



DIRECT ANALYSIS OF MINERAL RAW MATERIALS WITH A LASER

Task

Mineral raw materials are subject to natural variations. The composition of the material differs between individual natural deposits and may also vary widely within the same natural deposit site. Knowledge of the material's composition is indispensable to its targeted extraction and commercially effective usage. Composition analysis often relies solely on measurement methods that provide analysis results with a considerable time lag and at high cost. These methods may also pinpoint parameters that are only indirectly linked to the material's composition and thus prone to error.

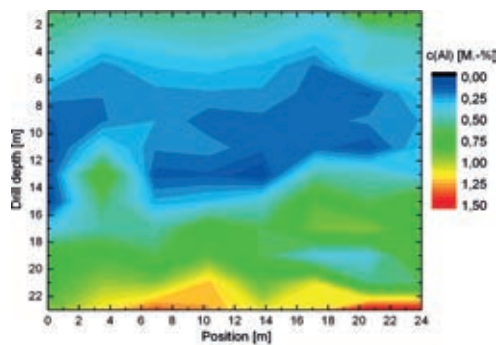
Method

Direct laser analysis using laser-induced breakdown spectroscopy (LIBS) directly determines the content of all the required elements. The measurements are conducted inline on the material flows during industrial processing. The measurement devices are purpose-built to work with existing powdered or solid materials. The results are analyzed in real time and transferred to the process control function; in many cases, it is now possible for the first time to directly adjust processes to variations in the material composition.

Result

A demonstrator to measure the composition of borings while conducting blasthole drilling has been tested in field trials and can be used in future to draw up an inline natural deposit model in support of the flexible adjustment of the hole matrix.

In cooperation with industry partners, a system has been set up which continually determines the ash content of coal, thus providing data on the coal's calorific value.



Applications

Direct laser analysis can be used to analyze the content of all mineral raw materials. Economic benefits can be derived from specifically targeting the usable rock in extraction and processing of the raw materials. As a result, natural deposits can be extracted more precisely and exploited for longer. This method saves raw materials and energy, helping to conserve natural resources.

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3 Inline analysis system for coal.

4 Demonstrator for direct laser analysis on a drilling rig.