

The sources, progress and frontiers of an exciting technology: Laser-Induced Breakdown Spectroscopy.

Javier Laserna*^A

^ADepartamento de Química Analítica, Universidad de Málaga, 29071 Málaga, Spain..

*laserna@uma.es

ABSTRACT: Laser induced breakdown spectroscopy (LIBS) is currently considered one of the most active research areas in the field of analytical spectroscopy. LIBS has emerged as a powerful alternative for chemical analysis in a wide front of applications, from geological exploration to industrial inspection, from environmental monitoring to biomedical and forensic analysis, from cultural heritage to homeland security. Development of LIBS instruments with extended capabilities for energy dosage to the sample using ultrashort laser pulses has been undertaken which have permitted a better understanding of the underlying issues of LIBS –notably, laser interaction with matter, plasma dynamics and properties. Significant progress in chemical information from the traditional ns monopulse ablation to multipulse, multiwavelength excitation has occurred in the last decade. These advances have resulted in substantial improvements in detection limits and method precision and accuracy. While LIBS certainly has practical utility in many laboratory-based chemical measurements, the true potential of this technology becomes apparent when it is used for applications inaccessible to more conventional analytical techniques. Underwater LIBS analysis and inspection of the elemental composition of distant objects constitute examples of the exclusive capabilities of LIBS. In this lecture an overview of LIBS from the original concepts to the current technology is presented. LIBS research of relevance to contemporary chemical analysis including both innovative performance breakthroughs and emerging applications will be discussed.
