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# Experimental observation and CFD study on inclusion particle behavior at a slag/argon interface

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This study highlights a dissolution experiment conducted by high-temperature confocal laser scanning microscopy (HT-CLSM). Besides providing essential information on particle dissolution inside slag, this experiment constitutes a slag-argon multiphase environment and reveals particle behavior in the vicinity of the interface. It is observed that after the slag melts, the particle initially placed on the slag surface moves into the slag rapidly, then intends to settle at the interface, followed by the final detachment from the interface. The corresponding scenario of particle/interface interaction is further investigated by CFD simulations. We use the volume of fluid (VOF) method and the dynamic overset grid technique in combination with the 6DOF solver to account for particle motion near the slag-argon interface. The results indicate that the capillary action and viscous effect could induce particle entrapment, and the settling position estimated by simulation shows consistency with experimental measurements. Simulations further evaluate if the dissolution-induced solute Marangoni convection is responsible for the final detachment. The results imply the contribution of both particle movement and dissolution on its detachment from a fluid-fluid interface. The findings can be highly relevant to particle separation at the steel-slag interface, which is essential for clean steel production.

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