Analysis of trace-elements in Durango apatite via Laser Induced Breakdown Spectroscopy (LIBS) using femtosecond laser and intensified charge-coupled device

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Apatite is a common accessory mineral found copiously throughout the Earth's crust and upper mantle. Its crystal lattice, with a variety of cation sites, allows for dozens of elements to be incorporated [1]; this has allowed trace-element data from apatites to have various geological applications, such as low-temperature thermochronology studies [e.g., 2, 3, 4].

Durango apatite has been analyzed via various analytical techniques throughout the years, including laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS), Electron Microprobe Analysis (EPMA), and Total Reflection X-ray Fluorescence (TXRF), and thus has become a popular reference material [e.g., 5, 6, 7].

In this study, we have analyzed Durango apatites via the traditional LA-ICP-MS approach and simultaneously with Laser-Induced Breakdown Spectroscopy (LIBS) using a femtosecond laser system equipped with dual intensified charge-coupled devices. The results demonstrated that LIBS is a valuable addition and highly complementary to the traditional LA-ICP-MS method.

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