

### The hydration of glass of CaO–Al<sub>2</sub>O<sub>3</sub> system

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There are many discussions about the hydration reaction of CaO–Al<sub>2</sub>O<sub>3</sub>–H<sub>2</sub>O system. But actually calcium aluminate phases in Portland cement were shown as interstitial phases, which are almost the state of glass including silicate ions. So the hydration reactions of those states are considered to show the difference with a pure crystal state of them. In this study the various glass states of calcium aluminates phases with a different mole ratio of CaO to Al<sub>2</sub>O<sub>3</sub> were prepared. The glass states of calcium aluminate phases including a little silicate ion in their composition were also prepared. And then the hydration reaction of them was investigated in this study. The syntheses of various glass states of calcium aluminate phases with a different mole ratio of CaO to Al<sub>2</sub>O<sub>3</sub> were carried out with the furnace designed in laboratory. The mole ratio of CaO to Al<sub>2</sub>O<sub>3</sub> was varied form 0.5 to 1. The silicate ions were added to calcium aluminate glasses. The rates of heat evolution of mixtures, which have a solution-to-liquid phase weight ratio of 1, were measured at 20°C by isothermal conduction calorimetry. The hydration reaction of calcium aluminate phase showed the difference as changing mole ratio of CaO to Al<sub>2</sub>O<sub>3</sub>, and the addition of silicate ion on the glass phase of calcium aluminate also affected the rate hydration.