Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Adsorption of Supercritical Carbon Dioxide in Aerogels as Studied by SANS and Neutron Transmission Techniques[1] GEORGE WIGNALL, YURI MELNICHENKO, DAVID COLE, Oak Ridge National Laboratory, HENRICH FRIELINGHAUS, Forschungszentrum, Julich — Small-angle neutron scattering (SANS) has been used to study the adsorption behavior of supercritical carbon dioxide (CO2) in porous Vycor glass and silica aerogels. Measurements were performed at T = 35C and 80C as a function of pressure up to P = 25 MPa. The neutron transmission data were used to monitor the "excess" adsorption of CO2 at different pressures. The adsorption of CO2 is significantly higher in aerogels than in activated carbons and silica gels. SANS data have revealed the existence of highly compressed adsorbed phase with the density close to the density corresponding to van der Waals volume of carbon dioxide. The results demonstrate the utility of SANS combined with transmission measurements to study the adsorption of supercritical fluids in porous materials.

[1]This work was supported by the Division of Materials Sciences, under Contract No. DE-AC05-00OR22725 with the Oak Ridge National Laboratory, managed by UT-Battelle, LLC.

George Wignall
Oak Ridge National Laboratory

Date submitted: 07 Dec 2005 Electronic form version 1.4