupalo – Ukrainian State University of Science and Technologies, Ukraine

[ecic_069] Investigate effects of sintering condition on the agglomeration behavior of iron ore sinter with high SiO2 content
P.-c. Cheng – National Cheng Kung University, Taiwan and China Steel Corporation, Taiwan
J.-s. Shiau – China Steel Corporation, Taiwan
S.-x. Liu, K.-c. Chang, K.-c. Hsieh, S.-k. Lin – National Cheng Kung University, Taiwan

[ecic_099] Continuous processes of different types of coke production in an annular furnace with a movable hearth
V. Kvyatkovskyy – Krypton Ocean Group, Ukraine
A. Koveria – Dnipro University of Technology, Ukraine

PRELIMINARY PROGRAMME SUBJECT TO CHANGES
CONFERENCE VENUE
The Conference will be held in Hotel Caesius Thermae & Spa Resort Via Peschiera, 3 – 37011 Bardolino VR (https://www.hotelcaesiusterme.com/en/)

HOW TO REACH THE CONFERENCE VENUE:
https://www.hotelcaesiusterme.com/en/location

ACCOMMODATION
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LANGUAGE
The official language of the Conference will be English.

PROCEEDINGS
The full texts of all accepted papers will be published in the electronic form proceedings and issued to delegates at the Conference. A selection of the best papers will be also published in “La Metallurgia Italiana – International Journal of the Italian Association for Metallurgy” – the scientific journal of AIM, which is covered in the Science Citation index Expanded by Clarivate Analytics (formerly Thomson Reuters), and in Scopus by Elsevier B.V

REGISTRATION
If you plan to attend, please register online on the Conference website https://www.aimnet.it/ecic/registration/ or fill in the enclosed Registration Form and send it to the Organising Secretariat best before July 12, 2024 (early–bird registrations deadline). Please use a separate form for each participant. For any assistance, we invite you to contact the Organising Secretariat best by e-mail.

CANCELLATION AND REFUND POLICY
A refund, less 20% deduction for administrative costs, will be issued for written cancellations received by July 12, 2024. For attendees who notify their cancellation after July 12, 2024, or will not attend the Conference, a charge of 100% of the Conference fee will be withheld and a copy of the proceedings will be sent after the event.
CONFERENCE REGISTRATION FEES INCLUDE

- Admittance to technical sessions
- Conference electronic proceedings
- Social events on October 16 and 17
- Coffee breaks and Lunches

For non-members (students excluded) the fee includes AIM Membership for the last quarter of 2024 and for the year 2025.

Additional ticket for Social event for accompanying persons: € 150 (plus 22% VAT) (includes only the social events on October 16 and 17)

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>> by credit card online (https://www.aimnet.it/eng/pagamento.php)
SPEAKERS REGISTRATION
Please be aware that only papers submitted on time and with presenting author regularly registered (registration fee paid) before July 12, 2024 will be included in the final program and published in the Conference proceedings. Registration forms will not be processed without payment. A maximum of two papers will be accepted for each author registered in time.

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SOCIAL PROGRAMME
In order to give delegates the opportunity to meet informally and enjoy Garda Lake’s atmosphere, AIM organized two Social events in the early evening of October 16 and October 17, 2024.

INSURANCE
The Organising Secretariat cannot assume any responsibility for personal accident, loss or damage to the private property of participants and accompanying persons, which may either occur during or arise from the Conference. Participants should therefore take whatever steps they consider necessary as regards insurance.

VISA APPLICATION FORM
According to our policy, we necessarily have to receive registration form first, duly filled in, before sending the VISA invitation letter.

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➢ First name
➢ Mr/Mrs
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➢ arrival and departure dates
➢ Nationality
➢ Hotel accommodation (name, address and telephone number)
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➢ Please contact in advance the Italian Embassy to verify if you need an invitation letter on our letterhead or if there is a specific form to follow
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ECIC 2024 will focus on the newest technologies in coke making, sintering, pelletizing, pyrolyzing the biomasses and ironmaking (blast furnaces, direct reduction and carbon-based smelting processes).

The 2050 goal of carbon neutrality and the related intensive efforts of the steel industry will significantly affect the technologies for iron ore reduction. In this perspective, the shortage of iron ores matching the requirement for direct reduction by gas and for melting in electric arc furnace makes important proposal of new technologies and devices that can ensure the carbon neutrality even for the coal based routes.

This Congress will focus on technologies that can achieve such a goal improving the efficiency of the existing process, applying the devices that avoid a net emission of green house gases and to point out new routes based on exploitation of biomasses whose net emission is intrinsically neutral.

The detailed sponsorship packages are available at this >>link

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Please complete and return this form by July 12, 2024 to:

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