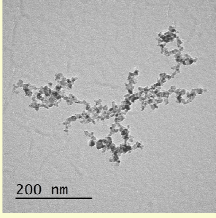


# Determination of airborne nanoparticle mass concentration from number concentration using their effective density - Application to ELPI/SMPS data

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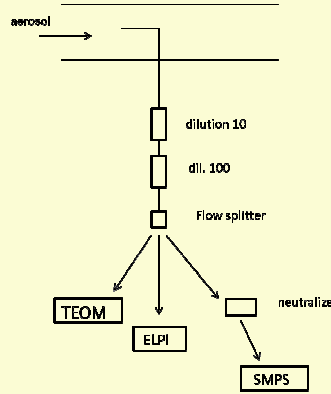
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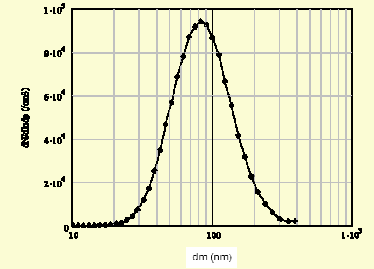


Zn/Al particles generated by electrical arc spraying process  
dpp = 9 nm

Aerosol sampling

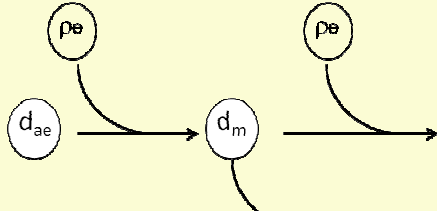


Number particle size distribution (SMPS data) – Lall&Friedlander correction for dpp = 9 nm



$$\phi_{dae} \cdot d_{ae}^2 = \phi_{dm} \cdot d_m^2 \cdot \frac{\rho_e}{\rho_0}$$

$$d_m = d_v \left( \frac{\rho_p}{\rho_e} \right)^{1/3}$$



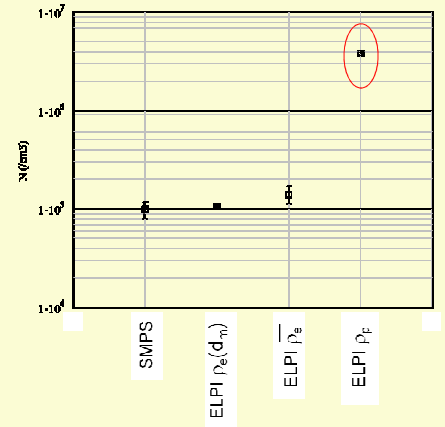
$\rho_e$  = effective density

- $d_{ae}$  : aerodynamic diameter
- $d_m$  : electrical mobility diameter
- $d_v$  : volume diameter
- $\phi$  : correction de Cunningham

$I$  (fA)  $\rightarrow$   $N$  (/cm<sup>3</sup>)  $\rightarrow$   $M$  (mg/m<sup>3</sup>)  
 $ne = a \cdot d_m^b$   
 $M = N \cdot \frac{\pi \cdot d_v^3}{6} \cdot \rho_p$

## RESULTS

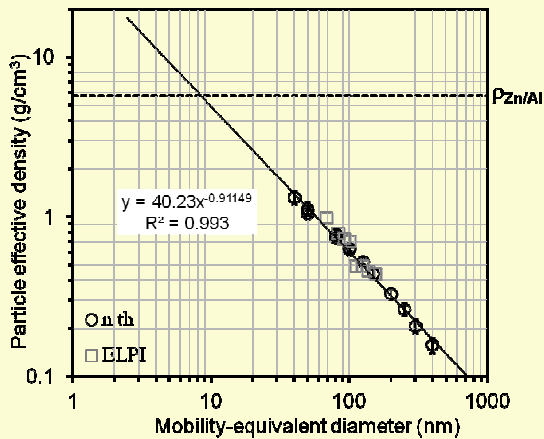
In Number



ELPI correction using:

- $\rho_e = f(d_m)$
- mean  $\rho_e$
- $\rho_p$  = bulk material density

$\rho_e$  measurement by tandem DMA - APM



In Mass

