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## Fast process slag analysis with laser spectroscopy, opening new opportunities for active optimization during melting and refining process.

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The growing trend in today's steel-making industry is enhancing scalability with the goal of net zero emission. This requires increased cost and process efficiency while reducing carbon emissions. To run a sustainable process, tighter control of process parameters along with close loop monitoring of liquid bath and slag plays an invaluable role. However, in terms of slag analysis, due to a relatively longer lead time ( transport + homogenization + XRF analysis ), the operator needs to wait at least 10 up to 20 minutes. As a result, decisions regarding basicity and flux addition have mostly been taken based on subjective evaluation of slag (from active heat) as well as historical slag data.

With Laser-induced breakdown spectroscopy (LIBS) reliable slag results can be delivered without complex homogenization. This allows the total measurement time to be reduced up to two minutes. Since slag results from each heat in EAF and LMF (before and after alloying) are available at the same time as melt data, decisions regarding process parameters optimization become more informed. This has the potential for increased refractory service life, production cost and raw material savings. In the oral presentation, data from LIBS-based sensors (operated in the pulpit) will be presented as well as process benefits from long-term operation will be shared.

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