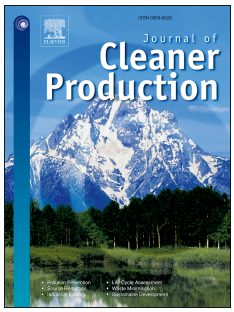
Accepted Manuscript



Utilization of precipitated $CaCO_3$ from carbon sequestration of industrially emitted CO_2 in cementless CaO-activated blast-furnace slag binder system

Yeonung Jeong, Woo Sung Yum, Juhyuk Moon, Jae Eun Oh

PII: S0959-6526(17)31815-2

DOI: 10.1016/j.jclepro.2017.08.097

Reference: JCLP 10355

To appear in: *Journal of Cleaner Production*

Received Date: 28 April 2017

Revised Date: 13 July 2017

Accepted Date: 12 August 2017

Please cite this article as: Jeong Y, Yum WS, Moon J, Oh JE, Utilization of precipitated $CaCO_3$ from carbon sequestration of industrially emitted CO_2 in cementless CaO-activated blast-furnace slag binder system, *Journal of Cleaner Production* (2017), doi: 10.1016/j.jclepro.2017.08.097.

Utilization of precipitated $CaCO_3$ from carbon sequestration of industrially emitted CO_2 in cementless CaO-activated blast-furnace slag binder system

Yeonung Jeong[a,b], Woo Sung Yum[a], Juhyuk Moon[b], and Jae Eun Oh[a,*]

a School of Urban and Environmental Engineering, Ulsan National Institute of Science and Technology (UNIST), UNIST-gil 50, Ulju-gun, Ulsan, 44919, Republic of Korea

b Department of Civil & Environmental Engineering, National University of Singapore, 1 Engineering Drive 2, Singapore 117576, Singapore

* Corresponding author. E-mail address: ohjaeeun@unist.ac.kr

Abstract

This study explores the use of precipitated calcium carbonate (PCC), an industrial by-product from the carbon sequestration process for emitted CO_2 from factories, in the cementless CaO-activated ground-granulated blast-furnace slag (GGBFS) system in an aim not only to improve the strength but also to develop more sustainable structural binder for concrete. The 28-day strength improved with increasing PCC content up to 20 wt%, and its highest strength showed an ~23% increase from the original strength of the sample without PCC. The analysis revealed that the PCC was not a simple inert filler, but it might promote more dissolution of GGBFS, resulting in a higher strength from additional formation of reaction products. In particular, even the sample with 50 wt% PCC yielded a very similar strength compared to the sample without PCC at 28 days. Thus, this binder system could be a decent solution that can store a large amount of PCC