

LOIKKA

Sub-project 1: Early-strength development of low carbon concrete

PUOLIVÄLIWEBINAARI – 14.3.2023

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Introduction

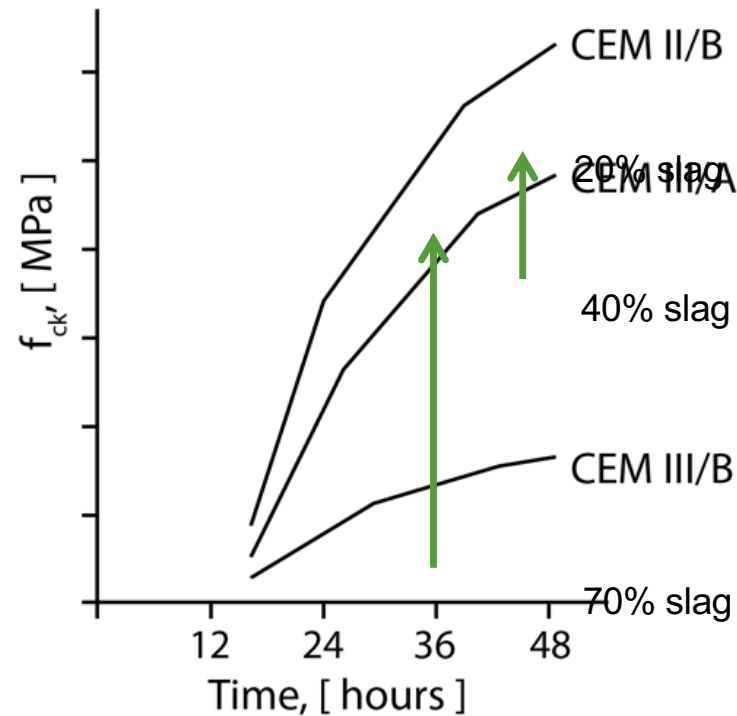
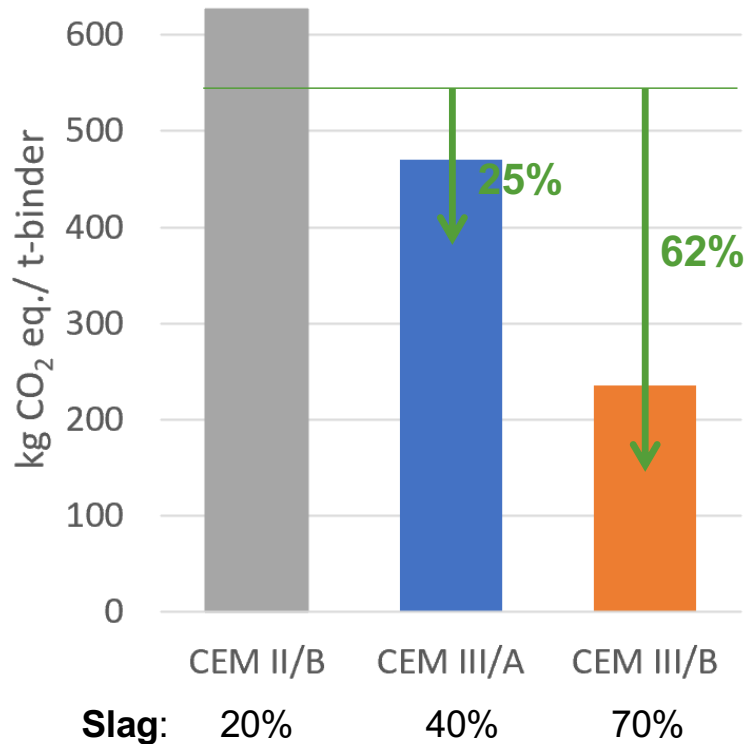


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Introduction

CO₂-emissions of cements



- **Target:** Accelerate the early-strength development of concretes with slag to the level of CEM II/B (Oiva).

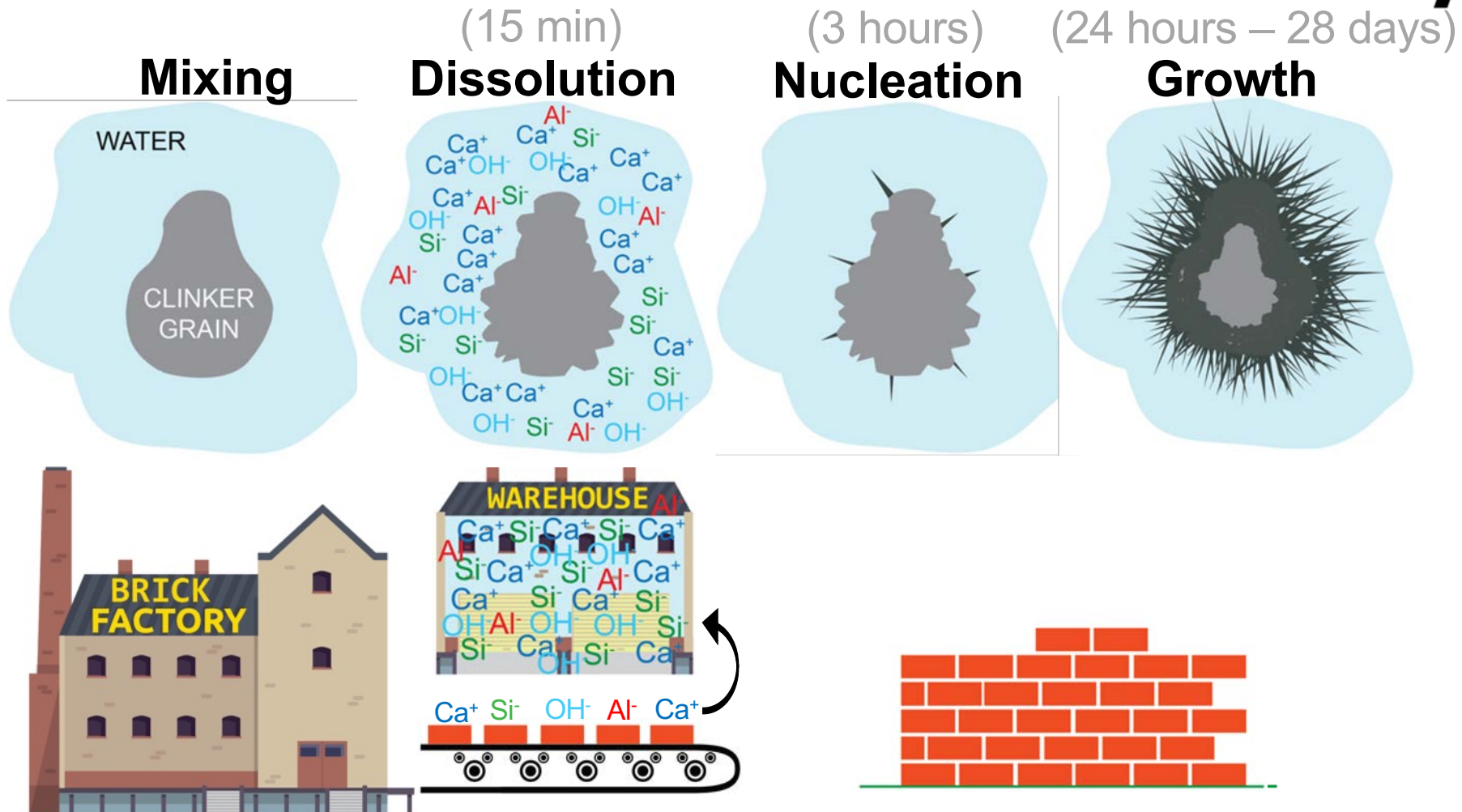
Mechanism of hydration



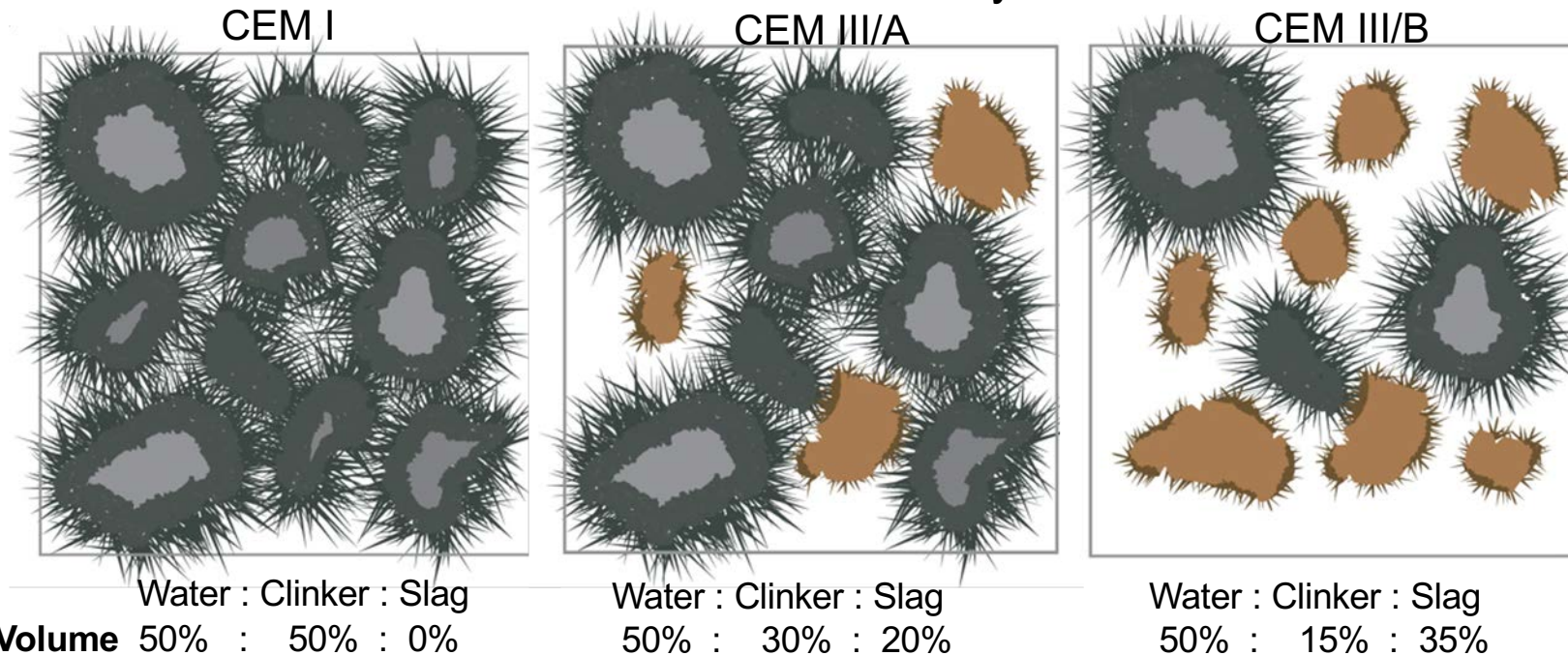
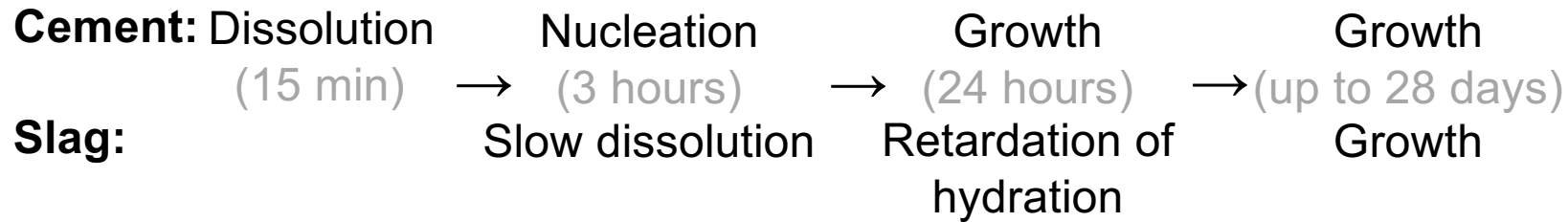
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From mixing to hardening



Hydration mechanism



Activate **DISSOLUTION** and **NUCLEATION** of slag

Activation of slag hydration



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Slag activation



Chemical activation:

Add ions which can attack slag bonds and provide nucleation sites



Dissolution & nucleation

Thermal activation:

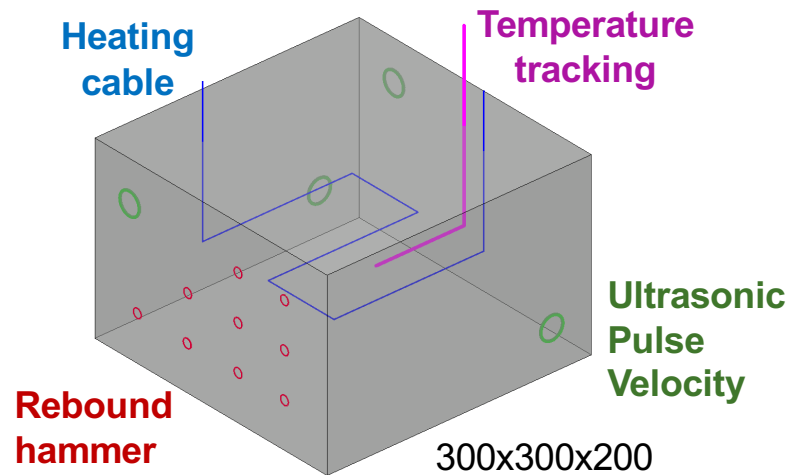
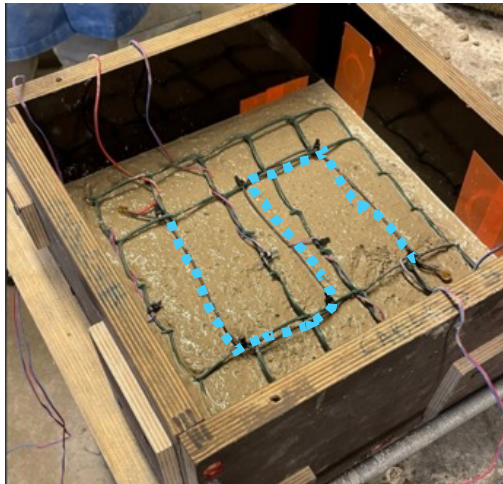
Heat = energy to break slag bonds



Dissolution

Slag activation

1. Thermal activation: Heating cables



2. Chemical activation: Added to the concrete mix during mixing

- For dissolution:
Alkali: NaOH, Na₂SO₄, etc.

- For nucleation:
X-Seed, CaCO₃, etc.