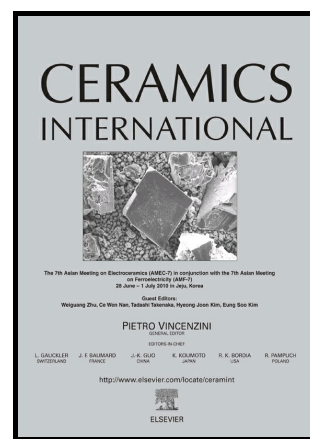


Fiber-reinforced one-part alkali-activated
slag/ceramic binders

Z. Abdollahnejad, M. Mastali, T. Luukkonen, P.
Kinnunen, M. Illikainen



www.elsevier.com/locate/ceri

PII: S0272-8842(18)30394-8
DOI: <https://doi.org/10.1016/j.ceramint.2018.02.097>
Reference: CERI17499

To appear in: *Ceramics International*

Received date: 30 December 2017
Revised date: 8 February 2018
Accepted date: 10 February 2018

Cite this article as: Z. Abdollahnejad, M. Mastali, T. Luukkonen, P. Kinnunen and M. Illikainen, Fiber-reinforced one-part alkali-activated slag/ceramic binders, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.02.097>

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 galley proof before it is published in its final citable 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.

Fiber-reinforced one-part alkali-activated slag/ceramic binders

Abdollahnejad Z.^{1*}, Mastali M.¹, Luukkonen T.¹, Kinnunen P.¹, Illikainen M.¹

1. Fiber and Particle Engineering, Faculty of Technology, Univ. of Oulu, P.O. Box 4300, 90014 Oulu, Finland

*Corresponding author Email: Zahra.abdollahnejad@oulu.fi

Abstract

In the present experimental/numerical study, a combination of ceramic waste and ground-granulated blast furnace slag were used in the preparation of one-part alkali-activated binders. Moreover, the effect of fiber type and content on hardened-state properties and shrinkage was studied under two different curing conditions. In the first stage of this study water absorption, compressive strength, and flexural strength were assessed. Subsequently, the flexural performance of fiber-reinforced binders was simulated and predicted using finite element models under concentrated and distributed flexural loading, respectively. The experimental results showed that fibers improved mechanical properties, and enhancement was governed by fiber type and curing conditions. Moreover, the numerical results indicated that the developed fiber-reinforced binders offer a flexural load-carrying capacity in the range of 10 to 40 kN/m² and permissible service loads were well below the ultimate capacity.

Keywords: One-part alkali-activated binders, Fiber-reinforced binders, Ground-granulated blast furnace slag, Ceramic waste, Hardened-state properties, Numerical simulations

1. Introduction

Alkali-activated binders have been investigated as one alternative to ordinary Portland cement (OPC). Alkali activation is based on the dissolution of reactive aluminosilicates in alkaline conditions. The most commonly used raw materials include kaolinitic clays [1-3], fly ash [5-8], blast furnace slag [9, 10], and combinations of these materials as hybrid blends [11-14].

Download English Version:

<https://daneshyari.com/en/article/7887465>

Download Persian Version:

<https://daneshyari.com/article/7887465>

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