

Mineralogical Association of Canada



Short Course Volume 41

SECONDARY ION MASS SPECTROMETRY IN THE EARTH SCIENCES: Gleaning the Big Picture from a Small Spot

Edited by Mostafa Fayek

Obtaining a quantitative and predictive understanding of geological systems, including exploitable energy sources, requires knowledge of the age of origin and subsequent thermal history of the system over geological time. While analysis of milligram- and microgram-sized materials is routine, obtaining important geologic information from features such as zoned minerals and cemented intergranular regions requires in situ measurements at the micron scale. An important breakthrough in this regard was the development of the

secondary ion mass spectrometer (SIMS). SIMS is capable of performing precise and accurate (i.e. ‰ to sub-‰) in situ measurements of most elements and their isotopes with ca. 10 µm resolution.

This short course volume introduces SIMS analytical techniques and assesses their applications in the Earth sciences. Topics include light stable and non-traditional isotope analysis, radiogenic isotope analysis, quaternary geochronology, and depth profiling techniques.

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