

Accepted Manuscript

Title: Impact of sample crushing on porosity characterization of hardened cement pastes by low temperature calorimetry: comparison of powder and cylinder samples

Author: Min Wu Katja Fridh Björn Johannesson Mette Geiker



PII: S0040-6031(18)30145-X
DOI: <https://doi.org/doi:10.1016/j.tca.2018.05.002>
Reference: TCA 77990

To appear in: *Thermochemica Acta*

Received date: 25-11-2017
Revised date: 7-3-2018
Accepted date: 1-5-2018

Please cite this article as: Min Wu, Katja Fridh, Björn Johannesson, Mette Geiker, Impact of sample crushing on porosity characterization of hardened cement pastes by low temperature calorimetry: comparison of powder and cylinder samples, *Thermochemica Acta* (2018), <https://doi.org/10.1016/j.tca.2018.05.002>

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.

Impact of sample crushing on porosity characterization of hardened cement pastes by low temperature calorimetry: comparison of powder and cylinder samples

Min Wu^{a,*}, Katja Fridh^b, Björn Johannesson^c, Mette Geiker^d

^a*Department of Civil Engineering, Technical University of Denmark, Building 118, 2800 Lyngby, Denmark*

^b*Division of Building Materials, Lund University, Lund, Sweden*

^c*Department of Building Technology, Linnaeus University, Växjö, Sweden*

^d*Department of Structural Engineering, Norwegian University of Science and Technology, Trondheim, Norway*

Abstract

The impact of sample crushing on the detected porosity of hardened cement pastes by low temperature calorimetry (LTC) was studied using powder and cylinder samples. Two types of cements, CEM I and CEM III, were used to prepare the pastes. A model porous material, MCM-41, was also used in order to investigate some aspects of the measurement and the evaluation approach. The powder and cylinder samples of the cement pastes were compared in terms of the calculated ice content curves, total pore volumes and pore size distribution curves. For the two studied cement pastes, the calculated ice content curves of freezing of the powder sample differed from that of the cylinder samples, especially for the paste CEM III. The results indicate that sample crushing changed the pore connectivity as compared to non-crushed samples. One important difference between the powder sample and the cylinder samples of the paste CEM III was that the determined maximum ice content in the powder sample was much higher than that in the cylinder samples, the relatively difference being about 40-50%. However, this kind of marked difference was not found in the paste CEM I. The observed difference between the calculated pore volume of the powder and the cylinder samples of the paste CEM III is possibly due to some of the “isolated” pores which, presumably, cannot be fully filled with water in the preparation of the cylinder samples. However, sample crushing makes it possible to saturate the pores to a greater

*Corresponding author. The content presented in this article has been included as part of the PhD thesis of the author and archived in the university repository[1]. Current contact address: COWI A/S, Parallevej 2, 2800 Lyngby, Denmark. Tel: +45 5640 7118.

Download English Version:

<https://daneshyari.com/en/article/7061912>

Download Persian Version:

<https://daneshyari.com/article/7061912>

[Daneshyari.com](https://daneshyari.com)