

Hydration Characteristics and Immobilization of Cr (VI) in Slag Cement-CKD Pastes under Hydrothermal Treatment

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ABSTRACT

The effect of hydrothermal curing regimes on the hydration characteristics of slag cement containing different ratios of cement kiln dust has been studied. The samples for this study were combination of slag cement and cement kiln dust (5%-25%) without and with immobilization of 5% Cr (VI) by mass. Pastes were hydrothermally treated at 180 °C for different periods (2-24 h) in well closed stainless steel capsule. The hydration characteristics of these pastes were studied by measuring the compressive strength, bulk density, total porosity and combined water content. The findings were further supported by XRD and SEM analysis. The results indicated that the hydration characteristics of slag cement paste containing cement kiln dust 10% by mass were enhanced, especially at later ages (24 h) of hydration. That is due to the hydrothermal curing regimes of immobilized pastes accelerating hydration reactions and precipitation of CaCrO_4 , indicating that Cr (VI) can be solidified in the cement paste. This precipitation leads to pore formation in hydrated slag cement pastes.

KEYWORDS: hydrothermal; immobilization; slag cement; CKD pastes

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