Fine Particle Measurement and Monitoring Challenges

REPA/INKA-ILMA

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Dekati Ltd.
Dekati Ltd.

- Sales, manufacturing and development of particle measurement solutions for different applications
- Company founded in 1993
- Privately owned technology spin-off from TUT Aerosol Physics Lab
- Core competence and know-how
  - Fine particle sampling and measurement technologies
- ~ 20 highly educated employees
  - In-house R&D
  - Production
  - Sales & Marketing
  - Administration
- Exports ~ 95 % of sales
  - Distributors in ~35 countries worldwide
  - 1000+ of instruments sold
What do we do?

• Instrumentation for fine particle sampling and dilution for demanding measurements
  – e.g. different parts of the power plant or engine exhaust

• Accurate Instrumentation for high-end particle measurements <10 µm
  – Particle concentration
  – Particle size distribution
  – Advanced particle properties
    • Electrical charge
    • Chemical composition
    • Shape and structure

Dekati is one of the world’s leading companies in advanced particle measurements
High Temperature ELPI+™

• All the features of the ELPI+™
• Direct hot aerosol sampling, max 180 °C
  – Calibration values provided for 20, 60, 120 and 180 °C
• Improved sensitivity as no dilution needed
• Integrated temperature control and option for additional external heater control
High Resolution ELPI+™

- ELPI+™ + data inversion to improve size resolution
- 100 (up to 500) size channels, 6 nm – 10 µm
- The only instrument with this wide measurement range, and this many size channels
Challenges in Measuring & Monitoring
Developments

- Increased need for information for different levels
- More data
- More structured, “executive data”
- Local and personal monitoring needs
- Low-cost sensors (range of devices/results)
- Awareness & activity of citizens
Understanding
- Research
- What we should measure
- How to measure
- How to interpret the results

Measurement
- Methods
- Relevance
- Integrity
- Traceability
- Cost

Communication
- “Number crunching”
- Tailored data
- To what need?
- Data form
- Availability
- Data ownership

Actions
- Regulators
- Control agencies
- Individuals
- What to do

DATA, KNOWLEDGE
Measurement needs

- Source
- Sample control
- Sample transfer
- Immission
- Source apportionment
- Spatial range, mobile
- Indoor/outdoor
- Local exposure
- Time resolved
- Biological effects
- Chemistry etc.
Easy challenge: Particle size concept

- The diameter of particle varies depending on the measurement method

- **Optical diameter**
- **Real Particle**
- **Mobility diameter**
- **Stokes diameter**
- **Optical properties**
- **Bulk density**
- **Unit density**
- **Aerodynamic diameter**
- **Charging, electric field**
- **Volatility, coating, “surface”**
- **SEM picture**
Real challenge: What to display and how?

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Solutions

What do we offer?
Dekati Ltd. Applications: Air Quality

- Environmental fine particle monitoring
- Occupational health
- Exposure studies
- Source apportionment
- Solutions for providing detailed real-time information and samples for both research and monitoring
Dekati Ltd. Applications: Emissions

- Engine exhaust: automotive, marine, aircraft
- Small and large scale power plants
- Combustion optimization
- Cleaning device development and optimization
- Emission characterization
- Complete measurement solutions for any source
• High end particulate measurement data
• Wide range capability
  – From source to exposure
• Understanding of sample conditioning
• Proven technology capable of range of measurement needs
Thank you for your attention!

www.dekati.com