

Abstract Submitted  
for the DFD12 Meeting of  
The American Physical Society

**Two-level hierarchical structure in nano-powder agglomerates in gas media** LILIAN DE MARTIN, WIM G. BOUWMAN, J. RUUD VAN OMMEN, Delft University of Technology — Nanoparticles in high concentration in a gas form agglomerates due to the interparticle van der Waals forces. The size and the internal structure of these nanoparticles agglomerates strongly influence their dynamics and their interaction with other objects. This information is crucial, for example, when studying inhalation of nanoparticles. It is common to model the structure of these agglomerates using a fractal approach and to compare their dimension with the dimension obtained from aggregation models, such diffusion limited aggregation (DLA). In this work we have analyzed the structure of nanoparticles agglomerates in situ by means of Spin-Echo Small-Angle Neutron Scattering (SESANS), while they were fluidized in a gas stream. The advantage of SESANS over conventional SANS is that SESANS can measure scales up to 20 microns, while SANS does not exceed a few hundred of nanometers. We have observed that when agglomerates interact, their structure cannot be characterized by using only one scaling parameter, the fractal dimension. We have found that there are at least two structure levels in the agglomerates and hence, we need at least two parameters to describe the autocorrelation function in each level.

Lilian de Martin  
Delft University of Technology

Date submitted: 26 Jul 2012

Electronic form version 1.4