



Chair of the Chemistry of Construction Materials

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Chemistry for CO₂ neutral Gigaton Materials

Our research is focused on the chemistry of large scale structural materials (i.e. construction materials such as concrete). The properties of these materials are determined by the binder phases which are formed via through solution chemical reactions on the job-site. In the case of portland cement, these reactions are called “hydration”.

We study kinetic and thermodynamic aspects of these binder reactions. A key motivation is to lower the carbon intensity of inorganic, mineral binders. Currently, concrete production stands at approx. 30 Gt/a and its binder portland cement is produced on a scale of 4.6 Gt/a. Due to its large scale, cement is responsible for approx. 8% of global CO₂ emissions. We search for alternative, low or no CO₂ binders.

Additionally, functional polymers strongly influence the properties of both fresh and hardened structural materials. We synthesize functional polymers and use them to change colloidal and mechanical properties of concrete.

