

Corliss Kin I Sio

Updated 09/15/2021

Assistant Professor
 University of Toronto
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EMPLOYMENT Assistant Professor (2021-)
 Department of Earth Sciences
 University of Toronto

Staff Scientist (career-indefinite; 2019-2021)
 Postdoctoral Research Staff Member (2016-2019)
 Nuclear and Chemical Sciences Division
 Lawrence Livermore National Laboratory (LLNL)

Postdoctoral Fellow (2014-2016)
 Geophysical Laboratory
 Carnegie Institution of Washington

EDUCATION Ph.D. in Geophysical Sciences, 2014
 The University of Chicago
 Dissertation title: Cooling and crystallization histories of magmatic bodies from *in-situ* Mg-Fe isotopic analyses in zoned olivines
 Thesis advisor: Nicolas Dauphas

B.S. in Geology, 2008
 University of California, Los Angeles (UCLA)

AWARDS LLNL DDS&T Excellence in Publication Award (2020)
 Carnegie Postdoctoral Research Fellowship (2014)
 Lunar and Planetary Institute Career Development Award (2014)
 NASA Earth and Space Science Fellowship (2013)
 Goldschmidt Travel Grant (2013)
 AGU Outstanding Student Paper Award [Oral presentation, MRP] (2012)
 Chateaubriand Fellowship (2011)
 UCLA Clem Nelson Award, Academic Excellence in Geology (2008)
 Meritus College Fund Scholarship (2004-2008)
 Maisin Scholar Award (2004-2008)

**FUNDING
(Sole PI)**

Duration	Total	Source	Proposal title
2021-2026	\$175,000	NSERC Discovery	Igneous petrology through the lens of non-traditional stable isotopes
2021-2024	\$120,000	NSERC Accelerator	
2021	\$12,500	NSERC Early Career	
2020-2022	\$524,000	DOE LDRD Labwide	Earth's leaky core: identifying signatures of core materials in the lithosphere
2014-2016	\$136,000	Carnegie Postdoc Fellowship	Experiments on olivine growth
2013-2014	\$35,000	NASA ESS Fellowship	Thermal histories of Martian nakhlites and Alexo komatiites, the terrestrial analogue?
2011	\$10,000	Chateaubriand Fellowship	Application of iron isotopes for petrologic studies

- PATENT**
- Additive Manufacturing of Microanalytical Reference Materials
U.S. patent application No. 16/902,076 filed on 6/15/2020.
Inventors: **Sio, C.K.**, Parsons-Davis, T., Lee, E., Kuntz, J., Pascall, A., Kevins, R., Bandong, B., Shusterman, J.
- TEACHING**
- ESS322 Igneous petrology (Winter 2022)
- STUDENTS**
- Bruna da Silva Ricardo (PhD student; 2021-)
 - Winnie Fan (MSc student co-supervised with Prof. Xu Chu; 2021-)
 - Jessica Verschoor (MSc student co-supervised with Prof. Neil Bennett; 2022-)
- SERVICE**
- Reviewer for: *American Mineralogist*, *Elements*, *Earth and Planetary Science Letters*, *Geochemical Perspectives Letters*, *Geochimica et Cosmochimica Acta*, *Geology*, *Meteoritics and Planetary Science*, *Nature Communications*, *Rapid Communications in Mass Spectrometry* (2014-)
 - AGU Fall Meeting session convener (2021) “Beyond equilibrium: Kinetic isotope fractionation in high-T environments”
 - LLNL PLS Workforce & Communications Committee (2020-2021)
 - Meritus College Fund scholarship judge (2018-2019)
 - Goldschmidt Conference session convener and chair (2018) “Geochemical and geodynamical constraints on the origin and evolution of planetary bodies”
 - AGU Fall Meeting OSPA judge (2016-2018)
 - LPSC Dwornik Award judge (2018)
 - DC STEM Fair Science judge (2015)
- VISITING SCHOLAR POSITIONS**
- Isotope Geochemistry Laboratory, University of Washington (2013)
 - UMET, Université de Lille 1, France (2010, 2012, 2013)
 - CRPG, Nancy, France (2012, 2013)
 - Isotope Laboratory, University of Arkansas (2011)
 - Laboratoire Magmas et Volcans, Clermont-Ferrand, France (2010)
- INVITED TALKS**
- University of Toronto (virtual; 4/28/2020 and 4/29/2020)
 - University of Nevada, Las Vegas (10/9/2019)
 - University of British Columbia (10/3/2019 and 10/4/2019)
 - University of California, Los Angeles (10/25/2018)
 - 2nd International Mars Sample Return Conference (4/26/2018; keynote)
 - University of Florida (2/8/2018 and 2/9/2018)
 - University of California, Santa Cruz (10/31/2017)
 - Lawrence Livermore National Laboratory (12/16/2015)
 - Carnegie Neighborhood Lecture Series (10/15/2015)
 - University of Maryland (3/4/2015)
- PUBLICATIONS**
1. **Sio, C.K.**, Bennett, N., Schauble E., Edwards, P., Leshner, C., Wimpenny J., Shahar, A. (in revision with *Nature Geoscience*). Iron isotope evidence of an impact origin for main-group pallasites.
 2. Wimpenny, J., Borg L., **Sio, C.K.** (in revision with *Earth and Planetary Science Letters*). The gallium isotopic composition of the Moon.
 3. **Sio, C.K.**, Baumer, T., Cahill, J., Hansen S., Harris S., Wimpenny J., Lindvall R., Du Frane, W., Kuntz J. (in review with *Diamond and Related Materials*). Determination of impurities in cubic boron nitride (cBN) by inductively coupled plasma mass spectrometry (ICPMS).

4. Nie, N.X., Dauphas, N., Alp, E.E., Zeng, H., **Sio, C.K.**, Hu, J.Y., Aarons, S.M., Zhang, Z., Tian, H.C., 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., 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*, 302, 18-45.
5. Cahill, J.T., Du Frane, W.L., Sio, C.K., Kig, G.C.S., Soderlind, J.C., Lu, Worsley, M.A., Kuntz, J.D. (2020). Transformation of boron nitride from cubic to hexagonal under 1-atm helium. *Diamond and Related Materials*, 109, 108078.
6. Kruijjer, T.S., Borg, L.E., Wimpenny, J. **Sio, C.K.** (2020). Onset of magma ocean solidification of Mars inferred from Mn-Cr chronometry. *Earth and Planetary Science Letters*, 116315.
7. **Sio, C.K.**, Borg, L.E., Cassata, W.S. (2020). The timing of lunar solidification and mantle overturn recorded in ferroan anorthosite 62237. *Earth and Planetary Science Letters*, 538, 116219.
8. **Sio, C.K.**, Parsons-Davis, T., Lee, E., Wimpenny, J., Kuntz, J.D., Pascall, A.J. Bennett, N. (2020). Additive manufacturing of platinum group element (PGE) reference materials with a silica matrix. *Rapid Communications in Mass Spectrometry*, 34(7), e8627.
9. Borg, L.E., Gaffney, A.M., Kruijjer, T.S., Marks, N.A., **Sio, C.K.**, Wimpenny, J. (2019) Isotopic evidence for a young lunar magma ocean. *Earth and Planetary Science Letters*, 523, 115706.
10. Elardo, S.M., Shahar, A., Mock, T. D., **Sio, C.K.** (2019). The effect of core composition on iron isotope fractionation between planetary cores and mantles. *Earth and Planetary Science Letters*, 513, 124-134.
11. **Sio, C.K.**, Roskosz, M., Dauphas, N., Bennett, N., Mock, T., Shahar, A. (2018) The isotope effect for Mg-Fe interdiffusion in olivine and its dependence on crystal orientation, composition and temperature. *Geochimica et Cosmochimica Acta*, 239, 463-480.
12. **Sio, C.K.**, Dauphas N. (2017) Thermal and Crystallization histories of magmatic bodies by Monte Carlo inversion of Mg-Fe isotopic profiles in olivine. *Geology*, 45(1), 47-70.
13. **Sio, C.K.** (2016) Dissecting a volcano. *American Mineralogist*, 101(5), 1023-1024.
14. Roskosz, M., **Sio, C.K.**, Dauphas, N., Bi, W., Tissot F.L.H., Hu, M., Zhao, J., Alp, E. (2015) Spinel-olivine-pyroxene equilibrium iron isotopic fractionation and applications to natural peridotites. *Geochimica et Cosmochimica Acta*, 169, 184-199.
15. Blanchard, M., Dauphas, N., Hu, M.Y., Roskosz, M., Alp, E.E., Golden, D.C., **Sio, C.K.**, Tissot, F.L.H., Zhao, J., Gao, L., Morris, R.V., Fornace, M., Floris, A., Lazzeri, M., Balan, E. (2015) Reduced partition function ratios of iron and oxygen in goethite. *Geochimica et Cosmochimica Acta*, 151, 19-33.
16. Teng, F.-Z., Li, W.Y., Ke, S., Yang, W., Liu, S.-A., Sedaghatpour, F., Wang, S.-J., Huang, K.-J., Hu, Y., Ling, M.-X., Xiao, Y., Liu, X.-M., Li, X.-W., Gu, H.-O., **Sio, C.K.**, Wallace, D.A, Su, B.-X., Zhao, L., Chamberlin, J., Harrington, M., Brewer, A. (2015) Magnesium isotopic compositions of international geological reference materials. *Geostandards and Geoanalytical Research*, 39(3), 329-339.

17. Dauphas, N., Roskosz, M., Alp, E.E., Neuville, D., Hu, M., **Sio, C.K.**, Tissot, F.L.H., Zhao, J., Tissandier, L., Medard, E., Cordier, C. (2014) Magma redox and structural controls on iron isotope variations in Earth's mantle and crust. *Earth and Planetary Science Letters*, 398, 127-140.
18. **Sio, C.K.**, Dauphas, N., Teng, F.-Z., Chaussidon, M., Helz, R., Roskosz, M. (2013) Discerning crystal growth from diffusion profiles in zoned olivine by *in-situ* Mg-Fe isotopic analyses. *Geochimica et Cosmochimica Acta*, 123, 302-321.
19. Dauphas, N., Roskosz, M., Alp, E.E., Golden, D.C., **Sio, C.K.**, Tissot, F.L.H., Hu, M., Zhao, J., Gao, L., Morris, R.V. (2012) A general moment NRIXS approach to the determination of equilibrium Fe isotopic fractionation factors: application to goethite and jarosite. *Geochimica et Cosmochimica Acta*, 94, 254-275.
20. Wang, K., Moynier, F., Dauphas, N., Barrat, J.A., Craddock, P., **Sio, C.K.** (2012) Iron isotope fractionation in planetary crusts. *Geochimica et Cosmochimica Acta*, 89, 31-45.

**SELECTED
CONFERENCE
ABSTRACTS**

** indicates
presenting author*

1. **Sio, C.K.***, Render, J. Wimpenny, J., Leshner, C.E., Brenan, J., Bennett, N. (2021) Nickel isotope fractionation in Fe-Ni and Fe-Ni-S alloys by thermodiffusion. AGU Fall Meeting.
2. **Sio, C.K.***, Parsons-Davis, T., Lee, E., Wimpenny, J., Pascall, A.J., Kuntz, J.D., Goodell, J.J., Roberts, K.E., Bandong, B.B., Bennett, N.R. (2020) Additive manufacturing of PGE standards with a silica matrix. Goldschmidt Conference.
3. Wimpenny, J., **Sio, C.K.**, Borg, L.E. (2020) Investigating the isotopic composition of the Moon using Zn and Ga isotope systematics. Goldschmidt Conference.
4. Harrington A.D., Calaway, M.J., **Sio, C.K.**, McCubbin, F.M. (2020) Considerations for the Mars Sample Return Containment Facility. Committee on Space Research (COSPAR) Scientific Assembly.
5. **Sio, C.K.***, Wimpenny, J., Borg, L.E. (2019) Iron isotope compositions of lunar highland rocks and mare basalts. Goldschmidt Conference. **[Oral]**
6. Wimpenny, J., Borg, L.E., **Sio, C.K.** (2019) Reassessing gallium isotopic evidence for volatile loss from the Moon. Goldschmidt Conference.
7. Gaffney, A.M., Borg, L.E., Wimpenny, J., **Sio, C.K.**, Cassata, W.S., Marks, N.E., Shearer, C.K., Miller, M.L. (2019) Isotope systematics of Mg-suite troctolite 14321,1847. LPSC.
8. **Sio, C.K.***, Moore, J. D. P. (2018) Unlocking the potential of isotopes to constrain thermal histories: Early steps toward a versatile tool for diffusion chronometry using chemical-isotopic profiles in zoned minerals. AGU Fall Meeting. **[Oral]**
9. 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.
10. Borg, L.E., Gaffney, A.M., Kruijjer, T.S., **Sio, C.K.*** (2018) Long term value of Apollo samples: how fundamental understanding of a body takes decades of study. 2nd International Mars Sample Return Conference. **[Keynote; Oral]**
11. **Sio, C.K.***, Borg, L.E. (2018) Sm-Nd isotopic systematics of ferroan anorthosite (FAN) 62237: Evidence of co-magmatism of FANs at 4.36 Ga. LPSC. **[Oral]**
12. Kruijjer, T.S., Borg, L.E., **Sio, C.K.**, Wimpenny, J. (2018) Chromium isotope systematics of martian meteorites: implications for Mars' early differentiation. LPSC.

13. **Sio, C.K.***, Roskosz, M., Dauphas, N., Bennett, N., Mock, T.D., Shahar, A. (2017) Experimentally determined isotope effect during Mg-Fe interdiffusion in olivine. AGU Fall Meeting. [**Oral**]
14. **Sio, C.K.***, Shahar, A. (2017) Cooling rates and metal-olivine iron isotope fractionations in pallasites. MetSoc. [**Oral**]
15. **Sio, C.K.***, Dauphas, N. (2016) Constraining thermal histories by Monte Carlo simulation of Mg-Fe isotopic profiles in olivine. AGU Fall Meeting. [**Oral**]
16. **Sio, C.K.***, Dauphas, N., Roskosz, M., Shahar, A. (2015). An improved geospeedometry using chemical-isotopic profiles in olivines. AGU Fall Meeting. [**Invited; Poster**]
17. **Sio, C.K.***, Chaussidon, M., Dauphas, N., Richter, F.M., Roskosz, M., Sautter, V., Ma, C. (2014). Determining the nature of olivine zoning in nakhlites by *in-situ* Mg and Fe isotopic analyses. LPSC. [**Poster**]
18. **Sio, C.K.***, Roskosz, M., Dauphas, N., Bi, W., Alp, E.E., Tissot, F.L.H., Hu, M.Y., Zhao, J. (2013). Spectroscopic determination of equilibrium Fe isotopes fractionation factors for spinels with varying Fe oxidation states. AGU Fall Meeting. [**Poster**]
19. **Sio, C.K.***, Roskosz, M., Chaussidon, M., Dauphas, N., Mendybaev, R., Richter, F., Teng, F.-Z. (2013). Diffusion-driven isotopic fractionations in olivine in laboratory and natural settings. Goldschmidt Conference. [**Oral**]
20. **Sio, C.K.***, Dauphas, N., Teng, F.-Z., Chaussidon, M., Helz, R., Roskosz, M. (2012). Telling zoned from zoned: LA-MC-ICPMS and SIMS iron isotopic measurements of olivine. AGU Fall Meeting. [**Oral**]
21. Dauphas N., Roskosz, M., Alp, E.E., **Sio, C.K.**, Tissot, F.L.H., Neuville, D., Hu, M., Zhao, J., Tissandier, L., Medard, E. (2012). Controls on iron isotope variations in planetary magmas. LPSC.
22. Roskosz, M., Alexander, C.M.O'D., **Sio, C.K.**, Wang, J., Watson, H.C., Dauphas, N., Mysen, B.O. (2010). Redox-dependent, diffusion-driven fractionation of Fe isotopes in silicate melts and its structural controls. Goldschmidt Conference.
23. **Sio, C.K.***, Dauphas, N., Roskosz, M., (2010). Can core formation in planetesimals fractionate iron isotopes? Clues from a study of metal-silicate assemblages in Disko Basalt, Greenland. LPSC. [**Oral**]