4. International ETH-Conference on Nanoparticle Measurement

Solid Combustion Particles emitted in large Concentrations by Diesels and other Traffic Partners invisible - in the Nanometer Size Range Lung penetrating, a Health Risk in all Cities

are an object of scientific research since more than 30 years. Not all of their properties and not all possible health risks are understood yet and further research is needed in the field of physical/chemical description or their generation in combustion and following modification in the atmosphere as well as of the mechanisms of their toxicity impact to human health – this will remain an extremely interesting field of research and given the complexity of particle formation it might provide open questions for many coming years.

Three main targets however have been reached, which ask for immediate action by emission engineering:
- Diesel PM-emissions are classified as “carcinogenic” by swiss clean air act and by others as “probably carcinogenic for humans” which leads to the legal request to “minimizing emissions according to BAT”.
- Particulate filters have been developed which trap those particles even in the nanometer range by an efficiency of 99 % or better – which defines BAT
- The main properties of combustion generated particles such as mass, number, surface and phase can be measured by robust instruments – even information of their chemistry can be collected online during transient cycles.

The need to introduce available technical means to clean the exhaust of Diesel engines to the extent of a nearly-ambient particle concentration seems obvious and imperative. Striking enough however this does not happen on large scale because of a number of very simple facts:
- Diesel combustion particles are not clearly defined (and never will ?)
- Their health relevant properties are not clearly defined (and never will ?)
- Measurement technique is not defined yet (but could be soon ?)

On the other hand it is well accepted that the exhaust gas can be perfectly cleaned from such defined and undefined particles, from the more and minor toxic substances whether they are measured as EC, EC+OC, mass or number or surface, particle core or particle bound substances – after cleaning there are hardly any left to be measured.

Based on this a simple engineering mind can only draw the following pragmatic conclusion: let’s use this technology and clean the combustion gases and just agree on available techniques and cycle conventions to control this step to efficiently clean our breathing air – keeping in mind that further improvement is never excluded.

The 4.ETH-Conference on the Measurement of Nanoparticles with its workshops was devoted to this target. We have not reached it but we have succeeded to make a few steps into the right direction.
We are confident to answer open questions during a next year of research and development and we invite the Nanoparticle-community to share these results during the 5.ETH-Conference on Nanoparticle Measurement - again on the Zürich ETH University Campus on 6th and 7th of August 2001.

A.Mayer
Editor
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