



## Minerals | Potassium Content in Potash

### Summary

Laser Induced Breakdown Spectroscopy (LIBS) provides accurate measurement of K in potash. These on-line measurements offer potentially significant economic and environmental benefits.

Progression, Inc. is the leader in the development and service of on-line NMR and LIBS in the chemical and mining industries. In 2003 Progression won the prestigious R&D 100 award for the development of its second generation on-line NMR system—the MagModule II™. In 2006, the company successfully entered the mining industry with its first commercial application, which was used to measure MgO, CaO, Fe<sub>2</sub>O<sub>3</sub>, and Al<sub>2</sub>O<sub>3</sub> in phosphate rock. Other uses and applications are in development to measure iron ore, zinc and lead, copper and coal.

### Benefit

On-line LIBS provides operational and economic benefits to potash producers. Progression's instrument, iPulse®, provides an analysis every 30 seconds to 5 minutes. The data is transmitted to the plant's control system for either closed loop or operator control.

### Mining Applications

Many plants currently depend on either operator experience or infrequent laboratory analysis to control beneficiation operations. Adding Progression's on-line analyzer can allow a plant to improve beneficiation control as well as feedstock monitoring, thereby improving the use of reagents and increasing recovery of K.

### Sampling

Progression designs and installs application specific, customized sampling systems as needed. Samples are either taken automatically from the process stream or measured in situ and may be returned into the process or sent to a disposal area depending on the needs of the customer.

Sample conditioning is typically not necessary. LIBS has the ability to measure solids, liquids, and slurries, without special

sample preparation. Further, the relatively small size (~30 ft<sup>3</sup>) of the instrument allows for optimal placement near sample points.

### Calibration and Results

System calibration and modeling is performed by Progression. Reference data is generated from samples taken at the instrument.

LIBS calibrations are made using reference values obtained by other techniques. Since the accuracy of these techniques can vary, it is impossible to specify an absolute accuracy. However, phosphate NMR measurements have proven to be extremely accurate based on both calibration and operational results.

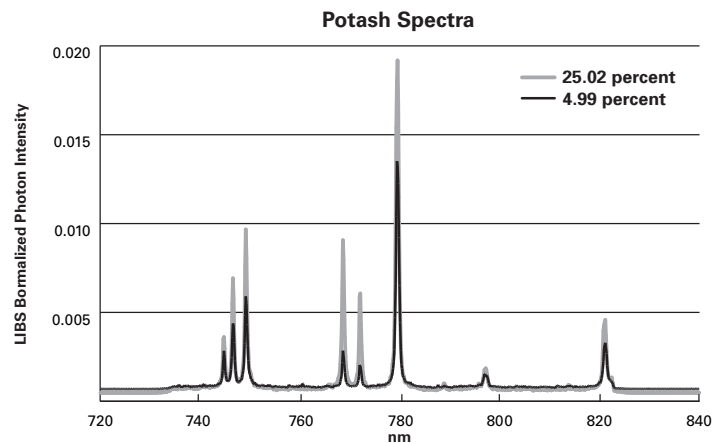


Figure 1: Potash Spectra

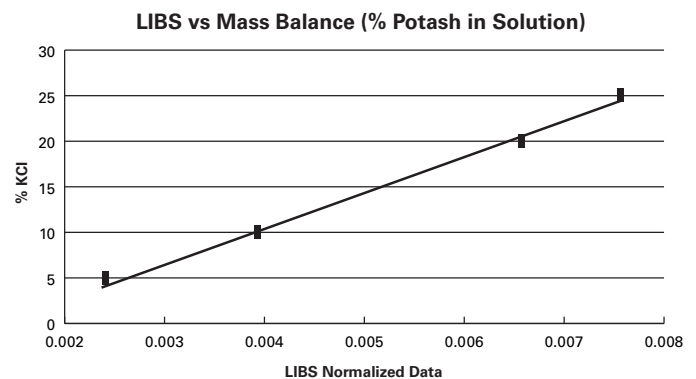


Figure 2: Calibration Data