Building Habitable Planets

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The habitability of our planet is strongly linked to its volatile budget along with the distribution and recycling of volatiles between different planetary reservoirs. The geochemistry of planetary building materials along with the dynamics of early planetary accretion and large scale differentiation into distinct reservoirs could have played a significant role in determining the abundance and fractionation of volatiles in the planet.

However, type of carrier materials, the mode of delivery of these volatiles, and how they were processed during the accretion and thermo-chemical differentiation of planetary bodies is still not well constrained.

It is crucial to address these questions in order to understand how our planet found itself under ideal conditions where the temperature, distance from the sun, and the volatile mix are ‘just right’ to have the essential ingredients required for the formation and sustenance of organic life as we know of it.

Geochemical analysis of meteorites integrated with constraints from high pressure–high temperature experiments simulating planetary differentiation processes can offer significant clues about these early planetary processes that determined the volatile budget of our planet.

PROFILE

Education: PhD in Experimental Geochemistry, University of Bristol, United Kingdom, 2009; MSc (Applied Geology), University of Allahabad, India, 2003

Expertise: Geochemistry, Planetary Science, High pressure–High Temperature experiments, Planetary Volatiles, Mineralogy

Work Experience:

2016-present: Assistant Professor, Department of Earth Sciences, IIT Roorkee, India

2013-2016: Leverhulmne fellow (PDRA), Centre for Planetary Sciences, University College London-Birkbeck, University of London, UK, and Department of Earth Sciences, Natural History Museum, London, UK

April 2009-December 2013: Postdoctoral Research Associate, Department of Earth Sciences, VU University, Netherlands

September 2007-December 2007: Visiting Scientist, Department of Earth Sciences, Tokyo Institute of Technology, Japan

October 2003-September 2004: Junior Research Fellow, National Centre of Mineralogy and Petrology, Allahabad, India

Teaching Experience and Research Supervision:

IIT Roorkee, India (2016–present): Teaching: 1) Geochemistry; 2) Crystallography and Mineralogy; and 3) Planetary Geosciences, to postgraduates and undergraduates.

Birkbeck, University of London, UK (2014-2016): Taught 'Planetary interiors' module (BSc, 2015-2016)

VU University, Amsterdam, Netherlands (2009–2013): Taught Advanced Geochemistry MSc course on 'Chemistry and timing of major differentiation events'. (2010-2013)

University of Bristol, UK (2004-2008): Postgraduate demonstrator in a) Mineralogy, b) Global Geophysics c) Non-renewable resources d) Materials of the Earth's Interiors and e) Minerals and Melts

Memberships in professional societies:

1) Geochemical Society, 2) Mineralogical Society, 3) American Geophysical Union and 4) Meteoritical Society

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