

Converting stöber silica and mediterranean sand to high surface area silicon by a reaction under autogenic pressure at elevated temperatures

Hai N.H., Grigoriants I., Gedanken A.

Department of Chemistry, Institute of Nanotechnology and Advanced Materials, Bar-Ilan University, Ramat-Gan 52900, Israel; Center for Materials Science, Hanoi University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Hanoi, Viet Nam

Abstract: We report on a reaction to convert Stöber silica or Mediterranean sand to high surface area silicon (HSAS). The starting silica and/or the sand are reduced by magnesium under the autogenic pressure of the reactants at 750 °C for 5 h. After the MgO is removed, HSAS is formed. The surface areas are 200 and 86 m²/g for the product obtained from the Stöber silica and sand, respectively. The morphology of the final product is almost identical to that of the precursor silica. The products are stable in air because a thin layer of SiO₂ is present on the surface of the silicon. We have detected luminescence from the HSAS in the wavelength region of 626-640 nm. © 2009 American Chemical Society.

Index Keywords: Autogenic pressure; High surface area; Reaction under autogenic pressure at elevated temperatures; Surface area; Thin layers; Wavelength regions; Magnesium; Sand; Silicon oxides; Silica

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Correspondence Address: Gedanken, A.; Department of Chemistry, Institute of Nanotechnology and Advanced Materials, Bar-Ilan University, Ramat-Gan 52900, Israel; email: gedanken@mail.biu.ac.il

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Authors with affiliations:

- Hai, N.H., Department of Chemistry, Institute of Nanotechnology and Advanced Materials, Bar-Ilan University, Ramat-Gan 52900, Israel, Center for Materials Science, Hanoi University of Science, Vietnam National University, Hanoi, 334 Nguyen Trai, Hanoi, Viet Nam
- Grigoriants, I., Department of Chemistry, Institute of Nanotechnology and Advanced Materials, Bar-Ilan University, Ramat-Gan 52900, Israel
- Gedanken, A., Department of Chemistry, Institute of Nanotechnology and Advanced Materials, Bar-Ilan University, Ramat-Gan

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