

# **“Unleashing Refractory Potential: Root Cause Analysis”**



**Fifty-ninth Annual Symposium on Refractories**

*sponsored by*

**The Greater Missouri (St. Louis) Section  
and Refractory Ceramics Division of**

**THE AMERICAN CERAMIC SOCIETY**

*at*

**Hilton St. Louis Airport Hotel  
St. Louis, Missouri**

*on*

**March 27<sup>th</sup> – 28<sup>th</sup>, 2024**

## PROGRAM

### “Unleashing Refractory Potential: Root Cause Analysis”

March 26<sup>th</sup>, 2024

5:00 P.M. Kickoff Event – Westport Social <https://westportsocial-stl.com/>

March 27<sup>th</sup>, 2024

7:15 A.M. Registration and Coffee

8:00 Morning Technical Sessions  
Welcome and Introductions

**Greater Missouri (St. Louis) Section Interim Vice Chair**

*Kelley Wilkerson*

Missouri University of Science & Technology

**Refractory Ceramics Division Chair**

*Bob Hunter*

**Co-Program Coordinators**

*Kenneth Andrew Domann*

Rath Group

*Brett Ervin*

Imerys Refractory Producers

8:15 There is Always Another Way to Destroy Refractories! Root Cause Analysis of a Steel Ladle Argon System Breakout  
*Tom Vert*

8:45 A Refractory Perspective on Latest Trends in Cement Clinker Production – What can used refractory samples tell us?  
*Dr. Kathrin Weber - Refratechnik Cement GmbH*

9:15 Fracture Toughness and Work of Fracture of Slide Gate Zirconia Inserts and Correlation with Post-mortem Analysis  
*Somnath Mandal, Tim J. Tracy, and Mark Snyder - Steel Flow Control Group, Vesuvius Research*  
*Nagendra Nag - Foundry Group, Vesuvius Research*

9:45 Coffee Break

10:15 Sintering and Thermo-Mechanical Characterization of a Novel Refractory Grade Bauxite  
*Luiz Gustavo Moreira Noronha – Bautek Minerais, Brazil*  
*Dereck Nills Ferreira Muche – Universidade Federal de São Carlos, Brazil*

10:45 Failure Analysis and Characterization of Alkali Attack and Mitigation Methods in the Cement Bonded Alumina-Zirconia-Silica System  
*Ed Reeves - Reeves Materials Engineering*

11:15 Castable Matrix Concept for Robust Behaviour in Steel Ladle Bottom Repair  
*Gabriela Rojek, Michal Sułkowski, Marcin Klewski - ArcelorMittal Refractories Poland*  
*Daniel Bednarek - ArcelorMittal Dąbrowa Górnicza Poland*  
*Andreas Buhr and Dagmar Schmidtmeier - Almatix Germany*  
*Jerry Dutton - United Kingdom*

11:45-1:00 Luncheon Banquet

## **Afternoon Session**

- 1:00-1:45 Presentation of the T.J. Planje St. Louis Refractories Award to **James G. Hemrick, Oak Ridge National Laboratory**
- 2:00 The Use of Sonic Velocity to Diagnose and Avoid Installation Failures of Refractory Castables  
*Megan Dye - Resco Products*
- 2:30 Coffee Break
- 3:00 Evaluation of Fracture Properties of Refractory Castables using Digital Image Correlation/Wedge Splitting Test Method”  
*Hong Peng - Elkem*
- 3:30 Some Practical Examples of Postmortem Investigation on Refractories as a Proven Root Cause Analysis Tool  
*Pitagoras Lanna - RHI Magnesita*
- 4:00 Reducing Scrap of Fired Dolomite Bricks due to Cracks in Production: An empirical approach  
*Celio Carvalho Cavalcante - RHI Magnesita*
- 4:30 Questions & Discussion  
Co-Program Coordinators
- 4:45 RCD Annual Members Meeting
- 5:00 Closing Remarks  
*Kelley Wilkerson*  
Missouri University of Science & Technology  
*Bob Hunter*
- 5:00-7:00 Exposition and Cocktail Hour
- |                            |                              |
|----------------------------|------------------------------|
| AC Tech                    | PRCO America, Inc.           |
| Almatis, Inc.              | R-E-D Industrial Products    |
| Alteo-Alumina              | Refractory Minerals Co.      |
| AluChem                    | TAM Ceramics                 |
| BassTech International     | The American Ceramic Society |
| Bautek Minerai Industriais | The Refractories Institute   |
| Christy Minerals           | Washington Mills             |
| Cremer Erzkontor N.A.      |                              |
| Elkem Silicon Products     |                              |
| Ferroglobe                 |                              |
| FIVEN AS                   |                              |
| FX Minerals                |                              |
| GNPGraystar                |                              |
| Gorka Cement               |                              |
| Great Lakes Minerals, LLC  |                              |
| Hindalco/GBL               |                              |
| Imerys                     |                              |
| Kyanite Mining Corp.       |                              |
- 7:00 Dinner Buffet

March 28<sup>th</sup>, 2024

- 6:30 A.M. Refractory Ceramics Division (RCD) Breakfast Meeting
- 8:15 Morning Technical Sessions  
Welcome and Introductions
- Greater Missouri (St. Louis) Section Interim Vice Chair**  
*Kelley Wilkerson*  
Missouri University of Science & Technology  
**Refractory Ceramics Division Chair**  
*Bob Hunter*
- Co-Program Coordinators**  
*Kenneth Andrew Domann*  
Rath Group  
*Brett Ervin*  
Imerys Refractory Producers
- 8:30 Refractory Solutions for Improving Surface Quality of the Cast Slabs in Steel  
Continuous Casting Based on Root Cause Analysis  
*Masakazu Iida - Shinagawa Refractories Co.*
- 9:00 Traditional Refractory Designs Replaced by Innovative Refractory Solutions in Hot  
Blast Stoves  
Presented by Ryan Hershey – Allied Mineral Products  
*Authors: Floris van Laar, Bob Hansen, and Jesse Carreau - Allied Mineral Technical Services*  
*Bob Byerman and Bryan Eschbach - Burns Harbor*
- 9:30 MgAlON Whisker Bond in Refractories  
*Zongqi Guo – Trasteel International SA*
- 10:00 Coffee Break
- 10:30 Crack Initiation and Propagation Due to Thermal Shock  
*Jeremy Watts – Missouri University of Science and Technology*
- 11:00 High-fidelity 3D microstructural characterization of ZrB<sub>2</sub> for fracture analysis  
*Randi Swanson and Scott McCormack – University of California, Davis*  
*Michael Chapman, Ashley Hilmas, and Michael Uchic – Air Force Research Laboratory*  
*Sara Akhavan and Hessam Babaei – University of Pittsburgh*  
*Ata Mesgarnejad – Northeastern University*  
*William Fahrenholtz – Missouri University of Science and Technology*
- 11:30 A Review of Calcium Magnesium Aluminate Applications in Refractory Brick and  
Monolithics  
*Scot Graddick – Imerys*
- 12:00 Questions & Discussion  
Co-Program Coordinators
- Greater Missouri (St. Louis) Section Interim Chair**  
*Kelley Wilkerson*  
Missouri University of Science & Technology  
**Refractory Ceramics Division Chair**  
*Bob Hunter*
- 12:30 St. Louis Section Members Meeting