

Department of Geology
Seminar Series

Deciphering the compositions of fluids in the Earth: Rubies, volcanoes and the origins of life

Location:
Virtual

**Wednesday,
January 26
1:00 p.m.**



**Dr. Vincent
van Hinsberg**

- **2021 Hutchison Medalist**
- **Associate professor and
Osisko Scholar
at McGill University**

Dr. van Hinsberg uses the compositions of minerals to reconstruct P-T conditions and fluid compositions in and on the Earth in his research.

A particular focus is the reconstruction of the compositions of fluids involved in water-rock interaction at the mid-ocean ridges and element release during slab devolatilisation in subduction zones, using mineral-fluid element partitioning systematics.

GAC 2021 W. W. Hutchison Medalist: Dr. Vincent van Hinsberg, McGill University

Title: Deciphering the compositions of fluids in the Earth: Rubies, volcanoes and the origins of life

Abstract

Earth is the "blue planet," with more than 70% of its surface covered in water and the equivalent of up to 4 oceans in its interior. This abundance of water has a profound impact on the processes that shape our planet, from ore formation to volcanism and plate tectonics, to the origins and development of life. To understand this impact, it is necessary to know the compositions of these fluids. At present, such information is largely unavailable, because direct samples of fluid are rare, especially for the early Earth and for the deep Earth interior.

In this presentation, I will outline a different approach, in which fluid composition is reconstructed from the geological rock record based on the predictable and characteristic element partitioning between minerals and fluid. Thermodynamics allows us to understand major element mobility, and insights into how elements are built into crystal lattices provides the complementary trace element story. Unlike fluids, minerals with preserved compositions are readily available in the geological record, and this approach therefore provides a widely applicable tool to reconstruct fluid compositions for the full range of Earth environments and even for its earliest history, and I will illustrate this with examples of my group's research on ruby formation, volcano monitoring and the development of early life.

W.W. Hutchison Medal

The W.W. Hutchison Medal is named after Dr. William W. Hutchison in recognition of his many contributions to Canadian and international geoscience. The medal is awarded to a young individual for recent exceptional advances in Canadian earth science research.

Biography – Dr. Vincent van Hinsberg



Vincent van Hinsberg is an associate professor and Osisko Scholar at McGill University in Montreal, Canada. He received his MSc in geochemistry from Utrecht University in the Netherlands, and a PhD from the University of Bristol in the UK where he worked on the geothermobarometric potential of tourmaline with John Schumacher. Prior to his faculty appointment, he was a postdoctoral scholar at McGill University and a Marie Curie Fellow at the University of Oxford studying the systematics of trace element incorporation into minerals. Currently he leads a research group in experimental petrology and water-rock interaction, and directs the McGill laser-ablation ICP-MS facility.

In his research, Vincent uses the compositions of minerals to reconstruct P-T conditions and fluid compositions in and on the Earth. A particular focus is the reconstruction of the compositions of fluids involved in water-rock interaction at the mid-ocean ridges and element release during slab devolatilisation in subduction zones, using mineral-fluid element partitioning systematics. This approach can be extended to a broad set of geological problems as exemplified by the diversity of research topics that occupy his grad students, from crater lake precipitates to ore formation.