Supercritical drying of SiO_2 and ZrO_2 aerogels

Christoffer Tyrsted, Martin Bremholm, Bo Brummerstedt Iversen, Center for Energy Materials, Department of Chemistry and iNANO, Univesity of Aarhus, DK-8000 Aarhus C, Denmark

Aerogels have unique properties and they are used widely for thermal insulation. In synthesis of aerogels the critical point is the drying because capillary forces tend to break down the ultraporous network. Here we report on aerogels consisting of SiO_2 and ZrO_2, which have been dried both by conventional methods and supercritical CO_2.

The aerogels have been analyzed using BET measurements, Thermogravimetry and PXRD. The results for the samples of SiO_2 reveal inner surface areas as high as 1159.7m^2/g and a pore volume of up to 0.828cc/g. The samples of ZrO_2 have an extremely high surface area of 608.7m^2/g and a pore volume of 1.310cc/g. The supercritically dried aerogels are compared to gels that have been dried by conventional methods. It is shown, that the supercritically drying has a larger effect on the ZrO_2 samples, than on the SiO_2 samples.