Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Ultra Low Density Materials Synthesized via an Aerosol Gelation Process RAJAN DHAUBHADEL, AMITABHA CHAKRABARTI, CHRISTOPHER M. SORENSEN, Kansas State University — We synthesized carbon and silica ultra low dense and high specific surface area solids via aggregation and gelation of nano-sized particles in the aerosol phase. We named such solids as Aerosol Gels. The process of formation of an Aerosol Gel starts with a collection of individual nano-sized monomers which undergo Brownian aggregation and finally gel quickly relatively to the gravitational settling when the monomers are small enough ($\sim$ 10 nm radius) and the monomer volume fraction is high enough ($\geq 10^{-4}$). The Carbon Aerosol Gel was found to have high specific surface area (200 – 350 m^2/g), an extremely low density (2.5 – 5 mg/cc) and a high electrical conductivity, properties similar to conventional aerogels. The Silica Aerosol Gel was also extremely porous with high specific surface area ($\sim$ 450 m^2/g) and a very low density ($\sim$ 4mg/cc).

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Date submitted: 20 Nov 2006 Electronic form version 1.4