

Hydrogen-metallized slag - refinement and uses – HAGGIS

Presenter

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Project leader

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Partners

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Program Day 2023

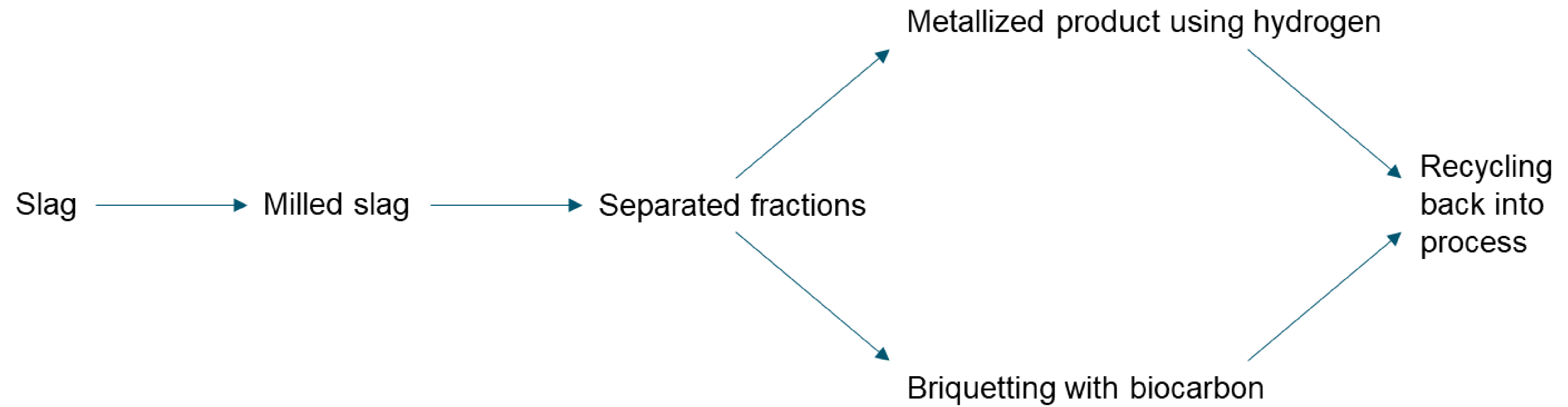
Goals of the project

In long term we would like to recycle slag in a metallized form. The metallization is achieved by hydrogen reduction, preferably in solid state, without (or with minor) use of carbon.

Recycling using our proposed route is especially desirable for slags without any alternative use today since we can avoid costs for disposal (in eg. landfills) and reduce consumption of virgin metallic elements.



Two approaches



Project Plan

WP1 Coordination (Swerim)

Project management

WP2 Material characterization and separation (Swerim, Chalmer)

Grinding, characterization of particle categories, and separation

WP3 Lab scale trials (H₂ reduction and melting) (Swerim)

Small-scale trials of separated material. Reduction, with subsequent melting (with or without the addition of biochar).

WP4 Study on the possibilities for industrial implementation (Vargön, Uddeholms)

Matching of the product, after reduction, with the steel industry's raw materials such as ferroalloys. Simple calculations of increased/reduced climate footprint by substitution of virgin raw material.

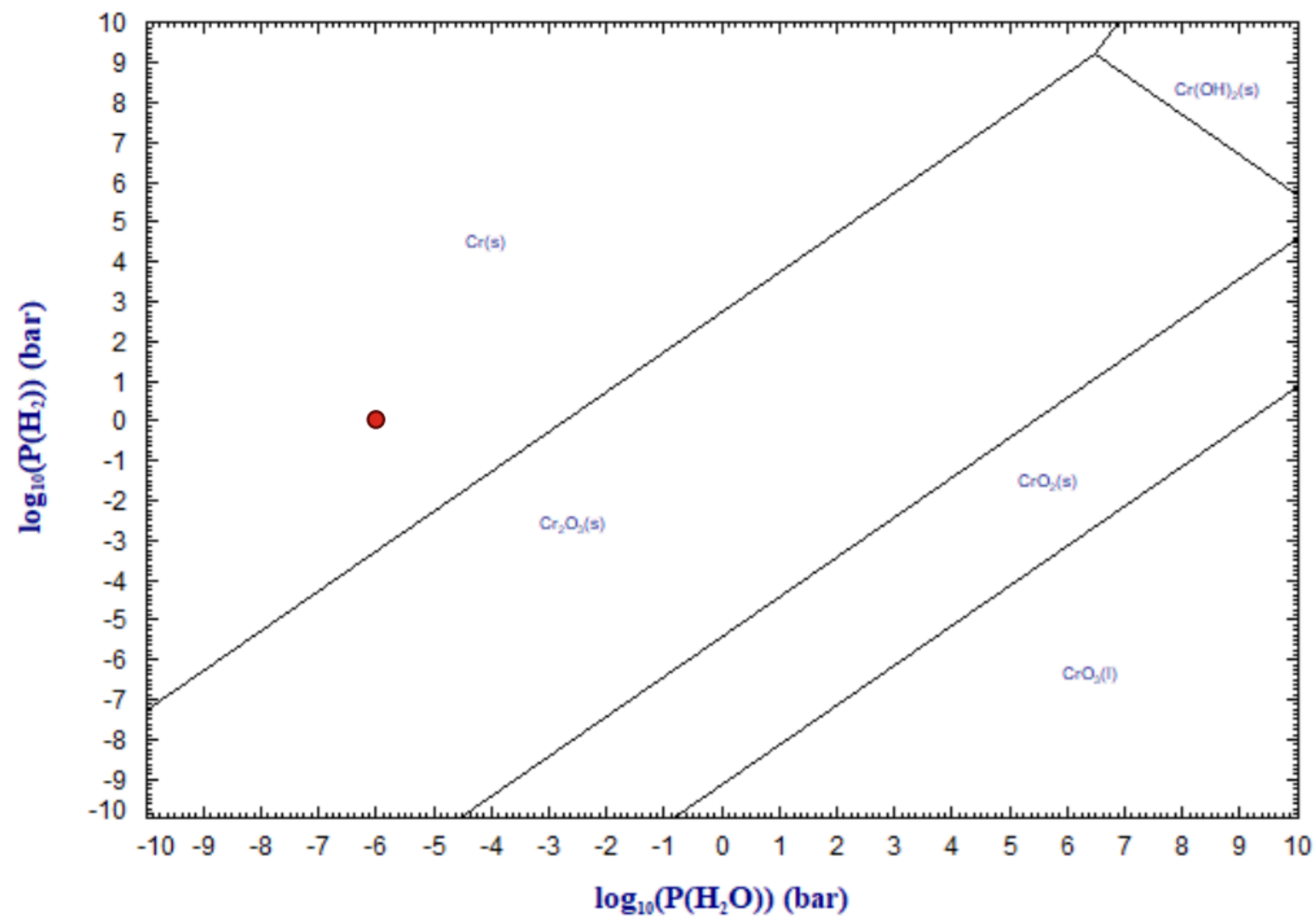
WP5 Residual slag properties (Swerim)

Properties of slag/residual stream obtained after grinding, separation and metallization.



Chromium metallization

Cr-H-O, 1300 C



Project results so far

Many trials including metallization in H₂, up to 1300 °C, performed so far.

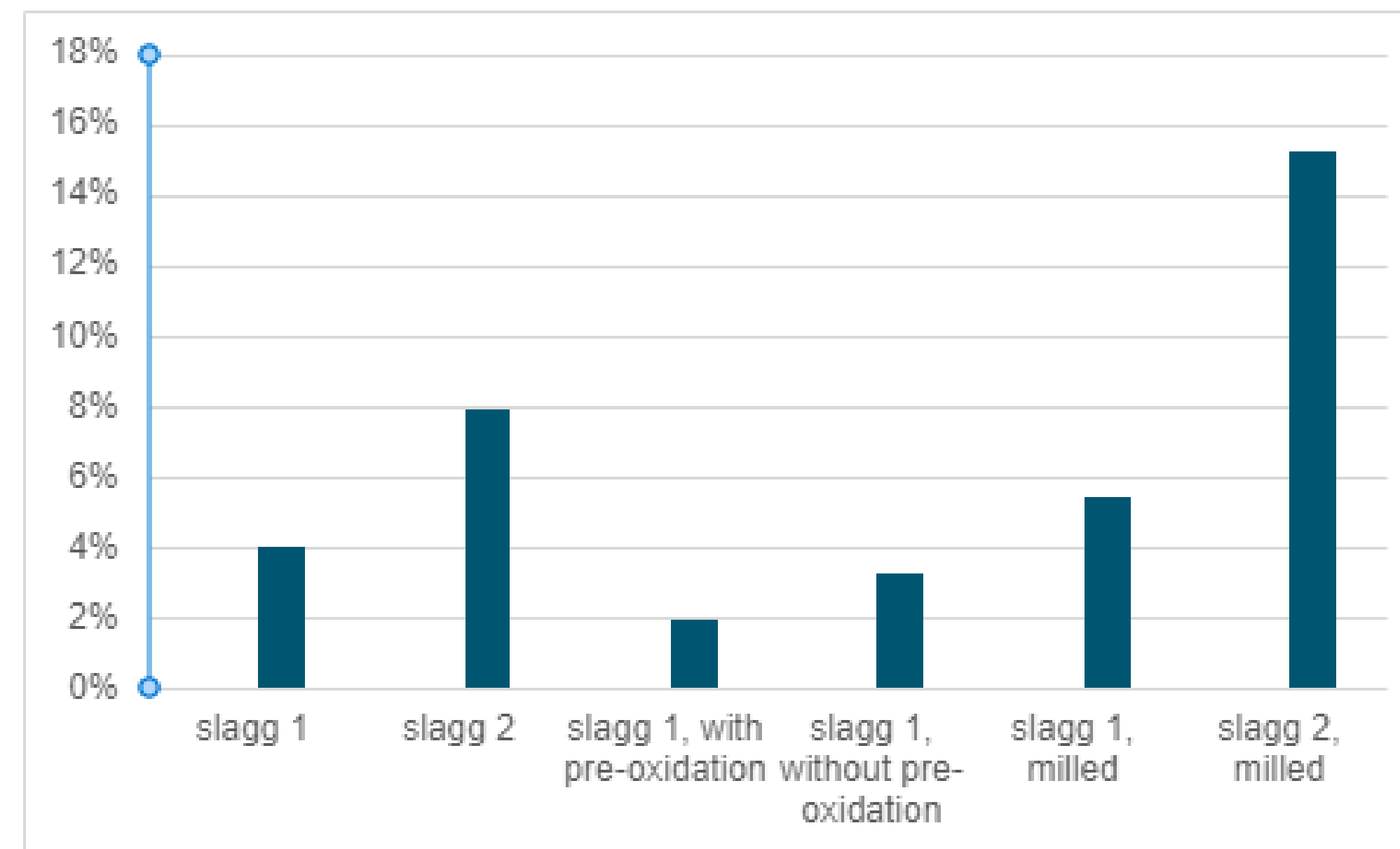


Before



After H₂ at 1300 °C

Metallization (mass loss)



Dissemination

- Publishing at a conference next year.



Mining innovation for a sustainable future