Document details

AIP Conference Proceedings
Volume 2068, 6 February 2019, Article number 020002
International Conference on X-Rays and Related Techniques in Research and Industry 2018, ICXRI 2018; Grand Riverview HotelKota Bharu, Kelantan; Malaysia; 18 August 2018 through 19 August 2018; Code 144871

Preparation of nano- silica powder from silica sand via sol-precipitation method (Conference Paper)

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Abstract

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Silica in the nanoscale has interesting properties compared to its bulk counterpart that leads to a different range of applications. This is due to its low toxicity, high physical and chemical stability, large surface area to volume ratio and direct surface chemistry that allows to be combined or functionalized with a variety of functional species or molecules. Most researches used metal alkoxides or agricultural materials for the source of silica but very few researches attempted at preparing nano- silica powder from silica sand via the chemical method . In this research, the nano- silica powder is prepared via sol-precipitation method and its subsequent characterization. The materials used for this project were silica sand , sodium hydroxide, hydrochloric acid and distilled water. Surface morphology using Field Emission Scanning Electron Microscope (FESEM) of the silica sand was found to be irregular in terms of its size and shape. The average particle size of the silica sand determined by FESEM was found to be around 230-μm. The nano- silica has quartz SiO_2 structures as demonstrated from XRD analysis. The synthesized nano- silica particle have a huge reduction in terms of size between 58-nm to 290-nm using FESEM. It was also found that the nano- silica particles were very agglomerated and had a spherical or globular particle shape. Hence, the silica sand can be an alternative precursor for synthesis of nano- silica particle by the sol-precipitation method instead of using other chemical precursor. © 2019 Author(s).

SciVal Topic Prominence

Topic: Ashes | Silica | Rice husks

Prominence percentile: 92.259

Funding details

Funding sponsor	Funding number	Acronym
International Islamic University Malaysia	RIGS16-086-0250	IIUM

Funding text

This work was funded by the International Islamic University Malaysia (IIUM) under Grant RIGS16-086-0250.

ISSN: 0094243X
ISBN: 978-073541796-0
DOI: 10.1063/1.5089301
Document Type: Conference Paper

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