

Introducing of Mg + Si into Manganese Bearing Brownmillerites

M. Zötzl, H. Pöllmann

Martin-Luther-University Halle-Wittenberg, Halle, Germany

CAC`s cements are mainly made from bauxite and lime stone with additionally other raw materials by fusion or rotary kiln process. The addition of manganese to CAC leads to a high amount of brownmillerite, because Mn^{3+} is typically incorporated in brownmillerite. Investigations of introducing $Mg^{2+} + Si^{4+}$ into manganese bearing brownmillerite were performed to produce a more hydraulic brownmillerite structure.

Mixtures of $CaCO_3$, Al_2O_3 , MnO_2 , MgO and SiO_2 were ground, heated at $1400^\circ C$ and quenched in air. Properties of compounds were determined by XRD and Rietveld-method compared by SEM/EDX, EMPA and heat flow calorimetry.

It is shown that up to 5 mol-% replacement of $2Al^{3+}$ by $Mg^{2+} + Si^{4+}$ in the crystalline structure of manganese-brownmillerites is possible. By addition of 20 mol-percent $Mg^{2+} + Si^{4+}$ samples were mainly composed of brownmillerite with minor secondary phases of periclase, larnite and pleochroite. Hydration characteristics of $Mg^{2+} + Si^{4+}$ doped compounds are discussed.