

The Effect of Minor Elements, Particularly Zinc, on Alite and Cement Hydration

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Nowadays, one of the biggest driving forces in cement research is the mitigation of the CO₂ emissions caused by its production. One potential solution to lower its environmental impact is replacing cement by supplementary cementitious materials (SCMs). This replacement induces low early age strength since they are slow to react.

The incorporation of minor elements has shown potential to improve cement reactivity. Few percent of ZnO in C₃S causes a notable increase in its reactivity. This effect was related with the incorporation of zinc into the C-S-H structure, increasing its needle length.

The aim of this project is to understand the fundamental chemistry of zinc oxide on alite and cement hydration. The effect of different amount of ZnO will be studied, as well as other elements, starting from synthetic cements to real ones. Focusing on hydration mechanisms, this research will provide knowledge on cement hydration for further substantial reduction in the environmental impact of cementitious materials.