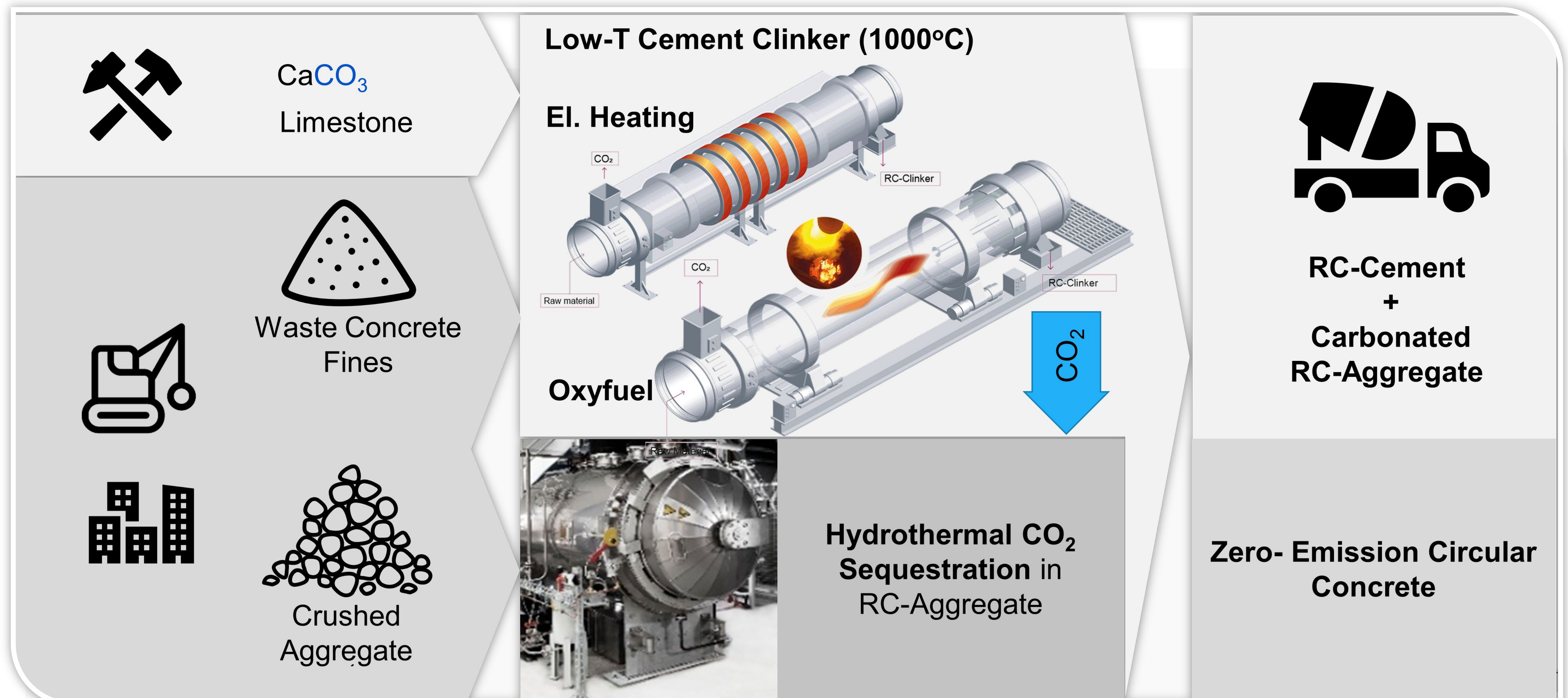


Zero-Emission Circular Concrete

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Processing of low temperature RC-Cement Clinker

Objective

Substitution of Portland Cement by RC-Cement in accordance to cement standards

Clinkering at 1000°C in concentrated CO₂ (TRL 4)

- ⇒ Processing of waste concrete fines
- ⇒ Capturing of concentrated CO₂
- ⇒ Electrical heating
- ⇒ 30% reduced process emissions

Hydrothermal sequestration of process CO₂

Objective

Carbonation of cement matrix in crushed aggregates. Used sequestration capacity > 80% in 6h

Semi-dry, pressurized carbonation (TRL 3)

- ⇒ Processing of waste concrete aggregate
- ⇒ Use of CO₂ on site for carbonation hardening
- ⇒ Use process heat from cement process
- ⇒ Upgrade of recycled aggregate

Recycling of cement and aggregate to reduce its 8% share of global CO₂ emissions

Background Low-T Cement Clinker

Calcination: $CaCO_3 \leftrightarrow CaO + CO_2 \uparrow$

Clinkering in low-T flux: $2CaO + SiO_2 \xrightarrow{Na_2CO_3} Ca_2SiO_4$
 T_{reaction} of calcination and clinkering converge

Increase of $p(CO_2)$ increases calcination temperature

Clinker formation starts at lower temperatures

Result

To date overall 70% CO₂ reduction achieved

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Transfer



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