

Zoom SIMS Mini-workshop:

Demonstrating the characterization of diffusion profiles using secondary ion mass spectrometry in depth-profiling mode: primary beam of O_2^- and detection of positive secondary ions.

17 October 2023

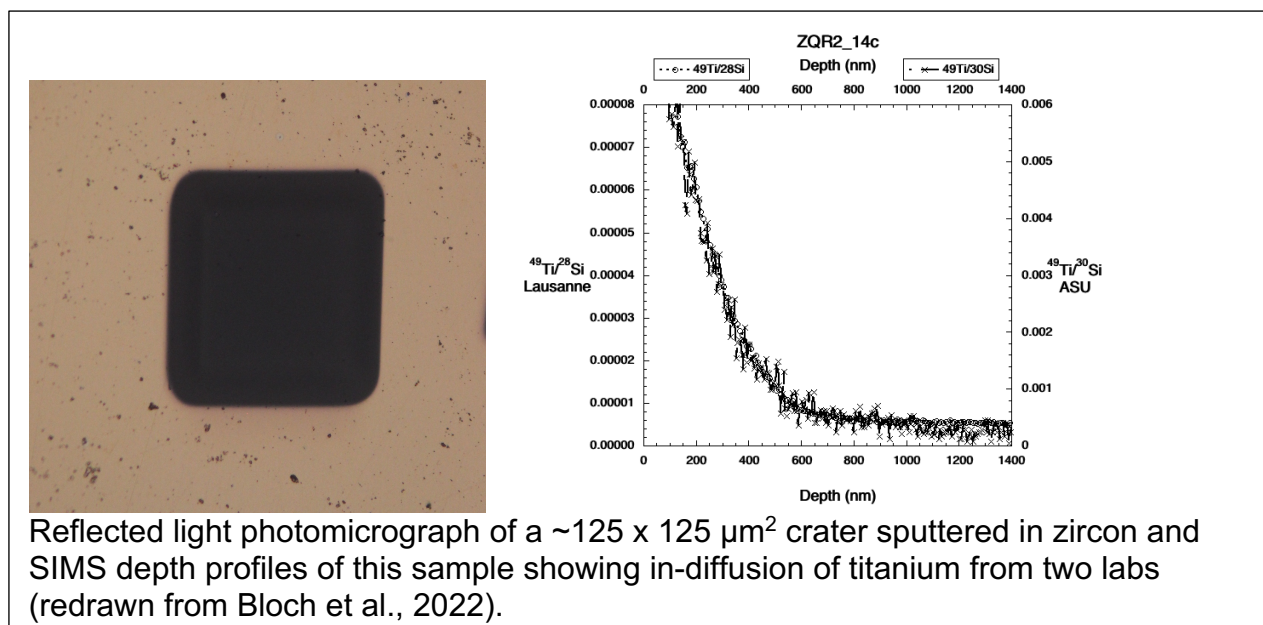
10 AM Mountain Standard Time.

Approximate duration: ~3 hours

Host: Rick Hervig at Arizona State University

You are invited to a free, on-line workshop demonstrating an approach to conducting depth profiles on samples with an experimentally-produced chemical gradient from the surface inwards. The content of this workshop is provided below.

Overview: Slow-diffusing elements may not migrate more than a few hundreds of nanometers in laboratory experiments (see figure). Such short gradients can be well-characterized using secondary ion mass spectrometry in depth-profiling mode. During this virtual, mini-workshop, the participants will observe the steps we use when characterizing diffusion profiles using an oxygen primary beam and detection of positive secondary ions (typical approach for lithophile element diffusion). The participants will observe the focusing of the primary beam and how one selects an appropriate intensity. We will set up parameters for controlling charging (when analyzing insulating matrices with charged particle beams), and the criteria used to select the elements (besides the obvious choice of the diffusant!) examined during the analysis.



Content:

- 1) Brief description/demonstration of the Cameca ims 6f SIMS (ion imaging, primary beam rastering, selection of the size of the analyzed area and other relevant parameters and live group discussion of these items).
- 2) Description of the sample of interest: a crystal of zircon exposed to a powder containing high titanium previously studied by Bloch et al. (2022).
- 3) Conducting a depth profile and real-time discussion of the results.
- 4) If possible, real-time observation of the measurement of the crater depth (post-analysis) using a stylus profilometer.

The process of extracting diffusivities from the raw data will not be covered during this short workshop. The importance of sample preparation and the experimental design will be mentioned, but those interested should examine published papers.

Participants will be able to view the screen of the instrument-controlling computer. Live images of the operator controlling some parts of the instrument not accessible by computer will also be available. Depending on the number of participants, the audio will be completely open or controlled by your host to only allow one participant to ask questions (via monitoring the chat window). The session will be recorded.

Note: We expect the instrument to be working normally at this time. If a technical problem arises, all participants will be notified.

If you are interested, please register on the following link by 13 October 2023:
<https://forms.gle/q3NCB1XsM6mZrvLN6>

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Bloch et al. (2022) Diffusion anisotropy of Ti in zircon and implications for Ti-in-zircon thermometry. <https://doi.org/10.1016/j.epsl.2021.117317>