



DETERMINING THE LIME STANDARD FOR LIQUID SLAG WITH LIBS

Task

Converter slag from raw steel production at voestalpine Steel, in Linz, Austria, should be analyzed with Laser-Induced Breakdown Spectroscopy (LIBS) directly in the ladle of slag transporters to determine the lime standard. The slag in the ladle is liquid or partially solidified on the surface at temperatures in the range of 600 °C to over 1300 °C (Figure 1). The measurement serves to classify the slag for targeted use. The laser measuring system is to be designed, developed and installed for automatic operation 24/7.

Method

In preliminary investigations, the feasibility and the analytical performance for the given conditions were demonstrated, and the process parameters determined. During the process development and the dimensioning and selection of the components, a great deal of attention had to be paid to the requirements of 24/7 operation, large measurement distances, and the exposure to heat and dust. The interfaces were defined in close cooperation with the customer. Adaptions and improvements of the measuring process were carried out before starting the trial operation.

Result

The laser measurement system has been installed at the plant and is running in trial operation. The inline measurement of the chemical composition from the release to the transfer to the control system lasts less than two minutes. In comparison to a reference analysis conducted in the customer's laboratory, the accuracy lies within the specified range.

Applications

The methods developed here and equipment are suitable for the automated analysis of mineral materials in the production process under the most difficult of conditions. Thus, materials accruing in production processes can be classified early and provided to targeted use.

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1 *Liquid slag poured out in a slag yard*
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