

TABLE OF CONTENTS

Light Metals 2009

Preface.....	xxvii
Editor's Biography	xxix
Program Organizers	xxx
Aluminum Committees.....	xxxvii

Alumina and Bauxite

Bayer Process Safety, Environmental and Sustainability Issues

The Asia-Pacific Partnership: An Important New Initiative for a Sustainable Alumina Industry	5
<i>M. Gräfe, G. Power, and C. Klauber</i>	
Operations Support in the Alumina Industry – A Valuable Partnership	11
<i>J. Berzansky</i>	
Sustainable Storm Water Management.....	15
<i>D. Smith, J. Fu, and A. Ludlow</i>	
Achieving Excellence in Liquid Effluent Treatment at Alunorte.....	21
<i>J. Aldi</i>	
Sustainability of Chinese Alumina Production from High Silica Diasporic Bauxite.....	25
<i>S. Gu, and Z. Yin</i>	
The Design of Pressure Safety Systems in the Alumina Industry	31
<i>B. Haneman</i>	
Mercury Vapor Sensor for Alumina Refinery Processes.....	37
<i>Y. Sabri, S. Ippolito, and S. Bhargava</i>	

Bauxite Ore Handling and Benefication

Mining Scheduling at Paragominas Bauxite Mine	45
<i>O. Guimaraes, H. Santos, F. Zelante, and L. Alves</i>	
Transformation of Sodalite to Cancrinite under High Temperature Bayer Digestion Conditions.....	51
<i>P. Smith, B. Xu, and C. Wingate</i>	

Desilication of Bauxite Ores Bearing Multi-Aluminosilicates by Thermochemical Activation Process	57
<i>G. Li, T. Jiang, N. Sun, X. Fan, and G. Qiu</i>	
Reductive Roasting and Magnetic Separation of Greek Bauxite Residue for Its Utilization in Iron Ore Industry	63
<i>A. Xenidis, C. Zografidis, I. Kotsis, and D. Boufounos</i>	
Reaction Behavior of Sulphur Existed in Diasporic Bauxite in Bayer Digestion Process	69
<i>Z. Yin, W. Guobao, L. Xinhua, and L. Peiqian</i>	
Roasting Pretreatment of High Sulfur Bauxite of China	75
<i>G. Lv, T. Zhang, L. Bao, Y. Liu, Z. Dou, Y. Li, X. Cao, and J. He</i>	
Study on Bayer Process and Soda-Lime Sintering Process of Special Diasporic Bauxite with High Silica	83
<i>W. Cao, W. Tian, and B. Qiao</i>	

Process Improvements and Experiences - Red Side

Advanced Process Control in Alumina Digestion Unit	91
<i>A. Oliveira, J. Batista, J. Santos, M. Ribeiro, R. Lopes, and J. Charr</i>	
The Red Mud Recycles on Bayer Process and Its Effect on the Iron Content on Liquor	97
<i>A. Oliveira, E. Ferreira, T. Ribeiro, A. Avelar, and D. Santos</i>	
Effect of Lime Quality on Slaking.....	101
<i>D. Kirkpatrick, D. Williamson, L. Blankenship, and S. Kostelak</i>	
Selection of Sedimentation Equipment for the Bayer Process - An Overview of Past and Present Technology.....	107
<i>T. Laros, and F. Baczek</i>	
A Novel Chemistry for Improved Aluminate Scale Control in Bayer Process	111
<i>J. Wang, H. Li, and K. O'Brien</i>	
Using a Statistical Model in the Red Mud Filtration to Predict the Caustic Concentration in the Red Mud.....	117
<i>A. Borges, and J. Aldi</i>	
Formation of Scales in Pipes and Equipments with Kelly Filter Liquor	121
<i>R. Galarraga, and R. Diaz</i>	
The Application of Nepheline in Alumina Industry	125
<i>Z. Liu, W. Li, W. Chen, and B. Liu</i>	

Methods - Bauxite Characterization, Bayer Chemistry, Alumina Quality

Characterisation of Iron Mineralogy in Jamaican Bauxite and Associated Aspects of Alumina and Soda Losses.....	133
<i>L. Kirwan, D. Lawson, A. Rijkeboer, K. Hodnett, A. Mooney, and R. Walker</i>	
Technological Characterization of Bauxite from Pará-Brazil	139
<i>F. Silva, F. Garrido, J. Sampaio, M. Medeiros, R. Santos, M. Carneiro, and L. Costa</i>	
Estimating Process Capability Indexes through Random Samples in CVG-BAUXILUM.....	145
<i>N. Piñero</i>	
Characterisation of Alumina and Soda Losses Associated with the Processing of Goethitic Rich Jamaican Bauxite.....	151
<i>K. Powell, L. Kirwan, D. Lawson, A. Rijkeboer, and K. Hodnett</i>	
Impact of Excess Synthetic Flocculent on Security Filtration.....	157
<i>J. Rousseaux, and P. Ferland</i>	
The Effects of Temperature, Hydrate Solids Concentration and Particle Size on Clarity in Laboratory Settling Tests.....	163
<i>S. Moffatt, and F. Bruey</i>	
Exergy Analysis of Alumina Production Heat Flow Diagrams.....	169
<i>V. Kazakov, and V. Lipin</i>	

Alumina Precipitation

Kinetics of Super-Fine Aluminum Hydroxide Precipitation from Sodium Aluminate Solutions with Gel-Seed	177
<i>J. Wang, Q. Chen, W. Li, and Z. Yin</i>	
Effect of //945;-Alanine on the Seeded Precipitation of Sodium Aluminate Solution.....	183
<i>B. Lv, Q. Chen, Z. Yin, H. Hu, and X. Chen</i>	
Effects of Four Aromatic Carboxylic Acids as Inhibitors on the Seeded Precipitation Ratios of Sodium Aluminate Solutions and the Agglomeration Efficiency of Gibbsite	189
<i>B. Lv, Q. Chen, Z. Yin, and H. Hu</i>	
Effect of Ultrasound on Particle Size Distribution of Al(OH) ₃ in Seeded Precipitation of Sodium Alumina Solution.....	193
<i>W. Yusheng, L. Mingchun, B. Shiwen, and Y. Yihong</i>	
Effect of Carbonization Seeds on Seeded Precipitation of Sodium Aluminate Solution	197
<i>W. Yusheng, B. Shiwen, and Y. Yihong</i>	

Effect of Cationic Polyacrylamide on the Seeded Agglomeration Process of Sodium Aluminate Liquors	201
<i>J. Yin, Q. Chen, Z. Yin, W. Li, and Z. Yin</i>	

Model on Batch Seeded Gibbsite Precipitation from Bayer Liquor	207
<i>J. Liu, W. Li, Y. Wang, and Z. Liu</i>	

Process Improvements and Experiences - White Side

Electrocatalytic Oxidation of Organics in Bayer Liquor	215
<i>A. Perrotta, and F. Williams</i>	

The Influence of Moisture in the Attrition Index of Alumina	219
<i>J. Lima, J. Ribeiro, C. Júnior, and C. Batista</i>	

The World’s Largest Hydrate Pan Filter: Engineering Improvements and Experiences.....	223
<i>B. Petersen, M. Bach, and R. Arpe</i>	

Superior Arguments for Most Modern Filtration Technologies in High Capacity Alumina Refineries	229
<i>R. Bott, T. Langeloh, and J. Hahn</i>	

Energy Efficiency in Gas Suspension Calciners (GSC)	235
<i>S. Wind, and B. Raahauge</i>	

Increased Availability and Optimization of Calciner Performance Due to Automation	241
<i>M. Missalla, J. Jarzembowski, R. Bligh, and H. Schmidt</i>	

Author Index	1249
--------------------	------

Subject Index	1257
---------------------	------

TABLE OF CONTENTS

Light Metals 2009

Preface.....	xxvii
Editor's Biography	xxix
Program Organizers	xxx
Aluminum Committees.....	xxxvii

Aluminum Reduction Technology

Environment

Global Anode Effect Performance: 2010 PFC Emissions Reduction Objective Met.....	251
<i>J. Marks</i>	
An Innovative Method for Sampling and Analysis of Tetrafluoromethane and Hexafluoroethane Emitted from Aluminium Smelter Using Sorbent Tubes.....	255
<i>J. Ross, V. Bouchard, M. Gagnon, and J. Maltais</i>	
Initiatives to Reduce Anode Effect Frequency at Dubal	259
<i>A. Kumar, A. Zaroni, and M. Jallaf</i>	
Handling Co ₂ EQ from an Aluminum Electrolysis Cell	263
<i>O. Lorentsen, A. Dyroy, and M. Karlsen</i>	
Comparison of PFC Emission for Operating and Newly Started Pots at the Alcoa Fjardaal Point Fed Prebake Smelter.....	269
<i>N. Dando, W. Xu, and J. Marks</i>	
Dry Scrubbing for Modern Pre-Bake Cells	275
<i>S. Lindsay, and N. Dando</i>	
Pot Gas Heat Recovery and Emission Control	281
<i>G. Wedde, and A. Sorhuus</i>	
Development of a Jet Induced Boosted Suction System to Reduce Fluoride Emissions	287
<i>M. Meyer, G. Girault, and J. Bertolo</i>	
The Impact of Ambient Wind on the Vertical Component of Smelter Roofvent Flow Velocity.....	293
<i>M. Gershenson, and N. Dando</i>	

Process Control

Correlation between Anode Properties and Cell Performance	301
<i>T. Jentoftsen, H. Linga, B. Aga, V. Christensen, F. Hoff, and I. Holden</i>	
Multivariate Statistical Process Monitoring of Reduction Cells.....	305
<i>J. Tessier, T. Zwirz, G. Tarcy, and R. Manzini</i>	
Development of a Multivariate Process Control Strategy for Aluminium	311
<i>M. Stam, M. Taylor, J. Chen, A. Mulder, and R. Rodrigo</i>	
Controlled Cooling of Aluminium Smelting Cell Sidewalls Using Heat Exchangers Supplied with Air	317
<i>S. Namboothiri, P. Lavoie, D. Cotton, and M. Taylor</i>	
Power Modulation within Alcoa Warrick Operations	323
<i>E. Kuhn, and N. Malcolm</i>	
Challenges in Power Modulation.....	327
<i>D. Eisma, and P. Patel</i>	
Electrical Power Availability Optimization at Alcoa Deschambault’s Smelter	333
<i>V. Letellier, and N. Plante</i>	
Increasing Electrolysis Pot Performances through New Crustbreaking and Feeding Solutions	337
<i>N. Dupas</i>	

New Pot Technology and Pot Start-Up

Start-Up of New Generation SY350/SY400 Pot	343
<i>K. Sun, X. Yang, Y. Liu, and J. Zhu</i>	
The Hamburg Smelter – A Study of the Cathode Performance.....	347
<i>T. Reek</i>	
Spent Si ₃ N ₄ Bonded SiC Sidelineing Materials in Aluminium Electrolysis Cell	353
<i>Z. Wang, E. Skybakmoen, and T. Grande</i>	
2008: A Milestone in the Development of the DX Technology.....	359
<i>B. Kakkar, M. deZelicourt, A. Zarouni, A. Kalban, M. Al-Jallaf, I. Baggash, and K. Alaswad</i>	
AP50 Performances and New Development.....	365
<i>B. Benkahla, O. Martin, and T. Tomasino</i>	

HAL4e – Hydro's New Generation Cell Technology	371
<i>A. Bardal, C. Droste, F. Øvstetun, E. Haugland, E. Wedershoven, M. Liane, B. Aga, S. Ryman, A. Berveling, M. Karlsen, M. Fechner, and T. Vee</i>	

The Advancement of New Generation SY350 Pot	377
<i>Z. Ming, Y. Xiaodong, L. YaFeng, and S. KangJian</i>	

Fundamentals

Alumina Dissolution in Aluminum Smelting Electrolyte.....	383
<i>X. Wang</i>	

Alumina Dissolution and Current Efficiency in Hall-Heroult Cells.....	389
<i>B. Lillebuen, M. Bugge, and H. Høie</i>	

The Behaviour of Moisture in Cryolite Melts.....	395
<i>K. Osen, C. Rosenkilde, A. Solheim, and E. Skybakmoen</i>	

Physical-Chemical Properties of the KF-NaF-AlF ₃ Molten System with Low Cryolite Ratio.....	401
<i>O. Tkatcheva, A. Apisarov, A. Dedyukhin, A. Redkin, E. Nikolaeva, Y. Zaikov, and P. Tinghaev</i>	

Aspects of Crust Formation from Today's Anode Cover Material	405
<i>T. Groutso, M. Taylor, and A. Hudson</i>	

Sideledge in Aluminium Cells: The Trench at the Metal-Bath Boundary.....	411
<i>A. Solheim, H. Gudbrandsen, and S. Rolseth</i>	

Inert Anode: Challenges from Fundamental Research to Industrial Application.....	417
<i>V. Nora, and T. Nguyen</i>	

Studies on the Possible Presence of an Aluminum Carbide Layer or Bath Film at the Bottom of Aluminum Electrolysis Cells.....	423
<i>S. Rolseth, E. Skybakmoen, H. Gudbrandsen, and J. Thonstad</i>	

Solid State Carbothermal Reduction of Alumina	429
<i>D. Liu, G. Zhang, J. Li, and O. Ostrovski</i>	

In-Situ Analysis Methods for Electrowinning in Chloride and Fluoride Baths.....	435
<i>K. McGregor, G. Snook, A. Urban, M. Lanyon, N. Scarlett, and I. Madsen</i>	

Operational Improvements

AP30 toward 400 kA	445
<i>L. Fiot, C. Ritter, R. Santerre, H. Vermette, and O. Martin</i>	
Evolution of CD20 Reduction Cell Technology towards Higher Amperage Plan at Dubal	451
<i>M. Al-Jallaf, A. Zarouni, A. Kumar, and M. Ali</i>	
ACD Measurement and Theory	455
<i>M. Jensen, K. Kalgraf, T. Nordbø, and T. Pedersen</i>	
Improved Cell Operation by Redistribution of the Alumina Feeding	461
<i>B. Moxnes, A. Solheim, M. Liane, A. Halkjelsvik, and E. Svinsås</i>	
Improving Anode Cover Material Quality at Nordural – Quality Tools and Measures	467
<i>H. Gudmundsson</i>	
Comparison of Bubble Noise of Søderberg Pots and Prebake Pots.....	473
<i>K. Kalgraf, M. Jensen, T. Pedersen, and T. Nordbø</i>	
Development of D18 Cell Technology at Dubal	477
<i>D. Whitfield, A. Said, M. Al-Jallaf, and A. Zarouni</i>	

Potroom Operation and Maintenance

Alcoa Maintenance Best Practices: To Achieve Excellence in Planning, Scheduling, Autonomous Maintenance and Reliability.....	485
<i>M. Beaudry, and M. Plante</i>	
Alcoa Warrick Operations Sustainability Activities.....	489
<i>N. Malcolm, and E. Kuhn</i>	
Reliability and Maintenance Excellence from "Cradle to Grave"	493
<i>S. Mathieu</i>	
Pure Metal Production and Methodology: The Alcoa Deschambault Experience	499
<i>S. Lindsay, and P. Doiron</i>	
A Simple Method for Alumina Homogenization in Large Silos	505
<i>G. Wedde, K. Rye, and G. Nyland</i>	
Issues Arising from the Back EMF in Potlines.....	509
<i>A. Mohamed, A. Kumar, and M. Jallaf</i>	
Electrolysis Pots Anode Changing Automation: Impact on Process and Safety Performances.....	515
<i>N. Dupas</i>	

Automated Stub Inspection System for Söderberg Technology.....	519
<i>J. Gagne, R. Minville, D. Bérubé, L. Paulino, and G. Dufour</i>	
Logistic Simulation of Discrete Material Flow and Processes in Aluminum Smelters.....	523
<i>A. Winkelmann, I. Eick, C. Droste, and M. Segatz</i>	
Potroom Metal Treatment by Charcoal Filtration - Removing Lithium and Other Alkaline Metals from the Aluminum.....	529
<i>A. Abbe</i>	

Modelling

Busbar Arrangement Optimization for End Cells.....	535
<i>D. Ziegler, and Y. Ruan</i>	
Heat Transfer Considerations for DC Busbars Sizing	539
<i>A. Schneider, T. Plikas, D. Richard, and L. Gunnewiek</i>	
The Effect of Channel Width under Different Bath Forces on the Aluminium Reduction Cell Current Efficiency	545
<i>M. Ali, M. Doheim, and A. El-Kersh</i>	
The Impact of Cell Ventilation on the Top Heat Losses and Fugitive Emissions in an Aluminium Smelting Cell.....	551
<i>H. Abbas, M. Taylor, M. Farid, and J. Chen</i>	
A Modelling Approach to Estimate Bath and Metal Heat Transfer Coefficients.....	557
<i>D. Severo, and V. Gusberti</i>	
Comparison of Two Different Numerical Methods for Predicting the Formation of the Side Ledge in an Aluminium Electrolysis Cell.....	563
<i>C. Bertrand, M. Marois, M. Desilets, M. Lacroix, and M. Coulombe</i>	
Solutions for the Metal-Bath Interface in Aluminium Electrolysis Cells.....	569
<i>V. Bojarevics, and K. Pericleous</i>	
Study of Current Distribution in the Metal Pad of Aluminum Reduction Cells.....	575
<i>Q. Xiquan, L. Dingxiong, M. Shaoxian, and W. Jihong</i>	
Fluid Flow and Bubble Behavior in the Aluminum Electrolysis Cell.....	581
<i>L. Zhang, Y. Wang, and X. Zuo</i>	

Poster Session

Detecting Abnormalities in Aluminium Reduction Cells Based on Process Events Using Multi-Way Principal Component Analysis (MPCA).....	589
<i>B. Young, J. Chen, N. Majid, and M. Taylor</i>	
Author Index	1249
Subject Index	1257

TABLE OF CONTENTS

Light Metals 2009

Preface.....	xxvii
Editor's Biography	xxix
Program Organizers	xxxix
Aluminum Committees.....	xxxvii

Cast Shop for Aluminum Production

Engineering and Industrial Developments

Hindalco Almex Aerospace Limited – A New Greenfield Aerospace Alloy Casthouse	599
<i>S. Hamer, and L. Fortier</i>	
Qatalum Cast House	605
<i>A. Home, and A. Troppeano</i>	
CVG Venalum- Design of a 55 t Tilting Melting Furnace	609
<i>S. Barry, F. Rodriguez, and O. Gil</i>	
Advanced Control of a Rotary Drum Furnace in a Secondary Smelter.....	615
<i>D. Maiwald</i>	
Fluid Modeling of the Flow and Free Surface Parameters in the Metallurgical LOTUSS System.....	621
<i>M. Bright, F. Illinca, J. Hetu, F. Ajersch, C. Saliba, and C. Vild</i>	
Electromagnetic Stirring in Aluminum Ladles	627
<i>R. Stål, and P. Hanley</i>	
Optifine - A Grain Refiner with Maximized Nucleation Efficiency	631
<i>R. Vainik, and J. Courtenay</i>	
New Grain Refiner Containing Ternary Carbide Nucleant Particles.....	637
<i>M. Suarez, M. Martin, and A. Banerji</i>	
New SiC-Graphite Castable for Molten-Metal Transfer Units.....	641
<i>C. Allaire</i>	

Environment, Health and Safety

Sustainability and the Aluminum Industry: Future Strength	649
<i>S. Larkin</i>	
Meeting Environmental Challenges in the Casthouse	653
<i>C. Chesonis, E. Williams, and D. DeYoung</i>	
Beryllium in Dross Produced during Aluminum Melting	659
<i>D. DeYoung, and J. Peace</i>	
Molten Metal Explosions Are Still Occurring	665
<i>S. Epstein</i>	
Safety Coatings to Prevent Molten Aluminum-Water Explosions	667
<i>J. Roberts, and A. Lowery</i>	
The Role of Automation in Explosion Prevention in Sheet Ingot Casting	669
<i>D. Bernard</i>	
Benefits to Safety Performance at ALBA from Use of the Wagstaff AutoFlo™ System for Casting of Extrusion Ingot	675
<i>T. Al Ansari, H. Alali, M. Jacobs, J. Mohammed, M. Kadhem, and G. Martin</i>	

Characterization and Furnace Operation

A Review of Inclusion Detection Methods in Molten Aluminium.....	681
<i>S. Poynton, M. Brandt, and J. Grandfield</i>	
A New Methodology for Performance Evaluation of Melt Refinement Processes in the Aluminum Industry.....	689
<i>B. Prillhofer, H. Böttcher, and H. Antrekowitsch</i>	
A Multiphase Model to Describe the Behaviour of Inclusions in LiMCA Systems	695
<i>X. Wang, M. Isac, and R. Guthrie</i>	
Hydrogen Measurement Practices in Liquid Aluminium at Low Hydrogen Levels	701
<i>M. Badowski, and W. Droste</i>	
Accurate Measurement of Hydrogen in Molten Aluminium Using Current Reversal Mode.....	707
<i>M. Hills, C. Thompson, M. Henson, A. Moores, C. Schwandt, and V. Kumar</i>	
Increasing the Surface Emissivity of Aluminum Shapes to Improve Radiant Heat Transfer.....	713
<i>R. Chandler, and P. Shull</i>	

Waste Heat Recovery in an Aluminium Cast House	717
<i>T. Schmidt, and J. Migchielsen</i>	
Reducing Metal Loss in Side Well Charged Melters with Invisiflame Burner Technology	721
<i>J. Feese, and F. Lisin</i>	
Structure and Features of Slag from the Aluminum and Aluminum Alloys Melting and the Consequences.....	727
<i>S. Novichkov, and A. Zholnin</i>	
<u>Molten Metal Cleanliness</u>	
Improvements in the Molten Metal Process Chain in the Cast House Based on Modeling - Achievements so Far and Challenges Left	735
<i>G. Gruen, and A. Buchholz</i>	
Aluminium Flotation in Stirred Reactor: A Mathematical Model and a Computer Simulation Coupling CFD and Population Balance	743
<i>O. Mirgaux, J. Bellot, E. Waz, and D. Ablitzer</i>	
Development and Practical Performance Characteristics of a New Impeller for Metal Treatment in Casting/Holding Furnaces	749
<i>B. Prillhofer, H. Böttcher, and H. Antrekowitsch</i>	
Operational Experience with a Large Capacity Integrated TAC (Treatment of Aluminium in a Crucible) and a Skimmer	755
<i>B. Maltais, D. Prive, and A. Hashimi</i>	
Comments on the Capture Mechanisms and Surface Forces Acting during Liquid Aluminum Depth Filtration.....	761
<i>H. Duval, V. Ghetta, E. Laé, N. Ruscassier, J. Trubuil, F. Wheling, and J. Guillot</i>	
Wetting of Pure Aluminium on Filter Materials Graphite, AlF ₃ and Al ₂ O ₃	767
<i>S. Bao, A. Kvithyld, S. Gaal, T. Engh, and M. Tangstad</i>	
Trial Results with an Improved System of Filtration of Molten Aluminium Based on a Three Stage Reactor Employing a Cyclone as Its Final Stage.....	773
<i>J. Courtenay, and F. Reusch</i>	
Removal of Iron and Manganese in Aluminium Alloys by Adding Magnesium and Subsequent Centrifuging.....	777
<i>C. Simensen, and P. Le Brun</i>	
Molten Metal Quality and Productivity Improvements by Process Optimization in Continuous Casting.....	783
<i>V. Ohm, P. Bauer, S. Schormann, and G. Jerusalem</i>	

Casting Structure vs. Process

Recovery vs Structure Driven DCCasting Process Optimisation	791
<i>P. Jarry</i>	
3D Modeling of the Flow and Heat Transfer during DC Casting with a Combo Bag	799
<i>F. Ilinca, J. Hétu, A. Arsenault, D. Larouche, and S. Tremblay</i>	
Advanced CFD Modeling of DC Casting of Aluminum Alloys.....	805
<i>M. Hasan, and K. Ramadan-Ragel</i>	
Mathematical Modeling of DC Cast Sheet Ingots Using a Semi-Solid Tensile Constitutive Behaviour for Hot Tearing Prediction.....	811
<i>D. Larouche, D. Nguyen, S. Cockcroft, and A. Larouche</i>	
A Comparison of Hot Tear Testing and Hot Tensile Testing of Al – Cu Alloys	817
<i>D. Viano, M. Wells, and D. StJohn</i>	
Influence of Iron and Manganese on Structure and Microporosity of the DC Cast AA5083 Alloy.....	823
<i>C. Stanica, P. Moldovan, G. Dobra, C. Stanescu, and D. Bojin</i>	
Influence of Ultrasonic Melt Treatment on Structure Formation in Aluminum Alloys with High Amount of Transition Metals.....	827
<i>T. Atamanenko, D. Eskin, and L. Katgerman</i>	
Ultrasonic Treatment of a Solidifying Al-Cu Melt in the Presence of Micron-Sized Hydrogen Bubbles	831
<i>M. Hasan, and A. Naji-Meidani</i>	
Silicon Crystal Formation during DC Casting of Aluminium-Silicon Alloys.....	837
<i>T. Carlberg</i>	
Effect of Application of Out-Phase Electromagnetic Field on Horizontal Direct Chill Casting of 7075 Aluminum Alloy.....	843
<i>Q. Zhu, Z. Zhao, J. Cui, and Y. Zuo</i>	

Casting Technology

Remelt Ingot Production Technology.....	851
<i>J. Grandfield</i>	
Nanotechnology Breakthrough Optimises Casting Process	859
<i>V. Hofmann</i>	

A Simplified Method to Characterize Mold Cooling Heat Transfer and an Experimental Study of Impacts of Water Temperature on Ingot Casting	863
<i>S. Bolduc, H. Yu, and L. Kiss</i>	
Advances in Cooling Water Deposit Control for Direct Chill Ingot Casting	871
<i>Y. Lefebvre, C. Sui, and W. Whitekettle</i>	
Heat Transfer During Rod Casting	877
<i>L. Cottignies, V. Duhoux, S. Blais, and C. Duran</i>	
Prevention of Starting Cracks in Al-Billets: Feasible Methods for Float and Spout DC-Casting	883
<i>M. Rosefort, T. Koehler, and H. Koch</i>	
Improving the Surface of AA6111 Sheet Material, Cast at High Speeds, through the Use of Macroscopically Textured Substrates.....	889
<i>D. Li, L. Calzado, M. Isac, and R. Guthrie</i>	
Reinventing Twin Roll Casting for the 21st Century	895
<i>E. Romano, and C. Romanowski</i>	
Author Index	1249
Subject Index	1257

TABLE OF CONTENTS

Light Metals 2009

Preface.....	xxvii
Editor's Biography	xxix
Program Organizers	xxxI
Aluminum Committees.....	xxxvii

Electrode Technology for Aluminum Production

Environmental Issues and Raw Materials

Anode Reactivity: Effect of Coke Calcination Level	905
<i>M. Chollier, A. Gagnon, C. Boulanger, D. Lepage, G. Savard, G. Bouchard, C. Lagacé, and A. Charette</i>	
Carbon Products: A Major Concern to Aluminum Smelters	909
<i>U. Mannweiler, W. Fischer, and R. Perruchoud</i>	
Evaluation of the Necessary Amount of Quinoline Insolubles in Binder Pitch	913
<i>J. Baron, S. McKinney, and R. Wombles</i>	
Environmental and Operating Benefits of a New Fume Treatment System at a Paste Mixing Plant.....	917
<i>M. Hagen, and R. Forster</i>	
From the "Low Caustic Leaching and Liming" Process Development to the Jonquiere Spent Potlining Treatment Pilot Plant Start-up, 5 Years of Process up-Scaling, Engineering and Commissioning.....	921
<i>G. Hamel, R. Breault, G. Charest, S. Poirier, and B. Boutin</i>	
Quality of Russian Petroleum Cokes for Aluminum Production.....	927
<i>V. Buzunov, A. Tayanchin, I. Cherskikh, and V. Polovnikov</i>	

Special Session: Coke Quality Changes and Countermeasures

Coal Tar Pitch: Past, Present, and Future	935
<i>J. Baron, R. Wombles, and S. McKinney</i>	
US Refining Economics – A Model Based Approach.....	941
<i>T. Dixon</i>	
Enhancing Coke Bulk Density through the Use of Alternative Calcining Technologies.....	945
<i>K. Ries</i>	

Anode Coating to Prevent Air Burn Oxidation in Aluminium Smelters951
*M. Jahedi, A. Oh, E. Gulizia, S. Gulizia, A. Malallah, M. Jallaf, N. Jabri,
and A. Zarouni*

Minimizing Impact of Low Sulfur Coke on Anode Quality.....957
A. Adams, R. Cahill, Y. Belzile, K. Cantin, and M. Gendron

Mild Coal Extraction for the Production of Anode Coke963
R. Andrews, D. Jacques, and T. Rantell

Joint Reduction and Electrode Technology Session: Coping with Changes in Coke Quality

Inert Anodes - The Status of the Materials Science, the Opportunities They Present and the Challenges that Need Resolving Before Commercial Implementation971
B. Welch

Use of Under-Calcined Coke for the Production of Low Reactivity Anodes.....979
J. Lhuissier, L. Bezamanifary, M. Gendre, and M. Chollier

Use of Shot Coke as an Anode Raw Material.....985
*L. Edwards, F. Vogt, R. Love, T. Ross, W. Morgan, M. McClung, R. Roush,
and M. Robinette*

Maintaining Consistent Anode Density Using Varying Carbon Raw Materials991
S. Wilkening

The Origin and Abatement of SO₂ Emissions from Primary Aluminium Smelters.....999
S. Broek, and B. Rogers

The Downstream Consequences of Rising Ni and V Concentrations in Smelter Grade Metal and Potential Control Strategies1007
J. Grandfield, and J. Taylor

Anode Production Operations - Focus on Baking

Anode Baking: The Underestimated Human Aspect.....1015
F. Keller, W. Fischer, and P. Sulger

A New Concept for Baking Anodes – Initial Full Scale Test Results and Future Potential.....1021
R. Lazarou, W. Leisenberg, W. Morgan, B. Sadler, K. Watson, and D. Schubert

Resistance Heating of Laboratory Scale Prebake Anodes1027
S. Rørvik, T. Foosnæs, H. Linga, and A. Ratvik

Reliable Blocked Flue Wall Detection for Enhanced Safety at Anode Baking Furnaces1033
P. Mahieu, A. Pinoncely, and J. Peenz

Which Strategy to Use When Sampling Anodes for Coring And Analysis? - Start with
How the Data Will be Used1037
K. Sinclair, and B. Sadler

Simulation-Based Approach for Validating a Lean Anode Plant Configuration1043
R. Baxter, T. Bouk, L. Tikasz, and R. McCulloch

Environmental Improvements During the Handling of Packing Coke at the Albras' Bake
Furnaces1049
P. Vasconcelos, and A. Mesquita

Electrode Connections and Cathode Studies

FEM Analysis of Voltage Drop in the Anode Connector Assembly1055
H. Fortin, M. Fafard, N. Kandev, and P. Goulet

Electrical Losses in the Stub-Anode Connection: Computer Modeling and Laboratory
Characterization1061
N. Kandev, and H. Fortin

Challenges in Stub Hole Optimisation of Cast Iron Rodded Anodes1067
D. Richard, P. Goulet, O. Trempe, M. Dupuis, and M. Fafard

New Solutions for Stub-Anode Connection at Egyptalum1073
A. Nofal, M. Waly, M. Agour, and S. Mohamed

Use of Cell Autopsy to Diagnose Potlining Problems1079
R. Jeltsch

Autopsies of Spent Refractory Pot Linings – A Revised View1085
K. Tschöpe, C. Schøning, and T. Grande

Energy Recovery and Amperage Increase in Aluminium Cells by Active Cooling of the
Anode Yokes1091
A. Solheim, B. Moxnes, K. Vamraak, and E. Haugland

Modelling of Collector Bar Sealing in Cathode Blocks with Cast-Iron1097
B. Allard, S. Lacroix, J. Noyel, and L. Rivoaland

Evaluation of Contact Resistance in Electrodes of Hall-Heroult Process1103
L. Kiss, L. St-Georges, and M. Rouleau

Electrode Technology - Cathodes and Inert Anodes

Formation and Dissolution of Aluminium Carbide in Cathode Blocks.....	1111
<i>K. Vasshaug, T. Foosnæs, G. Haarberg, A. Ratvik, and E. Skybakmoen</i>	
Resistivity Change of Cathode Graphite during and after Electrolysis in Alumina Molten Salt	1117
<i>N. Akuzawa, M. Chiwata, M. Hagiwara, Y. Sato, and H. Imagawa</i>	
Study of Aluminum Carbide Formation in Hall-Heroult Electrolytic Cells.....	1123
<i>A. Zoukel, P. Chartrand, and G. Soucy</i>	
The Effect of Potassium Cryolite on Construction Materials under Electrolysis Condition	1129
<i>Y. Zaikov, A. Kataev, A. Chuikin, N. Shurov, A. Redkin, A. Frolov, and A. Gusev</i>	
Electrochemistry of Tin-Species in Mid Temperature Cryolite-Alumina Melt.....	1135
<i>S. Vassiliev, V. Laurinavichute, A. Abakumov, E. Bendovskii, A. Filatov, D. Simakov, A. Gusev, E. Antipov, and G. Tsirlina</i>	
Mechanically Alloyed Cu-Ni-Fe Based Materials as Inert Anode for Aluminium Production	1141
<i>B. Assouli, M. Pedron, S. Helle, D. Guay, L. Roue, and A. Carrere</i>	
Effects of Pitches Modification on Properties of TiB ₂ -C Composite Cathodes	1145
<i>L. Xiaojun, X. Jian, L. Yanqing, L. Jie, F. Zhao, S. Yan, and L. Yexiang</i>	
Influence of Metallic Additives on Densification Behaviour of Hot-Pressed TiB ₂	1151
<i>X. Luo, Z. Wang, X. Hu, Z. Shi, B. Gao, C. Wang, G. Chen, and G. Tu</i>	

Poster Session

Lining Materials and Their Arrangement for Longer Life of Aluminum Reduction Cells	1159
<i>Q. Xiquan, M. Shaoxian, W. Dequan, and M. Jihong</i>	
Empiric Mathematical Models for Real Density of Calcined Coke Based on Industrial Data	1163
<i>E. Silva, D. Júnior, A. Santos, M. Giuliatti, and S. Derenzo</i>	
Numerical Analysis of the Anode Voltage Drop of a Reduction Cell.....	1169
<i>W. Li, J. Zhou, and Y. Zhou</i>	
Boron Salt Inhibitors of Air Reactivity of Prebaked Carbon Anodes – Literature Review and Laboratory Studies	1173
<i>R. Tosta, E. Inzunza, and L. Delgado</i>	

Analysis of Sodium and Cryolite Bath Penetration in the Cathodes Used for Aluminum
Electrolysis.....1177
J. Xue, W. Ou, J. Zhu, and Q. Liu

Author Index1249

Subject Index1257

TABLE OF CONTENTS

Light Metals 2009

Preface.....	xxvii
Editor's Biography	xxix
Program Organizers	xxxI
Aluminum Committees.....	xxxvii

Aluminum Hot and Cold Rolling and Strip Processing

Aluminum Hot Rolling

Profile Optimization on a Duo Hot Mill.....	1185
<i>K. Karhausen, I. Neitzel, and L. Francescutti</i>	
Evaluation of Recovery Kinetics of the Aluminum Alloy AA3103 Using Stress Relaxation and Double Tension Tests	1191
<i>S. Bhaumik, G. Gottstein, and V. Mohles</i>	
Effect of Homogenization Treatment on Microstructural Evolution of 1050 and 1200 TRC Aluminium Alloys.....	1195
<i>A. Dursun, B. Corlu, C. Inel, M. Dundar, and S. Aktuđ</i>	
Characterization of Edge Cracking Using a Crystal Plasticity Model with Damage Evolution.....	1201
<i>S. Kweon, A. Beaudoin, and R. McDonald</i>	

Aluminum Cold Rolling and Strip Processing

Cold Rolling Processes to Functionalize Semi-Finished Products.....	1209
<i>G. Hirt, K. Putten, R. Kopp, and M. Thome</i>	
Analytical Stress Field Modelling of Rolled Aluminium Strips Under Tensile Loading.....	1215
<i>H. Aretz, S. Neumann, and K. Karhausen</i>	
Recrystallization Texture Development Under Various Thermo-Mechanical Conditions in Aluminum Alloys	1221
<i>J. Sidor, A. Miroux, R. Petrov, and L. Kestens</i>	
Experimental Procedures for Characterization of Static Recovery in Cold Rolling Processes of AlFeSi Alloys.....	1225
<i>C. Heering, X. Li, G. Hirt, and M. Bambach</i>	

The Effect of Recrystallization Phenomena During Annealing on the Final Forming Properties of TRC AA8006	1231
<i>S. Katsas, and C. Gras</i>	
Innovations in Surface Quality Inspection as a Cornerstone for Production Optimization.....	1235
<i>U. Knaak, and E. Jannasch</i>	
The Origin of Matt Side Streakiness in Aluminum Alloys.....	1239
<i>S. Katsas, N. Kamp, and V. Vache</i>	
Effects of Annealing Process on Intermetallic Compound of Carbon Steel/Al Cladding Strip.....	1243
<i>G. Zu, W. Wang, and J. Yu</i>	
Author Index	1249
Subject Index	1257