



## NRC Publications Archive Archives des publications du CNRC

### **Laser induced breakdown spectroscopy: Challenges and Future**

Sabsabi, M.; Doucet, F. R.; Bouchard, P.; Héon, R.; Hamel, A.; Laville, S.; Gravel, J. F.

This publication could be one of several versions: author's original, accepted manuscript or the publisher's version. / La version de cette publication peut être l'une des suivantes : la version prépublication de l'auteur, la version acceptée du manuscrit ou la version de l'éditeur.

#### **Publisher's version / Version de l'éditeur:**

*CAP Congress (Canadian Association of Physicists), 2011-06-15*

#### **NRC Publications Record / Notice d'Archives des publications de CNRC:**

<https://nrc-publications.canada.ca/eng/view/object/?id=cc3eac61-c727-48dc-87e2-227f22e89fd8>

<https://publications-cnrc.canada.ca/fra/voir/objet/?id=cc3eac61-c727-48dc-87e2-227f22e89fd8>

Access and use of this website and the material on it are subject to the Terms and Conditions set forth at

<https://nrc-publications.canada.ca/eng/copyright>

READ THESE TERMS AND CONDITIONS CAREFULLY BEFORE USING THIS WEBSITE.

L'accès à ce site Web et l'utilisation de son contenu sont assujettis aux conditions présentées dans le site

<https://publications-cnrc.canada.ca/fra/droits>

LISEZ CES CONDITIONS ATTENTIVEMENT AVANT D'UTILISER CE SITE WEB.

**Questions?** Contact the NRC Publications Archive team at

PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca. If you wish to email the authors directly, please see the first page of the publication for their contact information.

**Vous avez des questions?** Nous pouvons vous aider. Pour communiquer directement avec un auteur, consultez la première page de la revue dans laquelle son article a été publié afin de trouver ses coordonnées. Si vous n'arrivez pas à les repérer, communiquez avec nous à PublicationsArchive-ArchivesPublications@nrc-cnrc.gc.ca.



## **Invited lecture to CAP2011**

# **Laser induced breakdown spectroscopy: Challenges and Future**

M. Sabsabi, F. R. Doucet, P. Bouchard, R. Héon, A. Hamel, S. Laville, and J.F Gravel.

National Research Council Canada (NRC), Industrial Materials Institute (IMI), Boucherville (QC), J4B 6Y4, Canada

Laser-Induced Breakdown Spectroscopy (LIBS) is a method of optical emission spectroscopy that uses laser-generated plasma as the source of vaporization, atomization and excitation. LIBS is being used as an analytical method by a growing number of research groups. Although the LIBS method has been in existence for more than 40 years, prior to 1980, interest in the technology centered mainly on the basics of plasma formation. A few instruments based on LIBS have been developed but have not found widespread use. In the last decade, there has been a renewed interest in the method for a wide range of applications. This is due to the unveiling of significant technological developments in the components (lasers, spectrometers, detectors) used in LIBS instruments as well as emerging needs to perform real time measurements under conditions to which conventional techniques cannot be applied.

Recently, fiber lasers have become one of the hottest topics in photonics. In this presentation we will report their use for LIBS analysis and will discuss their advantages and inconvenient in terms of sensitivity, standoff, reproducibility, ablation, energy delivery, etc. Also, we will give an overview about LIBS applications for on-line measurements such as molten materials, metal ore processing, effluents, slurries, liquids, LIBS for nuclear industry, pharmaceuticals etc. In addition, we will present some approaches to improve the LIBS sensitivity developed in our laboratory and elsewhere such as double pulse mode, laser induced fluorescence coupled to LIBS, resonance enhanced LIBS, resonant ablation etc.