



Dr Tim Tomkinson
PhD, MSci

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Area of research

Planetary processes

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Summary

My research focuses on the extraterrestrial formation of alteration minerals within Martian meteorites. These hydrous mineral assemblages provide an opportunity to gain key insights into the past Martian fluid reservoirs (hydrosphere) and the ancient atmosphere of Mars. I build on previous investigations by employing a new radioisotopic dating program and geochemical characterization of the alteration veins. This work uses state of the art instrumentation including X-ray Computed Tomography, NanoSIMS and a high-sensitivity, high resolution multicollector noble gas mass spectrometer (HELIX-SFT) for $^{40}\text{Ar}/^{39}\text{Ar}$ dating. These studies integrate data collected using these analytical instruments and results from FIB-SEM, Raman, TEM and EPMA and new preparation techniques to provide a comprehensive investigation of Mars' history through meteorite analyses.

Keywords

- Planetary Science
- Petrology
- Mineralogy
- Isotope Geochemistry
- Geology
- Meteorites

Memberships

Organisations

[School of Earth Sciences](#)

Earth Sciences staff

- [Earth Sciences academic staff including research fellows](#)
- [Earth Sciences postdoctoral researchers](#)

Research groups

- [Geochemistry](#)

Interdisciplinary groups

- [Bristol Biogeochemistry Research Centre](#)

Recent publications

- Cohen, BE, Mark, DF, Lee, MR, Cassata, WS, Griffin, S, Smith, CL & Tomkinson, T, 2018, '[The Nakhrites Sample Multiple Igneous Units: Evidence from \$^{40}\text{Ar}/^{39}\text{Ar}\$ Chronology and Geochemistry](#)'. in: *49th Lunar and Planetary Science Conference: 19-23 March, 2018 held at The Woodlands, Texas*.
- Cohen, BE, Mark, DF, Cassata, WS, Lee, MR, Tomkinson, T & Smith, CL, 2017, '[Taking the pulse of Mars via dating of a plume-fed volcano](#)'. *Nature Communications*, vol 8.
- Lee, MR, Tomkinson, T, Mark, DF & Smith, CL, 2016, '[Carbon sequestration on Mars](#)'. *Geology*, vol 44., pp. e388
- Lindgren, P, Hanna, RD, Dobson, KJ, Tomkinson, T & Lee, MR, 2015, '[The paradox between low shock-stage and evidence for compaction in CM carbonaceous chondrites explained by multiple low-intensity impacts](#)'. *Geochimica et Cosmochimica Acta*, vol 148., pp. 159-178
- Lee, M, Tomkinson, TOR, Hallis, LJ & Mark, DF, 2015, '[Formation of iddingsite veins in the martian crust by centripetal replacement of olivine: Evidence from the nakhrite meteorite Lafayette](#)'. *Geochimica et Cosmochimica Acta*, vol 154., pp. 49-65
- MacLaren, I, Andersson, SML, Kovács, A, Tomkinson, TOR & Mark, DF, 2015, '[Opal-A in the Nakhla meteorite: A tracer of ephemeral liquid water in the Amazonian crust of Mars](#)'. *Meteoritics and Planetary Science*, vol 50., pp. 1362-1377
- Cohen, BE, Cassata, W, Mark, DF, Tomkinson, T, Lee, MR & Smith, CL, 2015, '[Significance of the cosmogenic argon correction in deciphering the \$^{40}\text{Ar}/^{39}\text{Ar}\$ ages of the Nakhrite \(Martian\) meteorites](#)'.
- Blamey, NJF, Parnell, J, McMahon, S, Mark, DF, Tomkinson, T, Lee, M, Shivak, J, Izawa, MRM, Banerjee, NR & Flemming, RL, 2015, '[Evidence for methane in Martian meteorites](#)'. *Nature Communications*, vol 6.
- Tomkinson, T, Lee, MR, Mark, DF, Dobson, KJ & Franchi, IA, 2015, '[The Northwest Africa \(NWA\) 5790 meteorite: A mesostasis-rich nakhrite with little or no Martian aqueous alteration](#)'. *Meteoritics and Planetary Science*, vol 50., pp. 287-304
- Cohen, BE, Mark, DF, Tomkinson, TOR, Lee, MR & Smith, CL, 2015, '[Martian Igneous Activity and Fluid-Based Alteration: Chronological Constraints from \$^{40}\text{Ar}/^{39}\text{Ar}\$ Analyses of the Nakhrites](#)'.

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