



Contribution ID: 54

Type: Oral Presentation

## Non-metallic inclusion capture at the steel-slag interface in tundish simulations

*Wednesday, 25 September 2024 11:20 (20 minutes)*

Non-metallic inclusion have a strong impact on the final product quality in steel production. Thus, inclusion removal from the melt is an important aspect of achieving the intended steel properties. In continuous casters the tundish can be utilized to enhance inclusion removal. One method to promote inclusion removal within the tundish is the installation of an argon bubble curtain.

The aim of this work was to implement a model for inclusion removal within the CFD framework of Ansys Fluent. This inclusion flotation model considers a possible entrapment of inclusions at the steel-slag interface. The underlying CFD model is an Euler-Lagrangian model, which models the steel and slag phases using a VOF model. The non-metallic inclusions are modelled using the discrete phase model. Argon bubble flotation is considered in the model as well.

This work demonstrates the implementation of an interface-capture model for non-metallic inclusion in a full tundish simulation. This model was developed by Zhang et al. from detailed simulations of a spherical non-metallic inclusion at the steel-slag interface.

During model development, simplified simulation cases were used to demonstrate basic model capabilities and a generic tundish simulation was created to showcase the full model by comparing inclusion removal with and without argon bubbling.

### References

Zhang, X., Pirker, S. and Saeedipour, M. (2023), Investigation of Inclusion Removal at Steel-Slag Interface toward a Small-Scale Criterion for Particle Separation. *steel research int.*, 94: 2200842. <https://doi.org/10.1002/srin.202200842>

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**Session Classification:** Session 8

**Track Classification:** Casting and Solidification of Liquid Metals