Zhihao Guo

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RESEARCH INTERESTS

- Design and synthesis of flotation collectors
- Surface and interface
- Anodes materials for lithium-ion batterie

EDUCATION

Central South University **School of Minerals Processing and Bioengineering**

M. Sc. in Resources and Environment *Sep. 2021−Now*

- **Relevant Courses:** Flotation Interface Chemistry; Advancements in Mineral Processing; Advanced Research Techniques in Contemporary Resource Processing; Application of Computational Chemistry and Fluid Dynamics in Mineral Processing Simulation

Wuhan Institute of Technology **School of Resources and Safety Engineering**

B. Eng. in Mineral Processing Engineering *Sep. 2016−Jun. 2020*

- **Relevant Courses:** Organic Chemistry; Analytical Chemistry; Physical Chemistry; Principle and Application of Flotation Reagent; Mineralogy and Petrology

RESEARCH EXPERIENCE

Participation in National Natural Science Foundation, China *Sep. 2021−Now*

- **Project name:** Design of Flotation Collectors Based on Surface Property Differences of Bastnaesite
- My work involves the design and synthesis of novel collectors for mineral flotation, including structural design and synthesis route determination. I investigate the adsorption mechanisms of collectors on mineral surfaces, including adsorption quantity, strength, and structural characteristics. My investigation involves the use of techniques such as **IR, XPS, XRD, AFM, Zeta potential analysis**, and **First-principle calculations**.

Investigation of anodes materials for lithium-ion batterie *Oct. 2022−Dec, 2022*

Project name: Preparation of Mesoporous Silica and Its Lithium Storage Performance Study

- My work involves the synthesis of hollow mesoporous silica microspheres with controllable shell thickness using a dual-template method. Characterization and analysis of the resulting product were conducted using transmission electron microscopy (**TEM**), scanning electron microscope，(**SEM**), surface area and porosity analysis (**BET**) other methods.

RESEARCH PAPERS

- **Z. Guo**, S. Khoso, J. Wang, et al. Interaction mechanism of 2-hydroxy-3-naphthyl hydroxamic acid and 1-hydroxy-2-naphthyl hydroxamic acid in the flotation separation of bastnaesite/fluorite: Experiments and first-principles calculations. Sep. Purif. Technol. 285 (2022) 120307,

https://doi.org/10.1016/j.seppur.2021.120307. (**IF=8.6, Q1**)

- **Z. Guo**, M. Tian, G. Qian, et al. Flotation separation of bastnaesite and fluorite using styrylphosphonic acid and cinnamohydroxamic acid as collectors. J. Mol. Liq. 362 (2022) 119766, https://doi.org/10.1016/j.molliq.2022.119766. (**IF=6.0, Q1**)
- **Z. Guo**, M. Tian, Z. Gao, et al. A novel surfactant N-hydroxy-9,10-epoxy group-octadecanamide. Part I. Application in the flotation separation of fluorite/calcite and adsorption selectivity on the mineral surfaces. J. Mol. Liq. 387 (2023) 122563, https://doi.org/10.1016/j.molliq.2023.122563. (**IF=6.0, Q1**)
- S. Nie, **Z. Guo**, M. Tian, et al. Selective flotation separation of cassiterite and calcite through using cinnamohydroxamic acid as the collector and Pb2+ as the activator. Colloids Surf. A Physicochem. Eng. Asp. 666 (2023) 131262, https://doi.org/10.1016/j.colsurfa.2023.131262. (**IF=5.2, Q2**)
- **Z. Guo**, S.A. Khoso, M. Tian, et al. Utilizing N-hydroxy-9-octadecenamide as a collector in flotation separation of bastnaesite and fluorite. J. Rare Earths (2023), https://doi.org/10.1016/j.jre.2023.07.001. (**IF=4.9, Q1**)
- **Z. Guo**, P. Liu, W. Zhang, et al. An integrated experimental and computational investigation of N,9,10-trihydroxyoctadecanamide as a potential collector for the flotation separation of fluorite and calcite. Miner. Eng (2023), Proof, (**IF=4.8, Q1**)

SKILLS AND SELF-EVALUATION

Experimental Design and Operation Skills:

- Proficient in independently designing experimental plans with excellent hands-on abilities, capable of flexibly addressing various challenges encountered during experiments.

Data Processing and Analysis Skills:

- Proficient in using materials characterization and optoelectronic performance characterization techniques such as SEM (Surface Morphology Observation), XPS (Surface Chemical Composition Study), AFM (Nanometer-scale Topography Measurement), XRD (Crystal Structure Study), TEM (Nanometer-scale Structural Analysis), NMR (Determining Molecular and Compound Structures), as well as first-principles calculations to deeply explore material properties, providing strong support for research.

English Proficiency:

- IELTS (6.0), possessing English reading skills, capable of fluently reading English literature in relevant fields and staying updated with cutting-edge research.