

4. International ETH-Conference on

Nanoparticle Measurement

7. - 9. August 2000

ETH Zürich
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Festkörperphysik
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TTM
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September 2000

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

CONTENTS

Session 1: Input from other meetings and programs

J. McAughey/AEA Technology <i>VPEC-Program / UK</i>	1
M. Dunne/DETR <i>GRPE-Meeting Geneva, 21.5.2000</i>	2
D.J. Rickeard/ESSO <i>CRC-Meeting, Paris, 19.6.2000</i>	3
M. Mohr/EMPA <i>EU-Program "Particulates"</i>	4
J. McAughey/AEA Technology <i>Questionnaire from 3. ETH Workshop 1999</i>	5

Session 2: Health effect oriented metrology

J. McAughey/AEA Technology <i>Health effects of particle emissions - impact on metrology</i>	6
Alex Bugarski, Mridul Gautam/West Virginia University <i>Size Distribution and Deposition in Human Respiratory Tract: Particle Mass and Number</i>	7
J.P. Morin/University Rouen <i>In vitro lung toxicity of diesel exhausts using continuous flow sampling and exposure devices</i>	8
A. Duschl/University Würzburg <i>The connection between Diesel exhaust particles and allergy</i>	9
M. Costantini/HEI <i>Relation between particle metal content (with focus on iron) and biological responses</i>	10

Session 3: Research on Nanoparticles

D. Kittelson/University Minnesota <i>Diesel Aerosol sampling in the atmosphere</i>	11
M. Gautam, Sandeep Mehta, Zhuyun Xu/University West Virginia <i>Diesel exhaust plume studies: wind tunnel experiments and modeling</i>	12
P. Gilot/University Mulhouse <i>Comparison of soot reactivity in the presence of O₂ or NO₂</i>	13
A. Keller/ETH Zurich <i>Scaling laws with combustion particles</i>	14
K. Siegmann/ETH Zurich <i>Carbon formation in combustion</i>	15
K. Sattler/ETH Zurich <i>Nanoparticles in the time of flight mass spectrometer</i>	16
F. Dorfer/AVL <i>Diesel particle morphology depending on particle size</i>	17

Session 4: Instrumentation and calibration / Part 1

H.G. Horn <i>Sampling and dilution for the measurement of nanoparticles from engine exhaust</i>	18
I. Khalek/SWRI <i>SMPS and ELPI calibration using diesel exhaust particles</i>	19
D. Booker/Booker-Systems <i>Development of a real-time transient cycle mass monitor</i>	20
N. Bukowiecki/PSI <i>Comparing SMPS Particle Size Distributions with DC, PAS and CPC Data</i>	21
H. Burtscher/FH Aargau <i>The electrical diffusion battery for dynamic classification of nanoparticles</i>	22

Session 5: Instrumentation and calibration / Part 2

M. Kasper/Matter Engineering <i>NanoMet: on-line characterization of nanoparticle size and composition</i>	23
U. Matter/Matter Engineering <i>Stand alone soot generation - new standard, adjustable in size and concentration</i>	24
L. Jing/EAM <i>Properties of soot particles produced by a combustion aerosol standard</i>	25
R. Zahoransky/Wizard Z. KG <i>On-line/in-line measurements of particle emissions by a combustion aerosol standard</i>	26
A. Leipertz/S. Dankers/LTT-Erlangen <i>On-line Diesel soot diagnostics by time-resolved laser-induced incandescence (TIRE-LII)</i>	27
J. Schlatter/EAM <i>Legal Aspects of Particle Measurements</i>	28

Session 6: Nanoparticle-emissions from combustions

Tong Hui Ling/Tsinghua University, M. Fierz/ETH Zurich <i>Continuous measurement of fine particles and gases in the exhaust of a coal power plant</i>	29
V. Schmatloch/EMPA <i>Fine particle emissions from wood and oil fired furnaces</i>	30
J. Czerwinski/HTA Biel <i>Nanoparticles in the exhaust gas of a chainsaw</i>	31
G. Belot, F. Collin/PSA Peugeot Citroën <i>Size distribution and PAH content of particulates emitted by DI and IDI Diesel engines</i>	32
N. Metz/BMW <i>Mass, Size, Number and Surface of diesel soot particles of DI engines with common rail</i>	33

Session 7: Nanoparticles in the ambient air and in working places

B. Wehner/Institute for Tropospheric Research <i>Temporal and spatial variation of nanoparticle number concentration in the urban area</i>	34
Ji Ping Shi/University Birmingham <i>Particle number emission from diesel and petrol vehicles driving on road</i>	35
C. Dickens/AEA Technology <i>In-cabin particle exposure from vehicle emissions</i>	36
H.C. Siegmann/ETH Zurich <i>Phys. and chem. properties of particulate air pollution in major cities by portable sensors</i>	37
U. Lambrecht/IFEU <i>How can we estimate today's and future particulate emissions from transport and air quality?</i>	38
D. Dahmann/Institut für Gefahrstoff-Forschung der BBG <i>Nanoparticle emission measurement at the working place</i>	39
K. Earnshaw/Booker Systems <i>Real-time particle mass measurement in the environment</i>	40
Th. Kauffeldt/University of Duisburg <i>Test of cabin air filter with soot-similar test aerosol</i>	41

Session 8: Influence of fuels and engine management on nanoparticle emissions

U. Lehmann, M. Mohr/EMPA <i>Particle Emissions during cold start of a diesel and a petrol passenger car</i>	42
M. Gruber/TU Wien <i>Influence of fuel properties and aftertreatment techn. on particles in tailpipe and ambient air</i>	43
F. Tort/ELF <i>Influence of water emulsions on nanoparticle emission characteristics</i>	44
N. Rojas/University Leeds <i>Deposition/Release of particles in a diesel oxidation catalyst, effect of EGR on cold start</i>	45
M. Mohr/EMPA, L. Jäger/ETH-LVV <i>Investigation on the effect of engine management on the particle emissions</i>	46
J.F. Unsworth, R. Strading, C. Dobson/Shell Global Solutions <i>Fuel quality effects on Diesel particle emission from HDV and LDV</i>	47

Session 9: After-treatment

Th. Lanni/NYS <i>Particle size distributions from CRT-equipped NYC transit buses</i>	48
A.G. Konstandopoulos/FORTH/CPERI <i>Diesel particulate aftertreatment: characteristics of various filter media</i>	49
P. Zelenka/Zeuna-Stärker <i>Engine - management - supported after-treatment systems for HDV and LDV</i>	50
J. Peter-Hoblyn/CDT, A. Mayer/TTM <i>Size specific chemical analysis of engine emitted nanoparticles with traps and fuel additives</i>	51
S. Cook/OCTEL <i>Secondary Emissions when using fuel additives for regeneration?</i>	52
A.G. Konstandopoulos <i>The Diesel Exhaust Aftertreatment Cluster in the EU-growth programme</i>	53

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APPENDIX

- Programme of the 4. ETH Workshop on Nanoparticle Measurement
- List of Participants
- E-Network of Metrology Experts
- Questionnaire Results

