

Author's Accepted Manuscript

Biogenerated silica nanoparticles synthesized from sticky, red, and brown rice husk ashes by chemical method

S. Sankar, Sanjeev K. Sharma, Narinder Kaur, Byoung-ho Lee, Deuk Young Kim, Sejoon Lee, Hyun Jung



www.elsevier.com/locate/ceri

PII: S0272-8842(15)02279-8
DOI: <http://dx.doi.org/10.1016/j.ceramint.2015.11.172>
Reference: CER11791

To appear in: *Ceramics International*

Received date: 18 September 2015
Revised date: 13 November 2015
Accepted date: 30 November 2015

Cite this article as: S. Sankar, Sanjeev K. Sharma, Narinder Kaur, Byoung-ho Lee, Deuk Young Kim, Sejoon Lee and Hyun Jung, Biogenerated silica nanoparticles synthesized from sticky, red, and brown rice husk ashes by chemical method, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2015.11.172>

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 a 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

Biogenerated silica nanoparticles synthesized from sticky, red, and brown rice husk ashes by chemical method

S. Sankar¹, Sanjeev K. Sharma^{1*}, Narinder Kaur¹, Byoung-ho Lee¹, Deuk Young Kim^{1*}, Sejoon Lee¹, Hyun Jung²

¹Semiconductor Materials and Device Laboratory, Department of Semiconductor Science, Dongguk University-Seoul, Seoul 100715, Republic of Korea

²Advanced Functional Nanohybrid Materials Laboratory, Department of Chemistry, Dongguk University-Seoul, Seoul 100715, Republic of Korea

*Corresponding Author: sksharma@dongguk.edu , dykim@dongguk.edu Tel.: +82-2-2260-3183

An inexpensive chemical method was used to synthesize biogenic mesoporous silica (m-SiO₂) from rice husk ash (RHA). A comparative study was carried out to produce silica nanoparticles (S-SiO₂, R-SiO₂, and B-SiO₂) from three types of rice husk ashes (sticky, red, and brown). The microstructure of m-SiO₂ was dependent on the geographical provenance and the types of RHA. An analysis of the SEM and TEM micrographs reveals that the S-SiO₂ nanoparticles had a clustered spherical shape, while R-SiO₂ and B-SiO₂ nanoparticles were found to be purely spherical. The average crystallite size of S-SiO₂, R-SiO₂ and B-SiO₂ nanoparticles evaluated from the TEM measurements were observed to be 50, 20 and 10 nm, respectively. The XRD pattern of silica nanopowders had an absence of sharp peaks that confirmed the amorphous nature of the material. The Fourier transform infrared (FTIR) spectra of silica nanoparticles showed the symmetric Si-O and O-Si-O stretching bond vibrations at 462, 1088, and 1098 cm⁻¹. The surface area of S-SiO₂, R-SiO₂ and B-SiO₂ nanopowders were measured to be 7.5513, 201.45, and 247.18 m²g⁻¹, respectively. The surface area of uniformly-distributed spherical nanoparticles of B-SiO₂ were observed the highest, which can be applied for the application of energy storage and drug delivery systems.

Download English Version:

<https://daneshyari.com/en/article/10624357>

Download Persian Version:

<https://daneshyari.com/article/10624357>

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