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SOUTHERN AFRICAN PYROMETALLURGY 2024

INTERNATIONAL CONFERENCE

Sustainable Pyrometallurgy - Surviving Today and Thriving Tomorrow

13-14 MARCH 2024

MISTY HILLS CONFERENCE CENTRE
JOHANNESBURG, SOUTH AFRICA

ABSTRACTS RECEIVED

Process simulation of carbonitrothermic synthesis of titanium nitride from ilmenite
R.J. Motsoeri, *University of Johannesburg, South Africa*

The reduction and recovery of cast iron from limonite-coal composite pellets
S. Maritsa[1,2], S.M. Masuka[2], and E.K. Chiwandika[1,2], [1]*Harare Institute of Technology* and [2]*University of Zimbabwe, Zimbabwe*

Phosphorus distribution behavior in the H_2-CO gaseous reduction of a hematite ore
E.K. Chiwandika[1,2], S.M. Masuka[2], and S.M. Jun[3], [1]*Harare Institute of Technology*, [2]*University of Zimbabwe, Zimbabwe* and [3]*Pohang University of Science, and Technology, Korea*

The use of Zimbabwean limonite-coal composite pellets as a sustainable alternative feed for cast iron production
S.M. Masuka[1], T. Chisahwira[1], S. Maritsa[1], and E.K. Chiwandika[2], [1]*University of Zimbabwe* and [2]*Harare Institute of Technology, Zimbabwe*

A user friendly pyro metallurgical mass and energy balance model
J. Strydom, *South Africa*

Digital transformation of smelters– exploring the benefits of optimized operational schedules
Y. Valdez-Navarro, J. Louw, N. Nekoiemehr, and Y. Zhang, *Hatch, Canada, South Africa*

Optimizing the tapping process based on a predictive model accountng for human factors
J.E. Olsen[1] and Q.G. Reynolds[2,3], [1]*SINTEF, Norway*, [2]*Mintek*, and [3]*Stellenbosch University, South Africa*

An exploration of ferroalloy furnace tapping dynamics using reduced-order models
Q.G. Reynolds[1,2], J.E. Olsen[3], M.W. Erwee[4], J.D. Steenkamp[5], and J. Sutherland[6], [1]*Mintek*, [2]*Stellenbosch University*, [3]*SINTEF, Norway* [4]*Samancor Chrome*, [5]*Glencore*, [6]*Transalloys Ltd, South Africa, Canada*

Converter aisle scheduling using dynamic simulation
T. Isaacs[1], J. Bezuidenhout[1], B. Gerrits[1], and S. Matutu[2], and [1]*Hatch, Canada,* [2]*Zimplats, Zimbabwe, South Africa*

Assessment of slag compositions with elements of variable valence states through direct oxygen measurement by EPMA
R. Starykh, S. Sineva, D. Shishin, and E. Jak, *The University of Queensland, Australia*

Experimental and thermodynamic study of Cu-Ni mattes solidification upon cooling
S. Sineva[1], D. Shishin[1], R. Hundermark[2], and E. Jak[1], [1]*The University of Queensland, Australia,* and [2]*Anglo American Pt, South Africa*

The use of micro-X-ray fluorescence imaging for furnace refractory quality and wear characterization
D. Chetty and Y. Thakurdin, *Mintek, South Africa*

The implementation of automated power BI reporting in power BI at the Anglo American Platinum smelting operations
R.L. Sakaran, A. Cizek, D. Coetzee, W. Mbiza, T. Ndlovu, and N. Wanblad, *Anglo American, South Africa*

Furnace off-gas cleaning system improvements at the Polokwane metallurgical complex
M. Ndlovu, R. Hundermark[1], Q. Van Rooyen[1] and J. Bezuidenhout[2], [1]*Anglo American and* [2]*Hatch, South Africa*

Nanoparticle formation in the exhaust fumes of a metallurgical furnace
J. Conradie, *Resonant, South Africa*

Tenova's dry slag granulation process: The experience on EAF and LF slag in steel industry
M. Guzzon, M. Messuti, M. Bissoli, E.J. Chiarullo, and E. Malfa, *Tenova S.p.A., Italy*

The impact of feed composition on the recovery of base metals and precious metals in an electric furnace
R.L. Sakaran[1,2], J.D. le Roux[2], A.M. Garbers-Craig[2], [1]*Anglo American* and [2]*University of Pretoria, South Africa*

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Techno-economic analysis of a sustainable route for ferrochrome production using oxidative and hydrogen reduction pre-treatment processes
E.L.J. Kleynhans[1], S.P du Preez, J. Davies, S.C. Louw[1], and G.S. Terblanche[1], [1]*Metix Pty Ltd (SMS Group)* and [2]*North-West University, South Africa*

Barrier control monitoring for material control – leveraging of digital technologies, the risk-bowtie methodology, and real-time asset information to visualize the live risk of steam explosion in PGM furnaces
M. Pong, F. Bien, F. Hannemann, N. Sweeten, and M. Sitefane, *Hatch, South Africa*

Improved design methods of slag cleaning furnaces and matte settling furnaces in the copper and PGM industries
P. Conradie, S.C. Louw, *Metix Pty Ltd (SMS Group), South Africa*

Short Open Arc Controlled (SOAC) DC open bath furnace for green iron production
S.C. Louw[1], I.J. Geldenhuys[2], W.D. Moolman[1], G. Lötter[1], G.S. Terblanche[1], G. Farmer[1], E.J.L. Kleynhans[1], T. Ndwandwe[1], R. Webb[1], and P. Steyn[1], [1]*Metix Pty Ltd (SMS Group)* and [2]*Isabel Geldenhuys Consulting, South Africa*

PGM furnace crucible upgrade and performance
H. Joubert[1], G. de Villiers[1], J. Nel[1], D. Senekal[1], P. Mbedzi[2], and J. Davis[2], [1]*Tenova* and [2]*Sibanye-Stillwater, South Africa*

Alternative cooling medium for safe furnace operation
K. Maluleke, P. Jonker, B. Bouwer, H. Joubert, *Tenova, South Africa*

Recent developments at Anglo American Platinum's smelting operations
R. Snodgrass, G. Marsden, K. van der Merwe, and S. Shoko, *Anglo American Platinum, South Africa*

Monitoring submerged-arc furnace stability using Shewhart charts for electrodes resistance
A.V. Cherkaev, R. Fourie, and M. Erwee, *Samancor, South Africa*

Tenova's digital information systems for submerged arc furnaces
R. Hansraj, P. Jonker, and M. Singh, *TENOVA, South Africa*

Hot gas cleaning of furnace gasses
P.J. Jonker, *TENOVA, South Africa*

Tenova's iBlue open slag bath furnace design – fundamental design decisions for a DRI melter
A. Esterhuizen and P. Jonker, *TENOVA, South Africa*

Slag physical property determination: A review of experimental and computational methods to determine structure μ, σ, and κ
S. Zaaiman, H. Muire, and J. Zietsman, *Exmente, South Africa*

Slag physical property data and models: A review of structure, μ, σ, and κ
H. Muire, S. Zaaiman, and J. Zietsman, *Exmente, South Africa*

Seizing opportunities today: Enhancing profitability and environmental sustainability in pyrometallurgical plants
H. Weitz, T. Makgoale, J. Zietsman, *Exmente, South Africa*

Single particles entering a slag bath: How do they influence process dynamics and furnace capacity?
A. Bogaers, J. Swanepoel, W. Roos, and J. Zietsman, *Exmente, South Africa*

Empowering teams for sustainable high-performance operations: A human-centered approach
B. van Vuuren and J. Zietsman, *Exmente, South Africa*

Communication skills development through plain language principles and strategies
A. van Staden, *EF Group, South Africa*

A Case Study on energy conscious and efficient smelting as result of electrode sealing
K. Banda, F. Hannemann, S. Haley, A. Sadri, S. Sitefane, W. Bezuidenhout, and J. van Den Berg, *Hatch, South Africa*

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Comsol Multiphysics simulation of heat distribution in a static kiln for small scale Portland clinker production
J.S. Diatta[1], A.F. Mulaba-Bafubiandi[2,3], M. Ndong[1], and F. Senzani[2], [1]*Universite Assane Seck de Ziguinchor, Senegal,* [2]*University of Johannesburg, South Africa* and [3]*Universite de Mbuji-Mayi, Congo*

Novel copper slag cleaning furnace design and supply
H. Joubert, F. Marx, J. Jonker, D. Senekal, and N. Kamoa, *Tenova, South Africa*

New innovative technology for SAF power supply optimization
J. Nel, P. Jonker, and D. Djaffer, *Tenova, South Africa*

The feasibility of producing syngas from discard coal fines and steam using a DC arc gasifier
T.P. Kekana[1], B. Xakalashe[1], G. Akdogan[2], Q.G. Reynolds[1,2], and K. Bisaka[3], [1]*Mintek*, [2]*Stellenbosch University*, and [3]*Zawadi Business Solutions Pty Ltd, South Africa*

One step forward and two steps back: an industrial perspective of chromite pre-oxidation
S. Swanepoel, *Samancor, South Africa*

An updated overview of the history and current operational facilities of Samancor Chrome
S. Swanepoel and M. Erwee, *Samancor, South Africa*

SO_2 abatement of unstable and lean off-gas from pyrometallurgy processes with WSA and dynamic simulations
C. Frandsen, *Topsoe A/S, Haldor Topsøes Allé, Denmark*

Optimization of chromite roasting using variational quantum algorithms: A thermodynamics and complexation chemistry study of chromate salts production
M.J. Mvita, N.G. Zulu, B. Thethwayo, and S. Makhamis, *University of Johannesburg, South Africa*

V-shape repair methodology for ferrochrome furnaces
C. Coetzee[1], M. Erwee[2], S. Brisley[2], and C. Patru[3],[1]*Intocast*, [2]*Samancor Chrome, South Africa,* and [3]*TYK Europe GmbH, Germany*

Co-carbonization of discard coal fines with waste polyethylene terephthalate and bio-carbon: Preparation of an eco-friendly
S.E. Bambalaza, B.S. Xakalashe, and M. Mpongoshe, *Mintek, South Africa*

Pre-reduction of ilmenite in CO-H_2 system using a fluidized bed furnace
X.C Goso[1], K. Bisaka[2], N.Z. Fotoyi[1], T.G. Ntloko[1], and G. Tawane[1], [1]*Mintek, Zawadi Business Solutions Pty Ltd, South Africa*

Computational reacting flow models for the pre-reduction of manganese lumpy ore with hydrogen
M. Khama[1], Q.G. Reynolds[1,2], A. Sarkar[3], J. Safarian[3], and B Xakalashe[1], [1]*Mintek*, [2]*Stellenbosch University, South Africa* and [3]*Norwegian University of Science and Technology, Norway*