

A study on the wetting behavior of liquid iron on forsterite, mullite, spinel and quasi-corundum substrates

Hyun Sik Park, Youngjae Kim, Sookyung Kim,
Taehee Yoon, Yelim Kim, Yongsug Chung



www.elsevier.com/locate/ceri

PII: S0272-8842(18)31373-7
DOI: <https://doi.org/10.1016/j.ceramint.2018.05.226>
Reference: CERI18401

To appear in: *Ceramics International*

Received date: 12 April 2018
Revised date: 18 May 2018
Accepted date: 26 May 2018

Cite this article as: Hyun Sik Park, Youngjae Kim, Sookyung Kim, Taehee Yoon, Yelim Kim and Yongsug Chung, A study on the wetting behavior of liquid iron on forsterite, mullite, spinel and quasi-corundum substrates, *Ceramics International*, <https://doi.org/10.1016/j.ceramint.2018.05.226>

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.

A study on the wetting behavior of liquid iron on forsterite, mullite, spinel and quasi-corundum substrates

Hyun Sik Park^a, Youngjae Kim^a, Sookyung Kim^a, Taehee Yoon^b, Yelim Kim^b, Yongsug Chung^{b,*}

^a*Resource Recovery Research Center, Mineral Resources Research Division, Korean Institute of Geoscience and Mineral Resources (KIGAM), Daejeon 34132, Republic of Korea*

^b*Department of Advanced Materials Engineering, Korea Polytech University, Siheung 15073, Republic of Korea*

*Corresponding author. Tel.: +82 31 8041 0590, Fax: +82 31 8041 0599; E-mail address: ychung@kpu.ac.kr (Y.S. Chung)

ABSTRACT

Wetting characteristics of liquid iron on magnesia, alumina and silica mixture substrates were studied by sessile drop experiments. Chromium-free forsterite, mullite, spinel and quasi-corundum phases were selected as alternative refractories in MgO-Al₂O₃-SiO₂. Morphological changes of molten electrolytic iron on the oxide substrates were investigated via apparent contact angle measurements. The results showed that the wetting behavior was significantly influenced by FeO compounds that were formed via oxidation of the liquid iron. Morphologies of the reacted layer were studied by Scanning Electron Microscope (SEM)/EDX analysis. The ternary phases FeO-MgO-SiO₂ and FeO-Al₂O₃-SiO₂ improved the wetting of liquid iron on the forsterite and mullite substrates by providing liquid phases at solid (refractory)–liquid (iron)

Download English Version:

<https://daneshyari.com/en/article/8948426>

Download Persian Version:

<https://daneshyari.com/article/8948426>

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