

# Your Abstract #23159 Submission Has Been Received

PRINT/SAVE THIS PAGE

You have submitted the following abstract to the 2024 Goldschmidt Conference. A confirmation email has been sent to the submitter and all named authors. Receipt of this notice does not guarantee that your submission was complete or free of errors.

## Abstract Information

### Abstract ID:

**23159**

### Abstract Text:

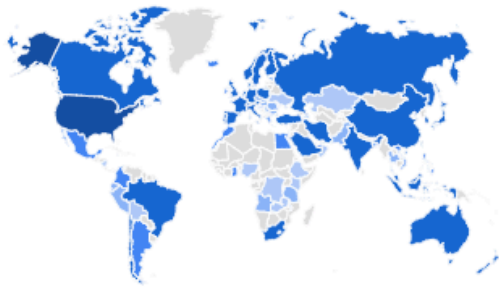
Thanks to the bright and responsible computer science undergrads Ranvir, Kevin, and Rob, the geochemical community now has a science gateway for geochemical modeling at <https://models.earth.indiana.edu/>, (and upcoming: [geochemsim.org](https://geochemsim.org)). About ~7000 users/visitors from 89 countries used these programs in the past two years for teaching and research.

The gateway hosts programs SUPCRTBL [1], Online PHREEQC, CO<sub>2</sub> Solubility Calculator, Reaction Rate Calculator, and H<sub>2</sub>S Solubility Calculator. Notably, the Online PHREEQC program together with our customized databases now allows speciation and solubility and reaction path modeling to temperatures up to 1000 °C and pressure up to 5000 bars [2]. Recently, an internally consistent thermodynamic database for rare earth element crystalline solids with 155 end-members for phosphates [3], oxides, hydroxides, chlorides, fluorides, carbonates, hydrous carbonates, and ferrite are added to SUPCRTBL and PHREEQC.

The science gateway is hosted on Indiana University's high-performance computers. The format of open-source and science gateway technologies answers the call from the U.S. National Science Foundation's FAIR guiding principles (Findability, Accessibility, Interoperability, and Reuse).

1. Zimmer, K., et al., Computers & Geosciences, 2016. **90, Part A**: p. 97-111.
2. Zhang, G.R., et al., Computers & Geosciences, 2020. **143**.
3. Pan, R., et al., Minerals, 2024. **14(3)**: p. 305.

Users by Country ID



COUNTRY	USERS
United States	1.6K ↑142...
Japan	220 ↑124...
United Kingdom	153 ↑150...
Canada	143 ↑138...
France	140 ↑125...
Germany	137 ↑90.3%
China	111 ↑200...

Last year

[View countries](#) →

**Keywords:**

critical minerals, geochemical modeling and rare earth elements

**Submitter's E-mail Address:**

chenzhu@indiana.edu

**Submitter Full Name:**

Chen Zhu

**Preferred Presentation Style:**

Poster

**Conference Attendance:**

In person

**Registration:**

I understand that the presenting author named in this submission must register for the conference by 1 July 2024.

**Submission Permission and Copyright:**

I grant non-exclusive copyright for my abstract and any related uploaded content to the Conference Exchange and the conference owners. I give permission for my details to be stored in the conference database. I, and the presenting author (if different than the submitter), agree to be contacted by the conference organizers about this submission. I agree to the recording and online

streaming of any presentations scheduled as a result of this submission. I confirm all listed authors have agreed to these terms.

### First Author

#### ***Presenting Author***

Lei Gong

Email: lgong@indiana.edu

Indiana University Bloomington

1001 east 10th street

Bloomington

USA

### Second Author

Ranvir Singh Virk

Email: rsvirk@iu.edu

Indiana University

School of Informatics and Computer Sciences

USA

### Third Author

Kevin Tu

Email: tuk@iu.edu

Indiana University - Bloomington

School of Informatics and Computer Sciences

USA

### Fourth Author

Robert Hageboeck

Email: rohage@iu.edu

Indiana University - Bloomington

School of Informatics and Computer Sciences

USA

### Fifth Author

Sudhakar Pamidighantam

Email: pamidigs@iu.edu

Indiana University - Bloomington

USA

### Sixth Author

Jun Wang

Email: wang208@iu.edu

Indiana University - Bloomington

Pervasive Technologies Institute

USA

### Seventh Author

Prof. Chen Zhu, M Sc PhD

Email: chenzhu@indiana.edu

Alternate Email: chenzhu@indiana.edu

Indiana University - Bloomington

Earth and Atmospheric

Professor

1001 E 10th St Rm GY129

Bloomington IN 47405-1405

USA