

## **Wei Liu, Ph.D.**

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### **EDUCATION & TRAINING**

Ph.D. in Mining and Minerals Engineering, 2019.01-2023.05  
**Virginia Polytechnic Institute and State University, Blacksburg, U.S.**  
M.S. in Mineral Processing Engineering, 2015.09-2018.07  
**China University of Mining & Technology, Beijing, China**  
B.S. in Mineral Processing Engineering, 2011.09-2015.07  
**Taiyuan University of Technology, China**

### **PROFESSIONAL EXPERIENCE**

- 08/2025- Present    Research associate, Department of Chemical Engineering at Michigan Technological University.
- 08/2023- 08/2025    Postdoctoral research associate, Department of Material Science and Engineering at University of Utah.
- 01/2019 – 05/2023    Research Assistant, Department of Mining and Minerals Engineering at Virginia Polytechnic Institute and State University.
- 09/2015 – 07/2018    Research Assistant, School of Chemical and Environmental Engineering at China University of Mining and Technology, Beijing.

### **RESEARCH INTERESTS**

- Valorization of mine tailings for critical metals
- Acid mine drainage prevention and control
- Extraction and purification of rare earth and critical metal
- Thermodynamic simulation of the hydrometallurgical process
- Dissolved air flotation of coal

### **TEACHING**

#### *A. Teaching interests and specialties*

- Mineral processing, Hydrometallurgy, Applied surface chemistry, Critical and rare earths elements recovery.

#### *B. Course Taught*

- 2025/Spring, MET E 5670/6670 Mineral Processing I, Co-instructor.

### **Research Grants Applied For**

- Long-Term AMD Prevention and Remediation through Historic Data Analysis and GIS Applications. (Under review), Source: U.S. Department of Interior Office of Surface Mining, **Role: Co-PI**, Funding Requested: \$200,000).

- Separation and Purification of Dy, Tb, Gd, and Er from Secondary Resources using 3D-printable Column with Functionalized Ligands (Source: U.S. Department of Energy FECM, Role: **key personnel**, Funding Requested: \$2,499,810).

### **SKILLS & KNOWLEDGE**

- Basic software: Matlab, MINEQL5.0, HSC, Visual MINTEQ 3.1, AutoCAD,
- Characterization and imaging techniques: SEM, TEM, XPS, XRD, ICP-OES, and FTIR.

### **HONORS & AWARDS**

- SME WAAIME Scholarship grand award (2020-2022)
- Pratt Graduate Award by the Department of Mining and Minerals Engineering, Virginia Tech (2020)
- Outstanding Graduate Student Award in China University of Mining and Technology, China University of Mining and Technology, Beijing, 2016 & 2017.
- First-class Scholarship, China University of Mining and Technology, Beijing, 2017.

### **LIST OF PUBLICATIONS**

#### **A. Peer-reviewed papers:**

1. **Liu, W.**, Feng, X., Noble, A. and Yoon, R.H., 2022. Ammonium sulfate leaching of NaOH-treated monazite. *Minerals Engineering*, 188, p.107817.
2. **Liu, W.**, Xiao, Z., Das, S., and Zhang, W.C., 2024. Mechanism and Kinetic Study of Rare Earth Extraction from Allanite by Direct Acid Leaching. *Minerals Engineering*, 205, p.108489.
3. **Liu, W.**, Sayem, A., Perez, J.P., Hornback, S., Owusu-Fordjour, E.Y. and Yang, X., 2024. Mechanism Investigation of Food Waste Compost as a Source of Passivation Agents for Inhibiting Pyrite Oxidation. *Journal of Environmental Chemical Engineering*, 12(5), p.113465.
4. **Liu, W.**, Rast, S., Wang, X., Lan, S., Owusu-Fordjour, E.Y. and Yang, X., 2024. Enhanced removal of Fe, Cu, Ni, Pb, and Zn from acid mine drainage using food waste compost and its mechanisms. *Green and Smart Mining Engineering*, 1(4), p.375-386.
5. **Liu, W.**, Liu, J., Owusu-Fordjour, E.Y. and Yang, X., Process Evaluation for the Recovery of Rare Earth from Bastnasite Using Ferric Sulfate Bio Acid. *Resources, Conservation and Recycling*, 215, p.108115.
6. **Liu, W.**, Honaker R. and Yang, X., 2025. Recovery of Rare Earth and Critical Metals from Thermally Activated Coal Refuse Using Ferric Sulfate Bio Acid. *Journal of Rare Earths* (In press).
7. **Liu, W.** and Yoon, R.H., 2025. Leaching Kinetics of Rare Earth Elements from NaOH-Treated Monazite by Ammonium Sulfate and Carboxylate Ligands. *Minerals Engineering*, 233, p.109654.
8. Owusu-Fordjour, E.Y., Yang, X., **Liu, W.**, Burke, J.P., and Free, M.L. 2025. “Chalcopyrite Leaching in Waste-Derived Bio Acid: Part I – Mechanistic Insights and Leaching Kinetics” *Journal of Sustainable Metallurgy* (Accepted).
9. Zhuo, Q., Liu, W., Xu, H., Sun, X., Zhang, H. and **Liu, W.**, 2018. The effect of collision angle

on the collision and adhesion behavior of coal particles and bubbles. *Processes*, 6(11), p.218.

10. Zhuo Q, Liu W., **Liu W.**, Kai P. Experimental study on the attachment behavior of coal particles and bubbles (In Chinese with English abstract). *Journal of China Coal Society*, 2018, 43(7): 2029-2035; doi:10.13225/j.cnki.jccs.2017.1148.
11. **Liu W.**, Zhang Y, Liu W., 2017. Decomposition Kinetics of Ammonium Bicarbonate and Its Dissolution Property in Weak Alkaline Solution (In Chinese with English abstract). *Chin. J. Process Eng.* 17(1):123-129. doi: 10.12034/j.issn.1009-606X.216270.

## **B. Manuscripts Submitted or Under Review:**

- 1 **Liu, W.**, Yang, X.B. 2025. “Long-term Performance of Food Waste Compost in Suppressing Acid Mine Drainage Generation in Fine Coal” *Green and Smart Mining Engineering* (under review).

## **C. Conference Abstracts and Presentations:**

- 1 **Liu, W.**, Huang, K.W., Onel, O, Rousan, R., Gupta, M., Noble, A., Yoon, R.H. Extraction of Rare Earth Elements from Nonconventional Resources. *XXXI IMPC-International Mineral Processing Congress*. Washongton, D.C., 2024.
- 2 **Liu, W.**, Hornback, S., Jiang, L.J., Yang, X.B. 2024. “Prevention of Acid Mine Drainage from Its Source: Inhibition of Pyrite Oxidation Using Humic-Rich Food Waste Compost Extraction of Rare Earth Elements from Coal-based Clays.” 2024 SME Annual Conference. Phoenix, AZ, 2024. (abstract and presentation)
- 3 Xiao, Z.Q., **Liu, W.**, Zhang, W.C. 2024. “Mechanism and Kinetic Study of Rare Earth Extraction from a Silicate Mineral Containing Allanite by Direct Acid Leaching.” 2024 SME Annual Conference. Phoenix, AZ, 2024. (abstract and presentation)
- 4 Xiao, Z.Q., **Liu, W.**, Zhang, W.C. 2024. “Enrichment of Rare Earth in Allanite through Comprehensive Screening of Flotation Agents.” 2024 SME Annual Conference. Phoenix, AZ, 2024. (abstract and presentation)
- 5 **Liu, W.**, Onel, O, Feng, X., Council-Torche, M., Rousan, R., Morris, J.R., Yee, G., Noble, A., and Yoon, R.H. 2023. “Extraction of Rare Earth Elements from Coal-based Clays.” 2023 SME Annual Conference. Denver, CO, 2023. (abstract and presentation)
- 6 **Liu, W.**, and Yoon, R.H. 2022. “Ammonium sulfate leaching of NaOH-treated monazite.” 2022 SME Annual Conference. Salt Lake City, UT, 2022. (abstract and presentation)
- 7 **Liu, W.**, Onel, O, Feng, X., Morris, J.R., Yee, G., Gupta, M., Noble, A., and Yoon, R.H. 2022. “Extraction of Rare Earth Elements from the Clayey Materials Discarded in the U.S. Coal Industry.” ACS Spring 2022. San Diego, CA. 2022. (abstract and presentation)

## **LIST OF PATENTS**

1. Yoon, R.H., Noble, A., Council-Torche, M., **Liu, W.**, 2021, Methods for extracting rare earth elements from rare earth element sources. (US Patent No: US20240368734A1)
2. Yoon, R.H., Noble, A., **Liu, W.**, Huang K.W., 2023, Extraction of rare earth and critical materials from clayey materials. (WO Patent No.: WO2023164555A2)
3. **Liu W.**, Liu W L, Zhuo Q.M. A Measuring Device of Micro-bubble Size Distribution and rising velocity of Pressured Solvent Air Flotation. China Utility Model Patent, ZL201720041703.8.
4. **Liu W.**, Liu W.L., Zhuo Q.M. A Kind of Device of Pressured Solvent Air Flotation for Coal

Slime in Laboratory- scale. China Utility Model Patent, ZL201720023099.6.

5. Tang Z.G., Guo D., **Liu W.**, Ai B., Xing X., Li H.W., Song X.F. A Process of Coking Wastewater Treatment with Integrated Membrane System. China Patent. 201710852593.8.

### **SERVICE TO DISCIPLINE AND PROFESSION**

- Professional Membership: Society for Mining, Metallurgy & Exploration (SME), 2019-Present.
- Judge, Student Poster Contest of 2025 College of Science Research Symposium, University of Utah (2025).
- Session Chair, MPD: Chemical Processing: Special topics in Chemical Processing. SME (2025).

### **COMPLETED AND CURRENT PROJECTS**

1. U.S. Department of Energy funding (Award Number: DE-FE0031526) for “Development of a cost-effective extraction process for the recovery of heavy and critical rare earth elements from the clays and shales associated with coal.” 2017/11/1-12/31/2019, total funding: \$2,000,000. PI: Dr. Aaron Noble. Co-PIs: Dr. Roe-Hoan Yoon, Dr. Gerald H. Luttrell (retired).
2. U.S. Department of Interior funding (Award Number: S22AC00020) for “Prevention of Acid Mine Drainage from Its Source: Inhibition of Pyrite Oxidation Using Humic Rich Food Waste Compost.” 2022/02/01-2024/05/31, total funding: \$169,810. PI: Dr. Xinbo Yang.
3. U.S. Department of Interior funding Applied Science for “Production of High-Grade Rare Earth Elements and Critical Materials from Coal Mine Drainage Aided by 3D Printed Ion Exchange Resin.” 2023/07/01-2024/12/31, total funding: \$200,000. PI: Dr. Xinbo Yang.
4. U.S. Department of Energy funding (Award Number: DE-FE0029900) for “Fundamental Studies on the Recovery of Rare Earth Elements from Coal and Coal Byproducts.” 2017/8/1-2021/3/31, total funding: \$1,000,000. PI: Dr. Roe-Hoan Yoon, Dr. Co-PI: Aaron Noble.
5. Grimstone Mining, LLC funding for “Rare earth extraction from clayey waste materials.” 2021/10/1-2022/10/1, total funding: \$ 500,000. PI: Dr. Roe-Hoan Yoon, Co-PI: Dr. Aaron Noble.
6. U.S. Department of Energy funding (Award Number: DE-AR0001713) for “Development of a Carbon-Negative Process for Comminution Energy Reduction and Energy-Relevant Mineral Extraction through Carbon Mineralization and Biological Carbon Fixation.” 2023/02-2026/01, total funding: \$ 3,500,000. PI: Dr. Rick Honaker.
7. U.S. Department of Energy funding (Award Number: DE-EE0009435) for “Rare Earth Element Separation Using Gas-Assisted Micro-Flow Extraction with Task-Specific Ionic.” 2021/05-2025/01, Total funding:\$ 300,000. PI: Wencai Zhang.