



Journal

Particulate Science and Technology >

An International Journal

Latest Articles

77 0
Views CrossRef citations to date Altmetric

Articles

Green production of silica nanoparticles from maize stalk

Jeleel Adekunle Adebisi , Johnson Olumuyiwa Agunsoye , Sefiu Adekunle Bello , Muthiah Haris ,
Mercy Munyadziwa Ramakokovhu , Michael Olawale Daramola & ...show all

Received 27 Jan 2018, Accepted 30 Jan 2019, Published online: 11 Mar 2019

 Download citation <https://doi.org/10.1080/02726351.2019.1578845>

Select Language ▼

Translator disclaimer

Full Article

Figures & data

References

Citations

Metrics

Reprints & Permissions

Get access

Abstract

Amorphous silica has been produced from some agricultural wastes but with drawbacks on agglomeration challenges. In the present study, potential of maize stalk (MS) wastes as a source of nano silica was studied through modified sol-gel techniques, which involved acid pretreatment, calcination, leaching, sol-gel modification, and post-filtration treatments. Nano silica particles obtained were characterized by XRD, SEM, EDS, TEM, PSA, Raman, and FT-IR for morphology, elemental composition, particle size, and surface chemistry. Results obtained revealed that pre-calcination acid treatment of the MS did not improve the silica yield but reduced the Van der Waal's interaction of the silica particles resulting in silica particles with a smaller degree of agglomeration. Sodium silicate modified with ethylene glycol sol-gel treatment prior to titration reduced silica agglomeration. Silica nanoparticles obtained according to XRD, TEM, and PSA are below 30 nm.

Keywords: Maize stalk, silica, nanoparticle, agglomeration, morphology

Additional information

Acknowledgments

Authors wish to show their appreciation to Materials Laboratory of Karunya University, Coimbatore, India and Institute of Nano Engineering Research (INER), Tshwane University of Technology, Pretoria, South Africa for allowing access to their laboratories for execution of this project.

People also read

Article

High-purity nano silica powder from rice husk using a simple chemical method >



Sign in here
to start your access


Your research could
inform the next
generation of technologies
Submit today →

EDITINGSERVICES
Supporting Taylor & Francis authors
Good editing leads to
a great manuscript


Information for

- Authors
- Editors
- Librarians
- Societies

Open access

- Overview
- Open journals
- Open Select
- Cogent OA

Help and info

- Help & contact
- Newsroom
- Commercial services

Keep up to date

Register to receive personalised research and resources by email

 Sign me up

