



Contribution ID: 57

Type: Oral Presentation

Steel and slag combined in HT-CSLM: A new approach for the in-situ investigation of non-metallic inclusions

Wednesday, 25 September 2024 14:10 (20 minutes)

The High-Temperature Confocal Scanning Laser Microscope (HT-CSLM) is a powerful tool for in-situ investigations of surface phenomena and has proven its suitability for metallurgical processes. It is widely used to observe phase transformations, melting behavior, agglomeration of non-metallic inclusions (NMIs), or dissolution of particles in slags. However, these processes have been studied as stand-alone experiments until now. In this work the authors describe the development of a set-up for the combined investigation of steel, slag, and NMIs in-situ in the HT-CSLM to observe agglomeration, movement towards the slag, detachment, and dissolution of NMIs in a single experimental set-up. The developed procedure takes geometrical, chemical, and physical aspects into account and includes safeguards to prevent leaking of liquid steel or slag into the furnace chamber by using a dual crucible approach. As the slag (partially) covers the steel it must be transparent which leads to limitation in composition of both steel and slag. The focus of this work is on different steel/slag combinations of medium-carbon steels with different alloying elements and deoxidation concepts. The slags used are low melting $\text{CaO-Al}_2\text{O}_3\text{-SiO}_2$ slags. For some experiments, alkali oxides were added to the slags to decrease their melting point and viscosity.

Speaker Country

Austria

Primary authors: Mr CEJKA, Julian (Christian Doppler Laboratory for Inclusion Metallurgy in Advanced Steelmaking); Prof. MICHELIC, Susanne K. (Christian Doppler Laboratory for Inclusion Metallurgy in Advanced Steelmaking)

Presenter: Mr CEJKA, Julian (Christian Doppler Laboratory for Inclusion Metallurgy in Advanced Steelmaking)

Session Classification: Session 8

Track Classification: Ceramic, Slag and Refractory Reactions with Liquid Metals