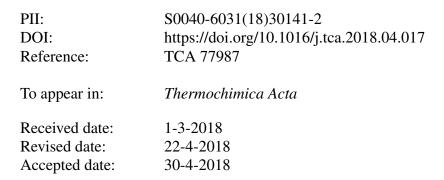
Accepted Manuscript

Title: Hydration kinetics of cement incorporating different nanoparticles at elevated temperatures

Authors: Guangcheng Long, Yuanyuan Li, Cong Ma, Youjun Xie, Ye Shi



Please cite this article as: Long G, Li Y, Ma C, Xie Y, Shi Y, Hydration kinetics of cement incorporating different nanoparticles at elevated temperatures, *Thermochimica Acta* (2010), https://doi.org/10.1016/j.tca.2018.04.017

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



ACCEPTED MANUSCRIPT

Hydration kinetics of cement incorporating different nanoparticles at elevated

temperatures

Guangcheng Long, Yuanyuan Li, Cong Ma^{1*}, Youjun Xie, Ye Shi

School of Civil Engineering, Central South University, Changsha, 410075, P. R. China

1

Corresponding author. E-mail address: macgyh090@csu.edu.cn

Highlights

- The effects of nanoparticles on cement hydration at elevated temperatures were investigated by isothermal calorimeter.
- The nucleation and growth processes of hydration products for nanoparticles modified cement were analyzed by a kinetics model.
- The mechanism of nanoparticles on the hydration kinetics of cement was discussed.

Abstract: The nanometer materials and technology are becoming new ways for cementitious composite innovation due to the significant improvement of microstructure and mechanical performance of cementbased materials. In this study, the isothermal calorimetry was employed to measure the heat release rate and total heat release of multi-scale cement system incorporated with different nanoparticles at elevated temperatures. The nucleation and growth processes of hydration products were simulated through a kinetics model. It is discovered that the effects of nanoparticles on cement hydration depend on itself chemical reactivity and physical properties as well as ambient temperature. Both nano-SiO₂ and nano-C-S-H can obviously shorten the induction period of cement hydration and have acceleration effects obviously. Addition of 1% nano-CaCO₃ seems to have no obvious effect on cement hydration process at Download English Version:

https://daneshyari.com/en/article/7061947

Download Persian Version:

https://daneshyari.com/article/7061947

Daneshyari.com