In situ imaging of multi-elements on single mineral using laser ablation inductively coupled plasma mass spectrometry

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As a solid sampling technique, laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) can achieve *in situ* microanalysis of the major, minor, and trace elements, and is widely used in geology, biology, medicine, and other fields. With the rapid development of quasi-nanoscale microanalysis and the requirement of high spatial resolution, the sampling areas of LA-ICP-MS are tend to be more microscopic and more stereoscopic.

In this study, one rapid analysis method of *in situ* multi-elements imaging in single mineral, including pyrite (Fig.1), dialogite, siderite, and phosphate concretion, with high resolution was developed using the 193 nm ultra-short pulse excimer laser ablation system and quadrupole rods inductively coupled plasma mass spectrometry.

Further quantitative and semi-quantitative statistical analysis showed that, *in situ* micro-analysis of multi-elements on single mineral could provide more direct and accurate visual data for the sedimentary redox conditions and post-depositional alterations, which are of great importances in the research of paleoenvironment, source rocks evaluation, and fluid accumulation.

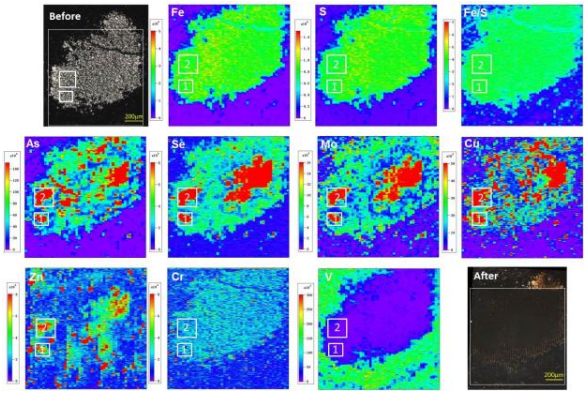

Fig.1 *In situ* imaging of multi-elements and Fe/S in the pyrite