



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Synthesis and properties of glassy mesoporous SiO₂ in the freshwater sponge *Cauxi*

Keding, Ralf; Jensen, Martin; Höche, Thomas; Yue, Yuanzheng

Publication date:
2009

Document Version
Publisher's PDF, also known as Version of record

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Keding, R., Jensen, M., Höche, T., & Yue, Y. (2009). *Synthesis and properties of glassy mesoporous SiO₂ in the freshwater sponge Cauxi*. Abstract from 8th Pacific im Conference on Ceramic and Glass Technology, ² Vancouver, Canada.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Synthesis and properties of glassy mesoporous SiO₂ in the freshwater sponge Cauxi

R. Keding*¹, M. Jensen¹, T. Höche², Y.Z. Yue¹

¹Aalborg University, Denmark

²Leibniz Institut for Surface Modification, Germany

The freshwater sponge Cauxi was collected at the river bank of the Rio Negro at Praia Grande in the Amazon basin 60 km west of Manaus, Brazil. Detailed investigations show that amorphous silica is synthesized by Cauxi in aqueous solution under ambient conditions via biological catalysis. The high-purity amorphous silica is obtained as spicules (average diameter: 15.6 μm, average length 305 μm) that are cemented through junctions, thereby forming the skeleton of the sponge. After removal of organic components the spicules were investigated by differential scanning calorimetry and the glass transition temperature of the glassy phase was determined to 1400 K indicating a low alkali and water content. The inorganic part of the spicules consists of about 99.7 wt% SiO₂ and traces of CaO and Al₂O₃. Vacuum hot extraction experiments, transmission electron micrographs, small angle X-ray scattering as well as thermogravimetric investigations exhibit that such amorphous spicules themselves consist of a glassy phase and contain about 10 vol% mesopores (average diameter: 23 nm). The microstructure and the properties of the Cauxi skeleton are described here. The driving force for the glassy silica deposition is identified as the supersaturation of silica in the Rio Negro caused by a change in the pH value.