

YISHEN (EASON) ZHANG

Leuven, Belgium

✉ yishen.zhang@kuleuven.be  [eazzon](https://github.com/eazzon)  [yishen_z](https://twitter.com/yishen_z)  [website](https://www.yishenzhang.com)

PERSONAL INFORMATION

Date of Birth: 17th December 1993

Nationality: China

Institution: Earth and Environmental Sciences, KU Leuven

Address: Celestijnenlaan 200E, 3001 Leuven

GENERAL RESEARCH INTERESTS

My research interests focus on three aspects in igneous petrology:

1. Mantle melting and mantle heterogeneity in igneous provinces and ocean islands. I am interested in characterization of heterogeneous mantle sources from major and trace elements, the degree of mantle melting accounts for the crustal thickness, trace element abundances in primary minerals
2. Crystallization kinetics, magma dynamics in magmatic systems. I am interested in understanding crystal size, texture, morphology and their responses to the change of magmatic conditions; Elemental diffusion and its application in addressing timescales in volcanic systems. Elemental partitioning under kinetic conditions.
3. Planetary interior structure, evolution and interior-atmosphere interactions. I am interested in using HTHP phase equilibria experiments to understand magma ocean and core/mantle differentiation of rocky planets.

To carry out my research, I use experiments combining with numerical modelling, thermodynamics, statistics, textural and geochemical analyzes

EDUCATION & ACADEMIC APPOINTMENTS

KU Leuven

PhD in Geology

06. 2019 – 01. 2024 (expected)

Leuven, Belgium

University of Liège

Visiting scholar

10. 2018 – 04. 2019

Liège, Belgium

China University of Geosciences (Beijing)

Master in Geology

09. 2016 – 05. 2019

Beijing, China

China University of Geosciences (Beijing)

Bachelor in Geology

09. 2012 – 07. 2016

Beijing, China

LABORATORY EXPERIENCE

- **Experimental petrology:**

1 atm gas mixing furnace

Over 300 runs with 1 atm high to low-temperature experiments, kinetic cooling experiments

Piston cylinder apparatus:

Experienced in 1-2GPa half inch experiments, capsule, assemblage preparation

- **Electron microprobe:**

Over 1000 hours experience with EPMA, experienced in instrument calibration, analytical method development, high precision measurement, mapping

- **Scanning Electron Microanalysis:**

Imaging of BSE and SE

- **X-ray tomography (nanotom system):**

Experienced in geo-material 3D scanning, data processing

- **NanoSIMS:**

Two week analytical experience, data reduction on mapping, trace element analysis

- **LA-ICP-MS:**

Data reduction and analysis

COMPUTER SKILLS

- Fluent in programming with python, including package development, numerical modelling, data analysis, PCA analysis.
- Proficient with Matlab, numerical modelling.
- Standard knowledge of shell scripting, julia, web building language including Django framework, HTML and CSS. Vim enthusiast.
- Experienced with thermodynamic modelling software: alphaMELTS family; MAGEMin; PerpleX
- Experienced with scientific writing in Word, LaTeX, Overleaf
- Experienced in design and editing with Adobe Illustrator, Photoshop, Premiere

FIELD WORK EXPERIENCE

2023 Eifel volcano, *Germany*, 2 days
2022 Fogo volcano, *Cape Verde*, 1 week
2018 Changbai Mountain North China, *Tianchi volcano*, 2 weeks
2018 Yunnan China *Tengchong volcano*, 2 weeks
2018 Emeishan Province *China*, 2 weeks
2018 Zhangjiakou North China, *Yaojiazhuang complex*, 1 week
2014 Akesu, *Xinjiang China*, *Gold deposits*, 3 weeks
2013 Zhoukoudian *China*, *field mapping courses*, 4 weeks
2012 Beidaihe *China*, *excursion*, 3 weeks

PRIZES & AWARDS

2023 Belgian FWO travel grant for Goldschmidt, 2023 (€500)
2018 Institute travel grant for attending Goldschmidt, 2018 (¥12000 = USD 1700)
2018 National Awards for Excellent Graduate Students (¥30,000 = USD 4300, 1%)
2014.12 Third prize in professional course. (15%)
2014.6 Third prize in professional course. (15%)
2014.5 Fourth prize in Institute Scientific Research Activity.

SERVICES

2023 Primary convenor, Goldschmidt 2023, *Dynamics and timescales in magmatic reservoirs, conduits and dikes*
Journal reviewer:
American Mineralogist

TEACHING

2022 Soil Science & Geology (practical, igneous rocks)
2021 Soil Science & Geology (practical, igneous and sedimentary rocks)

SUPERVISION

1. Kinjal Ganguly & Soetkin Willemyns, Interior structure and mineralogy of exoplanets. *Master*. 2023
2. Lander Cuypers, Experimental study of olivine morphology. *Bachelor*, 2021
3. Sarah Stammen, Experimental study of olivine and spinel equilibrium. *Master*. 2020

PUBLICATIONS

Peer reviewed journal publications

1. **Zhang Y**, Namur O, Li W, Shorttle O, Gazel E, Jennings ES, Thy P, Grove TL, Charlier B. (2023). An extended calibration of the olivine-spinel aluminum exchange thermometer: Application to the melting conditions and mantle lithologies of large igneous provinces. *Journal of Petrology* 64(11), p.egad077.
2. **Zhang Y**, Namur O, Charlier B. 2023. Experimental study of high-Ti and low-Ti basalts: liquid lines of descent and silicate liquid immiscibility in large igneous provinces. *Contrib. Mineral. Petrol.* 178(1):1-24.
3. Pirotte H, Cartier C, Pommier A, Namur O, **Zhang Y** Berndt J, Klemme S, Charlier B. 2023. Internal differentiation and volatile budget of Mercury inferred from trace element partitioning experiments at highly reduced conditions. *Icarus*. 115699

4. Vlieghe, M., Rochez, G., Pire-Stevenne, S., Storme, J.Y., Dekoninck, A., Vanbrabant, Y., Namur, O., **Zhang, Y.**, Van Ham-Meert, A., Donnadieu, J.P. and Berbigé, M., 2023. Ni-rich mineral nepouite explains the exceptional green color of speleothems. *Scientific Reports*, 13(1), p.15017.
5. Dekoninck A, Rufet G, Baptiste J, Wyns R, Philippo S, **Zhang Y**, Namur O 2022. Petrogenesis and $^{40}\text{Ar}/^{39}\text{Ar}$ dating of epithermal romanechite from the sub-aerial fault-related Romanèche Mn deposit (France). *Chemical Geology*. 121280
6. **Zhang Y**, Hou T, Veksler IV, Leshner CE, Namur O, 2018. Phase equilibria and geochemical constraints on the petrogenesis of high-Ti picrite from the Paleogene East Greenland flood basalt province. *Lithos*, 300-301,20-32.

Manuscripts under review

1. Jin Z, **Zhang Y**, Bose M, Glynn S, Couffignal F. (under review in GCA). A Novel Mechanism for Intermediate-Felsic Magmatism in the Early Solar System.
2. Xu Y, Lin Y, Wu P, Namur O, **Zhang Y**, Charlier B. (under review in Nature Astronomy). A diamond-bearing core-mantle boundary on Mercury

Manuscripts in progress

1. **Zhang Y**, Namur O, Hakim K (in prep). On the search for super Mercuries in the solar neighborhood.
2. **Zhang Y**, Charlier B, Grove TL, Brown SM, Namur O, Holtz F. (in prep). The very late-stage crystallization of the lunar magma ocean and the composition of immiscible urKREEP.
3. Jin Z, **Zhang Y**, Namur O., Hou T. (in prep). Stable and metastable silicate liquid immiscibility in the Chang'E-5 basaltic magma.
4. **Zhang Y**, Namur O, Charlier B, Holness MB (in prep). A general model for olivine growth rate and morphology.

Conference abstracts

1. **Zhang Y**, Namur O, Charlier B, 2023. Magmatic differentiation and silicate liquid immiscibility in large igneous province. EMPG-XVIII 2023. *oral*
2. **Zhang Y**, Namur O, Charlier B, Holness MB, 2023. A general model for olivine growth rate and morphology. Goldschmidt 2023. *poster*
3. Namur O, Tosi N, Shorttle O, Cartier C, Lin Y, **Zhang Y**, Saracino F, Liado L, Pirotte H, Charlier B. 2023. Mercury's mantle as constrained by its crust. Goldschmidt 2023. *keynote talk*
4. Saracino F, Charlier B, **Zhang Y**, Namur O, 2023. The role of sulfur on liquidus temperature and olivine-orthopyroxene equilibria in highly reduced magmas. Goldschmidt 2023. *poster*
5. Pirotte H, Cartier C, Pommier A, Namur O, **Zhang Y** Berndt J, Klemme S, Charlier B. 2023. Investigating Mercury's internal structure and volatile budget using trace elements partitioning experiments. Goldschmidt 2023. *poster*
6. Shepherd K, Namur O, Bachmann O, **Zhang Y**, Hendrickx T, Charlier B, 2022. Timescales and Petrological Processes in an Area of Plume-Ridge Interaction: Insights from the Islands of Terceira and Flores, Azores. AGU 2022 *oral*
7. **Zhang Y**, Namur O, Charlier B, Li W, Shorttle O, Gazel E, Jennings ES, Thy P, Grove TL, 2022, A re-evaluation of Al-in-Olivine geothermometer. Goldschmidt 2022 *oral*
8. **Zhang Y**, Namur O, Charlier B, 2020. Experimental liquid lines of descent and Silicate Liquid Immiscibility for low-Ti and high-Ti basalts of the Emeishan Large Igneous Province, SW China. AGU 2021. *poster*
9. **Zhang Y**, Namur O, Charlier B, 2020. Experimental liquid lines of descent for low-Ti and high-Ti basalts of the Emeishan Large Igneous Province, SW China. EMPG-XVII 2020. *poster*
10. **Zhang Y**, Hou T, Veksler IV, Leshner CE, Namur O, 2018. Phase equilibria and geochemical constraints on the petrogenesis of high-Ti picrite from the Paleogene East Greenland flood basalt province. Goldschmidt Abstract 2018. *oral*

INVITED TALKS

1. **Zhang Y**. Magmatic differentiation and thermal structure of large igneous provinces 2023. *Guangzhou Institute of Geochemistry, Chinese Academy of Sciences*.
2. Namur O, Charlier B, Cartier C, **Zhang Y**, Nittler M, Collinet M, Grove T, McCammon C. Sulfur chemistry in planetary interiors - Effects of reducing conditions. 2023. *Department of Physics and Astronomy, KU Leuven*.
3. Namur O, Tosi N, Shorttle O, Cartier C, Lin Y, **Zhang Y**, Saracino F, Liado L, Pirotte H, Charlier B. Mercury's mantle as constrained by its crust. *Goldschmidt 2023 keynote talk*.

CODE DEVELOPMENT

1. Li W, **Zhang Y** – pyAp, a package for calculating magmatic volatile, trace element concentrations, and oxygen fugacity using mineral apatite. *python*
2. **Zhang Y** – Mass balance calculation for petrology using non-negative and matrix decomposition algorithms, with MCMC propagating errors on phases and bulk composition. *python*
3. **Zhang Y**, Namur O, Gerve TDV – Multi-component olivine diffusion, integrated with uncertainties of temperature, pressure, oxygen fugacity. *python*
4. **Zhang Y** – Stepwise backward F-test model for multiple linear regression. *python*
5. **Zhang Y** – Script converts alphaMELTS output to formatted spreadsheet. *python*

REFERENCES

1. Olivier Namur (KU Leuven, Belgium): olivier.namur@kuleuven.be
2. Bernard Charlier (University of Liège, Belgium): b.charlier@uliege.be
3. Weiran Li (The University of Hong Kong, China): weiranli@hku.hk

Last edit: 16. October. 2023
Leuven, Belgium