

Bachelor/Master project

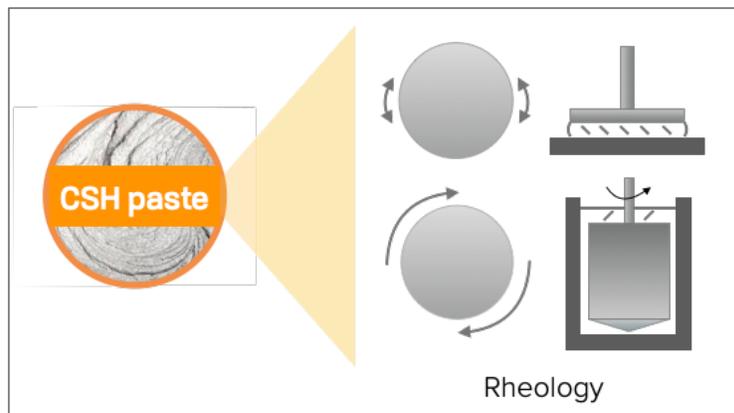
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Investigation of CSH gel properties

This project is part of a bilateral TU Wien collaboration between departments of civil engineering (bi.wwb) and technical physics (IAP). This collaboration is set in order to clarify one blurry and very debating aspect in the cement field: how we can quantify and control the forces between cement grains to have specific final properties (i.e. viscosity, elastic modulus...). In particular, bi.wwb will issue on the properties of fresh cement paste. On the other side IAP will provide information about surface structure and forces.

CSH, or calcium silicate hydrate, is one of the main products of the cement hydration [1]. CSH particles are formed near the contact points of the C_3S (alite, one of the cement major constituent phases) grains, influencing the cohesion of the cement slurry [2]. Due to its key role in the strength development of cement, CSH is an ideal model system to study and control both cement fresh and set properties. To fully understand such a complex system, a parallel investigation about the microscopic and macroscopic properties is needed. In particular, the investigation consists (i) at the **microscopic** level by measuring the interaction between CSH surfaces and, (ii) at the **macroscopic** level, by quantifying the influence of these interactions on fresh cement properties.

In this master project, carried out at **bi.wwb**, we would like build a setup [3] to synthesize CSH gel and made indirect rheological measurements to characterize it (i.e. viscosity, elastic modulus...).



Keywords: CSH gel-synthesys, rheology, mechanical characterisation

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[1] Cement chemistry, H F W Taylor, Thomas Telford, 1997.

[2] Jonsson B. et al. 2005, Langmuir.

[3] Li J. et al. 2019, Cement and Concrete Research.