Ziyan Han

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SUMMARY

Ph.D. in cosmochemistry with experience in experimental petrology and Cl isotopes.
Experienced in use of gas-mixing furnaces, aerodynamic furnaces, and TIMS.
Mainly studying on the volatility behaviour of the moderately volatile elements and their isotopes to constrain the volatile history of the early Moon and Solar System.

EDUCATION

Nanjing University, Nanjing, China **Sep 2018-Dec 2024**
Ph.D. in Cosmochemistry
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**
Graduate Research Assistant (Advisor: Prof. Hejiu Hui)

Experimental studies of volatile degassing and isotope fractionation on the lunar surface

- Conducted sublimation experiments on NaCl and KCl under different pressures, and analysed Cl and K isotopes. These experiments constrained the mechanisms of isotope fractionation during vaporization under different pressures, offering insights into the lunar atmospheric conditions responsible for Cl isotope fractionation.
- Determined the behaviour of Cl during the evaporation of lunar basalt composition material using an aerodynamic levitation furnace, identifying HCl and NaCl as dominant specie. This research provides deeper insights into the Cl transport on the lunar surface.
- Investigated elemental behaviour during the evaporation of chondrule-like material under different oxygen fugacity conditions with an aerodynamic levitation furnace, finding that Ni exhibits higher volatility than K under reduced conditions. 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, calculated the partial pressures of Na and K in the impact vapor plume, and determined the crater size necessary for the formation of the impact glass beads. This work implies a lunar transient atmosphere driven by impact bombardment.

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 structure of chondrule and CAI with electrostatic levitation facility on China Space Station and on the ground

in order to constrain the cooling history of the early solar system.

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:

- Gas-mixing furnace, aerodynamic levitation furnace, piston cylinder, electrostatic levitation
- 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 in C++.
- Skilled in using YADE for discrete element method simulations, ArcGIS for spatial analysis, ENVI for remote sensing data analysis, SPSS for statistical analysis, and JMARS for planetary geology research.

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
- Goldschmidt 2021 Conference Online Jul 2021
- National Planetary Science Conference (Excellent talk) Suzhou, China Jun 2021

Poster:

- AGU Conference 2023 San Francisco Dec 2023