

Nicole Xike Nie

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EDUCATION Ph.D. in Isotope Geo/Cosmochemistry, University of Chicago, Chicago, IL 2019
(Advisor: Prof. Nicolas Dauphas)
M.S. in Geochemistry, Chinese Academy of Sciences (CAS), Beijing, China 2013
B.S. in Geology, China University of Geosciences (CUG), Beijing, China 2010

PROFESSIONAL POSITION Carnegie postdoctoral fellow, Carnegie Institution for Science, Washington, DC 2019–present

RESEARCH INTERESTS Isotope geo/cosmochemistry; early solar system processes; Moon formation; volatile element depletion in planetary bodies; Earth and planetary surface weathering

SKILLS Element purification by column chromatography; MC-ICPMS; Electron Microprobe; NRIXS (Nuclear Resonant Inelastic X-Ray Scattering Spectroscopy); Mössbauer Spectroscopy

AWARDS P² (Postdoc x Postdoc) Grant, Carnegie Science 2020
Carnegie Postdoctoral Research Fellowship 2019
NASA Earth and Space Science Fellowship 2015–2018
Goldschmidt Student Travel Grant 2016
Department Fellowship, University of Chicago 2015
Chinese Academy of Sciences Fellowship, CAS, China 2010–2013
Outstanding Undergraduate Award, CUG, China 2010
Laboratory Open Funding Outstanding Project Award, CUG, China 2009
Tsang Hin-Chi Scholarship, China 2007–2010
Excellence in Geology Award, CUG, China 2007–2010
China National Scholarship (three times) 2007, 2008, 2009

PEER-REVIEWED PUBLICATIONS

- [13] Nie N. X., Dauphas N., Alp E. E., Zeng H., Sio C. K., Hu J. Y., Chen X., Aarons S. M., Zhang Z., Tian H.-C., Wang D., Prissel K. B., Greer J., Bi W., Hu M. Y., Zhao J., Shahar A., Roskosz M., Teng F.-Z., Krawczynski M. J., Heck P. R. and Spear F. S. (2021) Iron, magnesium, and titanium isotopic fractionations between garnet, ilmenite, fayalite, biotite, and tourmaline: results from NRIXS, ab initio, and study of mineral separates from the Moosilauke metapelite. *Geochimica et Cosmochimica Acta*. (in press) [Link](#)
- [12] Zhang Z. J., Nie N. X., Mendybaev R. A., Liu M. C., Hu J. J., Hopp T., Alp E. E., Lavina B., Bullock E. S., McKeegan K. D. and Dauphas N. (2021) Loss and Isotopic Fractionation of Alkali Elements during Diffusion-Limited Evaporation from Molten Silicate: Theory and Experiments. *ACS Earth and Space Chemistry*. (in press) [Link](#)
- [11] Chen X., Tissot F. L. H., Jansen M. F., Bekker A., Liu C. X., Nie N. X., Halverson G. P., Veizer J. and Dauphas N. (2021) The uranium isotopic record of shales and carbonates through geologic time. *Geochimica et Cosmochimica Acta* 300, 164–191. [Link](#)

- [10] Heard A. W., Dauphas N., Guilbaud R., Rouxel O. J., Butler I. B., **Nie N. X.**, Bekker A. (2020) Triple iron isotope constraints on the role of ocean iron sinks in early atmospheric oxygenation. *Science* 370(6515), 446-449. [Link](#)
- [9] Chen X., Wang W., Zhang Z., **Nie N. X.**, Dauphas N. (2020) Evidence from ab initio and transport modeling for diffusion-driven zirconium isotopic fractionation in igneous rocks. *ACS Earth and Space Chemistry* 4(9), 1572-1595. [Link](#)
- [8] **Nie N. X.**, Dauphas N., Villalon K. L., Liu N., Heard A. W., Morris R. V., Mertzman S. A. (2020) Iron isotopic and chemical tracing of basalt alteration and hematite spherule formation in Hawaii: A prospective study for Mars. *Earth and Planetary Science Letters* 544, 116385. [Link](#)
- [7] Zeng H., Rozsa V., **Nie N. X.**, Zhang Z., Pham T. A., Galli G., Dauphas, N. (2019) Ab initio calculation of equilibrium isotopic fractionations of potassium and rubidium in minerals and water. *ACS Earth and Space Chemistry* 3(11), 2601-2612. [Link](#)
- [6] **Nie N. X.**, Dauphas N. (2019) Vapor drainage in the protolunar disk as the cause for the depletion in volatile elements of the Moon. *The Astrophysical Journal Letters* 884(2), L48. [Link](#)
- [5] Johnson A. C., Aarons S. M., Dauphas N., **Nie N. X.**, Zeng H., Helz R. T., Romaniello S. J., Anbar A. D. (2019) Titanium isotopic fractionation in Kilauea Iki lava lake driven by oxide crystallization. *Geochimica et Cosmochimica Acta* 264, 180-190. [Link](#)
- [4] Prissel K. B., Krawczynski M. J., **Nie N. X.**, Dauphas N., Couvy H., Hu M. Y., Alp E. E., Roskosz M. (2018) Experimentally determined effects of olivine crystallization and melt titanium content on iron isotopic fractionation in planetary basalts. *Geochimica et Cosmochimica Acta* 238, 580-598. [Link](#)
- [3] Dauphas N., Hu M. Y., Baker E. M., Hu J., Tissot F. L. H., Alp E. E., Roskosz M., Zhao J., Bi W., Liu J., Lin J. F., **Nie N. X.**, Heard A. (2018) SciPhon: a data analysis software for Nuclear Resonant Inelastic X-ray Scattering with applications to Fe, Kr, Sn, Eu and Dy. *Journal of Synchrotron Radiation* 25(5). [Link](#)
- [2] **Nie N. X.**, Dauphas N., Greenwood R. C. (2017) Iron and oxygen isotope fractionation during iron UV photo-oxidation: Implications for early Earth and Mars. *Earth and Planetary Science Letters* 458, 179-191. [Link](#)
- [1] Zheng Y., Jia J., **Nie X.**, Kong P. (2014) Cosmogenic nuclide burial age of the Sanying Formation and its implications. *Science China Earth Sciences*, 57(6): 1141-1149. [Link](#)

CONFERENCE ABSTRACTS

- Nie N. X.**, Hopp T., Dauphas N. (2020) Rubidium isotopic compositions of Earth, Moon, and chondrites. *51th Lunar and Planetary Science Conference*, #2180.
- Hopp T., **Nie N. X.**, Dauphas N. (2020) Reappraisal of K and Rb isotope fractionation in lunar soils and the origin of the lunar exosphere. *51th Lunar and Planetary Science Conference*, #1190.
- Zhang Z., **Nie N. X.**, Mendybaev R. A., Liu M. C., McKeegan K. D., Dauphas N. (2020) Evaporation kinetics of potassium and rubidium and their isotope fractionation under vacuum conditions. *51th Lunar and Planetary Science Conference*, #2341.
- Aarons S. M., Dauphas N., Zeng H., **Nie N. X.**, Greber N. D., Johnson A. (2019) Controls on titanium isotope fractionation in tholeiitic and calc-alkaline magmas. *AGU Fall Meeting, December 09-13, San Francisco, CA*.
- Heard A. W., Dauphas N., Rouxel O. J., Bekker A., Guilbaud R., Butler I. B., **Nie N. X.** (2019) Triple iron isotope analyses as a tracer of sulfidic and oxic iron sinks before Earth's Great Oxygenation. *AGU Fall Meeting, December 09-13, San Francisco, CA*.
- Dauphas N., **Nie N. X.** (2019) Why is the Moon depleted in moderately volatile elements? *82nd Annual Meeting of The Meteoritical Society*, vol. 2157.

- Liu N., Oglione R. C., Nittler L. R., **Nie N. X.**, Dauphas N. (2019) Isotopic and elemental analyses of meteorites and Mars analogues by Hyperion-NanoSIMS. *82nd Annual Meeting of The Meteoritical Society*, vol. 2157.
- Nie N. X.**, Dauphas N. (2019) Rubidium isotopic compositions of the Earth and the Moon. *50th Lunar and Planetary Science Conference*, #2098. [Oral Presentation]
- Zhang Z., **Nie X.**, Mendybaev R. A., Dauphas N. (2019) Experimental study of potassium and rubidium evaporation under vacuum conditions. *50th Lunar and Planetary Science Conference*, #2834.
- Finlayson V., Rubin K. H., Konter J. G., **Nie N. X.**, Dauphas N. (2018) Variable fluid contributions to boninite magma generation, Mata Volcanic Field, NE Lau Basin as determined by trace elements and Fe-Sr-Pb-Nd-Hf-U-Th-Ra isotopes. *AGU Fall Meeting, December 10–14, Washington, DC*.
- Nie N. X.**, Dauphas N., Zeng H., Sio C. K., Hu J. Y., Alp E. E., Bi W., Hu M. Y., Spear F. S. (2018) High-temperature equilibrium Fe isotope fractionation: A comparison among NRIXS, ab-initio calculations and natural samples. *AGU Fall Meeting, December 10–14, Washington, DC*.
- Nie N. X.**, Dauphas N., Sio C. K., Spear F. S. (2018) Inter-mineral equilibrium iron isotopic fractionation factors from a special metamorphic rock. *Goldschmidt Conference, August 12–17, Boston, MA*.
- Heard A. Dauphas N. Rouxel O., **Nie N.** (2018) Triple iron isotope variations in Archean ocean sediments. *Goldschmidt Conference, August 12–17, Boston, MA*.
- Prissel K. B., Krawczynski M. J., Dauphas N., **Nie N. X.** (2018) Evaporative iron loss during one-atmosphere gas-mixing experiments. *Sixteenth International Symposium on Experimental Mineralogy, Petrology, and Geochemistry, June 17–21, Clermont-Ferrand, France*.
- Heard A. W., Dauphas N., Rouxel O. J., **Nie N. X.** (2018) Insights into redox cycling on early earth from the mass fractionation law of iron isotopes in Archean sediments. *49th Lunar and Planetary Science Conference*, #2470.
- Dauphas N., Meheut M., Blanchard M., Zeng H., Galli G., Canup R. N., Visscher C., **Nie N.** (2018) Can lunar formation theories be tested with K isotopes? *49th Lunar and Planetary Science Conference*, #2481.
- Finlayson V., Konter J., Rubin K. H., **Nie N. X.**, Dauphas N. (2017) A subduction zone spreading ridge transition signature preserved in recent volcanic activity in the NE Lau Basin. *The Geological Society of America 113th Annual Meeting, May 23–25, Honolulu, Hawai'i*.
- Nie N. X.**, Dauphas N., Morris R. V. (2017) Clues on acid-sulfate alteration and hematite formation on Earth and Mars from iron isotope analyses of terrestrial analogues from Hawaii. *48th Lunar and Planetary Science Conference*, #2802. [Oral Presentation]
- Nie N. X.**, Dauphas N., Greenwood R. C. (2016) Iron and oxygen isotope fractionation during photo-oxidation. *Goldschmidt Conference, June 26–July 1, Yokohama, Japan*. [Oral Presentation]
- Nie N. X.**, Dauphas N., Greenwood R. C. (2016) Iron and oxygen isotope fractionation during photo-oxidation. *47th Lunar and Planetary Science Conference*, #1489.
- Williams K. B., Krawczynski M. J., **Nie N. X.**, Dauphas N., Couvy H., Hu M. Y., Alp E. E. (2016) The role of differentiation processes in mare basalt iron isotope signatures. *47th Lunar and Planetary Science Conference*, #2779.
- Nie N. X.**, Dauphas N. (2015) Iron isotope constraints on the photo-oxidation pathway to BIF formation. *46th Lunar and Planetary Science Conference*, #2635. [Oral Presentation]

INVITED TALKS How did the Moon lose its volatiles after the Giant Impact? An isotopic perspective. (2019) *University of California, Berkeley*
 Photo-oxidation on early Earth and Mars: insights from Fe isotopes. (2017) *Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing, China*

TEACHING ASSISTANT-SHIPS GEOS 21100: Introduction to Petrology, University of Chicago Spring 2014, 2015, 2016
 PHSC 13600: Natural Hazards, University of Chicago Winter 2014, 2018
 PHSC 13400: Global Warming, University of Chicago Fall 2013, 2014
 (total hours \approx 200; total number of students \approx 120)

ACADEMIC SERVICE Reviewer for *Nature Geoscience*, *Geochimica et Cosmochimica Acta (GCA)*, *Geostandards and Geoanalytical Research (GGR)*, *Terra Nova*

OUTREACH NASA moon rocks help form new picture of early moon and Earth. (2019) *Uchicago News*. [Link](#)
 50 years later, UChicago scientists continue to decode moon's mysteries. (2019) *Uchicago News*. [Link](#)
 French-American Science Festival. (2017) *Chicago*. [Link](#)
 The idea of hematite formation on Mars through photo-oxidation. (2016) *CosmoSparks*. [Link](#)

PROFESSIONAL AFFILIATIONS American Geophysical Union (AGU), Geochemical Society (GS)

Last updated: Mar. 25, 2021