Oxygen as an enabler for energy-efficient and climate-neutral iron oxide processes and products.

Project leader
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Project duration
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SWEDISH MINING INNOVATION

Med stöd från
VINNOVA Sveriges innovationsmyndighet
Energimyndigheten
FORMAS
Strategiska innovations-program

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Goals of the project

The overall aim of the project is to diminish/eliminate the use of external fuel by investigating how oxygen can be used to set a new base for the future sustainable and fossil-free iron oxide product processes.

Goals:

- Optimized heating and oxidation of a pellet bed with oxygen-enriched gas by controlling ingoing gas temperature, flow rate, and oxygen content as well as total process time.
- Determination of the influence of raw material properties on the induration behavior with varying oxygen content.
- Dependency of high oxygen content during induration on the hydrogen reduction behavior.
- Validated models to be used as tools to predict the induration behavior with gas with varying oxygen content.
- Impact analysis of high oxygen content during induration.

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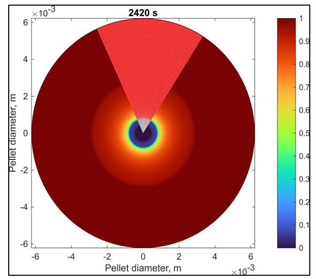
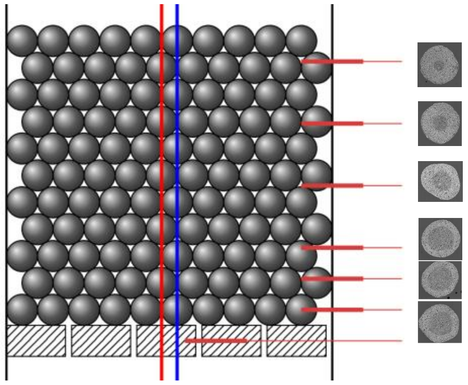
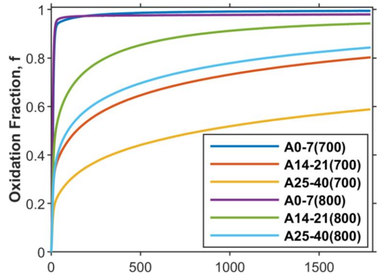
Results so far

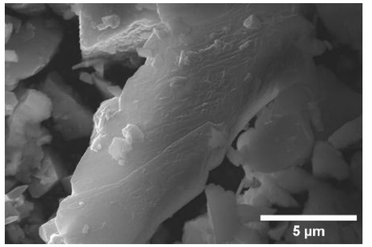
Correlation between induration gas flow-rate, oxygen level and pellet properties at bed level.



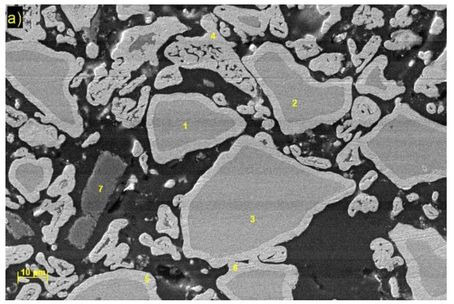


Correlation and initial model describing the relation between particle size and magnetite oxidation behaviour.





Correlation between particle size, chemical composition and iron oxide reduction behaviour.



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Upcoming activities and next step

- Continued correlation between raw material properties and induration behaviour with different oxygen content at particle, pellet and bed level.
- Continued correlation between raw material properties and oxidation degree and hydrogen reduction behaviour at particle level.
- Improved and validated models.
- Impact analysis.

Planning for the continuation

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