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Modern in-situ Slag adjustment for EAF, BOF, LF, and VD Steelmaking

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Slag is a critical factor in all major steelmaking routes, including EAF, BOF, LF, and VD processes. It affects refining efficiency, energy consumption, refractory life, and overall process stability. Traditionally, slag chemistry is measured using pressed pellets and X-ray fluorescence (XRF). While widely used, this method has some limitations: sample preparation takes time, heterogeneous or granular slag is difficult to analyse accurately, and light elements such as Si, Mg, and Al are challenging to measure reliably. These issues can slow down decision-making in the melt shop and create uncertainties in process control.

A modern alternative is in-situ slag analysis using Laser Optical Emission Spectroscopy (Laser OES or LIBS). This method provides rapid, precise, and preparation-free measurements of slag composition, including major and light oxides. By giving near real-time chemical data, LIBS allows operators to monitor slag continuously and make fast, informed process adjustments.

This presentation shows case studies from steel plants using EAF, BOF, LF, and VD steelmaking. The examples demonstrate how rapid slag analysis enables proactive interventions, improves refining performance, optimizes energy use, and reduces refractory wear. Customers also report better control of alloying additions and faster responses to process changes.

The results show that modern, rapid slag analytics improve measurement precision and support operational decision-making, leading to economic and process benefits. These case studies highlight that advanced in-situ slag analysis is not just a technological improvement—it is a practical tool for faster, more precise, and cost-effective steelmaking.

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