3-29-2015

Beneficiation of Phosphates VII CONFERENCE PROGRAM

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Florida Industrial and Phosphate Research Institute

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Program

Beneficiation of Phosphates VII
An ECI Conference Series
March 29-April 3, 2015
Melbourne, Australia

Chair
Dr. Patrick Zhang
Florida Industrial and Phosphate Research Institute

Co-Chairs
Professor Jan Miller
University of Utah, USA
Dr. Julian Hilton
Aleff Group, United Kingdom

Professor Laurindo Leal Filho
University of Sao Paulo/Vale, Brazil
Dr. Abdelaâli Kossir
OCP Group, Morocco

Mr. Ewan Wingate
WorleyParsons Services Pty Ltd, Australia
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Glenn Gruber, Jacobs Engineering Group
Hans Huckstedt, LL Namibia Phosphates
Chaucer Hwang, The Mosaic Company
Pieter Jacobs, Foskor
Andrew James, Phosphate Australia Limited
Jaisen Kohmuench, Eriez Magnetics
Tianxiang Li, Wengfu Group, China
Hamid Mazouz, OCP Group, Morocco
Wenyi Song, China Bluestar Lehigh Eng. Corp., China
Jorgen Stenvold, Yara International ASA
Previous conferences in this series:

Beneficiation of Phosphates: Theory and Practice
December 5-10, 1993
Palm Coast, Florida
Conference Chairs:
Ronald Wiegel, IMCF
Hassan El- Shall, Florida Institute Phosphate Research, USA
Brij Moudgil, University of Florida, USA

Beneficiation of Phosphates II
December 6 - 11, 1998
Palm Coast, Florida
Conference Chairs:
Patrick Zhang, Florida Institute of Phosphate Research, USA
Ronald Wiegel, University of Minnesota, USA
Hassan El-Shall, Florida Institute Phosphate Research, USA

Beneficiation of Phosphates III
December 2-7, 2001
St. Petersburg, Florida
Conference Chairs:
Patrick Zhang, Florida Institute of Phosphate Research, USA
P. Somasundaran, Columbia University, USA
Hassan El-Shall, Florida Institute Phosphate Research, USA
R. Stana, R. Squared S., Inc., USA

Beneficiation of Phosphates IV
December 5-10, 2004
Miami Beach, Florida
Conference Chairs:
Patrick Zhang, Florida Institute of Phosphate Research, USA
Hassan El-Shall, Florida Institute Phosphate Research, USA
Jan Miller, University of Utah
R. Stana, R. Squared S., Inc., USA

Beneficiation of Phosphates V
February 17-22, 2008
Rio de Janeiro, Brazil
Conference Chairs:
Patrick Zhang, Florida Institute of Phosphate Research, USA
Hassan El-Shall, Florida Institute Phosphate Research, USA
Laurindo Leal Filho, University of Sao Paulo, Brazil
Karen Swager, Mosaic Fertilizer LLC, USA

Beneficiation of Phosphates VI
March 6-11, 2011
Kunming, China
Conference Chair:
Patrick Zhang, Florida Institute of Phosphate Research, USA
Conference Sponsors

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Sunday, March 29, 2015

16:00 - 19:00       Conference check-in (Function Foyer)
18:00 - 19:00       Welcome Reception
19:00 - 21:00       Dinner

Notes

• All technical sessions will be in Parkside Room B.

• Meal locations will be announced on site.

• No recording, please! The use of any devices to capture images (e.g., camera or camera phones) or sound (e.g., tape and digital recorders) is strictly prohibited at all technical and poster sessions without the express written consent, obtained in advance, from ECI.

• Speakers – Please have your presentation loaded onto the conference computer prior to the session start (preferably the day before).

• Speakers – Please leave at least 3-5 minutes for questions and discussion.

• Please do not smoke at any conference functions.

• Turn your mobile telephones to vibrate or off during technical sessions.

• Please write your name on your program so that it can be returned to you if lost or misplaced.

• After the conference, ECI will send an updated participant list to all participants. Please check your listing now and if it needs updating, you may correct it at any time by logging into your ECI account.
**Monday, March 30, 2015**

06:30 - 08:30  Breakfast

**Opening Remarks**

08:30 - 08:35  Conference Chair: Patrick Zhang, Florida Industrial and Phosphate Research Institute, USA

**Welcoming Remarks**

08:35 - 08:45  ECI Liaison: Alan Hatton, Massachusetts Institute of Technology, USA

08:45 - 08:55  Ewan Wingate, WorleyParsons Services Pty Ltd., Australia

**Session I: Comprehensive Extraction**

Session Co-Chairs: Abdelaali Kossir, OCP Group, Morocco
Gary Albarelli, Florida Industrial and Phosphate Research Institute, USA

**Keynote 1:**

08:55 - 09:35  Smart, sustainable development of phosphate resources: The prospects of phosphogypsum utilization and uranium recovery
Julian Hilton, Aleff Group, United Kingdom

09:35 - 10:05  Recovery of REE from an apatite concentrate in the nitrophosphate process of fertilizer production
Mahmood Alemrajabi, Royal Institute of Technology (KTH), Sweden

10:05 - 10:35  There and back again 2.5: Who did what in solvent extraction - a demonstrated and proven technology for uranium recovery from phosphoric acid
Vaughn Astley, Dr. Phosphate, Inc., USA

10:35 - 11:05  Coffee break

11:05 - 11:35  Enrichment of rare earth elements from Florida phosphate flotation tailings
Yan Wu, China University of Geosciences, China

11:35 - 12:05  Rare earths and the recovery of administratium from phosphates
Vaughn Astley, Dr. Phosphate, Inc., USA

12:05 - 12:35  Upgrading phosphate flotation tailings for rare earths extraction
Salah Al-Thyabat, Al-Hussein Bin Tall University, Jordan

12:35 - 14:15  Lunch
Monday, March 30, 2015 (continued)

Session II: Process Innovation
Session Co-chairs: Laurindo Leal Filho, Vale Technological Institute, Brazil
Arafat Ghosheh, Saudi Arabian Mining Co. Ma’Aden, Saudi Arabia

Keynote 2:
14:30 - 15:15
The surface and colloid chemistry of layered silicate minerals
Jan Miller, University of Utah, USA

15:15 - 15:45
Tenova Bateman technologies: Tailor made approaches for mechanical beneficiation of phosphate rock
Leonid Lisiansky, Tenova Bateman Technology, Israel

15:45 - 16:15
Coffee break

16:15 - 16:45
Water quality effect in phosphate flotation: Understanding leads to overcoming
Lucas R. Moore, ArrMaz, USA

16:45 - 17:15
An alternative flotation process for apatite concentration of the Itataia carbonaceous uranium-phosphate ore
Elves Matiolo, Centro de Tecnologia Mineral, Brazil

17:15 - 17:45
Study on mineral processing of a medium to low grade phosphate ore
Mei Yang, China University of Geosciences, China

17:45 - 18:15
Application of pico-nano bubble generator in phosphate reverse flotation
Guoxin Wang, ArrMaz, USA

18:30 - 20:30
Dinner

20:30 - 21:30
Social Hour
Tuesday, March 31, 2015

06:30 - 08:30  Breakfast

**Session III: Flotation Reagents**
**Session Co-Chairs:** Chaucer Hwang, Mosaic Company, USA
Gerald Heebner, Arizona Chemicals, USA

**Keynote 3:**
08:30 - 09:15  The effect of dissolution kinetics on flotation response of apatite with sodium oleate
Laurindo Leal Filho, Vale Technological Institute, Brazil

09:15 - 09:45  Application of Custofloat® carbonate collectors in beneficiating phosphate ores in China
Guoxin Wang, ArrMaz, USA

09:45 - 10:15  Processing Florida dolomitic phosphate pebble with Custofloat® carbonate collectors
Guoxin Wang, ArrMaz, USA

10:15 - 10:45  Coffee break

10:45 - 11:15  Improvement of dolomite collector on high magnesium pebble sample from Florida
Patrick Zhang, Florida Industrial and Phosphate Research Institute, USA

11:15 - 11:45  Opportunities for flocculation/flotation treatment of phosphate slimes using temperature responsive reagents
Elizaveta Forbes, CSIRO, Australia

11:45 - 12:15  Phosphate beneficiation with novel collectors for direct and reverse flotation: Beyond low cost fatty acids
Pablo Dopico, Clariant Mining Solutions, USA

12:15 - 12:45  The use of lanthanum (La+3) and Cerium (Ce+3) ions as phosphate activators in low grade phosphate flotation
Salah Al-Thyabat, Mining Engineering Department, Al-Hussein Bin Talal University-Jordan, Jordan

12:45 - 14:15  Lunch

14:15  Optional excursion(s)

Dinner on own
Wednesday, April 1, 2015

06:30 - 08:30
Breakfast

Session IV: Processing Equipment
Session Co-Chairs: Jaisen Kohmuench, Eriez Flotation Division, USA
Abdelhak Kabbabi, OCP Group, Morocco

Keynote 4:
08:30 - 09:15
Advances in particle characterization for improved mineral processing technology
Jan D. Miller, University of Utah, USA

09:15 - 09:45
Column flotation of phosphate ore – An engineer’s perspective
Ewan Wingate, WorleyParsons, Australia

09:45 - 10:15
Phosphate In Australia – So Near Yet So Far
Ewan Wingate, WorleyParsons, Australia

10:15 - 10:45
Coffee break

10:45 - 11:15
Gravitational separation behavior of collophanite from dolomite in a packed column jig
Wending Xiao, China University of Geosciences, China

11:15 - 11:45
Pilot testing and feasibility analysis of deep cone thickening for Florida phosphate clay (slime)
Chaucer Hwang, The Mosaic Company, USA

11:45 - 12:15
Application of classification and fluidized-bed flotation at PCS aurora
George Piegols, PCS Phosphate, USA

12:15 - 12:45
Understanding the comminution mechanism of high-pressure grinding rolls: Lower cost, higher efficiency and selectivity
Francisco Sotillo, PerUsa EnviroMet, Inc., USA

12:45 - 14:15
Lunch

14:15
Group tour

19:00 - 21:00
Dinner

21:00 - 22:00
Social Hour
Thursday, April 2, 2015

06:30 - 08:30  Breakfast

Session V: Hydrometallurgy
Session Co-Chairs: Vaughn Astley, Dr. Phosphate, Inc., USA
Tibaut Theys, Prayon Technologies, Belgium

Keynote 5:
08:30 - 09:15  Research progress on the production of industrial phosphoric acid and downstream phosphates from wet-process phosphoric acid in China
Yuanxin Wu, Wuhan Institute of Technology, China

09:15 - 09:45  Newcomer in phosphoric acid process routes the DA-HF process ensures 2 to 3 % of efficiency increase compared to a standard dihydrate plant with a limited number of extra equipment
Tibaut Theys, Prayon Technologies, Belgium

09:45 - 10:15  Acidulation of low grade collophanite using HCL for production of dihydrate gypsum whisker and effective compound fertilizer
Wending Xiao, China University of Geosciences (Wuhan), China

10:15 - 10:45  Coffee break

10:45 - 11:15  Alloy 31 lining in hemihydrate reactors
John Pannia, IPL Phosphate Hill, Australia

11:15 - 11:45  P2O5 reclamation from gypsum sacks
Casey R. Hiette, IPL Phosphate Hill Operations, Australia

11:45 - 12:15  Improvement of valves and pumps for the phosphoric reactor circuit.
Matthew Johnson, Incitec Pivot Limited, Australia

12:15 - 12:45  Environmentally friendly, energy efficient slurry handling by MULTISAFE double hose-diaphragm pumps
Alan Frost, FELUWA Pumpen Australia, Australia

12:45 - 14:45  Lunch
**Thursday, April 2, 2015 (continued)**

**Session VI: Waste Utilization and the Environment**
**Session Co-Chairs:** Julian Hilton, Aleff Group, United Kingdom
Salah Al-Thyabat, Al-Hussein Bin Talal University, Jordan

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Presenter</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:00</td>
<td>Overcoming the regulatory hurdles to recovering rare earths from phosphate</td>
<td>Gary Albarelli</td>
<td>Florida Industrial and Phosphate Research Institute, USA</td>
</tr>
<tr>
<td>15:30</td>
<td>An optimized approach to phosphate recovery</td>
<td>Jaisen Kohmuench</td>
<td>Eriez Flotation Division, USA</td>
</tr>
<tr>
<td>16:00</td>
<td>Recovery of rare earths from Florida phosphogypsum</td>
<td>Patrick Zhang</td>
<td>Florida Industrial and Phosphate Research Institute, USA</td>
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<tr>
<td>16:30</td>
<td>Coffee break</td>
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<tr>
<td>17:00</td>
<td>Environmental protection: An imperative of sustainable development in phosphate industry</td>
<td>Abdelhak Kabbabi</td>
<td>OCP Group S.A., Morocco</td>
</tr>
<tr>
<td>17:30</td>
<td>Phosphorus removal and recovery from waste water by bio-processing followed by microwave radiation</td>
<td>Patrick Zhang</td>
<td>Florida Industrial and Phosphate Research Institute, USA</td>
</tr>
<tr>
<td>18:00</td>
<td>Recovery of sulphur values from phosphogypsum: A historical review and prospects for the future</td>
<td>Gary Albarelli</td>
<td>Florida Industrial and Phosphate Research Institute, USA</td>
</tr>
<tr>
<td>19:30</td>
<td>Banquet</td>
<td></td>
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</tbody>
</table>
Friday, April 3, 2015

06:30 - 08:30 Breakfast

Session VII: Analysis and Control
Session Co-Chairs: Wending Xiao, China University of Geosciences, China
Michael Gaft, Laser Distance Spectrometry (LDS), Israel

09:00 - 09:30 ReLIBS (Remote Laser Induced Breakdown Spectroscopy) – Industrial online analyzer for phosphate industry
Michael Gaft, Laser Distance Spectrometry (LDS), Israel

09:30 - 10:00 The use of advanced process controls in a phosphoric acid reactor
Vaughn Astley, Dr Phosphate, Inc., USA

10:00 - 10:30 Coffee break

10:30 - 11:00 Suitability of Geoscan-M elemental analyser for phosphate rock
Derek Griffiths, Scantech International Pty Ltd, Australia

11:00 - 11:30 The impact of an increase in potassium content in the rock feed on the operation of the Phosphate Hill hemihydrate phosphoric acid plant
Gerhardus C. Du Plessis, Incitec Pivot Ltd, Australia

11:30 - 12:00 Optimization of Jordanian phosphate flotation by artificial neural network (ANN)
Salah Al-Thyabat, Al-Hussein Bin Talal University, Jordan

12:00 Lunch and departures