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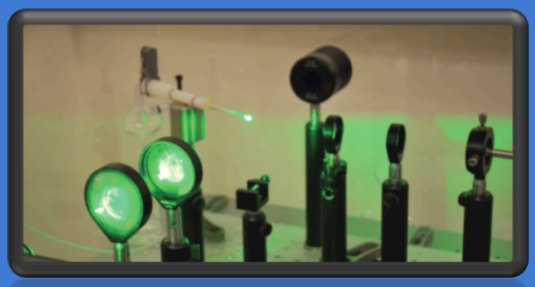

Final Program

North American Symposium on LIBS

NASLIBS 2011

July 18~20, 2011

Sheraton Sand Key Resort

Clearwater Beach, Florida

Prof. Jose Almirall
Chairman

Dr. Steve Buckley
Vice~Chairman

Prof. Jagdish Singh
General co~Chairman

Dr. Andrzej Miziolek
General co~Chairman

http://www.icet.msstate.edu/naslibs2011/

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International Forensic Research Institute

demonstrated. The performance obtained with such a LIBS sensor configuration demonstrates the possibility of integrating all of the required components in a small portable handheld system for nuclear forensics.

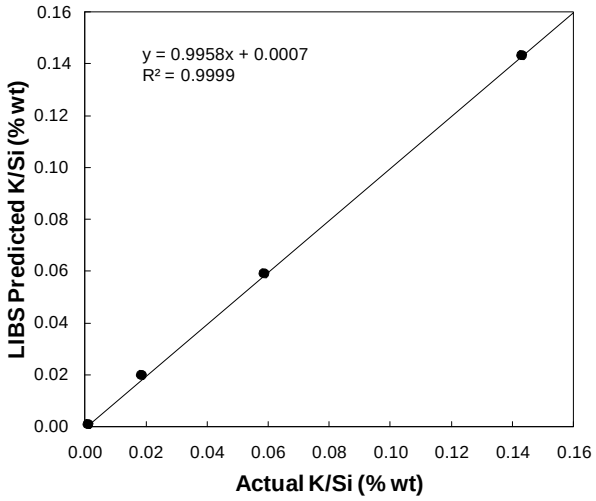
Monday 11:40-12:00	**Compact, Portable, Soil-Insertable LIBS Deminers' Probe** James P. Hauck, M. Walker, J. Eagan and S. Hamadani Scientific Applications and Research Associates, Inc., Cypress, CA, USA

We have developed a novel approach to underground LIBS measurements that combines the compactness, portability and relatively high Pulse Repetition Rates (PRRs) of Diode Pumped Nd:YAG Solid State Lasers (DPYs), highly stable laser output, novel beam delivery methods, and sophisticated processing to yield a LIBS systems that can be used for military and commercial applications. In comparison to most Flash Lamp Pumped YAG (FLPY) systems commonly in service, the system is more compact, lighter weight, and more efficient , with much higher PRRs, and higher beam quality and stability, resulting in considerably better spectral consistency and allowing more rapid and accurate processing of the LIBS data.

We have also built a detection/ID system that is comprised of a Fiber-Optic beam delivery system and a resilient and self-cleaning soil insertable lens system. It also includes an argon flush to "blow away" moisture, detritus, nitrogen and other gases from the specimen to be sampled by the LIBS measurement and the space immediately around it. While these capabilities have been demonstrated and reported elsewhere (SPIE DS&S Orlando 2009), in this paper we will be briefly review these capabilities and report on more recent results and data describing the characteristics of the laser, beam delivery, and light collection and analysis of data beyond what was presented previously. We have been able to distinguish different plastics under some conditions. Extrapolation to the performance of the next generation LIBS Deminers' system will conclude our presentation.

Monday 12:00-12:20	**Geochronology by LIBS: Development of a Method Suitable by Mars** Christopher B. Stipe, G.R. Rossman, S.G. Buckley Mechanical Engineering Department, Seattle University, Seattle, WA, USA

Geochronology techniques are being evaluated for future NASA missions to Mars. Under consideration is the K-Ar dating method, where radio-isotopes of ^{40}K and ^{40}Ar are used to determine the age of geological materials ranging from approximately ten thousand to over a billion years. While ^{40}Ar is measured by mass spectrometry, the suitability of LIBS is being explored to quantify potassium. Generally, ^{40}K is not measured directly; instead, ^{39}K is measured and a constant $^{39}K/^{40}K$ ratio is assumed. LIBS was used to quantify potassium in prepared USGS standard basaltic glasses and the equivalent raw basalt rocks. Precision and accuracy of potassium measurements by LIBS and the overall efficacy of the technique are presented.


y = 0.9958x + 0.0007
R² = 0.9999
LIBS Predicted K/Si (% wt)
Actual K/Si (% wt)
0.00
0.02
0.04
0.06
0.08
0.10
0.12
0.14
0.16

Session III

Instrumentation