



The Southern African Institute of Mining and Metallurgy
Founded in 1904

Southern African Pyrometallurgy 2011 International Conference



Pyro 2011

6–9 March 2011

Misty Hills, Muldersdrift, South Africa



Final Programme

Technical Programme

Sunday, 6 March 2011

- 14:00 **Bus departs from Misty Hills to visit Ngwenya Glass Craft Market**
- 15:30 **Bus departs from Ngwenya Glass craft Market to return to Misty Hills**
- 17:00–19:00 **Pre-registration cocktail function**

To assist delegates in finding the relevant paper in the proceedings book, the page numbers are shown after the author's name

Day 1: Monday, 7 March 2011

Session Chairman: R.T. Jones

- 07:00–08:30 **Registration & early morning refreshments**
- 08:30–17:30 **Slag Course by Ken Mills**
- 19:00 **Dinner at Carnivore Restaurant at Misty Hills**

Day 2: Tuesday, 8 March 2011

Session Chairman: R.T. Jones

- 07:00–08:30 **Registration & early morning refreshments**
- 08:30–08:45 **Welcome and introduction**
G.V.R. Landman, *President, SAIMM*

Session 1—Electric Furnaces

Session Chairman: L. Nelson

- 08:45–09:15 **Some considerations on future developments in ferro-alloy furnaces (Keynote address)**
I.J. Barker, *University of the Witwatersrand, SA* (Page 1)

- 09:15–09:40 **Some myths about DC arc furnaces**
R.T. Jones, Q.G. Reynolds, T.R. Curr, *Mintek*, and D. Sager, *ABB, Switzerland* (Page 15)

- 09:40–10:05 **The dual-electrode DC arc furnace—modelling insights**
Q.G. Reynolds, *Mintek* (Page 33)

- 10:05–10:30 **Application potential of SMS DC smelter technology for the pyrometallurgical industry in South Africa**
R. Degel, K. Schmale, M. Köneke, and H. Schmieden, *SMS Siemag, Germany* (Page 47)

- 10:30–11:00 **Tea**

Session 2: Steel, Ferrochrome and Silicon

Session Chairman: A.M. Garbers-Craig

- 11:00–11:25 **The history and development of the pyrometallurgical processes at Evraz Highveld Steel and Vanadium**
W.S. Steinberg, W. Geyser, *Evraz Highveld*, and J. Nell, *Hatch Africa* (Page 63)

- 11:25–11:50 **Ferrochrome smelting and smelting capacity investment in Zimbabwe**
J. Chirasha, *ZA Chrome, Zimbabwe* (Page 77)

- 11:50–12:15 **Silicon processing: from quartz to crystalline silicon solar cells**
B.S. Xakalashe and M. Tangstad, *Mintek and NTNU, Norway* (Page 83)

- 12:15–12:40 **DC arc smelting of silicon: Is it technically feasible?**
M. Abdellatif, *Mintek* (Page 101)

- 12:40–13:40 **Lunch**

Session 3: Processing before and after Furnaces**Session Chairman: M.D. Shapiro**

- 13:40–14:05 **Recent Improvements in the Kumera Steam Dryer**
J. Talja, S. Chen, H. Mansikkaviita, and I. Kylmäkorpi, *Kumera Corporation, Finland* (Page 117)
- 14:05–14:30 **Further processing and granulation of slags with entrained metal and high metal compound content, with specific reference to present manganese slag dumps as well as additions due to daily production**
D. Norval, *Consultant* and R.E. Oberholster, *Cembeton* (Page 129)
- 14:30–14:55 **Co-generation: A challenge for furnace off-gas cleaning systems**
E.S. Schubert and R. Gottschling, *Theisen Engineering, Germany* (Page 145)
- 14:55 **Tea**

Session 4: PGM's, Nickel and Copper Part 1**Session Chairman: J. Eksteen**

- 15:25–15:50 **Characterisation of SO₂ in off-gas at Zimplats smelter**
L. Mabiza, *Zimplats, Zimbabwe*, R. Picas, J. Nell, B. Matsetela, and G. Erasmus, *Hatch* (Page 161)
- 15:50–16:20 **The distribution of metallic elements in granulated nickel converter matte phases**
E.L. Thyse, G. Akdogan, *University of Stellenbosch*, P. Taskinen, *Aalto University, Finland*, and J.J. Eksteen, *Lonmin Platinum* (Page 173)
- 16:20–16:45 **Influence of slag composition on reduction control and operations of the slag-cleaning furnace at KCM, Zambia**
H.M. Chikashi, *Konkola Copper Mines, Zambia* (Page 185)
- 16:45– **Close of first day of conference**

Buses leave for tours

- 16:45 Group B: Wonder Cave—Dinner at Misty Hills
- 17:30 Group A: Sterkfontein Caves—Dinner at Misty Hills
Group C: Kromdraai Gold Mine—Dinner at Misty Hills
Group D: Aloe Ridge Observatory—Dinner at Aloe Ridge Observatory
- 19:00 **Bus departs from tour to return to Misty Hills**
- 19:30 **Dinner at Misty Hills for group A, B & C**

Day 3 Wednesday, 9 March 2011**Session 5: General****Session Chairman: R.T. Jones**

- 08:30–08:55 **Mineralogical solutions to pyrometallurgical problems**
L. Andrews and P. den Hoed, *Anglo American Research* (Page 199)
- 08:55–09:20 **The ROMA project, (Resource Optimization and Recovery in the Material Industry)—a typical cooperation project in Norway**
M. Tangstad, *Norwegian University of Science and Technology, Norway* (Page 209)
- 09:20–09:45 **Pyrometallurgical Research at SINTEF and NTNU in Norway**
E. Ringdalen, *Sintef, Norway* and M. Tangstad, *NTNU, Norway* (Page 219)
- 09:45–10:15 **Tea**

Session 6: PGMs, Nickel and Copper—Part 2**Session Chairman: T.R. Curr**

- 10:15–10:40 **Cracking a hard nut: An overview of Lonmin's operations directed at smelting of UG2-rich concentrate blends**
J.J. Eksteen, B. van Beek, and G.A. Bezuidenhout, *Lonmin Platinum* (Page 231)

- 10:40–11:05 **Bindura Nickel Smelter—from decommissioning, care and maintenance, to plant re-start**
A. Mboma and K.D. Chitaukire, Bindura Nickel Corporation, Zimbabwe (Page 253)
- 11:05–11:30 **Implementation of an alternative matte-level measurement solution at Lonmin Marikana Smelter Division for improved process monitoring**
T.J. Goff, *Lonmin Platinum*, N. Brogden, J.P. Nilsson, P. Bloemer, and A. Lyons, *Agellis Group, Sweden* (Page 269)
- 11:30–11:55 **ISACONVERT™—Continuous Converting of Nickel/PGM Mattes**
M.L. Bakker, S. Nikolic, A.S. Burrows, and G.R.F. Alvear, *Xstrata Technology, Australia* (Page 285)
- 11:55–12:20 **The smelting operations of Anglo American's platinum business: an update**
R.J. Hundermark, S.B. Mncwango, L.P.vS. de Villiers, and L.R. Nelson, *Anglo Platinum Ltd* (Page 295)
- 12:20–13:20 **Lunch**

Session 7: Physical Properties**Session Chairman: Q.G. Reynolds**

- 13:20–13:45 **Blast furnace control using slag viscosities and liquidus temperatures with phase equilibria calculations**
J. Muller, *Algoness* and M. Erwee, *University of Pretoria* (Page 309)
- 13:45–14:15 **Thermal conductivity of solidified manganese-bearing slags—a preliminary investigation**
J.D. Steenkamp, *University of Pretoria*, M. Tangstad, *NTNU, Norway*, and P.C. Pistorius, *Carnegie-Mellon University, USA* (Page 327)

- 14:15–14:40 **The thermophysical properties of raw materials for ferromanganese production**
M. Ksiazek, M. Tangstad, and E. Ringdalen, *NTNU, Norway* (Page 345)
- 14:40–15:10 **Tea**

Session 8: Refractories**Session Chairman: P. den Hoed**

- 15:10–15:35 **Chromite—A cost-effective refractory raw material for refractories for various metallurgical applications**
N. McEwan, T. Courtney, R.A. Parry, and P. Knupfer, *Vereeniging Refractories* (Page 359)
- 15:35–16:00 **Interaction of MgO-MgR₂O₄(R: Al, Cr, Fe) refractories with SO₂-containing gases**
N.Z. Fotoyi, *Mintek*, and R.H. Eric, *University of the Witwatersrand* (Page 373)
- 16:00 **Close of conference**
- 18:00 **Dinner at Misty Hills**
- 19:00 **Buses depart from Misty Hills to attend Theatre visits**
Group E: Cirque du Soleil (Coca-Cola Dome, Northgate)
Group F: Evita (Montecasino)

At the end of the performance the buses depart from the Theatre Visits to Misty Hills

The organisers of the conference wish to
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EXHIBITORS



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