



Mechanisms of cement hydration

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ABSTRACT

The current state of knowledge of cement hydration mechanisms is reviewed, including the origin of the period of slow reaction in alite and cement, the nature of the acceleration period, the role of calcium sulfate in modifying the reaction rate of tricalcium aluminate, the interactions of silicates and aluminates, and the kinetics of the deceleration period. In addition, several remaining controversies or gaps in understanding are identified, such as the nature and influence on kinetics of an early surface hydrate, the mechanistic origin of the beginning of the acceleration period, the manner in which microscopic growth processes lead to the characteristic morphologies of hydration products at larger length scales, and the role played by diffusion in the deceleration period. The review concludes with some perspectives on research needs for the future.

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