Ziyan Han

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SUMMARY

Ph.D. in Cosmochemistry with experience in experimental petrology and isotope geochemistry.
Experienced in the use of gas-mixing furnaces, aerodynamic levitation laser-heated furnaces, and TIMS.
My research investigates volatility of Cl, K, Ni and their isotope fractionations during evaporation to constrain the volatile history of the early Moon and the Solar System.

EDUCATION

Nanjing University, Nanjing, China **Sep 2018-Dec 2024**
Ph.D. in Geology (Planetary materials and evolution)
China University of Geosciences (Wuhan), Wuhan, China **Sep 2014-Jun 2018**
B.S. (Honors) in Geology

RESEARCH EXPERIENCE

Nanjing University, Nanjing, China **Sep 2018-Dec 2024**
Advisor: Prof. Hejiu Hui

PhD thesis: **Experimental studies of volatile degassing and isotope fractionation on the lunar surface**

- Conducted sublimation experiments on NaCl and KCl under different pressures, and analyzed Cl and K isotopes. These experiments constrained the mechanisms of isotope fractionation during vaporization under different pressures, offering insights into the lunar atmospheric conditions.
- Determined the behavior of Cl during the evaporation of lunar basalt composition material using an aerodynamic levitation furnace, identifying HCl and NaCl as dominant species. This research provides deeper insights into the Cl transport on the lunar surface.
- Investigated elemental volatility during the evaporation of chondrule-like material under different oxygen fugacity conditions using an aerodynamic levitation furnace. Measured the K and Ni isotope fractionations during the evaporation process, providing insights into the volatile history of the Moon and other airless bodies.

Lunar transient atmosphere recorded in Chang'e 6 impact glass beads

- Identified pervasive Na and K in-gassing profiles in Chang'e 6 impact glass beads, estimated the partial pressures of Na and K in the impact vapor plume, and the crater size necessary for the formation of the impact glass beads. This work implies a lunar transient atmosphere driven by impact bombardment in the early Moon.

Microgravity effect of the melting and crystallization of the chondrule and CAI

(Cooperation with Prof. Haolan Tang)

- Conducted experiments to study the microgravity effect on the crystallization of chondrule and CAI with electrostatic levitation facility on the China Space Station and on the ground. Results suggests that limited convection in space can significantly change the crystallization sequence, expanding our understanding of early solar system processes.

Limited U isotope fractionation during evaporation: insights from aerodynamic levitation experiments

(Cooperation with Prof. Haolan Tang)

- Conducted experiments to study the U isotope fractionation during evaporation. The U isotope fractionation is very small compared to the K isotope results. This work indicates that evaporation might not be the main process causing the U isotope variation shown in CAI and chondrules.

Formation of the Venusian steep-sided dome

(Cooperation with Prof. Liqing Jiao & Prof. Chaosheng Tang)

- Modelling the morphology of the lava dome using discrete element method, investigation of the formation of Venusian steep-sided domes.

RESEARCH SKILLS

Experimental and Analytical Techniques:

- Gas-mixing furnace, aerodynamic levitation laser-heated furnace, piston cylinder, electrostatic levitation system
- Thermal ionization mass spectrometry, column chemistry, ICP-OES, flame photometer
- SEM, EMPA, LA-ICP-MS, FTIR, Raman spectroscopy

Programming and Software:

- Proficient in Python, Matlab, and familiar with C++.
- YADE (discrete element method simulations), ArcGIS, ENVI, SPSS, JMARS

TEACHING

The Story of the Earth, Teaching Assistant, Nanjing University 2020-2021

HIGHLIGHTED AWARDS

- National Scholarship, Nanjing University 2023
- Academic First-class Scholarship, Nanjing University 2018
- Distinguished Graduate Thesis, China University of Geosciences (Wuhan) 2018
- National Scholarship, China University of Geosciences (Wuhan) 2015

PUBLICATIONS

- **Han, Z.,** Hui, H., Wei, H., & Li, W. (2023). Isotopic fractionation of chlorine and potassium during chloride sublimation under lunar conditions. *Geochimica et Cosmochimica Acta*, 353, 112-128
- Hui, H., **Han, Z.,** & Shuai, K. (2024). Origin of Water in the Moon. *National Science Review*, nwae151.
- **Han Z.**, Hui H. (2021). Steep-sided domes on Venus: an analog study. *Acta Geologica Sinica* 95.09 :2843-2856. (In Chinese).

HIGHLIGHTED CONFERENCES

Talks:

- Goldschmidt 2024 Conference Chicago Aug 2024
- National Planetary Science Conference (Excellent talk) Suzhou, China Jun 2021

Poster:

- AGU Conference 2023 San Francisco Dec 2023
- Goldschmidt 2021 Conference Online Jul 2021