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A Front-Fixing Approach for Scrap Dissolution Modeling in EAF Steelmaking

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Describing scrap dissolution has become a topic of renewed interest due to the increasing significance of the electric arc furnace in global raw steel production, as well as the growing complexity introduced by charging mixtures of scrap, DRI, HBI, and hot metal. We present a physically based, computationally efficient dissolution model built on a front-fixing moving-boundary formulation. The model accounts for coupled heat and mass transfer at the solid-liquid interface and is validated against laboratory-scale experimental data. We discuss its potential application to EAF process analysis and optimization.

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