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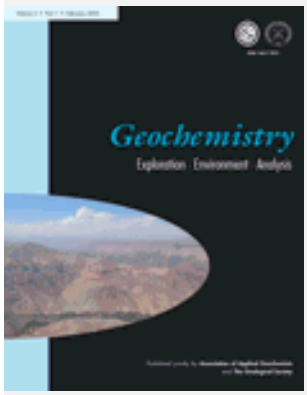
Volume 5, Number 1

February 2005



RESEARCH ARTICLE | FEBRUARY 01, 2005

Laser-induced breakdown spectroscopy (LIBS) – an emerging field-portable sensor technology for real-time, in-situ geochemical and environmental analysis

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Geochemistry: Exploration, Environment, Analysis (2005) 5 (1): 21-28.

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https://doi.org/10.1144/1467-7873/03-059

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Abstract

Laser-induced breakdown spectroscopy (LIBS) is a simple spark spectrochemical sensor technology in which a laser beam is directed at a sample to create a high-temperature microplasma. A spectrometer/array detector is used to disperse the light emission and detect its intensity at specific wavelengths. LIBS has many attributes that make it an attractive tool for chemical analysis. A recent breakthrough in component development, the commercial launching of a small, high-resolution spectrometer, has greatly expanded the utility of LIBS and resulted in a new potential for field-portable broadband LIBS because the technique is now sensitive simultaneously to all chemical elements due to detector response in the 200 to 980 nm range with 0.1 nm spectral resolution. Other attributes include: (a) small size and weight; (b) technologically mature, inherently rugged, and affordable components; (c) *in-situ* analysis with no sample preparation required; (d) inherent high sensitivity; (e) real-time response; and (f) point sensing or standoff detection. LIBS sensor systems can be used to detect and analyse target samples by identifying all constituent elements and by determining either their relative or absolute abundances.

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