

Final Programme — Ferrous 2016

FERROUS AND BASE METALS DEVELOPMENT NETWORK CONFERENCE 2016

Day 1 — 19 October 2016

- 07:30–08:30 **Registration and Coffee**
- 08:30–08:40 **Welcome – Chairperson**
J. Papo, AMI - FMDN Co-ordinator
- Session 1:** J. Nel
- 08:40–09:10 **Keynote Address**
W. Stumpf, *University of Pretoria*
- 09:10–09:30 **Exploring differences in various Nb(V)- and Ta(V) tropolonato complexes by a solid-state structural comparison study**
R. Koen, A. Roodt and H. Visser, *University of the Free State, South Africa* (JSAIMM page 895–899)
- 09:30–09:50 **High-temperature thermal plasma treatment of monazite followed by aqueous digestion**
D. Kemp and A.C. Cilliers, *North-West University, South Africa* (JSAIMM page 901–906)
- 09:50–10:10 **Measurement and monitoring of naphthenic acid corrosion in a crude oil refinery's crude distillation fired heaters**
N. Xaba[†], L.A. Cornish[†] and F.M.L. Mulaudzi[†], *Shell and BP Refineries South Africa, †The University of the Witwatersrand and †Mintek* (Proceedings page 5–6)
- 10:10–10:40 **Morning Tea**
- Session 2:** R. Tshikhudo
- 10:40–11:00 **Molecular modelling of tantalum pentahalides during hydrolysis and oxidation reactions (Presentation Only)**
M.J. Ungerer, C.G.C.E. van Sittert, D.J. van der Westhuizen and H.M. Krieg, *North-West University, South Africa* (Proceedings page 7–8)
- 11:00–11:20 **Investigation of the 'tiger skin' defect on indefinite chill rolls**
J. Jonck^{*}, J.S. Moema^{*}, J. Jooste[†] and P. van Tonder[†], **Mintek, †Vaal University of Technology, and †South African Roll Company, South Africa* (JSAIMM page 907–913)
- 11:20–11:40 **The effect of platinum loading on Co/SiO₂-based Fischer-Tropsch synthesis**
S. Govender^{*}, M. de Beer^{*} and E. van Steen^{*}, **University of Cape Town and †DST-NRF Centre of Excellence in Catalysis, South Africa* (Proceedings page 11–18)
- 11:40 – 12:00 **The separation of zirconium and hafnium from (NH₄)₂Zr(Hf)F₇ using amine based extractants**
E.W. Conradie^{*}, D.J. van der Westhuizen^{*}, J.T. Nel[†] and H.M. Krieg^{*}, **North-West University and †The South African Nuclear Energy Corporation SOC Ltd. (Necsa), South Africa* (JSAIMM page 915–920)
- 12:00–13:00 **Lunch**
- Session 3:** K. Sikhwivhilu
- 13:00–13:20 **Influence of weld axial force on static strength and impact toughness of Ni-Cr-Mo-V steel repaired by friction hydro pillar processing**
W.G. Pentz and D.G. Hattingh, *Nelson Mandela Metropolitan University, South Africa* (Proceedings page 21–34)
- 13:20–13:40 **Corrosion study using various techniques to measure the corrosivity of sulphate-reducing bacteria**
N.D.E. Masia, L. Shaku, M. Smit and S.J. Moema, *Mintek, South Africa* (Proceedings page 35–46)
- 13:40–14:00 **Investigation of pressing and sintering of Ti-HDH powder**
T.M. Motsai^{*}, S. Chikoshaf^{*}, S. Bhero^{*} and H.K. Chikwanda[†], **University of Johannesburg and † CSIR, South Africa* (Proceedings page 47–58)
- 14:00–14:20 **Influence of temperature on the metal dusting of Alloy 800**
K.V. Morudu[†], F.M.L. Mulaudzi[†], J. van der Merwe[†], M. Maja^{*} and J.S. Moema^{*}, **Mintek and †University of the Witwatersrand, South Africa* (Proceedings page 59–68)

- 14:20–14:40 **The use of vanadium carbide in an impact-resistant alloy for grinding balls**
A.D. Mabeba^{††}, J. Jonck^{*} and J.S. Moema^{*}, **University of Pretoria and †Mintek, South Africa* (Proceedings page 69–80)
- 14:40–15:10 **Afternoon Tea**
- Session 4:** A. Mwamba
- 15:10–15:30 **Correlation of microstructure and fatigue crack growth resistance in Ti-6Al-4V alloy**
S. Masete^{††}, K. Mutombo^{††}, R. Mostert[†], C. Siyasiya[†] and W. Stumpf[†], **Council for Scientific and Industrial Research, (CSIR), †University of Pretoria, South Africa* (Proceedings page 81–92)
- 15:30–15:50 **Fatigue of railway axle steels subjected to uniaxial tension fatigue tests**
D.E.P. Klenam^{††}, L.H. Chown^{††}, M.J. Papo^{††}, J. Jonck[†] and L.A. Cornish^{††}, **University of the Witwatersrand, †DST-NRF Centre of Excellence in Strong Materials, University of the Witwatersrand and †Mintek, South Africa* (Proceedings page 93–106)
- 16:00–19:00 **Cocktail Function**

Day 2—20 October 2016

- 07:00–08:00 **Registration and Coffee**
- 08:00–08:05 **Welcome – Chairperson**
J. Papo, AMI - FMDN Co-ordinator
- Session 5:** J. Moema
- 08:05–08:25 **Keynote Address**
A. Mngomezulu, *CEO and President of Mintek*
- 08:25–08:50 **Corrosion characteristics of mild steel storage tanks in fluorine-containing acid**
R. van der Merwe^{††}, L.A. Cornish^{*} and J.W. van der Merwe^{*}, **University of the Witwatersrand and †South African Nuclear Energy Corporation SOC Limited (Necsa)* (JSAIMM page 927–934)
- 08:50–09:15 **Cold-spray coating of an Fe-40 at.% Al alloy with additions of ruthenium**
R.A. Couperthwaite^{*}, L.A. Cornish[†] and I.A. Mwamba^{*}, **Mintek and †University of the Witwatersrand, South Africa* (JSAIMM page 927–934)
- Session 6:** L. Chown
- 09:15–09:40 **Metal dusting behaviour of annealed copper-plated 304 stainless steel**
Y.A. Mgwebi, and J.W. van der Merwe, *University of the Witwatersrand and DST-NRF Centre of Excellence in Strong Materials, University of the Witwatersrand, South Africa* (Proceedings page 111–122)
- 09:40–10:00 **Morning Tea**
- 10:00–10:25 **Evaluation of the microstructure and microhardness of laser-fabricated titanium aluminate coatings**
M. Tlotleng^{††}, T. Lengopeng^{*} and S. Pityana^{††}, **CSIR, †University of Johannesburg and †Tshwane University, South Africa* (Proceedings page 123–134)
- 10:25–10:50 **The influence of particle size distribution on the properties of metal-injection-moulded 17-4 PH stainless steel**
M. Seerane^{*}, P. Ndlangamandla[†] and R. Machaka^{*}, **Council for Scientific and Industrial Research and †University of Pretoria, South Africa* (JSAIMM page 935–940)
- 10:50–11:20 **Presentation Transnet**
M. Phasha, *Transnet Engineering*
- 11:20–12:00 **Lunch**
- 12:00–16:00 **Site Visit:**
1) Transnet Engineering
- 19:00 **AMI Gala Dinner**

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Day 3—21 October 2016

- 07:00–08:00 **Registration and Coffee**
- 08:00–08:05 **Welcome – Chairperson**
J. Papo, AMI - FMDN Co-ordinator
- Session 7:** M. Topic
- 08:05–08:40 **Keynote Address: Electrochemical characterization of stainless steel alloys in corrosive environment—perspectives for two corrosion resistance alloys (UNS S32003 and UNS N08367)**
H. Castaneda, *Texas A&M University, USA*
- 08:40–09:05 **Dynamic behaviour of the TM380 mild steel and Ti6Al4V alloy subjected to blast loading**
L. Shoke*, K. Mutombo†, I.M. Snyman* and T. Sono*, **Defense Peace Safety and Security and †Material Sciences and Manufacturing - Council for Scientific and Industrial Research, (CSIR), South Africa (Proceedings page 137–148)*
- 09:05–09:30 **Spheroidisation of iron powder in a microwave plasma reactor**
J.H. van Laar*†, I.J. van der Walt†, H. Bissett*, J.C. Barry† and P.L. Crouse†, **South African Nuclear Energy Corporation SOC Ltd., (NECSA) and †University of Pretoria, South Africa (JSAIMM page 941–946)*
- 09:30–09:55 **Effect of yield strength on wear rates of railway wheels**
V.J. Matjeko*†, J.W. van der Merwe*†, M.J. Phasha, A.S. Bolokang* and C. Moopana*, **Transnet Engineering, †University of the Witwatersrand and ‡DST-NRF Centre of Excellence in Strong Materials, University of the Witwatersrand, South Africa (JSAIMM page 947–955)*
- 09:55–10:30 **Morning Tea**
- Session 8:** G. Pattrick
- 10:30–10:55 **Premature failure of re-sulphurised steel studs**
E. Molobi, *Transnet Engineering, South Africa (JSAIMM page 957–962)*
- 10:55–11:20 **Characterisation and corrosion studies of Ni-50%Fe sintered compacts prepared from ball-milled powders**
M.E. Masonyaneng*, M.B. Shongwe*, M.I. Makena*, M.M. Ramakokovhu*, M.L. Lethabane* and P.A. Olubambi†, **Institute for Nano Engineering Research, Department of Chemical, Metallurgical and Materials and †Department of Chemical Engineering Technology, University of Johannesburg, South Africa (Proceedings page 155–168)*
- 11:20–11:45 **Deformation behaviour of aluminium low-micron MMCs and MMNCs at warm working temperatures (0.3–0.5T_m)**
Z. Gxowa*†‡, L.H. Chown†‡, G. Govender* and U. Curle*, **CSIR, †University of the Witwatersrand and ‡DST-NRF Centre of Excellence in Strong Materials, hosted by Wits, South Africa (JSAIMM page 963–968)*
- 11:45–12:10 **Grain refinement of 25 wt% high-chromium white cast iron by addition of vanadium**
L.A. Mampuru, M.G. Maruma and J.S. Moema, *Mintek, South Africa (JSAIMM page 969–972)*
- 12:10–12:35 **X-Ray computed tomography studies of MIM and DPR parts**
N.S. Muchavi*, L. Bam†, F.C. De Beer†, S. Chikosha* and R. Machaka*, **Council for Scientific and Industrial Research and †Radiography/Tomography Section, Neccsa, Radiation Science Department, South Africa (JSAIMM page 973–980)*
- 12:35–13:30 **Lunch**

- Session 9:** P. Chetty
- 13:30–13:55 **Impact of crude flexibility on the technical integrity of crude oil heaters**
G.P. Dube and A. Stefan, *Shell Global Solutions International BV, Netherlands (Proceedings page 175–184)*
- 13:55–13:20 **Constitutive analysis of the effect of α into β -phase transformation in Ti6Al4V during hot deformation**
K. Mutombo*, C. Siyasiya† and W.E. Stumpf†, **CSIR and †University of Pretoria, South Africa (Proceedings page 185–202)*
- 13:20–13:45 **Effect of niobium on the solidification structure and properties of hypoeutectic high-chromium white cast irons**
M.E. Maja*†, M.G. Maruma*, L.A. Mampuru* and S.J. Moema*, **Mintek and †Tshwane University of Technology, South Africa (JSAIMM page 981–986)*
- 13:45–14:10 **Microstructure and dry sliding wear performance of oxide dispersion strengthened austenitic stainless steel**
B.A. Obadele*, M.S. Ramashala† and P.A. Olubambi*, **University of Johannesburg and †Tshwane University of Technology, South Africa (Proceedings page 205–212)*
- 14:10–14:30 **Afternoon Tea**

POSTER PRESENTATIONS

- Synthesis of platinum and gold nano-sized particles supported on titania**
A. Kunene* and E. van Steen*†, *University of Cape Town and ‡DST-NRF Centre of Excellence in Catalysis, South Africa (Proceedings page 213–222)*
- Corrosion inhibition of martensitic stainless steel by sodium benzoate in acidic solution: *Solanum tuberosum* extract as surfactant**
O.L. Akanji*, C.A. Loto†, A.P.I. Popoola* and A.V. Kolesnikov*, **Tshwane University of Technology and †Covenant University, Ota, Nigeria (Proceedings page 223–238)*
- Cathodic modification of 316L stainless steel welds with minor ruthenium addition**
V. Motsweni, M. Smit and A. Mwamba, *Mintek (Proceedings page 239–244)*