

PROCEEDINGS

54TH ANNUAL

CONFERENCE OF METALLURGISTS



hosting America's Conference on Aluminum Alloys

AUGUST 23-26 | FAIRMONT ROYAL YORK HOTEL, TORONTO, ON, CANADA



2 0 1 5

hosting AMCAA

www.metsoc.org

TABLE OF CONTENTS

Advanced Aerospace Materials High Temperature Alloys


Paper No.: 8896

Keynote (50 minutes): Advancements in Materials and Processes for Future Aerospace Propulsion Systems

David Ulrich Furrer, Pratt & Whitney 

Paper No.: 8933

Microstructural Analysis of Electro-Spark Deposited Aerospace Superalloy

Evgeniy Anisimov, University of Manitoba; Abdul Khaliq Khan, University of Manitoba; Olanrewaju Akanbi Ojo, University of Manitoba..... 

Paper No.: 8785

Synthesis and Sintering of Titanium Aluminide (Ti-48Al) Powder

Hung-Wei Liu, Dalhousie University; Kevin Plucknett, Dalhousie University..... 

Advanced Aerospace Materials Modelling and Life Prediction


Paper No.: 9006

Invited (50 minutes): Understanding the Physics of Creep Deformation and Fracture in Gas Turbine Hot Section Components

Ashok Koul, Life Prediction Technologies Inc..... **NO PAPER**


Paper No.: 9158

Failure Physics and its Importance in Ivhm

Xijia Wu, National Research Council of Canada; Prakash C. Patnaik, National Research Council of Canada; Zhong Zhang, National Research Council of Canada..... 

Paper No.: 9042

Predicting Thermal Conductivities of Rare-Earth Pyrochlores from First-Principles

Guoqiang Lan, McGill University; Bin Ouyang, McGill University; Jun Song, McGill University..... 

Paper No.: 9124

Assessment of the Remaining Life for Turbine Components Made of Advanced Materials Through Analyses and Testing

Wieslaw Beres, National Research Council Canada – Aerospace..... 

Advanced Aerospace Materials Innovative Materials and Processes

Paper No.: 9137

Invited (50 minutes): Alloy Exploration for Aerospace Manufacturing

John R. Rodgers, Toth Information Systems **NO PAPER**

Paper No.: 8998

Innovative Grain Refinement Solutions for Cast Titanium Aluminides

Julien Zollinger, Institut Jean Lamour; Jacob R. Kennedy, Institut Jean Lamour;
Said Khallouk, Institut Jean Lamour; D. Daloz, Institut Jean Lamour; Bernard
Rouat, Institut Jean Lamour; Emmanuel Bouzy, Universite de Lorraine



Paper No.: 8864

Invited (50 minutes): A New Class of Oxidation-Resistant, Microstructural-Stabilized and Cold-Workable Titanium Alloys for Exhaust Applications

Carsten Siemers, Technische Universite Braunschweig; Juergen Kiese, VDM
Metals GmbH; Christina Schmidt, VDM Metals GmbH; M. Kohnke, Technische
Universite Braunschweig.....



Paper No.: 8921

Twin Variant Selection in Deformed High Purity Titanium

Hong Qin, McGill University; John Joseph Jonas, McGill University

Paper No.: 8957

Creep Analysis of a Nozzle Guide Vane Under Thermo-Mechanical Loading

Zhong Zhang, National Search Council Canada; Xijia Wu, National Search
Council Canada; Leiyong Jiang, National Search Council Canada.....

**NO
PAPER**

**Advanced Aerospace Materials
Coating Systems**

Paper No.: 9054

**Invited (50 minutes): Mechanical Properties of Heat Resistant Alloys with
Diffusion Barrier Coating Systems**

Toshio Narita, DBC System R&D Co., Ltd.....

**NO
PAPER**

Paper No.: 8786

**The Effect of Binder Content on the Aqueous Corrosion Response of WC-
Co Cermets**

Zhila Memarrashidi, Dalhousie University; Kevin Plucknett, Dalhousie University.....



Paper No.: 8954

**Cyclic Oxidation Behaviour of Diffusion Aluminate and Cathodic Arc
Deposited Nicrally Coatings**

Linruo Zhao, National Research Council of Canada; Weijie Chen, AVIC
Commercial Aircraft Engine Manufacturing Co. Ltd.; Vladimir Pankov, National
Research Council of Canada



Paper No.: 8787

The Sliding Wear Performance Titanium Carbide-Stainless Steel Cermets

Kevin Plucknett Dalhousie University; Chukwuma Candidus Onuoha, Dalhousie
University; Zoheir Farhat, Dalhousie University;
Georges Kipouros, University of Saskatchewan.....

**NO
PAPER**

**Advances in Materials Manufacturing II
Casting and Solidification**

Paper No.: 9053

**Keynote (50 minutes): Rapid Solidification Characteristics of Atomized Co-
Based Metallic Glass**

Abdoul-Aziz Bogno, University of Alberta; Carlos Riveros, University of Alberta;
Delin Li, Natural Resources Canada; Hani Henein, University of Alberta



Paper No.: 9004

Grain Selection During Epitaxial Growth of Welded Nickel-Based Alloy

Thomas Billotte, Institut Jean Lamour; Julien Zollinger, Institut Jean Lamour;
Bernard Rouat, Institut Jean Lamour; Guillaume Tirand, AREVA ; Vincent
Robin, AREVA; Dominique Daloz, Institut Jean Lamour



Paper No.: 8839

Reinforcement of Aluminum Castings with Dissimilar Metals

Qingyou Han, Purdue University



**Advances in Materials Manufacturing II
Welding and Joining**

Paper No.: 9040

Dissimilar Refill Friction Stir Spot Welding of Al 6063 to DP600 Steel

Yuyang Chen, University of Waterloo; James Chen, CanmetMATERIALS;
Michael Worswick, University of Waterloo; Adrian Gerlich, University of Waterloo.....

**NO
PAPER**

Paper No.: 9065

**Cold-Wire Tandem Submerged Arc Welding: a Novel Technique for
Pipeline Manufacturing**

Mohsen Mohammadjoo, University of Alberta; Stephen Kenny, Evraz Inc. NA;
J. Barry Wiskel, University of Alberta; Doug G. Ivey, University of Alberta; Hani
Henein, University of Alberta.....



Paper No.: 8746

**Hybrid Laser-Arc Welding of Cast Martensitic Stainless Steel CA6NM-Post-
Weld Tempered Microstructure and Mechanical Properties**

Fatemeh Mirakhorli, Ecole de technologie superieure; Xinjin Cao,
National Research Council Canada; Xuan Tan Pham, Ecole de technologie
superieure; Priti Wanjara, National Research Council Canada; Jean-Luc Fihey,
Ecole de technologie superieure.....



Paper No.: 8930

**Study on the Fabrication and Joining Technologies of Advanced Oxide
Dispersion Strengthened Steel**

T.K. Kim, Korea Atomic Energy Research Institute; S. Noh, Korea Atomic
Energy Research Institute; S.H. Kang, Korea Atomic Energy Research Institute;
B.K. Choi, Korea Atomic Energy Research Institute; K.B. Kim, Korea Atomic
Energy Research Institute; G.E. Kim, Korea Atomic Energy Research Institute;
H.J. Jin, Korea Atomic Energy Research Institute



Paper No.: 8783

**Microstructure and Mechanical Property of Al/Mg/Ti Laminated Composite
Sheet Fabricated by Hot Roll Bonding**

Zejun Chen, Chongqing University; Wenchang Liu, Yanshan University; Guojun
Wang, Northeast Light Alloy Co., Ltd.



**Advances in Materials Manufacturing II
Steel and Processing**

Paper No.: 8860

**Keynote (50 minutes): Sustainability Research: Hot Workability for Higher
Strength and Reduced Weight-HSLA Steel Products**

Hugh J. McQueen, Concordia University; Elena V. Konopleva, Concordia
University.....



Paper No.: 8953

Invited: Effect of Tempering Parameters on the Fatigue Crack Propagation Resistance of Martensitic Stainless Steels Subjected to Trip

Myriam Brochu, Ecole Polytechnique de Montreal; Jocelin Chaix, Ecole Polytechnique de Montreal; Denis Thibault, Institut de Recherche d'Hydro Quebec (IREQ).....

**NO
PAPER**

Paper No.: 8929

Inclusion Evolution in Ti-Stabilized 17Cr Austenitic Stainless Steels Produced by Ingot Casting

Xue Yin, University of Toronto; Yanhui Sun, University of Science and Technology Beijing; Yindong Yang, University of Toronto; Mansoor Barati, University of Toronto; Alex McLean, University of Toronto.....



Paper No.: 9149

Evolution of the Spectral Emissivity and Phase Transformations of the Al-Si Coating on Usibor® 1500P Steel During Austenitization

Cangji Shi, University of Waterloo; Kyle Daun, University of Waterloo; Mary A. Wells, University of Waterloo



Paper No.: 8967

Microstructural Evolutions of Oxide Dispersion Strengthened Martensitic Steels with Different Mechanical Alloying Times

Sanghoon Noh, Korea Atomic Energy Research Institute; Ga Eon Kim, Korea Atomic Energy Research Institute; Byoung Kwon Choi, Korea Atomic Energy Research Institute; Tae Kyu Kim, Korea Atomic Energy Research Institute



Paper No.: 8942

Effects of Fabrication Process Parameters on the Microstructure of Ferritic/Martensitic Oxide Dispersion Strengthened (ODS) Steel Components for Future Nuclear Reactor System Applications

Byoung Oon Lee, Korea Atomic Energy Research Institute; Sanghoon Noh, Korea Atomic Energy Research Institute; Tae Kyu Kim, Korea Atomic Energy Research Institute



**Advances in Materials Manufacturing II
Mg Alloys and Processing**

Paper No.: 9169

Progressive Texture Evolution During Annealing of Hot Deformed Mg-Al-Sn Alloy

Abu Syed Humaun Kabir, McGill University; Jing Su, McGill University; Mehdi Sanjari, McGill University; In-Ho Jung, McGill University; Stephen Yue, McGill University.....



Paper No.: 9166

Recrystallization of AZ31 Magnesium Alloy During High Speed Rolling and Subsequent Annealing

Jing Su, McGill University; Mehdi Sanjari, McGill University; Abu Syed H. Kabir, McGill University; In-ho Jung, McGill University; Steve Yue, McGill University.....



Paper No.: 9027

Anisotropic Flow Behaviour of Extruded AZ31B Magnesium Alloy during Isothermal Uniaxial Compression

Tsz Wun Wong, University of Waterloo; Amir Hadadzadeh, University of Waterloo; Mark A. Whitney, University of Waterloo; Mary A. Wells, University of Waterloo



Paper No.: 8781

Effect of Yttrium Addition on Texture Evolution During Pre- and Post-Deformation Annealing in an Extruded ZM31 Alloy

Nabila Tahreen, Ryerson University; D.F. Zhang, Chongqing University; F.S. Pan, Chongqing University; X.Q. Jiang, Southwest University; D.Y. Li, University of Alberta; Daolun Chen, Ryerson University



Paper No.: 9013

Formability Correlation Between Texture Weakening and Deformation Mechanism in a Rolled AZ31 Magnesium Alloy

M. Sanjari, McGill University; A.S. Kabir, McGill University; J. Su, McGill University; K.S. Tamimi, University of Aveiro; H. Utsunomiya, Graduate School of Engineering Japan; R. Petrov, Ghent University; S. Yue, McGill University; L. Kestens, Ghent University



Paper No.: 8790

Study to Enhance the Stiffness of Thin Walled Part of AZ31 Alloy Sheet

Youngseon Lee, Korea Institute of Materials Science; Sejong Kim, Korea Institute of Materials Science; Eunwoo Yoon, Korea Institute of Materials Science; Yonghyun Song, Korea Institute of Materials Science; Younghoon Moon, Pusan National University



Paper No.: 8816

Mechanical Properties of Mg-Gd and Mg-Y Solid Solutions

Anna Kula, AGH-University of Science and Technology; Xiaohui Jia, McMaster University; Raja Mishra, General Motors Research & Development Center; Marek Niewczas, McMaster University



**Advances in Materials Manufacturing II
Novel Manufacturing**

Paper No.: 8848

Keynote (50 minutes): Addressing the Weldability Problems of Advanced Aerospace Nickel-Based Superalloys

Olanrewaju Ojo, University of Manitoba

**NO
PAPER**

Paper No.: 8755

Numerical and Experimental Analysis on Selective Laser Post-Treatment of Cold Sprayed Titanium Coatings

Pierpaolo Carlone, University of Salerno; Antonello Astarita, University of Napoli; Felice Rubino, University of Salerno



Paper No.: 8728

The Interface of TiB₂ and Al₃Ti in Molten Aluminum

Xiaoming Wang, Purdue University; Jie Song, Purdue University; Wei Vian, Purdue University; Haibin Ma, Purdue University; Qingyou Han, Purdue University



Paper No.: 8869

Invited: Laser Welding of Aerospace Titanium Alloys

Xinjin Cao, NRC Aerospace; Priti Wanjara, NRC Aerospace

**NO
PAPER**

Paper No.: 9025

Room Temperature Uniaxial Die Compaction Behavior of Titanium Sponge Granules

Amir Hadadzadeh, University of Waterloo; Stephen F. Corbin, Dalhousie University; Mark A. Whitney, University of Waterloo; Mary A. Wells, University of Waterloo



Paper No.: 8803

Effect of Strain Rate and Temperature on Tensile Properties and Deformation Behavior of Rolled Al/Mg/Al Tri-Layer Clad Sheet

A. Macwan, Ryerson University; X.Q. Jiang, Chongqing Academy of Science and Technology; D.L. Chen, Ryerson University



Paper No.: 9096

The Multi-Component CrBMoS Solid Lubricant and Tribological Films Prepared by Pulsed Magnetron Sputtering from Powder Targets

Yanwen Yanwen Zhou, University of Science and Technology Liaoning; Shing Liu, University of Science and Technology Liaoning; Fudong Wang, University of Science and Technology Liaoning



**Advances in Materials Manufacturing II
Novel Manufacturing**

Paper No.: 8885

Invited: Laser Cladding Applications in Tooling Repair and Modification

Hongping Gu, SCFI, A Division of Magna international Inc.

**NO
PAPER**

Paper No.: 8889

Effect of Fe on the Evolution Of Microstructure and Elevated Temperature Properties in Al-Mn-Mg 3004 Alloys

Kun Liu, University of Quebec at Chicoutimi; X.-G. Chen, University of Quebec at Chicoutimi



Paper No.: 8721

Effect of Heat Treatment on Microstructure and Mechanical Properties of Cast Al-Si-Cu-Mg Alloy with Micro Additions of Zr-Ti-V

Sugrib Kumar Shaha, Ryerson University; Frank Czerwinski, CanmetMATERIALS, Natural Resources Canada; Wojciech Kasprzak, CanmetMATERIALS, Natural Resources Canada; Jacob Friedman, Ryerson University; Daolun Chen, Ryerson University



Paper No.: 9023

Phase Distributions on Titanium Oxide Rough Thin Films Obtained by Anodization Process

N. Sarica, Bogazici University, Sakarya University; Z.Z Öztürk, Gebze Technical University; C. Bindal, Sakarya University; A.H. Üçisik, Atilim University



Paper No.: 8743

Nondestructive Evaluation of Friction Stir Welded AZ31B-H24 Mg Alloy

Daniel Levesque, National Research Council Canada; Xinjin Cao, National Research Council Canada - Aerospace; Martin Lord, National Research Council Canada; Priti Wanjara, National Research Council Canada – Aerospace

**NO
PAPER**

Paper No.: 9011

Microstructure and Mechanical Properties of Asymmetrically Rolled if Steel Sheets

Saeed Tamimi ; Augusto B. Lopes; Mehdi Sanjari; Said Ahzi; Jose J Gracio

**NO
PAPER**

Paper No.: 8825

Microstructural and Microhardness Evolution During High-Pressure Torsion of Recycled Al-7%Si Piston Alloys

Fredrick Mwema Dedan Kimathi, University of Technology; James N. Keraita, Dedan Kimathi University of Technology; Phillipha AS Reed, University of Southampton; Nong Gao, University of Southampton; Thomas Ochuku Mbuya, University of Nairobi; Bruno Mose Roberts, Jomo Kenyatta University of Agriculture and Technology

**NO
PAPER**

Computational Materials Science Symposium: Oral Presentations Only.

In honor of Professor David Wilkinson of McMaster University, Ontario, Canada in recognized as an international leader in the science and technology of solid materials. His research has focused on the processing and properties of structural materials, including metallic alloys, ceramics, ceramic matrix composites, metal matrix composites, functionally gradient materials and biomaterials, with his recent research central on the automotive sector. Organized to honor Prof. David S. Wilkinson on the occasion of his 65th birthday. A wide representation of speakers from academia, industry and former students, post-docs and co-workers featured.

David S. Wilkinson Honorary Symposium: Oral Presentations Only.

Symposium focus on the latest developments in computational modeling in materials science. We will target new theoretical/computational tools development, applications of atomic-scale, meso-scale, micro-scale and multi-scale models on a variety of materials systems, as well as new insights and findings in these fields. Advances related to new international initiatives such as Materials Genome Initiative (MGI) and Integrated Computational Materials Engineering (ICME) form important parts of this symposium. Case studies on MGI/ICME implementation on industrially relevant materials problems highlighted.

Hydrometallurgical Processes & Technologies, Lucy Rosato Memorial Symposium

Hydrometallurgical Processes & Technologies (Plenary Session)

Paper No.: 9114

Keynote (50 minutes): Sustainability-Driven R&D in Zinc Hydrometallurgy: Remembering Lucy Rosato

George P. Demopoulos, McGill University



Paper No.: 9083

Keynote (50 minutes): Development of Pressure Leaching Technology in China

Kaixi Jiang, Beijing General Research Institute of Mining and Metallurgy; Haibei Wang, Beijing General Research Institute of Mining and Metallurgy; Sanping Liu, Beijing General Research Institute of Mining and Metallurgy; Yufang Wang, Beijing General Research Institute of Mining and Metallurgy; Bangsheng Zhang, Beijing General Research Institute of Mining and Metallurgy



Hydrometallurgical Processes & Technologies, Lucy Rosato Memorial Symposium

Gold Processing

Paper No.: 8780

A Conceptual Circuit Development for Gold Processing Based on Bromine/Bromide Lixiviant

Mariam Melashvili, SGS Canada Inc.; Chris Fleming, SGS Canada Inc.; Mykolas Gladkovas, SGS Canada Inc.; Mike Dry, Arithmetek; Mani Manimaran, Albemarle Corporation



Paper No.: 8815

The Effect of Dmsa Addition on the Performance of Thiosulfate Leaching of Gold

Scott Hume, Laurentian University; Jeffrey Shepherd, Laurentian University; Eduard Guerra, Laurentian University; Yeonuk Choi, Barrick Gold Corporation



Paper No.: 8827

Gold Leaching in Organic Solvents: Simple and Milde Reaction Conditions for Fast Gold Dissolution

Hiwa Salimi, University of Saskatchewan; Loghman Moradi, University of Saskatchewan; Stephen Foley, University of Saskatchewan



Paper No.: 9122

Adsorption of Gold From Au(III)-Chloride Solutions on Alternative Materials to Activated Carbon Inorganic Materials

Thomas Feldmann, McGill University; George P. Demopoulos, McGill University



Paper No.: 8897

A Study of Electrochemical Interactions Between Gold and its Associated Oxide Minerals

Ahmet Deniz Bas, Laval University; Edward Ghali, Laval University; Yeonuk Choi, Barrick Gold Corporation



Hydrometallurgical Processes & Technologies, Lucy Rosato Memorial Symposium

Zinc and Nickel Processing

Paper No.: 8752

Sulfate-Balance Control Strategy at the Flin Flon Zinc Plant

Philipp Mirzoev, HudBay Minerals Inc.; Tracey Bodnarchuk, HudBay Minerals Inc.



Paper No.: 8986

Influence of Different Organic Additives on Zinc Electrowinning from Acidic Sulphate Electrolyte

Nabil Sorour, Laval University; Georges Gabra, Laval University; Edward Ghali, Laval University; Georges Houlachi, Hydro-Quebec research centre (LTE); Wei Zhang, Laval University



Paper No.: 8834

Autoclave Leaching of Zinc Concentrate at a Bench Scale

Gerardo Erasmo Fuentes, Universidad Catolica del Norte; Claudio Abraham Acuna, Universidad Catolica del Norte; Sergio Romo, Comercializadora de Minerales Viacha



Paper No.: 8723

Corefco Leach Residue Re-Processing-Testwork and Commercial Considerations

Lyle Clifton Trytten, Sherritt International Corporation; James John Budac, Sherritt International Corporation; Ariel Mosqueda Martinez, Moa Nickel; Russ Kofluk, Sherritt International Corporation.....



Paper No.: 8996

Mineralogical Characterization of Sudbury Pyrrhotite Tailings-Evaluating the Bioleaching Potential

Douglass Duffy, University of Toronto; Srinath Garg, University of Toronto; Cheryl Washer, University of Toronto; Tassos Grammatikopoulos, SGS Canada Inc.; Vladimiro Papangelakis, University of Toronto.....



Paper No.: 8727

Sustainable Hydrometallurgical Processing at the Ambatovy Nickel Operation in Madagascar

Michael J. Collins, Sherritt Technologies, Sherritt International; Ding Yuan, Sherritt Technologies, Sherritt International; Mark Sitter, Sherritt International.....



Paper No.: 8964

Hematite Precipitation from Sulphate - Chloride Solutions at 150°C

Tasawar Javed, University of British Columbia; Edouard Asselin, University of British Columbia.....



**Hydrometallurgical Processes & Technologies, Lucy Rosato Memorial Symposium
Copper and Silver Processing**

Paper No.: 8793

Royal Canadian Mint Miller Salt Process Developments

Vicken Aprahamian, Royal Canadian Mint.....



Paper No.: 9082

Test Work and Geochemical Modeling for Copper in Situ Leaching

Laura Sinclair, Cornell University.....



Paper No.: 8810

The FLSmidth® Rapid Oxidative Leach (RoI) Process. Part I: Mechano-Chemical Process for Treating Chalcopyrite

D. Chaiko, FLSmidth USA Inc.; F. Baczek, FLSmidth USA Inc.; S.S. Rocks, FLSmidth USA Inc.; T. Walters, FLSmidth USA Inc.; R. Klepper, FLSmidth USA Inc.....



Paper No.: 8811

The FLSmidth® Rapid Oxidative Leach (RoI) Process. Part II: A New Chemical Activation Process for Chalcopyrite

D. Chaiko, FLSmidth USA Inc.; S.S. Rocks, FLSmidth USA Inc.; T. Walters, FLSmidth USA Inc.; S. Asihene, FLSmidth USA Inc.; C. Eyzaguirre, FLSmidth USA Inc.; R. Klepper, FLSmidth USA Inc.; F. Baczek, FLSmidth USA Inc.; G. McMahon, Boston College.....



Paper No.: 8870

Evaluation of Ion Exchange as a Means of Separating and Recovering Base Metals from Concentrated Chloride Leach Solutions

Bryn Harris, NMR360 Inc.; Carl White, NMR360 Inc.....



Paper No.: 8814

Selective Separations in the Minor and Specialty Metals Industry

N.E. Izatt, IBC Advanced Technologies, Inc.; S.R. Izatt, IBC Advanced Technologies, Inc.; R.L. Bruening, IBC Advanced Technologies, Inc.; K.E. Krakowiak, IBC Advanced Technologies, Inc.; R.M. Izatt, IBC Advanced Technologies, Inc.



Paper No.: 8958

Advances in CFD Modeling of Mechanical Mixing in the Metals, Mining, and Process Industries

D. Baker, Hatch Associates; A. Blackmore, Hatch Associates; L. Human, University of Waterloo; D. Wilson, University of Waterloo



Paper No.: 9183

Leaching of Copper Oxide Ore by Ammonium Carbamate

Lingyun Huang, Kunming University of Science and Technology; Yingbo Mao, Kunming University of Science and Technology; Tong Xiong, Kunming University of Science and Technology; Jiushuai Deng, Kunming University of Science and Technology



Hydrometallurgical Processes & Technologies, Lucy Rosato Memorial Symposium
Environmental Aspects

Paper No.: 9074

Development of Innovative Recycling Technologies for Sustainable Metallurgical Industry

V.I. Lakshmanan, Process Research ORTECH Inc.; R. Sridhar, Process Research ORTECH Inc.; J. Chen, Process Research ORTECH Inc.; M.A. Halim, Process Research ORTECH Inc.



Paper No.: 8734

Co2 Utilization via Intensified and Integrated Mineral Carbonation-Process and Products Optimization

Rafael M. Santos, Sheridan Institute of Technology; Pol C.M. Knops, Innovation Concepts B.V.; Keesjan Rijnsburger, Innovation Concepts B.V.



Paper No.: 8893

Gypsum - Anhydrite Conversion as Possible Means to Control Scale and Decrease Calcium Levels in Hydrometallurgical Processes

Georgiana Moldoveanu, University of Toronto; Vladimiro Papangelakis, University of Toronto



Paper No.: 8991

Forward Osmosis for Industrial Process Water Recovery: The Case of TMA-Co2-H2O as Draw Solution

Georgios Kolliopoulos, University of Toronto; Tim Clark, Forward Water Technologies Inc.; Vladimiro Papangelakis, University of Toronto



Paper No.: 8768

Determination and Prediction of Solubilities for Sodium Silicates in Alkaline Carbonate Aqueous Solutions with Application for the Preparation of Precipitated Silica

Yan Zeng, Chinese Academy of Sciences; Zhibao Li, Chinese Academy of Sciences; George P. Demopoulos, McGill University



Paper No.: 8819

The Extraction of Iron from Iron Fines

Lizelle van Dyk, University of the Witwatersrand; Glawdis Shungu Tshofu, University of the Witwatersrand



Paper No.: 9151

Hydrometallurgical Recovery of Zinc, Manganese and Lead from Pyrometallurgy Sludge

Julien Mocellin, Institut National de la Recherche Scientifique; M.-O. Simonnot, Universite de Lorraine CNRS; G. Mercier, Institut National de la Recherche scientifique; J.-F. Blais, Institut National de la Recherche scientifique; J.-L. Morel, Universite de Lorraine INRA



Paper No.: 9146

Recovery of Dysprosium and Neodymium from Permanent Magnet Scraps Leach Liquors by Environmentally Friendly Hydrometallurgical Routes

Ho-Sung Yoon, Korea Institute of Geoscience & Mineral Resources (KIGAM); Chul-Joo Kim, Korea Institute of Geoscience & Mineral Resources (KIGAM); Kyeong-Woo Chung, Korea Institute of Geoscience & Mineral Resources (KIGAM) ; Sung-Don Kim, Korea Institute of Geoscience & Mineral Resources (KIGAM); Rajesh Kumar Jyothi, Korea Institute of Geoscience & Mineral Resources (KIGAM)



Paper No.: 8884

The Effects of Compositional and Structural Characteristics of Scorodite on its Leaching Stability

Zhihong Liu, Central South University; Xiaofeng Yang, Central South University; Zhiyong Liu, Central South University; Yuhu Li, Central South University; Qihou Li, Central South University.....



Management of Metallurgical Plant Capital Projects

Paper No.: 8776

Engineering, Construction & Project Management of Ambatovy Nickel Project

P. Larouchelle , SNC-Lavalin; E. McConaghy, Ambatovy Project.....



Paper No.: 8874

The Devilish Details: an Analysis of Problem Projects and their Contributing Challenges

Robert Duinker, Hatch Ltd.....



Paper No.: 8724

Learnings from Infrastructure Replacement within an Operating Refinery

Lyle Clifton Trytten, Sherritt International Corporation; Scott Bass, Sherritt International Corporation; Paul Nawrocki, Sherritt International Corporation; Jeremy Mercer, Sherritt International Corporation.....



Paper No.: 9152

Eagle Mine and Mill Commissioning

Jennifer Anna Abols, Lundin Mining.....



Paper No.: 9073

An Integrated Approach to Managing Asset Revamp Shutdown Projects

Mike Santaluce, Outotec



Paper No.: 9001

**Optimization of Capital Cost and Smelter Revenue - Integrated Team
Rebuild of Barro Alto Furnaces**

F. Stober, Hatch; N. Voermann, Hatch; B. Snider, Hatch; A. Munsch, Hatch; T. Koehler, Hatch; G. Norval, Hatch; K. Belanger, Hatch; J. Mclachlan, Hatch; E. Piantino, Anglo American Brasil; J. Carlos Queiroz, Anglo American Brasil; A. Rodrigues, Anglo American Brasil; M. Rodrigues, Anglo American Brasil



Paper No.: 9022

**Innovative Perspectives on Effective Development Methods for Mining
Processing Plants**

Thomas Gluck, Independent Consultant.....



Paper No.: 9092

Developing Projects Rapidly and Preserving Shareholder Value

Nick Mason, Hatch Associates.....

**NO
PAPER**

Paper No.: 8902

The Engineering, Procurement and Construction of the Eleonore Project

Christian Frechette, SNC-Lavalin Inc.; Matthew Kreuh, SNC-Lavalin Inc.



Paper No.: 9067

**Digital Transformation in Metallurgical Facility Design, Construction and
Operations**

Daryl Ofstie, Hatch Ltd.; Bharat Kargutkar, Hatch Ltd.



Paper No.: 8720

Arbitration-Effective Dispute Resolution for the Metallurgical Industry

Paul Tichauer, CEO Arbitration.....



Paper No.: 9215

**Managing Project Development Challenges for Improved Business
Outcomes**

Jeffrey Donald, SNL Lavalin Inc.....



Managing Furnace Integrity for Reliable Metal Production

Paper No.: 9057

**Keynote (50 minutes): Differential Thermal Expansion and its Influence on
Metallurgical Furnaces**

Allan J. MacRae, MacRae Technologies Inc.



Paper No.: 9179

High-Intensity Waterless Cooling for Refractory Lined Vessels

Michael Parravani, Hatch Ltd.; Maciej Jastrzebski, Hatch Ltd.; Zoe Coull, Hatch Ltd.; Bert Wasmund, Hatch Ltd.



Paper No.: 8758

Some Considerations for Safer Furnace Cooling

Mark William Kennedy, Norwegian University of Science and Technology; Allan MacRae, MacRae Technologies, Inc.; Rodney Jones, Mintek; Liev Kolbeinsen, Norwegian University of Science and Technology; Per Nos, Termek Technology Ltd.; Andreas Filzwieser, Mettop GmbH



Paper No.: 8877 Observations on the Impact of Furnace Dimensions and Power Density on Taphole Integrity Lloyd R. Nelson, Anglo American Platinum Ltd.; Rodney J. Hundermark, Anglo American; Kevin van der Merwe, Anglo American Platinum Ltd.	
Paper No.: 8955 Development of Power Stabilization Systems for Electric Arc Furnaces Jason Cheung, Hatch Ltd.; Dong Shen, Hatch Ltd.; Tom Ma, Hatch Ltd.	
Paper No.: 9103 Monitoring Lining Wear on Submerged Arc Furnaces P. Schmidt, Saveway GmbH & Co. KG; Manfred Hopf, Saveway GmbH & Co. KG	
Paper No.: 9033 Design Methods for DC Arc Furnaces to Enhance Furnace Integrity Rodney T. Jones, Mintek; Quinn G. Reynolds, Mintek	
Paper No.: 8708 Utilization of Radar in Controlling Feed Levels for Electric Furnaces Jennifer Erskine, Hatch Ltd.; John Armitage, Hatch Ltd.; Afshin Sadri, Hatch Ltd.	
Paper No.: 9223 Furnace Explosions with a Focus on Water Harmen Oterdoom, SMS Group.....	
Paper No.: 9232 First Industrial Applications of the New Ionic Liquid Cooling Technology Andreas Filzwieser, METTOP GmbH; Andreas Siegmund, INMET LLC; Iris Filzwieser, METTOP GmbH.....	NO PAPER
Paper No.: 8928 Teck's Kivcet™ Lead Tapping Experience D.J. Rioux, Teck Metals Ltd.; T.A. Moore, Teck Metals Ltd.; G.J. McTeer, Teck Metals Ltd.; D.L. Verhelst, Teck Metals Ltd.	
Paper No.: 9079 Keynote (50 minutes): an Integrated Approach to Managing Furnace Integrity for Reliable Metal Production Nils Voermann, Hatch Canada.....	NO PAPER
Paper No.: 8831 Ensuring the Furnace Integrity with Intelligent Operations, Efficient Cooling and Refined Design Jani Jansson, Outotec (Canada) Ltd.; Lauri Pesonen, Outotec (Canada) Ltd.; Lina Vaajamo, Outotec (Finland) Oy	
Paper No.: 8709 Managing Furnace Integrity by Utilizing Non-Destructive Testing (NDT) and Monitoring Techniques Wai Lai Ying, Hatch Ltd.; Richard MacRosty, Hatch Ltd.; Pawel Gebiski, Hatch Ltd.; Ravi Pula, Hatch Ltd.; Afshin Sadri, Hatch Ltd.; Terry Gerritsen, Hatch Ltd.....	

Paper No.: 9186

Continuous Online Temperature Measurement System

Goran Vukovic, RHI AG; Bojan Zivanovic, RHI-AG; Bob Drew, RHI-AG; Klaus Gamweger, RHI-AG



Paper No.: 8900

Investigation of Freeze Linings in Magnesia-Containing Copper Slags

Tijl Crivits, University of Queensland; Peter Charles Hayes, University of Queensland; Evgueni Jak, University of Queensland



Paper No.: 8753

A Comprehensive Review of Acousto Ultrasonic-Echo (AU-E) Technique for Furnace Refractory Lining Assessment

Afshin Sadri, Hatch Ltd.; Wai Lai Ying, Hatch Ltd.; Pawel Gebiski, Hatch Ltd.; P. Szyplinski, Hatch Ltd.; Trevor Goff, Lonmin Platinum; Burger Van Beek, Lonmin Platinum



Paper No.: 9059

Application of Infrared Thermal Imagery in Lead Blast Furnace Operation

Paul Francis Gover, Brunswick Smelter; Spencer Rosengren-Devereaux, Brunswick Smelter; Scott Edward Everett, Eigen Innovations; Mike Douglas Tyler, Eigen Innovations.....



Paper No.: 8968

Operational Excellence in PS Converting at Saganoseki Smelter & Refinery

Takafumi Sasaki, Pan Pacific Copper Co., Ltd.; Katsuya Toda, Pan Pacific Copper Co., Ltd.; Hiroyuki Sano, Pan Pacific Copper Co., Ltd.; Hiroshi Chida, Pan Pacific Copper Co., Ltd.



Paper No.: 9225

Bath Level Measurement for a Closed DC Furnace

Andreas Liedtke, SMS Group; Adriaan Scheltema Beduin, SMS Group; Harmen Oterdoom, SMS Group; Christian Kempe, SMS Group; Andreas Haaks, SMS Group



Materials Challenges for the Mining and Metallurgy Industries

Paper No.: 8873

Avoiding Costly Mistakes: How Past Experience can Help Prevent Serious Damage to Metallurgical Equipment

Nicolas Geoffroy, GCM Consultants; Samih Beskri, GCM Consultants



Paper No.: 8748

Galvanizing in Mining

Martin Gagne, International Zinc Association; Frank Goodwin, International Zinc Association



Paper No.: 9168

Quality Assurance in Capital Projects, Opportunities and Challenges

Wilson Pascheto, XPS Consulting & Testwork Services



Paper No.: 9147

Addressing Wear Problems in Mining and Mineral Processing

Jiaren (Jimmy) Jiang, National Research Council of Canada; Yongsong Xie, RJI Materials Technologies Inc.; Rees Llewellyn, RJI Materials Technologies Inc.....



Paper No.: 8838

Performance and Cost Comparison of Materials Used in Design and Fabrication of Hydrometallurgical Equipment

Kevin Lambrych, Ashland Performance Materials; Thomas Johnson, Ashland Performance Materials; D. Kelley, Ashland Performance Materials.....



Paper No.: 8935

Materials Challenges in Mine, Mill, and Smelters

Nosrat Behnood, Process Technology Materials Consultant Inc.....



Paper No.: 8919

Copper, Calorizing, and Metallurgical Vessels

Trevor Shellhammer, TVR Technologies LLC; Andrew Park, Quantum Ceramalloy Inc.



Paper No.: 8735

FRP Challenges and Applications in Metals Processing

Rafic Moubarac, Experco Composites Inc.....



Paper No.: 9007

The Effect of Grain Boundary Engineering on Microstructural Evolution of a Nickel-Based Superalloy

Mohsen Sanayei, University of Saskatchewan; Jerzy Szpunar, University of Saskatchewan

NO PAPER

Paper No.: 8832

Alternative Reducing Agents in Metallurgical Processes; Investigation of Combustion Properties of Carbon-Containing Shredder Residue Material

Samira Lotfian, Lulea University of Technology; Hesham Ahmed, Lulea University of Technology; Caisa Samuelsson, Lulea University of Technology

NO PAPER

Paper No.: 8722

Applicability of Near-Infrared Hyperspectral Imagery (Nir-Hi) for Sensor Based Sorting of an Epithermal Au-Ag Ore

Marinus Dalm, Delft University of Technology; Mike W.N. Buxton, Delft University of Technology; Frank van Ruitenbeek, University of Twente.....



Paper No.: 8861

Study of the Inert Anode for Al Electrolysis Based on Nickel Ferrite Cermet

Yihan Liu, Northeastern University; Jintao Zhang, Northeastern University; Jieming Yuan, Northeastern University; Guanglei Song, Northeastern University.....



**Sustainability in Ironmaking/Steelmaking
CO2 Emissions and CCS**

Paper No.: 9205


Keynote (50 minutes): The Impact of Co2 Capture for Iron and Steel Making

Dianne Wiley, University of New South Wales; Minh Ho, University of New South Wales.....



Paper No.: 8830

Experience of the Oxygen Bottom-Blown Converter in Posco

H.S. Choi, POSCO; C.S. Ha, POSCO; D.Y. Shin, POSCO; S.J. Kim, POSCO 

Paper No.: 8937


Improving Yield and Productivity while Reducing Ghg Emissions in Bf/Bof Steelmaking

Douglas J. Zuliani, Tenova Goodfellow Inc. 

**Sustainability in Ironmaking/Steelmaking
Alternative Reductants**


Paper No.: 9155

Keynote (50 minutes): Autogenous Pyrolysis Process — an Enabling Technology for Introduction of Renewable Carbon for the Steel Industry

Alex Deev, Commonwealth Scientific and Industrial Research Organisation; S. Jahanshahi, University of New South Wales; J. Donnelly, Commonwealth Scientific and Industrial Research Organisation 


Paper No.: 8886

Effect of Volatile Matter on Reduction of Iron Oxide- Containing Carbon Composite

Asmaa A. El-Tawil, Luleå University of Technology; Hesham M. Ahmed, Luleå University of Technology; Abdel Hady El-Geassy, Central Metallurgical Research and Development Institute (CMRDI); Bo Bjorkman, Luleå University of Technology 


Paper No.: 9101

Technical and Economic Lessons from the Last Charcoal-Blast Furnaces in the World

Cristobal Feliciano Bruzual, Macquarie University; Ricardo Luchese de Moraes, Independent Consultant in BF Process; John A. Mathews, Macquarie University 

Paper No.: 8943

Biomass Carbide Injection Into Blast Furnace

Hidekazu Tsuruta, JFE Steel Corporation; Akinori Murao, JFE Steel Corporation; Akio Fujibayashi, JFE Steel Corporation; Ryota Murai, JFE Steel Corporation; Ikuhiro Sumi, JFE Steel Corporation 

**Sustainability in Ironmaking/Steelmaking
Recycle and Recovery**


Paper No.: 9051

Keynote (50 minutes): The Fixation of Co2 in Carbonates-Application For Iron — and Steelmaking

Ron Zevenhoven, Åbo Akademi University 

Paper No.: 9084

Dry Slag Granulation — a Path to Improving the Safety and Sustainability of the Metallurgical Sector

L.C. So, Hatch Ltd.; S. Mostaghel, Hatch Ltd.; G. Chahal, Hatch Ltd.; S. Faucher, Hatch Ltd.; S.K. Lee, Ecomaister Co., Ltd.; S.Y. Oh, Ecomaister Co., Ltd. 

Paper No.: 8994

Modeling of Energy Recovery and Slag Structure During Cooling of Blast Furnace Slags

Sherry Esfahani, University of Toronto; Mansoor Barati, University of Toronto



Paper No.: 9195

Convert Hot Slag Directly into Value-Added Materials

Yu Li, University of Science and Technology Beijing; Wenbin Dai, University of Science and Technology Beijing; Daqiang Cang, University of Science and Technology Beijing; Wei Wang, Taidong Industries Co. Ltd.; Qingde Wang, University of Science and Technology Beijing; Min Guo, Taidong Industries Co. Ltd.....



Paper No.: 8972

Characterization and Upgrading of Ore Based Steelmaking Sludges

Anton Andersson, Lulea University of Technology; Caisa Samuelsson, Lulea University of Technology; Bo Bjorkman, Lulea University of Technology; Hesham Ahmed, Lulea University of Technology



Paper No.: 8936

Beneficiation of the Clear Hills Ironstone

Patrick Kerr, MINEPROMET; Qi Liu, University of Alberta; Thomas H. Etsell, University of Alberta



**Sustainability in Ironmaking/Steelmaking
Sustainable Routes for Ironmaking
Process Optimization and Modeling**

Paper No.: 9244

Keynote (50 minutes): Low Carbon Ironmaking Technology Developments in Europe

Jan van der Stel



Paper No.: 8809

Sustainable Conceptual Process Design for a Primary Steel Plant

Hamid Ghanbari, Abo Akademi University; Mikko Helle, Abo Akademi University; Henrik Saxén, Abo Akademi University



Paper No.: 9058

Analysis on Material and Energy Balances of Ironmaking Systems Under Novel Operating Conditions of Blast Furnace

Hiroshi Nogami, Tohoku University; Jun-ichiro Yagi, Tohoku University; Peter R. Austin, BlueScope Steel; Yoshiaki Kashiwaya, Kyoto University



Paper No.: 8938

Best Energy Management Practices for Electric Furnace Steelmaking

Douglas J. Zuliani, Tenova Goodfellow Inc.....



Paper No.: 8850

Modelling of Emissions from Electric Arc Furnaces

Viraj Parekh, University of Toronto; Xiao Zhang, University of Toronto; Sina Mostaghel, Hatch Ltd.; Kinnor Chattopadhyay, University of Toronto



Paper No.: 8782

Characterization Dynamic Analysis of Interfacial Tension Instability by Gas Bubble Passing through Molten Metal-Slag Interfaces

Shungo Natsui, Hokkaido University; Ryota Nashimoto, Hokkaido University; Hifumi Takai, Hokkaido University; Takehiko Kumagai, Hokkaido University; Tatsuya Kikuchi, Hokkaido University; Ryosuke O. Suzuki, Hokkaido University



Paper No.: 9204

Keynote (50 minutes): Sustainability in Iron & Steel - a Historical Review of U. S. Steel Canada's Lake Erie Works

Jack Young, Hatch



Paper No.: 9150

Enterprise-Wide Optimization in Steelmaking: a Scoping Study

Justin Worden, The University of Queensland; Simon Smart, The University of Queensland; Ian Cameron, The University of Queensland; Habib Zughbi, BlueScope Ltd.; David Hughes, BlueScope Ltd.; Paul Zulli, BlueScope Ltd.



Paper No.: 8926

Optimization of the Operation of Hot Stoves

Mikko Helle, Abo Akademi University; Henrik Saxen, Abo Akademi University



Paper No.: 8762

Modern Air Pollution Control in Iron Ore Pelletizing

Janice Bolen, Hatch Ltd.



Paper No.: 8849

Mathematical Modelling of Emissions During Pre Heating of Magnesia-Carbon Bricks

Kinnor Chattopadhyay, University of Toronto; Xingtong (Brett) Liu, University of Toronto; Saikat Chatterjee, University of Toronto



**Torstein Utigard Memorial Symposium
Historical Metallurgy**

Paper No.: 9068

Torstein Utigard: The Man - The Scientist

Mansoor Barati, University of Toronto; Carlos Diaz, Consultant



Paper No.: 8990

Some Perspectives on Pyrometallurgical Activities at the University of Toronto

Alexander McLean, University of Toronto; Mansoor Barati, University of Toronto



Paper No.: 9117

The Pursuit of Environmental Friendly Operations in Canadian Sulphide Smelting

Philip J. Mackey, P.J. Mackey Technology Inc.; Sam Marcuson, Marcuson and Associates



Paper No.: 9216

Fifty Years of Evolution of the Metallurgical Engineering Companies in Canada

Chris Twigge-Molecey, Hatch Ltd.



Torstein Utigard Memorial Symposium Metallurgy of Nickel

Paper No.: 9064

Energy Consumption Patterns in 20th Century Canadian Cuni Smelters
Samuel Marcuson, Marcuson and Associates; Philip J. Mackey, P.J. Mackey
Technology



Paper No.: 9002

**A Review of Tecnology Developments in Nickel Pyrometalurgy and Nickel
Production Trends Over the Last Three Decades**

Ahmed Vahed, WorleyParsons Canada Services Limited; Anthony E.M. Warner,
WorleyParsons Canada Services Limited; Phillip J. Mackey, WorleyParsons
Canada Services Limited



Paper No.: 8731

Study of Oxygen Flash Smelting of Nickel/Copper Concentrates

Jin Liu, Consultant; Torstein Utigard, Former Profession at the University of
Toronto



Paper No.: 9213

Dead Roasting of Dumont Nickel Concentrate

Mika Muinonen, XPS Testwork & Consulting Services; Johnna Muinonen, Royal
Nickel Corporation; Rajan Pandher, XPS Consulting & Testwork Services



Torstein Utigard Memorial Symposium Metallurgy of Nickel and Ferroalloys

Paper No.: 9075

**An Innovative Process for the Separation of Iron in Mixed-Chloride
Medium — a Case Study for Lateritic Ore**

V.I. Lakshmanan, Process Research ORTECH Inc.; R. Sridhar, Process
Research ORTECH Inc.; Z. Jankovic, Process Research ORTECH Inc.; J.
Chen, Process Research ORTECH Inc.; M.A. Halim, Process Research
ORTECH Inc.



Paper No.: 8726

**Strategies for Maximizing Ferronickel Particle Growth in the Thermal
Upgrading of a Nickeliferous Limonitic Laterite Ore**

Richard Elliott, Queen's University; C.A. Pickles, Queen's University; J. Peacey,
Queen's University



Paper No.: 8894

**Reducing Energy Consumption by Alternative Processing Routes to
Produce Ferrochromium Alloys from Chromite Ore**

Arthur Robert Barnes, XPS Testwork and Consulting Services; Mika Muinonen,
XPS Testwork and Consulting Services; Maurice J. Lavigne, KWG Resources
Inc.



Paper No.: 9144

A Review of Desulphurization Practice in Ferronickel Refining

Manuel Zamallao, ZOJ Research & Consulting Engineers; Pascal Coursol, 5N
Plus; P.J. Mackey, P.J. Mackey Technology Inc.

**NO
PAPER**

Paper No.: 8730

Utilization of Co₂ in Metallurgical Processes

Haijuan Wang, University of Science and Technology Beijing; Nurni Viswanathan, Indian Institute of Technology Bombay; Seshadri Seetharaman, Royal Institute of Technology.....



Paper No.: 9236

High Grade Concentrate from a Low Grade Silicate Laterite Ore via Microwave Vacuum Reduction Roasting

J. Forster, Robert M. Buchan Department of Mining; C.A. Pickles, Robert M. Buchan Department of Mining; K. Mackowiak, Robert M. Buchan Department of Mining.....



**Torstein Utigard Memorial Symposium
Metallurgy of Copper**

Paper No.: 9078

Adoption of High Oxygen Bottom Blowing in Copper Matte Smelting-Why is it Taking so Long?

Joël Kapusta, BBA Inc.; Francois Larouche, BBA Inc.; Enzo Palumbo, BBA Inc.....



Paper No.: 8745

Optimal Oxygen Allocation to Maximize Copper Smelter Throughput

Alessandro Navarra, Universidad Catolica del Norte; Roberto Parra, Universidad de Concepcion; Boyd Davis, Kingston Process Metallurgy Inc.; Frank Mucciardi, McGill University.....



Paper No.: 9163

Isasmelt™ - Smelting More with Less

Alistair Stewart Burrows, Glencore Technology; Gerardo R. F. Alvear Flores, Glencore Technology ; Phillip J. Mackey, P.J. Mackey Technology Inc.; Biplo Das, Sesa Sterlite Ltd.; E. Herrera, Southern Copper Corporation.....



Paper No.: 8915

Crystallization Behaviors of Magnetite and Hematite During Molten Oxidation of Copper Slag

Yong Fan, Tohoku University; Etsuro Shibata, Tohoku University; Atsushi Iizuka, Tohoku University; Takashi Nakamura, Tohoku University.....



Paper No.: 8945

Reduction of Magnetite and Cuprous Oxide from a Liquid Slag with Carbon

Torstein Utigard, University of Toronto; Andrzej Warczok, University of Toronto.....



Paper No.: 9196

Spectral Characterization and Image Analysis in Ferrous And Non-Ferrous Process Metallurgy for the Design of New Sensors for Process Control

Roberto Parra, University of Concepción; Daniel Sbárbaro, University of Concepción; Luis Felipe Verdeja, University of Oviedo; Javier Mochón, National Centre of Metallurgical Research (CENIM); Iñigo Ruiz Bustinza, National Centre of Metallurgical Research (CENIM).....



Paper No.: 9034

Study of Copper Recovery from Smelting Slag by Flotation, and Energy Consumption, as an Alternative to the Use of Cleaning Furnaces

Leandro Voisin, DIMin & AMTC of University of Chile; Willy Kracht, DIMin & AMTC of University of Chile; Nicolas Guarda, DIMin & AMTC of University of Chile

**NO
PAPER**

Paper No.: 9035

Novel Process Using Pig-Iron for Treating Complex Impurity-Rich-Copper Matte and Copper Scrap at 1473 K

Leandro Voisin, DIMin & AMTC of University of Chile; Victor Montenegro, DIMin of University of Chile; Gonzalo Damm, DIMin & AMTC of University of Chile; Karl Muhlenbrock, DIMin & AMTC of University of Chile

**NO
PAPER**

**Torstein Utigard Memorial Symposium
Modelling and Light Metals**

Paper No.: 8983

Coupled Thermodynamic and Multiphysics Modelling in Pyrometallurgical Process Simulation

Tanai Marin, Vale Base Metals Technical Excellence Centre



Paper No.: 8914

Enhancing Liquid Metal Cleanliness by Controlling Fluid Flows — a Case Study

S. Chatterjee, University of Toronto; K. Chattopadhyay, University of Toronto



Paper No.: 8924

Mathematical Modeling of Levitation Melting of Metals

Lei Gao, University of Toronto; Kinnor Chattopadhyay, University of Toronto; Guifang F. Zhang, Kunming University of Science and Technology; Yindong Yang, University of Toronto; Zhe Shi, Kunming University of Science and Technology; Alexander McLean, University of Toronto



Paper No.: 9105

Utilizing the Local Heat Transfer Coefficient around a Solid Object to Determine Velocity in a High Temperature Liquid Metal

Mitren Sukhram, Hatch Ltd.



Paper No.: 8923

Fluxing Molten Converter Slags with Spent Potlining (SPL) for Metal Recovery

Dawei Yu, University of Toronto; Kinnor Chattopadhyay, University of Toronto



Paper No.: 8910

Imaging of Molten Salt Electrolysis — a Review in Honour of Professor Torstein Utigard

Brook Zaback, Kingston Process Metallurgy; Boyd Davis, Kingston Process Metallurgy



Paper No.: 9048

Titanium Powder Production By Reducing Titanium Tetrachloride With Magnesium Metal In A Molten Salt

R. Susilo, Kingston Process Metallurgy Inc.; T. Tzanetakis, Queen's University; B. Davis, Kingston Process Metallurgy Inc.; Y. Laffitte, Queen's University; M. McGurn, Queen's University; G. Minhas, Queen's University; M. Pule, Queen's University; J. Peacey, Queen's University



**Torstein Utigard Memorial Symposium
Solar Silicon**

Paper No.: 8866

Prediction of Thermodynamic Properties of Si-P and Si-Fe-P Alloys for Solar Grade Silicon Refining

Wei Yan, University of Science and Technology Beijing; Yingdong Yang, University of Toronto; Weiqing Chen, University of Science and Technology Beijing; Alex McLean, University of Toronto; Mansoor Barati, University of Toronto



Paper No.: 8997

Dephosphorization of Levitated Silicon-Iron Alloy Droplets for Potential Generation of Solar Grade Silicon

Katherine Le, University of Toronto; Andrew Hue, University of Toronto; Paul Wu, University of Toronto; Yindong Yang, University of Toronto; Alexander McLean, University of Toronto



Paper No.: 9050

Phosphorus Removal From Silicon by Solvent Refining using Ferrosilicon Alloys

Leili T. Khajavi, University of Toronto; Mansoor Barati, University of Toronto.....



**UBC-McGill-UofA Symposium on Mineral Processing: Modelling & Optimization of Mineral Processing Systems
System Analysis**

Paper No.: 8797

Using a Constraint Model to Optimize a Mineral Processing System

Asim Khan, Analyze and Improve; Carmine Ciriello, Analyze and Improve



Paper No.: 8818

Concentrator Utilization Under Geological Uncertainty

Alessandro Navarra, Universidad Catolica del Norte; Kristian Edmond Waters, McGill University.....



Paper No.: 8808

Advance Data Handling to Support Modeling and Simulations in Mineral Processing Plant Optimization

Jorge Torrealba-Vargas, BBA Inc.; Ricardo Esteban, BBA Inc.; David Runnels, BBA Inc.; Genevieve Couture, Glencore - Raglan Mine



Paper No.: 9008

Geomet: Modelling Metallurgical Parameters from Exploration and Resource Data

Pim van Geffen, REFLEX Geosciences - Americas; James Cleverley, REFLEX Geosciences; Dave Lawie, REFLEX Geosciences.....



**UBC-McGill-UofA Symposium on Mineral Processing: Modelling & Optimization of Mineral Processing Systems
Process Optimization**

Paper No.: 8817

A Systems Approach to Mineral Processing Based on Mathematical Programming

Alessandro Navarra, Universidad Catolica del Norte; Amir Arash Rafiei, McGill University; Kristian Edmund Waters, McGill University.....



Paper No.: 8841

Non-Linear Data Reconciliation of the Santa Luz Gold Mine (C1 Project)

Luiz R.P. de Andrade Lima, Federal University of Bahia; Edvaldo A. Amaral Jr., Yamana Gold; Janine C.O. Souza, Federal University of Bahia; Joao A.S. Carneiro, Federal University of Bahia

**NO
PAPER**

Paper No.: 8939

Metallurgical Characterization of the Collective and Selective Flotation Plants at Minera Los Pelambres

Juan Yianatos, Federico Santa Maria Technical University; L. Vinnett, Federico Santa Maria Technical University; V. Iriarte, Federico Santa Maria Technical University; F. Henriquez, Los Pelambres Mining Company; F. Diaz, Nuclear Trace and Engineering Ltd.....



Paper No.: 8844

Modeling the Relationship Between the Grinding Breakage Rate of a Size Class and its Sub-Size Classes

Amir Arash Rafiei, McGill University; Faramarz Hassani, McGill University; Peter Radziszewski, McGill University.....

**NO
PAPER**

**UBC-McGill-UofA Symposium on Mineral Processing: Modelling & Optimization of Mineral Processing Systems
Comminution and Flotation**

Paper No.: 8779

Surfactant Blinding Agents for Preg-Robbing Ores in CIL and RIL

Qiong Zhou, Akzo Nobel Surface Chemistry LLC; Joseph Zachwieja, Akzo Nobel Surface Chemistry LLC; John Jiang, AuTec Innovative Extractive Solutions Ltd.....



Paper No.: 8959

Grinding Media Size and Surface Chemistry

Kyle Douglas, University of Windsor; Brian Hart, University of Windsor; Liuyin Xia, University of Windsor

**NO
PAPER**

Paper No.: 9085

Stirred Milling Kinetics of Saprolitic and Goethitic Nickel Laterites for Selective Comminution

Libin Tong, University of British Columbia; Bern Klein, University of British Columbia; Massimiliano Zanin, University of South Australia; Keith Quast, University of South Australia; William Skinner, University of South Australia; Jonas Addai-Mensah, University of South Australia; David J. Robinson, Australian Minerals Research Centre



Paper No.: 9161

Keynote (50 minutes): Effect of Using Different Grinding Media on the Flotation Performance of a Platinum Group Ore

Zenguo Song, University of Cape Town; Kirsten C. Corin, University of Cape Town; Jennifer Wiese, University of Cape Town; Cyril T. O'Connor, University of Cape Town



Paper No.: 8962

DFT Study on Reactivity of Different Neutral Flotation Collectors with Cu, Zn and Pb Metal Ions in Solution

Manjeet Chowdhry, University of Alberta; Phillip Choi, University of Alberta; Qingxia Liu, University of Alberta; Zhenghe Xu, University of Alberta



Paper No.: 9028

Flotation Monitoring Using Fundamental Dynamic Models-Investigating the Effect of Particle Size on Attachment

Khushaal Popli, University of Alberta; Qi Liu, University of Alberta; Artin Afacan, University of Alberta; Stevan Dubljevic, University of Alberta; Vinay Prasad, University of Alberta



**UBC-McGill-UofA Symposium on Mineral Processing: Modelling & Optimization of Mineral Processing Systems
Flotation**

Paper No.: 9178

Optimization of Industrial Flotation Circuits — an Illustrative Case Study on the Beneficiation of a Mixed Sulphide-Oxide Copper Ore

Pradip Pradip, Tata Consultancy Services Ltd.

**NO
PAPER**

Paper No.: 9072

Continuous Gas Holdup Estimation in a Laboratory Mechanical Cell Using Maxwell's Model

R. Varela, University of Santiago; M. Maldonado, University of Santiago; C.O. Gomez, McGill University; L. Magne, University of Santiago



Paper No.: 9056

Application of Box-Behnken Design to Modelling of Iron Bearing-Gangue Recovery In Hydroxamate Flotation of Pyrochlore

Charlotte Gibson, Queen's University; Massoud Aghamirian, SGS Canada Inc.; Sadan Kelebek, Queen's University; Ben Yu, SGS Canada Inc.



Paper No.: 9045

Adsorption Characteristics of Copper-Polyamine Chelates on Natural Bentonite and Peat

Alexander M.L. Cushing, Queen's University; Sadan Kelebek, Queen's University



Paper No.: 9010

Floatability of Siderite in the Presence of Starch and Guar Gum

Jophat Engwayu, University of British Columbia; Marek Pawlik, University of British Columbia

**NO
PAPER**

Paper No.: 9036

An Evaluation of Hydroxamate Collectors for Malachite Flotation

Mr. Christopher Marion, McGill University; Adam Jordens, McGill University; Kristian Waters, McGill University

**NO
PAPER**

Paper No.: 9016

CFD Studies on the Flow Field Characteristics of the 600 M3 Air-Forced Mechanical Flotation Cell

D. Chen, Beijing General Research Institute of Mining and Metallurgy; J.H. Chen, Guangxi University; X.S. Fan, Beijing General Research Institute of Mining and Metallurgy; T.R. Feng, Beijing General Research Institute of Mining and Metallurgy



Paper No.: 9018

The Performances of XCF/KYF/GF Combined Flotation Machines in Bauxite Flotation Circuit

S.X Shi, Beijing General Research Institute of Mining and Metallurgy; Y.Q. Li, Guangxi University; D.F. Han, Beijing General Research Institute of Mining and Metallurgy; M. Tan, Beijing General Research Institute of Mining and Metallurgy; Z.B. Han, Beijing General Research Institute of Mining and Metallurgy



Paper No.: 9019

Research on Characteristics of Gas Dispersion in a Kyf Flotation Cell

M. Zhang, Beijing General Research Institute of Mining and Metallurgy; Y.J. Zhang, Beijing General Research Institute of Mining and Metallurgy; J. H. Chen, Guangxi University; Q. Chen, Beijing General Research Institute of Mining and Metallurgy; J.H. Zhang, Beijing General Research Institute of Mining and Metallurgy; F.M. Zheng, Guangxi University



Paper No.: 9055

Break-Up in Formation of Small Bubbles — a Consideration from Energy Aspect

Pengbo Chu, McGill University; James Finch, McGill University



Paper No.: 9177

Keynote (50 minutes): Developments in Pept for Flotation Research

Jan Cilliers, Imperial College London; Pablo Briio-Parada, Imperial College London; Alex Norori-McCormack, Imperial College London



Paper No.: 8798

Synthesis and Characterization of new Polyglycol-Based Frothers — a Structure-Function Study

Wei Zhang, McGill University; Jim Finch, McGill University



Paper No.: 8985

Understanding the Effect of Mineralogy on Muscovite Flotation Using Qemscan

Adam Jordens, McGill University; Christopher Marion, McGill University; Tassos Grammatikopoulos, McGill University; Kristian Waters, McGill University

**NO
PAPER**

**UBC-McGill-UofA Symposium on Mineral Processing: Modelling & Optimization of Mineral Processing Systems
Characterization and Environmental**

Paper No.: 9009

Adsorption of Carboxymethyl Cellulose on a Mixture of Quartz and Hematite

Jophat Engwayu, University of British Columbia; Marek Pawlik, University of British Columbia

**NO
PAPER**

- Paper No.: 8960**
Dense Discrete Phase Model of a Spiral Concentrator: Particles Generation in the Feed Distributor
Darryel Boucher, McGill University **NO PAPER**
- Paper No.: 8988**
Positron Emission Particle Tracking within a Hydrocyclone
J.M. Sovechles, McGill University; D. Boucher, McGill University; R. Langlois, McGill University; A.P. Sasmito, McGill University; K.E. Waters, McGill University..... **NO PAPER**
- Paper No.: 9070**
Modelling Wettability of Coal Through the Contact Angle Measurements
Maria Ewelina Holuszko, University of British Columbia; Jie Liu, University of British Columbia; Haixing Yan, University of British Columbia **NO PAPER**
- Paper No.: 9143**
A Test Apparatus for Studying the Effects of Weathering on Self-Heating of Sulphides
F. Rosenblum, McGill University; J.A. Finch, McGill University; K.E. Waters, McGill University; J.E. Nessel, McGill University 
- Paper No.: 8804**
Characterization of Rare Earth Minerals Using X-Ray Phase Map with High Spatial Resolution Field-Emission Scanning Electron Microscope
Chaoyi Teng, McGill University; Adam Jordens, McGill University; Hendrix Demers, McGill University; Nicolas Brodusch, McGill University; Kristian Edmund Waters, McGill University; Raynald Gauvin, McGill University..... 
- Paper No.: 9020**
Structural and Electronic Properties of Smithsonite and Cerussite — a DFT Simulation
Xian H. Long, Guangxi University; Jianhua H. Chen, Guangxi University; Yu Q. Li, Guangxi University; Ye Chen, Guangxi University 
- WALSIM: Water, Air and Land; Sustainability Issues in Mineral and Metal Extraction Sustainability**
- Paper No.: 9071**
Keynote (50 minutes): Mining and Sustainable Development: Oxymoron or Rx for a Bright Future?
Krishna Parameswaran, ASARCO LLC 
- Paper No.: 9185**
Green Mining: Oxymoron or Opportunity
Janice Zinck, NRCan..... **NO PAPER**
- Paper No.: 8911**
From Liability to Valuable Resource - Water in the Mining Industry
Mika Martikainen, Outotec Finland; Tuomas van der Meer, Outotec Finland; Annukka Makinen, Outotec Research Center..... 

WALSIM: Water, Air and Land; Sustainability Issues in Mineral and Metal Extraction
Water

Paper No.: 8852

Surface Complexation Modeling of Toxic Elements to Aluminum Hydroxide for Process Optimization of Wastewater Treatment

Chiharu Tokoro, Waseda University; Tatusya Kato, Waseda University; Kenichi Muto, Waseda University; Taisuke Sakakibara, Waseda University; Shinya Suzuki, Waseda University



Paper No.: 8863

Process Optimization for Boron Removal from Wastewater Using Co-Precipitation Process With Ettringite

Kenichi Muto, Waseda University; Shinya Suzuki, Waseda University; M. Maeda, Waseda University; Tatsuya Kato, Waseda University; Chiharu Tokoro, Waseda University; Yoshiyuki Tanaka, Sumitomo Metal Mining Co. Ltd.



Paper No.: 8906

Flotation of Pyrite in High Salinity Water

Mingbo Zhang, University of Alberta; Hongbo Zeng, University of Alberta; Qingxia Liu, University of Alberta



Paper No.: 9172

Adsorption of Polycyclic Aromatic Hydrocarbons (Pahs) from Aqueous Phase onto Oil Sands Petroleum Coke-Derived Porous Carbons

Ayodeji Awoyemi, Contract Pharmaceuticals Limited; Shitang Tong, Wuhan University of Science and Technology; Charles Q. Jia, University of Toronto.....

NO PAPER

Paper No.: 8740

Activated Carbon-Assisted Oxidation of Arsenic Species in Process Solutions and Waste Waters: the Oxidation Reaction Mechanism

Rebecca Radzinski, The Robert M. Buchan Department of Mining, Queen's University; Ahmad Ghahremaninezhad, The Robert M. Buchan Department of Mining, Queen's University



WALSIM: Water, Air and Land; Sustainability Issues in Mineral and Metal Extraction
Air

Paper No.: 8920

Solving Combustion Related Fugitive Emissions Problems in Metallurgical Operations Using Computational Fluid Dynamics

Jennifer Woloshyn, Hatch Ltd.; Adam Blackmore, Hatch Ltd.; Alexandre Lamoureux, Hatch Ltd.



Paper No.: 9184

A Heuristic for Fugitive Emissions Management

Ahmed M.S. Hussein, Hatch Associates; Brian E. Rogers, Hatch Associates



Paper No.: 8750

Thermodynamic Aspects of Flue Dust Formation in the Primary Copper Industry

Stephan Rupert Steinacker, University of Leoben; Juergen Antrekowitsch, University of Leoben; Holger Schnideritsch, University of Leoben



Paper No.: 8980

A Positive Pressure Based Dry Gas Handling System for Energy Recovery from Suppressed Combustion Exhaust

Michael Trovant, Hatch Ltd.; Arran McGrath, Hatch Ltd.; Mirza Haque, Hatch Ltd.....



Paper No.: 8961

Mercury Abatement in the Gold Industry

Roki Fukuzawa Hatch Ltd.; Brian E. Rogers, Hatch Ltd.; John R. Barber, Goldcorp USA



Paper No.: 9211

Design and Start-Up of a Circulating Dry Scrubber System for So₂ Abatement from Rotary Kilns

Victor Silla, Hatch Ltd.; Jean-Claude Milot, Hatch Ltd.; Marc-Andre Villiard, Rio-Tinto Fer et Titane; Claude St-Onge, Rio-Tinto Fer et Titane.....



Paper No.: 8868

Atmospheric Leaching of Enargite in Chloride Media

Fazel Ghazali Jahromi, The Robert M. Buchan Department of Mining Engineering, Queen's University; Ahmad Ghahremaninezhad, The Robert M. Buchan Department of Mining Engineering, Queen's University.....



**WALSIM: Water, Air and Land; Sustainability Issues in Mineral and Metal Extraction
Recycling and Process Optimization**

Paper No.: 8883

Concentration of PGMs from Spent Automobile Catalyst by Combining Heating-Quenching and Selective Grinding

Gangfeng Liu, Waseda University; Shuji Owada, Waseda University.....



Paper No.: 9003

Bioleaching of Pyrrhotite Tailings for Ni Extraction-Insights into an Adaptive Evolution Study

Srinath Garg, University of Toronto; Vladimiro G. Papangelakis, University of Toronto; Cheryl Devine, University of Toronto; Radhakrishnan Mahadevan, University of Toronto; Elizabeth Edwards, University of Toronto.....



Paper No.: 8853

Heating and Physical Separation for Co Recycling from Spent Lithium Ion Battery

Kengo Horiuchi, Waseda University; Yuki Shinohara, Waseda University; Chiharu Tokoro, Waseda University; Shuji Owada, Waseda University; Shojiro Usui, JX Nippon Mining & Metals Corporation.....



Paper No.: 9171

Oil Sands Petroleum Coke as Secondary Source of Vanadium

Celine Y. Zhang, University of Toronto; Chloe J. Feng, University of Toronto; Donald W. Kirk, University of Toronto; Charles Q. Jia, University of Toronto.....



Paper No.: 8908

Platinum and Rhenium Recovery from Reforming Catalysts via Plasma Arc Technology

Peter Michael Keeley, University of Birmingham; Neil A. Rowson, University of Birmingham; David E. Deegan, Tetronics International; Tomasz Stachowski, Tetronics International.....



Paper No.: 9160

Effect of Ammonia Addition on the Crystallization of Ammonium Paratungstate (APT) in the Extraction Process

Jae-Hwan Pee, Korea Institute of Ceramic Engineering and Technology; Guen-Hee Kim, Korea Institute of Ceramic Engineering and Technology; Hyun-u Lee, Iljin Diamond; YooJin Kim, Korea Institute of Ceramic Engineering and Technology.....



Paper No.: 8856

Canadian Energy Strategy and Conservation in the 1970's

Hugh McQueen, Concordia University.....



Other

Paper No.: 8976 (Poster Session)

Effects of Grain Size on the Bendability of AA6016 Automotive Sheets

Pizhi Zhao, Qi Zhang, Xinxing Wu, Yingjuang Fengr.....



Paper No.: 8772 (Poster Session)

Solidification Of Wrought Aluminum Alloy 7075

Xinwei Shen, University of Windsor; Xuezi Zhang, University of Windsor
Li Fang, University of Windsor; Henry Hu, University of Windsor
Xueyuan Nie, University of Windsor; Jimi Tjong, Ford Powertrain Engineering Research & Development Centre



Paper No.: 8982

Generation Of Carbonaceous Material From "Pure Water Sachets" And Their Subsequent Utilisation As Reductants For The Opon Mansi Iron Ore

James R. Dankwah, University of Mines and Technology;
Emmanuel Baawuah, Golden Star Bogoso Resources;
Jessica Dankwah, Kwame Nkrumah University of Science and Technology; Frank Awotwe-Appiah, University of Mines and Technology
Pramod Koshy, University of New South Wales



Paper No.: 8969

Dynamics Properties Of 320 M3 Air-Forced Mechanical Flotation Machine

Zhengchang Shen, Beijing General Research Institute of Mining and Metallurgy; Jianhua Chen, Guangxi University;
Yuqiong Li, Guangxi University; Cuihua Zhao, College of Material Science and Engineering.....



Paper No.: 9017

Study On The Large Industrial Bioreactor

G.G. Dong, Beijing General Research Institute of Mining and Metallurgy
M.H. Lai, Beijing General Research Institute of Mining and Metallurgy
T.Q. Liu, Guangxi University; F. Wu, Beijing General Research Institute of Mining and Metallurgy; Q.F. Wang, Beijing General Research Institute of Mining and Metallurgy;
J.H. Chen, Guangxi University



Paper No.: 8981


**Arbothermal Upgrading Of The Awaso Bauxite Ore Using Waste Polypropylene
As Reducing Agent**

James Dankwah, University of Mines and Technology

Jessica Dankwah, Kwame Nkrumah University of Science and Technology

Frank Awotwe-Appiah, University of Mines and Technology

Allen Yushark Fosu, University of Mines and Technology

Pramod Koshy, University of New South Wales 


Paper No.: 8952 (Poster Session)

A Novel High Thermal Conductivity Al-Si Casting Alloy and Application

Hiromi Nagaumi, CHINALCO Research Institute of Science and Technology, Suzhou
Nonferrous Metals Research Institute

Yongfu Wu, CHINALCO Research Institute of Science and Technology

Guanglei Zhu, CHINALCO Research Institute of Science and Technology

Yi Xu, Suzhou Nonferrous Metals Research Institute 

PROCEEDINGS



**AMERICA'S
CONFERENCE
ON ALUMINUM
ALLOYS**

hosted by the 54th Annual Conference of Metallurgists



AUGUST 23-26 | FAIRMONT ROYAL YORK HOTEL, TORONTO, ON, CANADA



AMCAA x 2015

www.metsoc.org

**AMCAA: America's Conference of Al Alloys *Papers Optional
Formability and Fracture**

Paper No.: 9121

Evaluation of the Axial Crush Performance of Al-Mg-Si Extrusions

Jean-François Béland, National Research Council Canada (NRC); Nick Parson,
Rio Tinto Alcan (RTA)



Paper No.: 9110

Deep Drawing of Aluminum Alloy 5182-O in a Servo Press

Long Ju, University of Science and Technology Beijing; Shrinivas Patil, Aida-
America Corporation; Taylan Altan,
The Ohio State University

**NO
PAPER**

Paper No.: 9239

**A Combined Technological Proofing Method for Deep Drawing and Stretch
Forming of Sheet Metal Materials**

Roland Hennig, Aleris Rolled Products Germany GmbH - Innovation Center
Aachen

**NO
PAPER**

Paper No.: 8744

**Fracture Behavior Evaluation of High Strength Al7050 Alloy at Room and
Elevated Temperatures Using Notched Specimens**

Parvin Abachi, Sharif University of Technology; Puyan Shushtarizade Naseri,
Sharif University of Technology;
P. Musavi Garavi, Sharif University of Technology; Kazem Purazrang, Sharif
University of Technology.....



**AMCAA: America's Conference of Al Alloys
Joining**

Paper No.: 9226

**Keynote (50 minutes): Joining Processes for Aluminum Automotive Body
Structures**

Blair Carlson, GM Global R&D; Hui-Ping Wang, GM Global R&D; David R.
Sigler, GM Global R&D;
Peter M. Parlow, GM Global Manufacturing Engineering

**NO
PAPER**

Paper No.: 8760

**Short-Time Heat Treatment of Aluminium Alloy Sheet for Laser-Assisted
Clinching**

Julia Osten, University of Rostock; Michael Reich, University of Rostock; Jan
Kalich, Technical University of Dresden; Uwe Fussel, Technical University of
Dresden; Olaf Kessler, University of Rostock.....



Paper No.: 8941

**The Impact of Time, Temperature, and Sheet Temper on Solid State
Diffusion of Silicon in Clad Aluminum Brazing Sheet**

Michael James Benoit, University of Waterloo; Mark Whitney, University of
Waterloo; Mary A. Wells, University of Waterloo; Sooky Winkler, Dana Canada
Corporation.....

**NO
PAPER**

Paper No.: 9091

Waveforms in Arc Welding of Aluminum Alloys-Effect on Bead Profile, Performance, Softening in Haz and Microstructure

Jian Zhang, The Lincoln Electric Company; Adrian Gerlich, University of Waterloo; Murat Acar, Siemens Energy; Ali Nasiri, University of Waterloo; Abdelbaset Midawi, University of Waterloo.....

**NO
PAPER**

Paper No.: 9041

Welding Parameters for Friction Stir Lap Welding of Al 7075 Sheets

Adrian Gerlich University of Waterloo; Michael Booth, University of Waterloo; Olga Gopkalo, Queen's University; Brad Diak, Queen's University.....

**NO
PAPER**

Paper No.: 9080

The Use of FSW in Thinner Aluminum Sheets

Ricardo do Carmo Fernandes, Votorantim Metais; Fabio Luiz dos Santos, Votorantim Metais



Paper No.: 9119

Evaluation of Residual Stress in a Friction Stir Processed 7075 Alloy by Neutron Diffraction and Instrumented Nano-Indentation

Meysam Haghshenas, University of Waterloo; Michael Gharghouri, Canadian Neutron Beam Centre; Vineet Bhakhri, Western University; Robert J Klassen, Western University; Adrian P Gerlich, University of Waterloo

**NO
PAPER**

**AMCAA: America's Conference of Al Alloys
Formability and Fracture**

Paper No.: 9109

Warm Forming Limits of Aluminum Alloy AA7075

Sante DiCecco, Department of Mechanical and Mechatronics Engineering, University of Waterloo, Canada; Michael Worswick, Department of Mechanical and Mechatronics Engineering, University of Waterloo, Canada; Edmund Chu, Alcoa Inc., USA; Eric Boettcher, Honda R&D Americas, Inc., USA.....

**NO
PAPER**

Paper No.: 8757

Formability and Friction Evaluation of 6000 Aluminum Grades

Susan E. Hartfield-Wunsch, General Motors Body Manufacturing Engineering; Jamie N. Burdeski, General Motors Body Manufacturing Engineering.....



Paper No.: 9113

Influence of Reduction Rate on the Characteristics of Cavities in Superplastically Formed 5083 Aluminum Alloy

S.M. Chentouf, École de Technologie Supérieure; T. Belhadj, École de Technologie Supérieure; N. Bombardier, Verbom Inc.; M. Jahazi, École de Technologie Supérieure



Paper No.: 9174

Axial Crush Response of AA6063-T6 Extrusions

Amir Zhumagulov, University of Waterloo.....

**NO
PAPER**

Paper No.: 9098

Time-Dependent Methods for the Evaluation of FLC – Comparison of Different Algorithms for the Detection of Onset of Necking for Aluminum Alloy Sheets

Srihari Kurukuri, University of Waterloo, Waterloo; Ekta Jain, University of Waterloo; Michael Worswick, University of Waterloo; Sooky Winkler, Dana Canada Corporation

**NO
PAPER**

**AMCAA: America's Conference of Al Alloys
Manufacturing Processes**

Paper No.: 9139

Keynote (50 minutes): Use of Aluminium in Automotive Applications

Jurgen Hirsch, Aluminium Rolled Products.....

**NO
PAPER**

Paper No.: 8891

Aluminum from Cans to Cars-Recycling the Future / Opportunities and Challenges

Geoff M. Scamans, Innoval Technology Limited



Paper No.: 8807

Practical Application of the Metalvision Inclusion Detection System

Dawid Dewet Smith, JW Aluminum; Claude Dube, JW Aluminum; Brett Hixson, JW Aluminum; Hugh Mountford, MetalVision Manufacturing; Iain Sommerville, MetalVision Manufacturing



Paper No.: 9180

On the Circumferential Plane-Strain Limits of Seamless and Porthole Extruded Aluminum Tubes

A. Ilinich, Ford Research and Advanced Engineering; T. Hakoyama, Ford Research and Advanced Engineering; M. Saito, Ford Research and Advanced Engineering; T. Kuwabara, Ford Research and Advanced Engineering; G. Luckey, Ford Research and Advanced Engineering

**NO
PAPER**

Paper No.: 8978

Prediction of AA6063 Aluminum Alloy Hardness After Extrusion

Daniel O. Odoh, University of Waterloo; Yahya Mahmoodkhani, University of Waterloo; Mary A. Wells, University of Waterloo; Michael J. Worswick, University of Waterloo; Raja K. Mishra, General Motors Research and Development Centre Michigan

**NO
PAPER**

Paper No.: 9005

Synthesis of Particulate In-Situ Al/Al₂O₃ Composite by use of Ceramic Powders

Mohsen Sanayei, University of Saskatchewan; Mahmood Meratian, Isfahan University of Technology

**NO
PAPER**

Paper No.: 9127

Additive Manufacturing of Aluminum Alloys

Mathieu Brochu, McGill University; Jason Milligan, McGill University; Ryan Chou, McGill University; Andrew Walker, McGill University; Javier Arreguin-Zavala, McGill University

**NO
PAPER**

- Paper No.: 9241**
Interface Formation During Co-Casting of AA3003/AA4045 Aluminum Alloy Ingots
M.M. Di Ciano, University of Waterloo; D.C. Weckman, University of Waterloo;
Mary A. Wells, University of Waterloo..... **NO PAPER**
- Paper No.: 9218**
Co-Extrusion to Produce an Al-clad Extrudate
Yahya Mahmoodkhani, University of Waterloo; Mary A. Wells, University of
Waterloo..... **NO PAPER**
- AMCAA: America's Conference of Al Alloys**
Modelling and Simulation
- Paper No.: 9175**
Keynote (50 minutes): Advances in Crystal Plasticity Analysis with Application to Anisotropy in Aluminum Sheet
Athony Rollett, Carnegie Mellon University; Minh-son Pham, NIST and CMU;
Adam Creuziger, NIST; Mark Iadicola, NIST; Timothy Foecke, NIST **NO PAPER**
- Paper No.: 9229**
Predicting Accurate FLDs Using Microstructure Based Hardening Laws for AA5754
Mohsen Mohammadi, University of Waterloo; Abhijit Brahme, University of
Waterloo; Raja K. Mishra, General Motors R&D Center; Kaan Inal, University of
Waterloo..... **NO PAPER**
- Paper No.: 9089**
Prediction of Deformation Textures in Asymmetric Rolling of Aluminium Alloys
Diarmuid Shore, KU Leuven; Tuan Nguyen-Minh, Ghent University; Leo
Kestens, Ghent University; Albert Van Bael, KU Leuven **NO PAPER**
- Paper No.: 9230**
A Phenomenological Model for Multi-Scale Modeling of Microstructural Evolution in Aluminum Alloy for Axial Crush
John L. Bassani, University of Pennsylvania; Chris Kohar, University of
Waterloo; Raj K. Mishra, General Motors R&D Center; Kaan Inal, University of
Waterloo..... **NO PAPER**
- Paper No.: 9097**
Hydroforming and in-service Simulations for a Helicopter Skid Landing Gear Cross Beam
Julie Levesque, Laval University; Xavier Elie-dit-Cosaque, Laval University;
Michel Guillot, Laval University; Augustin Gakwaya, Laval University **NO PAPER**
- Paper No.: 9111**
Hot Forging Process Simulation for Aerospace Aluminium Alloy Using a Coupled Eulerian Lagrangian Formulation
Kadiata Ba, Laval University; Julie Levesque, Laval University; Michel Guillot,
Laval University; Augustin Gakwaya, Laval University **NO PAPER**

Paper No.: 8845

Material Modeling and Hole Expansion Simulation of 6000-Series Aluminum Alloy Sheet

Takahiro Mori, Tokyo University of Agriculture and Technology; Toshihiko Kuwabara, Tokyo University of Agriculture and Technology; Mineo Asano, USCJ Co.; Naoyuki Uema, USCJ Co.; Yoichi Ueno, USCJ Co.

**NO
PAPER**

Paper No.: 9227

Reconstruction of the 3D Representative Volume Element from the Generalized 2-Point Correlation Function with Validation for Failure Modeling

Mohsen Mohammadjoo, University of Alberta; Yauheni Straraselski, University of Waterloo; Abhijit Brahme, University of Waterloo; Raja K. Mishra, General Motors R&D Center; Kaan Inal, University of Waterloo

**NO
PAPER**

Paper No.: 9182

Analysis of Microstructural Evolution Kinetics of Aluminum Alloy B206 During Artificial Aging Using Non-Isothermal Calorimetry

Seyyed Mohammad Mohseni, University of British Columbia; Andre Phillion, University of British Columbia; Daan Maijer, University of British Columbia



Paper No.: 9088

Assessing the Plastic Anisotropy of Asymmetrically Rolled and Annealed Aluminum Sheets by Simulations

Tuan Nguyen Minh, Ghent University; Diarmuid Shore, KU Leuven; Albert Van Bael, KU Leuven; Leo Kestens, Ghent University

**NO
PAPER**

Paper No.: 9140

Numerical Modeling of Aluminum Extrusion Processes for Complex Hollow Profiles Based on a Spatial Flow Formulation

Pavel Hora, ETH Zurich; Christoph Becker, ETH Zurich; Longchang Tong, ETH Zurich; N. Manopulo, ETH Zurich; Joachim Maier, WEFA



Paper No.: 9112

Modeling of the Machining Process of an Aluminium Alloy Using the Ale Formulation: Application to Orthogonal Cutting

Oussama Mechri, Laval University; W. Jomma, Laval University; Mohamed Jebahi, Laval University; Michel Guillot, Laval University; Julie Levesque, Laval University; Augustin Gakwaya, Laval University

**NO
PAPER**

Paper No.: 8771

Simulation of the Concomitant Process of Nucleation-Growth-Coarsening of Al₂Cu Particles in a 319 Foundry Aluminum Alloy

Rémi Martinez, Université Laval; Daniel Larouche, Université Laval; Georges Cailletaud, Mines ParisTech, PSL Research University; Ivan Guillot, Université Paris-Est Créteil; Denis Massinon, Research and Development Montupet S.A.



Paper No.: 8792

A Coupled Experimental and Thermodynamic Modeling of the Al-Cr-Mg Ternary System

Senlin Cui, McGill University; In-Ho Jung, McGill University

**NO
PAPER**

Paper No.: 9242

Optimization of a Multi-Cellular Aluminum Extrusion for Crashworthiness Applications

Christopher P. Kohar, University of Waterloo; Mohsen Mohammadi, University of Waterloo; Abhijit Brahme, University of Waterloo; Amir Zhumagulov, University of Waterloo; Michael J. Worswick, University of Waterloo; Raja K. Mishra, General Motors Research & Development Center; Kaan Inal, University of Waterloo.....

**NO
PAPER**

**AMCAA: America's Conference of Al Alloys
Surfaces and Corrosion**

Paper No.: 9128

Invited (50 minutes): Technical Challenges Associated with the Production & Application of High Recycled Content Aluminum Sheet Products

Graeme J. Marshall, Novelis; Kevin M. Gatenby, Novelis

**NO
PAPER**

Paper No.: 8956

Evolution of Near Surface Microstructures in Aluminum-Magnesium Alloys during Hot Rolling

Mehdi Shafiei, Novelis; John A. Hunter, Novelis; Olufisayo A. Gali, University of Windsor; Reza Riahi, University of Windsor

**NO
PAPER**

Paper No.: 9217

Investigation of Formation Mechanism of Ti/Zr-Based Pretreatment Film on Aluminum Alloys using Rotating Disk Electrode

Liangliang Li, Novelis Global Research and Technology Center; Brian Walczak, Novelis Global Research and Technology Center; Sree Nimmala, Novelis Global Research and Technology Center; Kevin Johnson, Novelis Global Research and Technology Center; John Hunter, Novelis Global Research and Technology Center.....

**NO
PAPER**

Paper No.: 9191

Investigation of Filiform Corrosion on Painted 6000-Series Aluminum Alloys

Niamh Hosking, Ford Motor Company Ltd.; Mark Nichols, Ford Motor Company Ltd.



Paper No.: 8974

Behavior of Hydrogen in An Al-Zn-Mg Alloy Investigated by Means of Hydrogen Microprint Technique

Toshiaki Manaka, Ibaraki University; Syuuhei Fukasawa, Ibaraki University; Goroh Itoh, Ibaraki University.....



Paper No.: 9141

Integrity and Appearance of Anodic Films Formed on Aluminium Alloys

Xiaorong Zhou, The University of Manchester.....

**NO
PAPER**

AMCAA: America's Conference of Al Alloys
Mechanical Properties, Phase Transformations and Characterization

Paper No.: 8917

Invited (50 minutes): Materials Evaluation using Advanced Hollomon Relation Based on Taylor Slip Model-New Constitutive Relation Analyses
S. Saimoto, Queen's University; P. Van Houtte, Katholieke Universiteit, Leuven, Belgium; K. Inal, University of Waterloo; H Jin, Formerly Novelis Global Technology Centre.....

**NO
PAPER**

Paper No.: 9120

Mechanical Properties of AA6xxx-T4 Extrusions Between 4K and 298K
Anna Kula, AGH - University of Science and Technology; Q. Bian, McMaster University; Raja Mishra, General Motors R&D Center; Marek Niewczas, McMaster University.....

**NO
PAPER**

Paper No.: 9240

Grain Boundary Precipitation in 6016-type Aluminium Automotive Alloys And Its Influence On Bendability
A. Davidkov, Aleris Rolled Products Germany GmbH - Innovation Center Aachen; R.H. Petrov, Delft University of Technology & Ghent University; P.P. De Smet, Ghent University; L.A.I. Kestens, Ghent University.....

**NO
PAPER**

Paper No.: 9136

Effects of Environment on Fatigue Crack Growth Behavior in 7000 Series Aluminum Alloys
Ryuichi Yamada, Ibaraki University; Goroh Itoh, Ibaraki University; Akira Kurumada, Ibaraki University; Manabu Nakai, Kobe Steel Ltd.....



Paper No.: 8712

Effect of Porosity on the Tensile Properties of Die Cast Aluminium A360
Franco Chiesa, Centre de Metallurgie du Quebec; David Levasseur, Centre de Metallurgie du Quebec; Gheorghe Marin, Centre de Metallurgie du Quebec; Bernard Duchesne, College de Trois-Rivieres.....



Paper No.: 9077

Development of a Novel Shear Test-Experiment, Standardization and Applications
Jidong Kang, CanmetMATERIALS; David S. Wilkinson, McMaster University; Raja K. Mishra, General Motors R&D Center; David S. Sigler, General Motors R&D Center; Blair Carlson, ; Kevin Gong, Constellium ASNA; Kaan Inal, University of Waterloo.....

**NO
PAPER**

Paper No.: 9189

Invited: Quench Induced Stresses in Thick Heat Treatable Aluminium Alloy Components-Impact of Precipitation
Nicolas Chobaut, Ecole Polytechnique Federale de Lausanne; Denis Carron, Univ. Bretagne-Sud; Patrick Schloth, Ecole Polytechnique Federale de Lausanne; Jean-Marie Drezet, Ecole Polytechnique Federale de Lausanne.....

**NO
PAPER**

Paper No.: 8747

A Novel Heat Treatment Practice for Al-3%Cu-1%Mg DC Cast Ingot Plates
Emad Eldin Elgallad, University of Quebec at Chicoutimi; Peng Shen, PCP Canada; X.-G. Chen, University of Quebec at Chicoutimi.....



- Paper No.: 8855**
Dynamic Restoration Mechanisms and Grain Growth - Stabilization of Nanostructured Aluminum in Hot Consolidation
H.J. McQueen, Concordia University; H. Asgharzadeh, University of Tabriz.....
- Paper No.: 9066**
Characterization of Damage in a Cast Aluminum Alloy During Cyclic Loading Test at High Temperature by X-Ray Tomography
Sebastien Dezecot, MATEIS - INSA-Lyon; Jean-Yves Buffiere, MATEIS - INSA Lyon; Alain Koster, MINES ParisTech; Vincent Maurel, MINES ParisTech; Fabien Szymtka, PSA Peugeot Citroen.....
- Paper No.: 8888**
Effect of Mn on the Evolution of Constituent Particles in AA6082 Based Alloys
Zhijun Zhang, University of British Columbia; Chenglu Liu, University of British Columbia; Nick C. Parson, Rio Tinto Alcan; Warren J. Poole, University of British Columbia
- Paper No.: 8887**
The Effect of Chemistry and Homogenization Conditions on the High Temperature Flow Stress of AA6082 Based Alloys
Chenglu Liu, The University of British Columbia; Hamid Azizi-Alizamini, The University of British Columbia; Nick C. Parson, Rio Tinto Alcan; Warren J. Poole, The University of British Columbia.....
- Paper No.: 8823**
Effect of Thermomechanical Treatment on Mechanical Properties of A6022/A7075/A6022 Aluminum Alloy Clad Sheets Fabricated by Roll Bonding Process
Su-Hyeon Kim, Korea Institute of Materials Science; Yun-Soo Lee, Korea Institute of Materials Science; Hyoung-Wook Kim, Korea Institute of Materials Science; Joon-Hyeon Cha, Korea Institute of Materials Science
- Paper No.: 9060**
Study of the Fatigue Resistance of Very Thin Brazed Aluminum Materials used in Car Heat Exchangers
J. Paturaud, INSA-Lyon; J.Y. Buffiere, INSA-Lyon; D. Fabregue, INSA-Lyon; A.G. Villemiane, Valeo Thermal System, THS-TPT; M. Perrier, Constellium C-TEC, Constellium Technology Center.....
- Paper No.: 9094**
Tensile Deformation Behavior of Aluminum Alloys Near the Solidus Temperature
Amir Bolouri, University of Quebec at Chicoutimi; X. Grant Chen, University of Quebec at Chicoutimi.....

**NO
PAPER**



**NO
PAPER**

**NO
PAPER**



**NO
PAPER**