

Preliminary Technical Program

Beneficiation of Phosphates VIII

An ECI Conference Series

April 29 – May 4, 2018
Cape Town, South Africa

Chair

Dr. Patrick Zhang
FIPR Industrial and Phosphate Research Institute
Florida Polytechnic University

Co-Chairs

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University of Utah, USA

Professor. Laurindo Leal Filho
University of Sao Paulo, Brazil

Mr. Marius Porteus
Foskor, South Africa

Professor Neil Snyders
Stellenbosch Univ., South Africa

Mr. Ewan Wingate
WorleyParsons, Australia

Professor Guven Akdogan
Stellenbosch Univ., South Africa



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Sunday, April 29, 2018

16:30 – 19:00 Registration

18:00 – 19:00 Welcome Reception (Wine Tasting)

19:00 – 20:30 Dinner

Monday, April 30, 2018

07:30 – 08:30

Breakfast

08:30 – 9:05

Keynote 1

Flotation in Seawater

Janusz Laskowski, University of British Columbia, Vancouver, Canada

Session I: Sustainability and the Environment

09:05 – 09:30

Resource-Saving Technology for Processing By-Products of the Wet Phosphoric Acid Process – Phosphogypsum and Fluosilicic Acid to Produce Ammonium Sulfate

Maksim Tcikin, The Research Institute for Fertilizers, Russi

09:30 – 09:55

Recovery of High Purity Calcium Sulfate from Phosphogypsum I: Thermodynamic Study of SO_4^{2-} Purification

Zejiang Zhang, Wuhan Institute of Technology

09:55 - 10:20

Dry Beneficiation of Phosphate Minerals Using a Triboelectric Belt Separator

Kyle Flynn, ST Equipment & Technology, USA

10:20 – 10:50

Coffee break

10:50 – 11:15

Removal of Coarse Fraction from Phosphatic Clays for Clay Settling Area Reduction and Additional Phosphate

Charles Guan, Mosaic Fertilizer, LLC, Florida, USA

11:15 – 11:40

Heavy Metal Contamination and Health Risk Assessment in Waste Mine Water Dewatering Using Phosphate Beneficiation Processes in

Mohammad Salem Al-Hwaiti, Al-Hussein Bin Talal University, Jordan

11:40 – 11:45

Biotechnological Polyphosphate Production from Rape Seed

Jonas Christ, RWTH Aachen University, Germany

11:45 – 12:10

Upgrading Phosphogypsum for Uses as Construction Materials

Wending Xiao, Wuhan Institute of Technology, China

12:10 – 13:30

Lunch

Keynote 2:

14:30 – 15:05

The New Frontiers of Mineral Processing

Ruan Chi, Wuhan Institute of Technology

Session II: Comprehensive Extraction

15:05 – 15:30

Recovery of Rare Earths and P from Phosphate Flotation Tails

Patrick Zhang, FIPR Institute, USA

15:30 – 15:55

Reprocessing of Phosphogypsum for Recovery of Rare Earths

Jason Yang, Geological Survey of Finland, Finland

Monday, April 30, 2018 (continued)

- 15:55 – 16:20 **The Recovery of Rare Earth Elements from Phosphate Rock and Phosphate Mining Waste Products Using A Novel Water-Insoluble Adsorption Polymer**
Joseph Laurino, Periodic Products, Inc., Florida, USA
- 16:20 – 16:50 Coffee break
- 16:50 – 17:15 **A Novel Process to Recover Sulfur, Lime and Rare Earths from Gypsum**
David van Vuuren, University of Pretoria, South Africa
- 17:15 – 17:35 **Hydrothermal Pre-Treatment Process of Phosphogypsum for Enhanced Rare Earths Recovery**
Eugene Lakay, Mintek, South Africa
- 17:35 – 18:00 **Simultaneous Recovery of Rare Earths and Uranium from Wet Process Phosphoric Acid Using Solvent Extraction with D2EHP**
Shengxi Wu, National Engineering Research Center for Rare Earth Materials, General Research Institute for Nonferrous Metals, Beijing, China
Patrick Zhang, FIPR Institute
- 18:00 – 18:25 **Recovery of Thourium from Phosphogypsum by Acid Leaching**
Tebogo Mashifana, University of Johannesburg, South Africa
- 19:00 – 20:30 Dinner
- 20:30 – 21:30 Social Hour

Tuesday, May 1, 2018

- 07:00 – 08:30 Breakfast
- 08:30 – 09:05 **Keynote 3**
Surface Chemistry and Flotation Behavior of Monazite, Apatite, Ilmenite, Quartz, Rutile, and Zircon with Octanohydroxamic Acid
Corby Anderson, Colorado School of Mines, USA
- Session III: Flotation Fundamentals and Reagents**
- 09:05 – 09:30 **How to Truly Optimize Phosphate Flotation, When Feed Grade is Ever-changing**
Lucas R. Moore, ArrMaz, USA
- 09:30 – 09:55 **New Reagent Development for the Beneficiation of Various Phosphate Ores**
Pablo Dopico, Clariant Mining Solutions, USA
- 09:55 – 10:20 **Mine Arnaud Project: Flotation Circuit Adjustment and Collector Reduction**
Christine Croteau, COREM, Canada
- 10:20 – 10:50 Coffee break
- 10:50 – 11:15 **Case Study for Processing Phosphate Ores Worldwide**
Guoxin Wang, ArrMaz, USA
- 11:15 – 11:40 **Evaluation of the Effect of Ca²⁺ Ion Concentration on Calcite Flotation of Santa Quit rias´S Ore Using Carbonic Gas**
Elves Matiolo, Centro de Tecnologia Mineral (CETEM), Brazil
- 11:40 – 12:05 **Investigation of the Mechanism of Apatite/Carbonates Separation in Acidic Flotation Process Using In Situ Raman Spectroscopy**
Lev Filippov, Universit  de Lorraine, France
- 12:05 – 12:30 **Formulation of a Reagent Used in a Process of Water Recovery the Sludge from Beneficiation Process of Phosphate Ore Using Mixture Design**
Mohammed EL ASRI, Sidi Mohamed Ben Abdellah University, Morocco
- 12:30 – 14:00 Lunch
- 14:00 – 18:30 Free time / Optional self-organized excursion(s)

Dinner on your own

Wednesday, May 2, 2018

- 07:00 – 08:30 Breakfast
- 08:30 – 09:05 **Keynote 4:**
Chemical characterization of fatty acids aiming at preparing suitable blends to float apatite from igneous phosphate ores
Laurindo De Salles Leal Filho, University of Sao Paulo, Brazil
- 09:05 – 09:30 **Session IV: : Flotation Fundamentals and Reagents Part 2**
Tailoring Collectors to Allow for Sea Water Usage in Phosphate Beneficiation
Lucas R. Moore, ArrMaz, USA
- 09:30 – 09:55 **The Surface Chemistry and Microflotation of Xenotime and Depression of Gangue Minerals**
Corby Anderson, Colorado School of Mines, USA
- 09:55 – 10:20 **ChemBe: the new way for phosphate rock beneficiation by EcoPhos**
Marc Sonveaux, Ecophos, Belgium
- 10:20 – 10:50 Coffee break
- 10:50 – 11:15 **Alternative Depressors in Floating Phosphate**
André Carlos Silva, Federal University of Goiás, Brazil
- 11:15 – 11:40 **Separation of Dolomite from Phosphate at Low Cost and Reduced Environmental Impact**
Wending Xiao, Hubei Bonan Technology Co., Ltd, China
- 11:40 – 12:05 **Using Two Alternative Vegetable Oil's as Collector in Apatite Froth Flotation**
André Carlos Silva, Federal University of Goiás, Brazil
- 12:15 – 14:00 Lunch
- 14:00 – 19:00 Group Tour (City tour of Cape Town and trip up Table Mountain) followed by transfer to Gold Restaurant
- 19:00 – 20:30 Off site dinner at Gold Restaurant

Thursday, May 3, 2018

07:00 – 08:30

Breakfast

08:30 – 09:05

Keynote 5

Latest Trend for Fluorine in the Phosphoric Industry: Absorption Efficiency Improvement, Conversion into Raw Material

Tibaut Theys, Prayon Technologies, Belgium

09:05 – 09:30

Session V: Hydrometallurgy

Can Your P₂O₅ Be Commercially Exploited

Michael E. Kelahan, Phosphate Consulting LLC, USA

09:30 – 09:55

How Phosphate Rock Quality Impacts the Phosphoric Acid and Granulation Plant Operations

Curtis Griffin, PegasusTSI, USA

09:55 – 10:20

Technical Summary of Phosphoric Acid Production Using A Top Submerged Lance Furnace Technology

Ewan Wingate, WorleyParsons, Australia

10:20 – 10:45

Extraction of Rare Earth Concentrate from Phosphogypsum Waste in Phosphoric Acid Process

Maryam Kargar Razi, Azad University, Tehran, Iran

10:45 – 11:15

Coffee break

11:15 – 11:40

Revisiting the Merseburg Process: Economic Opportunity and Environmental Benefit?

Gary Albarelli, Florida Industrial and Phosphate Research Institute, USA

11:40 – 12:05

Economically effective phosphoric acid production using a TSL furnace

Ewan Wingate, WorleyParsons, Australia

12:05 – 12:30

Recovery of Rare Earth Elements from Phosphate Rock by Hydrometallurgical Processes - A Critical Review

Shengxi Wu, National Engineering Research Center for Rare Earth Materials, General Research Institute for Nonferrous Metals, Beijing, China

Patrick Zhang, FIPR Institute, USA

12:15 – 13:30

Lunch

Thursday, May 3, 2018 (continued)

Session VI: Advances in Processing Technology and Equipment

- 14:00 – 14:25 **Physical Separation of High Grade and Low Grade African Phosphates**
Deepika Babu Dayal, Mintek, South Africa
- 14:25 – 14:50 **Dry Rotary Triboelectrostatic Phosphate Ore Beneficiation**
Dongping Tao, University of Science and Technology Liaoning, China
- 14:50 – 15:15 **Evaluation of an Agua Resources-Três Estradas Brazilian Phosphate Ore Using Column Flotation**
Andrew Hobert, Eriez Flotation Division, USA
- 15:15 – 15:40 **Influence of the Impeller Speed on Phosphate Rock Flotation**
André Carlos Silva, Federal University of Goiás, Brazil
- 15:40 – 16:10 Coffee break
- 16:10 – 16:35 **Successful Applications of Vertical-Roller-Mills in Phosphate Processing**
Jonathan Smith, Loesche South Africa, South Africa
- 16:35 – 17:00 **The Application of Dense Medium Separation for Monazite Beneficiation**
Uwais Ahmed,
- 17:00 – 17:25 **The Fundamentals, Unique Features and Performance of A Newly Improved Packed Column Jig for Phosphate Processing**
Wending Xiao, Wuhan Institute of Technology, China
- 17:25 – 17:50 **Milling of the Phosphate Rock Flotation Circuit Circulating Load Aiming Production Increase and Iron Content Reduction in the Final Concentrate**
André Carlos Silva, Federal University of Goiás, Brazil
- 19:30 – 21:30 Banquet

Friday, April 4, 2018

- 07:00 – 08:30 Breakfast
- Departures