The Rate of Cement Hydration as a Function of the Water State

M. Gerstig, L. Wadsö
Building Materials, Lund University, Lund, Sweden

The rate of cement hydration as a function of temperature has been the subject of extensive research. Another much less studied factor influencing the rate of cement hydration is the water availability. We have developed a method based on isothermal (conduction) calorimetry to measure the hydration rate as a function of water content. Thin samples of cement pastes or mortars are used. The moisture content is altered by the perfusion of gas. With this method one can decrease the water content at any stage of the hydration process and measure the resulting change in hydration rate (thermal power). This approach makes it possible to experimentally investigate, e.g., the effect of water loss by surface drying of exposed concrete and the effect of self-desiccation on the hydration rate.