Society for Mining, Metallurgy, and Exploration, Inc.

Transactions Volume 342

Transactions of the Society for Mining, Metallurgy, and Exploration, Inc. Volume 342 2017

Editor:

Chee S. Theng

Volume 342 contains three sections of technical papers:

- **Section A**: This section includes papers published only in this volume. Transactions papers are identified as “Transactions, Vol. 342” in the index.

- **Section B**: This section includes all of the papers published in January through December 2017 in the Technical Papers Section of Mining Engineering, Vol. 69. Mining Engineering papers are identified as “Mining Engineering, Vol. 69” in the index.

- **Section C**: This section includes all of the papers published in the Vol. 34, Nos. 1, 2, 3 and 4 (February, May, August and November 2017) issues of Minerals & Metallurgical Processing. Minerals & Metallurgical Processing papers are identified as “Minerals & Metallurgical Processing, Vol. 34” in the index.

**CONTENTS**

**SECTION A: TRANSACTIONS PAPERS**

This section contains papers published only in this volume. All papers passed peer review and were accepted for publication between November 1, 2016, and October 31, 2017.

Mining discrete-event simulation projects: A chronological, comprehensive review from 2008 to 2015

*E. Tarshizi and L. O’Connor*

CFD gas distribution analysis for different continuous-miner scrubber redirection configurations


A case study exploring field-level risk assessments as a leading safety indicator

*E.J. Haas, B.P. Connor, J. Vendetti and R. Heiser*

Prediction of human core temperature rise and moisture loss in refuge alternatives for underground coal mines

*M. Klein, D.S. Yantek, M. Hepokoski and L. Yan*

Exploring the use of situation awareness in behaviors and practices of health and safety leaders

*D.R. Willmer*

An evaluation of the relative safety of U.S. mining explosion-protected equipment approval requirements versus international standards

*W. Calder, D. Snyder and J.F. Burr*

Methane emissions and airflow patterns on a longwall face: Potential influences from longwall gob permeability distributions on a bleederless longwall panel

*S.J. Schatzel, R.B. Krog and H. Dougherty*

Current issues with purported asbestos content of talc: Hydrothermal-hosted talc ores in southwest Montana

*M.E. Buzon and M.E. Gunter*

Experimental study on foam coverage on simulated longwall roof

*W.R. Reed, Y. Zheng, S. Klima, M.R. Shahan and T.W. Beck*
SECTION B: MINING ENGINEERING TECHNICAL PAPERS
This section contains all of the technical papers published in Mining Engineering, Vol. 69 (2017).

JANUARY
Development of a roof bolter canopy air curtain for respirable dust control
W.R. Reed, G.J. Joy, B. Kendall, A. Bailey and Y. Zheng

FEBRUARY
Investigating particle size distribution of blasthole samples in an openpit copper mine and its relationship with grade
R. Ganguli, A. Purvee, N. Sarantsatsral and N. Bat
Optimization of flotation plant performance using micro-price analysis
G.H. Lutrell and A. Noble

MARCH
Reduction in diesel particulate matter through advanced filtration and monitoring techniques
C. Pritchard, J. Hill, J. Volkewin, J. Noll and A. Miller
New integer programming models for tactical and strategic underground production scheduling
B. King, M. Goycoolea and A. Newman

APRIL
Effects of mine strata thermal behavior and mine initial temperatures on mobile refuge alternative temperature
D.S. Yantek, L. Yan, P.T. Bissert and M.D. Klein

MAY
Human thermoregulation model for analyzing the performance of mine refuge alternatives
M. Klein and M. Hepokoski
Respirable dust measured downwind during rock dust application
M.L. Harris, J. Organiscak, S. Klima and I.E. Perera

JUNE
Update of industrial minerals and rocks of New Mexico
V.T. McLemore
Characterization of a mine fire using atmospheric monitoring system sensor data
L. Yuan, R.A. Thomas and L. Zhou

JULY
Quick fixes to improve workers’ health: Results using engineering assessment technology
E.J. Haas and A.B. Cecala

AUGUST
Roof control, pillar stability and ground control issues in underground stone mines
D. Newman
SEPTEMBER

Identifying and controlling heat-induced health and safety problems in underground mines

K.C. Kocsis and M. Sunkpal

Characterization of airborne float coal dust emitted during continuous mining, longwall mining and belt transport

M.R. Shahan, C.E. Seaman, T.W. Beck, J.F. Colinet and S.E. Mischler

OCTOBER

Risk management and long-term production schedule optimization at the LabMag iron ore deposit in Labrador, Canada

M. Spleit and R. Dimitrakopoulos

Have emerging technologies reached the point where diesel particulate matter can be removed from underground mines?

K.C. Kocsis

NOVEMBER

Fundamental error estimation and accounting in the blasthole sampling protocol at a copper mine

R. Ganguli, A. Chieregati and A. Purvee

Laboratory demonstration of DPM mass removal from an exhaust stream by fog drops

L. Rojas-Mendoza, Z. Henderson, E. Sarver and J.R. Saylor

DECEMBER

Effects of FAME biodiesel and HVORD on emissions from an older-technology diesel engine

A.D. Bugarski, J.A. Hummer and S.E. Vanderslice

Industrial Internet of Things (IIoT) applications in underground coal mines

C. Zhou, N. Damiano, B. Whisner and M. Reyes

SECTION C: MINERALS & METALLURGICAL PROCESSING PAPERS

This section contains all of the papers published in M&MP, Vol. 34 (2017).

FEBRUARY

Design of a continuous pilot-scale deslime thickener

H.J. Haselhuhn and S.K. Kawatra

Heat generation model in the ball-milling process of a tantalum ore

J. Maríño-Salguero, J. Jorge, J.M. Menéndez-Aguado, B. Álvarez-Rodriguez and J.J. de Felipe

Study on copper recovery from smelted low-grade e-scrap using hydrometallurgical methods

E. Rudnik and N. Dasbold

Effects of solids concentration on gas dispersion in industrial mechanical cells

F. López-Saucedo, A. Uribe-Salas, G. Dávila-Pulido, L. Magallanes-Hernández and J. Batista Rodríguez

Mineral chemistry and phase equilibrium constraints on the origin of accretions formed during copper flash smelting

J.C. Fernández-Caliani, I. Moreno-Ventas, M. Bacedoni and G. Ríos

Kinetic study of titanium-bearing electric arc furnace molten slag treated by molten sodium hydroxide

Y. Li, H. Ni, Y. Zhou, D. Li, F. Zheng, M. Zhang and M. Guo
MAY

Heap leach modeling – A review of approaches to metal production forecasting
J.O. Marsden and M.M. Botz 265

Comparative analysis of the effect of microwave pretreatment on the milling and liberation characteristics of mineral matters of different morphologies
V. Singh, R. Venugopal, S.K. Tripathy and V.K. Saxena 277

Production of chalcocite by selective chlorination of chalcopyrite using cuprous chloride
J. Kang and J.Y. Lee 288

Comparative study of pellets fired in pot grate and grate kiln pilot furnaces
S.S. Wendling, R.C. Nascimento and F. Wendling 296

Solubility of rhodium in doré metal
K. Avarmaa and P. Taskinen 303

System dynamics and discrete event simulation of copper smelters
A. Navarra, H. Marambio, F. Oyarzún, R. Parra and F. Mucciardi 308

AUGUST

Special Issue on Rare Earths

Process evaluation and flowsheet development for the recovery of rare earth elements from coal and associated byproducts

Physical chemistry considerations in the selective flotation of bastnaesite with lauryl phosphate
W. Liu, X. Wang, H. Xu and J.D. Miller 328

Solvent extraction and separation of cerium(III) and samarium(III) from mixed rare earth solutions using PC88A
V. Agarwal and M.S. Safarzadeh 337

Concentration of rare earth minerals from coal by froth flotation
W. Zhang, R. Honaker and J. Groppo 344

Characterizing rare earth elements in Alaskan coal and ash

Rare-earth leaching from Florida phosphate rock in wet-process phosphoric acid production
H. Liang, P. Zhang, Z. Jin and D. DePaoli 358

Peer-reviewed abstracts from the 2017 Student Poster Contest
Mineral & Metallurgical Processing Division

Foreword by R. Bryce 366

The influence of starch in amine adsorption by quartz in the reverse flotation of iron ore
K. Shrimali and J.D. Miller 367

The effect of polysaccharides on bubble attachment at talc surfaces
V. Atluri and J.D. Miller 368

A novel approach to alkali pug bake for the extraction of rare earth elements from monazite concentrate
J. Galvin and M.S. Safarzadeh 369

Copper recovery from waste printed circuit boards
N. Santa and V. Salinas 370

Performance analysis of CMC in high talc copper sulfide flotation systems
C. O’Connell and A. Noble 371

Cyanidation tests and pretreatments to recover gold from a refractory ore in Colombia
C. Vanegas and F. Muñoz 372
NOVEMBER

SPECIAL ISSUE ON RARE EARTHS

Recovering rare earths from waste phosphors using froth flotation and selective flocculation
  M. Yu, G. Mei, Y. Li, D. Liu and Y. Peng 373

Chemical extraction of rare earth elements from coal ash
  M. Peiravi, L. Ackah, R. Guru, M. Mohanty, J. Liu, B. Xu, X. Zhu and L. Chen 382

Exploring blast furnace slag as a secondary resource for extraction of rare earth elements
  Abhilash, P. Meshram, S. Sarkar and T. Venugopalan 390

The ultimate mineral processing challenge: Recovery of rare earths, phosphorus and uranium from Florida phosphatic clay
  P. Zhang, H. Liang, Z. Jin and D. DePaoli 395

Rare earth mineralogy in tailings from Kiirunavaara iron ore, northern Sweden: Implications for mineral processing
  C. Wanhainen, B.I. Pålsson and O. Martinsson and Y. Lahaye 401

Rare earths recovery and gypsum upgrade from Florida phosphogypsum
  H. Liang, P. Zhang, Z. Jin and D. DePaoli 413

INDEX

Complete index to the Transactions of the Society for Mining, Metallurgy and Exploration Inc., Vol. 342 (2017) 419