

Unlocking the mineral exploration potential of Laser Induced Breakdown Spectroscopy [LIBS]

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Laser Induced Breakdown Spectroscopy or LIBS presents many opportunities for novel and powerful applications that allow the investigation of geological and other materials for both research and commercial purposes. This study is primarily focused on the application of LIBS to mineral exploration. LIBS allows the analysis of many elements such as Li, Be, C, B and Na that were not practically possible using existing field portable technologies such as portable XRF [pXRF]. In addition to this the use of a laser allows the analysis of highly specific parts of a sample and combining multiple points of analysis allows changes in composition to be observed within minerals or surrounding geologic features such as veins and fractures. This analysis can be performed with spatial context at scales relevant to understanding the processes related to alteration and mineralisation. Understanding changes in mineral chemistry and related mineralogy and these scales can be employed as vectoring tools to target mineralisation. The rapidly developing field of microanalysis has allowed the development of new tools for exploration through better geochemical analysis of samples at micro and even nano scales. Based upon the success of applying analytical techniques such as Laser Ablation-Inductively Coupled-Mass Spectrometry [LA-ICP-MS], Electron Probe Microanalysis [EPMA] and more recently micro-XRF and Synchrotron X-Ray Fluorescence [SXRF] imaging, LIBS is now starting to be utilised for similar applications with success. Through a series of examples related to the application of LIBS to the analysis of geological applications a summary of the current state of the technology and comments upon the future direction of the application of this analytical technique shall be presented and discussed.