

Accepted Manuscript

Suspension preparation of Alumina whiskers for spray granulation

Roghayeh Mirzajany, Masoud Alizadeh, Mohsen Saremi, Mohammad-Reza Rahimipour

PII: S0167-577X(18)30891-7
DOI: <https://doi.org/10.1016/j.matlet.2018.05.136>
Reference: MLBLUE 24436

To appear in: *Materials Letters*

Received Date: 24 October 2017
Revised Date: 26 May 2018
Accepted Date: 31 May 2018

Please cite this article as: R. Mirzajany, M. Alizadeh, M. Saremi, M-R. Rahimipour, Suspension preparation of Alumina whiskers for spray granulation, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.05.136>

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.



Suspension preparation of Alumina whiskers for spray granulation

Roghayeh Mirzajany^a, Masoud Alizadeh^{a,†}, Mohsen Saremi^b, Mohammad-Reza Rahimipour^a

a: Ceramics Department, Materials and Energy Research Center, P.O. Box 31787-316, Alborz, Meshkindasht, Iran

b: School of Metallurgy and Materials Engineering, Faculty of Engineering, University of Tehran, P.O. Box 11365-4563, Tehran, Iran

Abstract: Whisker presence in a ceramic matrix could increase mechanical strength and reduce thermal conductivity due to phonon scattering. Therefore it is a potential reinforcement in TBCs, However, due to difficult handling and lack of homogenous distribution, their usage is limited. In this study, semi-flowing granules of alumina whiskers were prepared by spray dryer suitable for plasma spraying method. Suspensions of alumina whiskers and nanoparticles were prepared; rheological properties of the slurries were studied using spin rheometer, zeta-sizer and observing the sedimentation height. Two different slurries were prepared; the first one comprises alumina whiskers and the second one comprise 70% wt alumina whiskers- 30% wt alumina nanoparticles as filler. Both slurries were prepared with the same condition of pH, solid content and binder then granulated using a spray dryer. Morphology of the obtained granules was analyzed by FE-SEM and OM, also flow properties were investigated. The results showed that the granules from both slurries were hollow with semi-spherical morphology. However, the powder contained alumina nanoparticles had a thicker shell and smoother surface, because nanoparticles have been filled the gaps between whiskers; therefore it has the better flowability.

Keywords: ceramic; powder technology; spray dryer; alumina whisker; rheology

Introduction

Download English Version:

<https://daneshyari.com/en/article/8012679>

Download Persian Version:

<https://daneshyari.com/article/8012679>

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