

Technical sessions



Last updated on September 24, 2021

Monday 27.09.2021

1A CO2 emissions		Chair: Franciscus Prins	
Time	Title	Author	Affiliation
01:10	Towards a climate-friendly ferroalloy industry in Norway	B. Ravary, K.B. Bjelland, Aa. Valderhaug A.G. Messenlien	Eramet Norway AS
01:35	Evaluating the carbon footprint of ferrochrome production technologies using HSC-SIM and OpenLCA software packages	J. Hamuyuni, H. Johto, T. Haimi, A. Bunjaku, P. Mäkelä, L. Närho, M. Lindgren	Metso Outotec Research Center, Finland
02:00	Greenhouse gas emissions from silicon production - development of carbon footprint with changing energy systems	G. Saevarsdottir, H. Kvande, T. Magnusson	Reykjavik University, Iceland
02:25	Methanol production from silicomanganese off-gas of arc submerged furnace	Y. Yan, C. Wei, Q. Niu	Inner Mongolia Erdos Electric Power&metallurgy Co.,Ltd.

1B Transport - Refractories		Chair: Daniel Lindberg	
Time	Title	Author	Affiliation
01:10	Furnace linings with environmentally friendly materials	L.Lindstad, A.Autruffe, M. Bryntesen	Elkem, Norway
01:35	The Effect of the MgO Content of Slag on its Penetrability into Refractory Lining in the Ferrochrome Converter	V.-V. Visuri, E.-P. Heikkinen, J. Kaisto, A. Harju, R. Mattila, P. Kupari, T. Ikäheimonen, T. Fabritius	Outokumpu Stainless Oy, Finland and University of Oulu, Finland
02:00	New insights into refractory lining wear mechanisms on a 22MVA FeMn furnace	C.Coetzee, Q. Taylor, A. Brisley, P. Botha, M. Cele, S. Moodley	Intocast South- Africa
02:25	New Refractory Lining Direction at Maringá Ferro-Liga Silicomanganese furnace #5	J. Braga Maia, I. Tiago Santos, T. Rodrigues da Silva, P. Sylven	Grupo Maringá, Brazil

1C Recycling		Chair: Rodney Jones	
Time	Title	Author	Affiliation
01:10	Leveraging Value and Environmental Gains Through Integrated Steel- and Ferroalloy Plant Slag Cleaning	B.N. Belford, A.A. van Niekerk, G. Lotter, S.C. Louw, W. van der Struys	Metix (SMS Group), Sandton, South Africa
01:35	The Agglomeration of Solid Wastes for Ferroalloy Production	F. Li, Z. Sun, F. Yan,	Lanzhou University of Technology, China
02:00	The study of the characteristics and possibilities of using slags and dusts from ferrochrome production	V.I. Zhuchkov, O.V. Zayakin, A.V. Sychev	Institute of Metallurgy of the Ural Branch of the Russian Academy of Sciences, Russia
02:25	Continuous improvement in the development of cold agglomeration process to add value to manganese-rich waste streams	M.Cele, P. Botha	Assmang Manganese, South Africa

2A CO2 emissions		Chair: Gabriella Tranell	
Time	Title	Author	Affiliation
03:20	CO2 capture for the silicon process-effects of flue gas recirculation	V. Andersen, H. Knuutila, L. Braakhuis, E. Myrhaug, K.E. Einarsrud, G. Tranell	Norwegian University of Science and Technology (NTNU), Norway
03:45	Pig Iron Production (post Blast Furnace era)	G.J. Lötter, A.A. van Niekerk, G.E. Farmer	Metix (SMS Group), South Africa
04:10	Some carbon-free technologies for manganese ferroalloy production	I.T. Kero, H. Dalaker, K.S. Osen, E. Ringdalen	SINTEF Industry, Norway

2B New methods and products		Chair: Casper Van der Eijk	
Time	Title	Author	Affiliation
03:20	Development of a method for granulation of Ferromanganese alloys	K. Beskow, A. Persson	UHT Uvån Hagfors Teknologi AB, Sweden
03:45	Experiences from remote commissioning of FeMn refining converter plant	C. Rick, J. Lundström, H. Sjöström, L. Zandberg, G. Nagel, A. Bohta	UHT AB, Sweden
04:10	Novel Applications of Ferroalloys for Manufacturing of High Entropy Alloy	S.-C. Duan, J.-Y. Kang, W. Mu, J.H. Park	Hanyang University, Rep. of Korea

2C Recycling		Chair: Isabel Geldenhuys	
Time	Title	Author	Affiliation
03:20	Prereduction of manganese briquettes produced with tailing dam materials from Urucum/Brazil	L. G. M. de Jesus, M. Tangstad	Federal Institute of Education Science and Technology of Mato Grosso do Sul, Brazil
03:45	Technical Focus on DC-arc Furnace Application to Waste Stream Smelting	S.C. Louw, B.N. Belford, A.A. van Niekerk, R. Degel, M.A. Reuter	Metix (SMS Group), South Africa
04:10	Kinetics of silicon production by aluminothermic reduction of silica using aluminium and aluminium dross as reductants	H. Phillipson, G. Lie Solbakk, M. Wallin, K. E. Einarsrud, G. Tranell	Norwegian University of Science and Technology (NTNU), Norway

Tuesday 28.09.2021

3A Mn raw materials		Chair: Joalet Steenkamp	
Time	Title	Author	Affiliation
08:30	Recycling of Mn-rich ore fines, dust and sludge briquettes in Mn alloys production	L. Diaz, N. Julia, A. Amalric, G. Nussbaum, K.B. Bjelland	Eramet Ideas, France
08:55	Reducing CO2 footprint from SIMn production by optimization of fluxes	J.E. Davidsen	Eramet Norway AS, Norway
09:20	Mix-sintering process of manganese ores and its effects on the properties of sinters	Y. Han , H.J. Wang , G.H. Deng , L.X. Wang, Z.B. Yang	University of Science and Technology Beijing, China
09:45	The effect of manganese ore iron content on carbothermic reduction rates at low temperatures.	T. Coetsee	University of Pretoria, South Africa

3B Process control /Recruitment		Chair: Casper Van der Eijk	
Time	Title	Author	Affiliation
08:30	Bridging the training gap between academia and industry through digital technology	Noémie Julia	Eramet Ideas, France
08:55	Laser OES based optimization of extractive metallurgy, purification and Ferro-Alloy sales	A. Schlemminger	QuantoLux GmbH, Germany
09:20	In-situ versus post-mortem process control - How LIBS-based slag analysis within 1-2 minutes enables a completely new process management in pyrometallurgical processes	A. Ahsan, C. Gottlieb, M. Chao	SECOPTA analytics GmbH, Germany

3C Si/FeSi furnace operation		Chair: Li Fei	
Time	Title	Author	Affiliation
08:30	Conceptual model of tapping mechanisms in FeSi/Si furnaces	M. Tangstad, E. Ringdalen, J.E. Olsen, K.E. Einarsrud, E. Myrhaug, Q. Reynolds	Norwegian University of Science and Technology (NTNU), Norway
08:55	Permanent control and continuous improvement of the ferrosilicon smelting process	B. Machulek, J. Przegęda, Ł. Banasik, S. Kozłowski	Silesian University of Technology, Poland
09:20	Investigation of slag composition and possible relation to furnace operation of a FeSi75 furnace	K.F. Jusnes, R. Hjelmseth, M.B. Folstad, N.S. Ditlefsen, M.Tangstad	Finnfjord AS, Norway
09:45	Features of regulation of the electric regime of electro arc furnaces in the production of ferroalloys with high silicon content	B.Klocok, S.Kuzmenko, M. Suroviak, J.Lorinc	Oravské ferrozliatinárske závody, OFZ, a.s., Slovakia

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Technical sessions



Tuesday 28.09.2021

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4A Mn furnace operation		Chair: Merete Tangstad	
Time	Title	Author	Affiliation
10:40	Excavation and analysis of a 31 MW SiMn-furnace at Eramet Kvinesdal	E.A. Nordbø, S. Øvreid, E. Gridset	Eramet, Norway
11:05	Numerical study on transient smelting process for manganese-silicon production in a submerged arc furnace	Y. Yu, B. Li, S. Liu, F. Qi, Z. Liu	Northeastern University, China
11:30	Optimization of Production of Blast Furnace Ferromanganese in Conditions of Non-Integrated Iron Works	I. Shepetovsky, A. Shalygin, I. Chmerenko, R. Nuriev, K. Myasnikov, A. Shepetovskaya	Kosaya Gora Iron Works, Tula, Russia

4B FeCr		Chair: Paul Beukes	
Time	Title	Author	Affiliation
10:40	An experimental study of the formation of surface agglomerates in a submerged arc furnace	V.-V. Visuri, J. Kunelius, E. Puukko, T. Fabritius	Outokumpu Stainless Oy, Finland and University of Oulu, Finland
11:05	The importance of controlling the chemistry of pre-oxidized chromite pellets for Submerged Arc Furnace FeCr smelt: a study on furnace Si	M.W. Erwee, S. Swanepoel, Q.G. Reynolds	SamancorCr, South Africa
11:30	A study on the temperature dependency of the electrical conductivity of chromite pellets	A. Heikkilä, V.-V. Visuri, E.-P. Heikkinen, T. Fabritius	University of Oulu, Finland

4C Electrical Si		Chair: Quinn Reynolds	
Time	Title	Author	Affiliation
10:40	Electrical resistivity of partially transformed silicon carbide made from coal	H. Hoover, G. Saevarsdottir, M. Tangstad	Norwegian University of Science and Technology (NTNU), Norway
11:05	The Effect of Electrode Movements on Inductive Reactance in a Submerged Arc Furnace	Y.A. Tesfahunegn, T. Magnusson, M. Tangstad, G. Saevarsdottir	Reykjavik University, Iceland
11:30	Modeling of electric arcs for industrial applications: A review	H. Haraldsson, Y.A. Tesfahunegn, M. Tangstad, G. Saevarsdottir	Reykjavik University, Iceland

5A Mn furnaces and tapping		Chair: Astrid Hecquet	
Time	Title	Author	Affiliation
01:35	Variability in ferroalloy furnace tapping – insights from modelling	Q.G. Reynolds, J.E. Olsen, J.D. Steenkamp	Mintek and University of Stellenbosch, South Africa
02:00	CFD modelling of inconsistent furnace taps	J.E. Olsen	SINTEF Industry, Norway
02:25	Modelling of Furnace Tapping with Uniform and Non-uniform Porosity Distribution	V. Loomba, J.E. Olsen, K.E. Einarsrud	Norwegian University of Science and Technology (NTNU), Norway

5B FeNi		Chair: Nic Barcza	
Time	Title	Author	Affiliation
01:35	Benchmarking of FeNi electric arc furnace operations for developing furnace design parameters for lateritic ores in the intermediate SiO ₂ /MgO range of between 2.2 and 2.7	P. Palovaara, S. Pislä, M. Sakaranaho, M. Lindvall, J. Tikka.	AFRY (ÄF Pöyry), Finland
02:00	Investigating the effect of temperature on sulfur department in nickel laterite calcination	S. Sarbishei, L. Tafaghodi	University of British Columbia, Canada,
02:25	Study on the refining conditions of nickel pig iron for high purity nickel matte production	C.-W. Seok, K.-H. Lee, W.-Y. Son, J. K. Park, Y. Kang	Dong-A University, Rep. of Korea

5C Emissions		Chair: Robert Cromarty	
Time	Title	Author	Affiliation
01:35	Casting bay fume abatement improvement project Sakura Ferroalloys, Malaysia	R. Koekemoer, J. du Preez, D. Chen, K. Joubert, L. Els, C. Coetzee, R. Dreyer.	Sakura Ferroalloys (SFA), Bintulu, Malaysia
02:00	Venturi scrubber development and implementation to industry scale	N. Räsänen, P. Mäkelä, M. Lindgren, O. Pekkala	Metso Outotec Finland Oy, Finland
02:25	Optimal design of secondary fume extraction systems in ferroalloys production: From principles to operation	M. Kadkhodabeigi	ERAMET Norway As, Norway

6A Slags in Mn production		Chair: Sten Yngve Larsen	
Time	Title	Author	Affiliation
03:20	Carbide formation and accumulation in SiMn furnaces	V. Canaguier, J.E. Gjøvik, E. Ringdalen	SINTEF Industry, Norway
03:45	Effective binary diffusivity of silica and viscosity of silicomanganese slag in the smelting of Comilog and Wessels ores	O. Ostrovski	The University of New South Wales Sydney, Australia
04:10	Factorial Design Analysis of the Metallic Yield of Silicomanganese Alloy from Rich Manganese Slag	S. Ghali, H. El-Faramawy, M. Eissa, E. Kotb	Central Metallurgical Research & Development Institute (CMRDI), Cairo, Egypt

6B FeCr		Chair: Leili Tafaghodi	
Time	Title	Author	Affiliation
03:20	A study on decreasing heat and metal loss in ladle in HC-FeCr production	O. Uylas, Y. Kaya, S. Savalev, G. Romanenko, A. Bykov	Yilmaden Holding Inc, Turkey
03:45	Computational modelling of electrical conduction in ferroalloy furnace burdens	Q.G. Reynolds, S.J. Baumgartner, M.W. Erwee, S. Swanepoel, I.J. Geldehuys, G. Akdogan	Mintek and University of Stellenbosch, South Africa
04:10	Redesign of Tap-Hole in Submerged Arc Furnace of HC-FeCr Production	O. Uylas, Y. Kaya, S. Savalev, G. Romanenko, A. Bykov	Yilmaden Holding Inc, Turkey

6C Emissions HSE		Chair: Sean Gaal	
Time	Title	Author	Affiliation
03:20	Particle Size Distributions of Airborne Particulate Matter in a Ferrosilicon Smelter	I.T. Kero, A. Blom, R.B. Jørgensen	SINTEF Industry, Norway
03:45	SINTSENSE: low cost monitoring of VOC emissions from the ferroalloy industry	T.A. Aarhaug, O.S. Kjos, I.T. Kero, P.A. Eidem	SINTEF Industry, Norway
04:10	Health friendly materials for use in taphole and runner	L.Lindstad, C.N.Lindstad, A.de.Pretto	Elkem, Norway

Technical sessions

Wednesday 29.09.2021

Last updated on September 24, 2021

7A Mn pretreatment				7B Si-slag				7C Other alloy			
Time	Title	Author	Affiliation	Time	Title	Author	Affiliation	Time	Title	Author	Affiliation
Chair: Haijuan Wang				Chair: Halvor Dalaker				Chair: Joohyun Park			
08:30	Pretreatment of manganese ores in different gas atmospheres	E. Ringdalen	SINTEF Industry, Norway	08:30	SlagCalculator: a framework for slag and metallurgical properties	S. Bublik, S. Gouttebroze, T. Coudert, M. Tangstad, K.E. Einarsrud	Norwegian University of Science and Technology (NTNU), Norway,	08:30	Characterization of impurities and inclusions in ferrochrome alloy and their effects on the inclusion characteristics in stainless steels	Y. Wang, A. Karasev, W. Mu, J.H. Park, P.G. Jönsson	KTH Royal Institute of Technology, Sweden
08:55	Pretreatment of manganese ore for improved energy efficiency and smelting furnace stability	J. Hamuyuni, J. Saarenmaa, P. Mäkelä, O. Pekkala, C. Binder, S. Rannantie, M. Lindgren	Metso Outotec Research Center, Finland	08:55	An investigation on the relationship between structure and viscosity of silicate slags	Sh. Haghdani, M. Tangstad, K.E. Einarsrud	Norwegian University of Science and Technology (NTNU), Norway	08:55	The service characteristics of complex boron-bearing ferroalloys	I.N. Kel, V.I. Zhuchkov, O.V. Zayakin, D.S. Renev	Institute of Metallurgy of the Ural Branch of the Russian Academy of Sciences, Russia
09:20	A comparison of direct concentrating solar thermal treatment of manganese ores to fossil fuel based thermal treatments	L. Hockaday, Q. Reynolds, C. McGregor, F. Dinter	Mintek Pyrometallurgy Division, South Africa	09:20	Representation of the Multiphysical Properties of SiO ₂ -Al ₂ O ₃ -CaO Slags by Deep Neural Networks	K. Tang, S. Gouttebroze, X. Ma, Q. Du, C. van der Eijk	SINTEF Industry, Norway	09:20	Rotary kiln reduction of titanomagnetite concentrate	H. Sun, Y. Guo C. Wu	China ENFI Engineering Corporation, China
8A Mn pretreatment				8B Si/FeSi production				8C FeNi			
Time	Title	Author	Affiliation	Time	Title	Author	Affiliation	Time	Title	Author	Affiliation
Chair: Eli Ringdalen				Chair: Halvor Dalaker				Chair: Muxing Guo			
10:05	Off-gas characteristics for varying conditions in the prereluction zone of a ferromanganese furnace – a basis for energy recovery	T.A. Larssen, M. Tangstad	SINTEF Industry, Norway	10:05	Industrial measurements of the gas and temperature in Si and FeSi production process.	M. Ksiazek, R. Saadie, H. Gaertner, S. Grådahl, B. Sægrov, M. Tangstad, A. Valderhaug, E. Ringdalen	SINTEF Industry, Norway	10:05	Distribution of nickel in the slags of electrothermal ferronickel production and technological schemes of its utilization.	Denys Shevchenko	Pobugskoe village
10:30	Pre-heating manganese ore in a pilot-scale rotary kiln	N. Julia, A.Hecquet, G.Nussbaum, S. B. Blancher, A. Amalric	Eramet Ideas, France	10:30	SiO ₂ -CaO-Al ₂ O ₃ slags in Si/FeSi furnaces	M.B. Folstad, M. Tangstad	Norwegian University of Science and Technology (NTNU), Norway,	10:30	Thermodynamic model of the process of desulfurization of a black ferronickel in a ladle.	Denys Shevchenko	Pobugskoe village
10:55	Extent of Ore Prereluction in Pilot-scale Production of High Carbon Ferromanganese	T. Mukono, J.E. Gjøvik, H. Gaertner, M. Ksiazek, M. Wallin, E. Ringdalen, M. Tangstad	Norwegian University of Science and Technology (NTNU), Norway,	10:55	Casting of Ferroalloys	K. Forwald	Styrhuset AS, Norway	10:55			
9A Mn pretreatment				9B Electrical conditions				9C Reductants			
Time	Title	Author	Affiliation	Time	Title	Author	Affiliation	Time	Title	Author	Affiliation
Chair: Eli Ringdalen				Chair: Merete Tangstad				Chair: Buhle Xakalashe			
11:40	Process design for the pre-treatment of manganese ores	T. Kazdal, R. Haas-Wittmuess, S. Richter, S. Lang, C. Binder, M. Reuter	Metso Outotec, Germany	11:40	Electrical Conditions in 3-phase Submerged Arc Furnaces – Learning from the EIMet project	S.A. Halvorsen, M. Sparta, V.K. Risinggård, M. Fromreide,	NORCE Norwegian Research Centre AS, Norway	11:40	Evaluation of coke resistivity for the manganese alloy market	R. Cromarty J. Nhiwatiwa	University of Pretoria, South Africa
12:05	Experimental study of packed bed heat transfer in a shaft kiln to pre-heat manganese ore with hot air.	S.N. Sambo, S.A.C. Hockaday, T. Seodigeng	MINTEK, Johannesburg, South Africa	12:05	Effects of Alternating Currents in the Hearth of Submerged Arc Furnaces	M. Fromreide, S.A. Halvorsen, M. Sparta, V.K. Risinggård, P. Salgado,3, D. Gómez,3 E.V. Herland4	NORCE Norwegian Research Centre AS, Norway and University of Santiago de Compostela, Spain	12:05	The effect of densification on compressive strength of charcoal	H.Kaffash, M.Tangstad	Norwegian University of Science and Technology (NTNU), Norway,
12:30	Isothermal reduction of Nchwaning manganese ore in CO/CO ₂ /H ₂ atmospheres	T.L. Schanche, M. Tangstad	Norwegian University of Science and Technology (NTNU), Norway	12:30	Metamodeling of the electrical conditions in Submerged Arc Furnaces	M. Sparta, D. Varagnolo, H. Martens, S.A. Halvorsen	NORCE Norwegian Research Centre AS, Norway	12:30	The properties of carbon blends in submerged arc furnaces	G.R. Surup, N. Smith-Hanssen, M. Tangstad	Norwegian University of Science and Technology (NTNU), Norway,