SEG 2017 Conference

A new LA-ICP-MS mapping processing software—LaIcpMs

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Most geological samples are composed of heterogeneous minerals. Geochemical analysis of specific areas in such minerals requires high-resolution micro-analytical techniques. LA-ICP-MS is an established method for *in situ* quantitative spot-analysis of geological materials for trace elements and isotopes. However, in many cases, deriving spatial information about trace element distribution using single spot analyses is impractical and time-consuming. To obtain a complete, quantitative 2D element-distribution image, parallel adjacent line-scans are combined into a coherent trace-element image, which reveals features based on chemical variability. Compared to other mapping methods (e.g., optical microscopy, BSE, cathodoluminescence [CL] and quantitative element mapping [SEM-EDX, SIMS, SXAS, TEM-EDX, PIXE]), LA-ICP-MS mapping is quick (mostly requiring less than 2 hours), and allows multi-element analysis (more than 10 elements), with low detection limits (ppm), and easy sample preparation. Major advances include improved designs of the laser-ablation cells and refinements of commercially available laser systems and data reduction software (such as, "Iolite"), and "LAICPMS" based on "R" and some in-house software. We present a new data processing software package (LaIcpMs) based on Matlab. This software can be installed in Windows systems and is free and easy to use. Data processing from raw data to presented graphics takes only a few minutes, and offers several color codings for maps (linear, logarithmic and self-defined linear scale) in based-on-mineral-shape model (not rectangular). A profile-cutting kit and element ratios function are also added in this program. We present our results for mapping plagioclase, garnet, and scheelite, and illustrate how mineral mapping helps researchers to develop a comprehensive understanding of mineral forming processes.