

## Test report:

### Determination of particle loss in glass chambers; coated and uncoated:

#### Principle

No testing standard currently exists covering the measurement of fine and ultra-fine dust loading in building interiors. The following measurement setup was selected to obtain a qualified and reproducible statement concerning the effectiveness of the glass coatings.

#### Measurement setup

Two identical glass chambers were constructed by the company Nanoenergy GmbH, Germany. One chamber was made with non-coated glass, the other with coated glass. The aim was to test whether the chamber with the coated glass had an increased particle reducing effect.

An atmospheric aerosol (external air) was passed through both chambers. The mobility particle sizer determined the particle size distribution alternately at the exits of the two chambers at 5-minute intervals over several days. The aerosol volume flow rate of the particle sizer was 1 l/min. This means a mean volume flow rate of 0.5 l/min, at a chamber volume of approx. 100 l.

The measurements took place from 20.03. - 26.03.2017 in our institute in Leipzig. Only measuring instruments approved by the Institute were used.



Figure 1: Measurement setup

The World Calibration Centre for Aerosol Physics (WCCAP) of the WMO-GAW (World Meteorological Organization — Global Atmosphere Watch) uses reference instruments for the calibration of aerosol instruments, which are regularly calibrated to SI units. In total, five reference instruments were used to calibrate mobility particle sizers. In the setup described above, a reference mobility particle sizer was used. The setup of such a particle sizer is described in Wiedensohler et al. (2012).

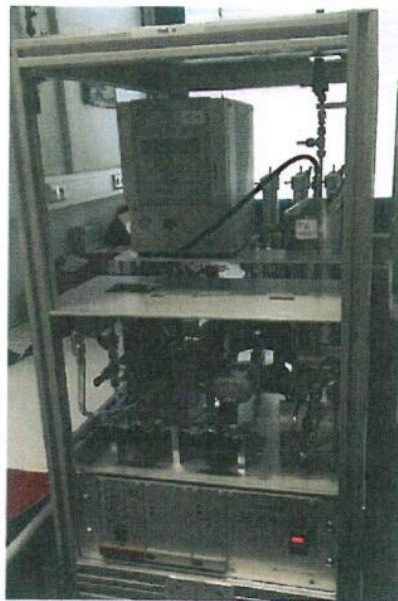


Figure 2: Setup of a WCCAP mobility particle sizer

## Results

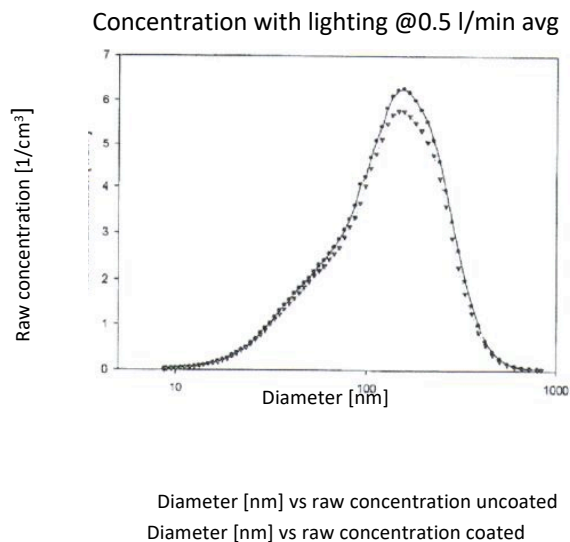


Figure 3: Comparison of the mean raw concentration at the chamber exit.

Concentration with lighting @0.5 l/min avg

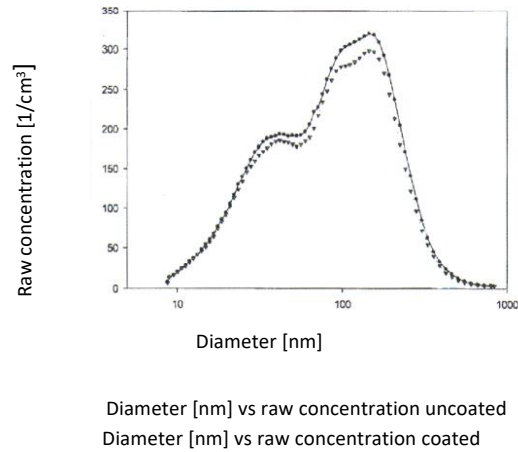


Figure 4: Comparison of the particle size distribution at the chamber exit

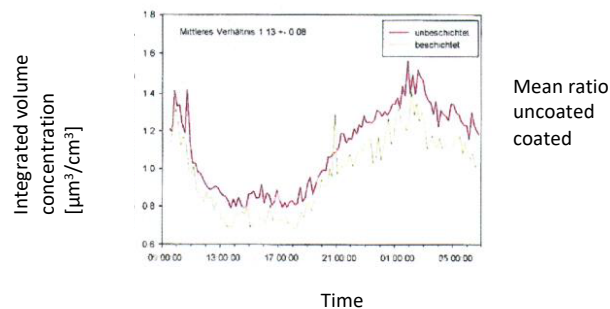


Figure 5: Time curve of the total volume concentration at the chamber exit

#### Conclusion:

Based on the evaluation of the measurement results using an external air aerosol, there is clear evidence of particle reduction by the coating.

#### References:

Wiedensohler, A., W. Birmili, A. Nowak, A. Sonntag, K. Weinhold, M. Merkel, B. Wehner, T. Tuch, S. Pfeifer, M. Fiebig, A. M. Fjåraa, E. Asmi, K. Sellegri, H. Venzac, P. Villani, P. Laj, P. Aalto, J. A. Ogren, E. Swietlicki, P. Roldin, P. Williams, P. Quincey, C. Hüglin, R. Fierz-Schmidhauser, M Gysel, E Weingartner, F. Riccobono, S. Santos, C. Grüning, K. Faloon, D. Beddows, R. Harrison, C. Monahan, S. G. Jennings, C.D. O'Dowd, A. Marioni, H.-G. Horn, L. Keck, J. Jiang, J. Scheckman, P. H. McMurry, Z. Deng, C. S. Zhao. M. Moerman, B. Henzing, G. d. Leeuw, G. Löschau and S. Bastian (2012). Mobility Particle Size Spectrometers: Harmonization of Technical Standards and Data Structure to Facilitate High Quality Long-term Observations of Atmospheric Particle Number Size Distributions. AMT 5, 657—685.

[Signature]