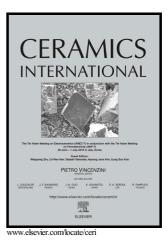
Author's Accepted Manuscript

Preparation and corrosion resistance of cordierite– spodumene composite ceramics using zircon as a modifying agent

Jianfeng Wu, Cheng Hu, Chen Ping, Xiaohong Xu, Weiheng Xiang



 PII:
 S0272-8842(18)31944-8

 DOI:
 https://doi.org/10.1016/j.ceramint.2018.07.205

 Reference:
 CERI18927

To appear in: Ceramics International

Received date:3 July 2018Revised date:17 July 2018Accepted date:23 July 2018

Cite this article as: Jianfeng Wu, Cheng Hu, Chen Ping, Xiaohong Xu and Weiheng Xiang, Preparation and corrosion resistance of cordierite–spodumene composite ceramics using zircon as a modifying agent, *Ceramics International*, https://doi.org/10.1016/j.ceramint.2018.07.205

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.

ACCEPTED MANUSCRIPT

Preparation and corrosion resistance of cordierite-spodumene composite

ceramics using zircon as a modifying agent

Jianfeng Wu^{a1}, Cheng Hu^{b*1}, Chen Ping^b, Xiaohong Xu^a, Weiheng Xiang^a

^aState Key Laboratory of Silicate Materials for Architectures, Wuhan University of Technology, Wuhan 430070, P. R. China ^bThe State Key Laboratory of Refractories and Metallurgy, Wuhan University of Science and

Technology, Wuhan 430081, P. R. China

^{*}Corresponding author: The State Key Laboratory of Refractories and Metallurgy, Wuhan University of Science and Technology, Wuhan 430081, P. R. China. hucheng0402@whut.edu.cn

Abstract

To prolong the service life of cordierite–spodumene composite ceramics applied to the solar heat transmission pipeline, the zircon modifier was introduced to improve the corrosion resistance of the ceramics. The effects of zircon on the density, bending strength, crystalline phase, microstructure and chemical stability were studied. The results showed that the sintering temperature range of the composite ceramics was broadened to 40–60 °C with the introduction of 5–15 wt% zircon. Moreover, the mechanical strength and corrosion resistance of the ceramic materials were improved with the zircon introduction. In particular, sample C3 containing 15 wt% of zircon and sintered at 1360 °C exhibited the best performance, which had the 0.03% Wa, 0.07% Pa, 2.34 g·cm⁻³ Db and 100.17 MPa bending strength. After acid and alkali corrosion, the water absorption was still less than 0.5% and the strength loss rate decreased to less than 5.3%. The XRD and SEM analyses demonstrated that the ZrSiO₄ grains dispersed at the grain boundaries could enhance the mechanical properties. Furthermore, the existence of the Zr⁴⁺ ions not only reduced the cationic

¹ These authors contributed equally to this work and should be considered co-first authors

Download English Version:

https://daneshyari.com/en/article/10155428

Download Persian Version:

https://daneshyari.com/article/10155428

Daneshyari.com