

## AEROSOL SCIENCE FOR ATMOSPHERIC QUALITY AND HUMAN HEALTH

**Maria Ochsenkühn- Petropoulou<sup>1</sup>, F. Tsopelas<sup>1</sup>, Th. Lymperopoulou<sup>1</sup>, L.A. Tsakanika<sup>1</sup>,  
K.M. Ochsenkühn<sup>1</sup>, B. Beckhoff<sup>2</sup>**

<sup>1</sup>*School of Chemical Engineering, National Technical University of Athens (NTUA), Greece*

<sup>2</sup>*Physikalisch-Technische Bundesanstalt, Berlin, Germany*

*(\*[oxenki@central.ntua.gr](mailto:oxenki@central.ntua.gr))*

### **Abstract**

Measurements of airborne particulate matter are of paramount importance for the protection of human health, the design of the appropriate measures and legislation as well as the investigation of climate change. Usually, the research focuses on PM<sub>10</sub> και PM<sub>2.5</sub> particulates (aerodynamic diameter less than 10 μm and 2.5 μm, respectively). The level of uncertainty however, is too high and the traceability is insufficient. Solutions for such issues are properly addressed and proposed within the framework of two European EMPIR (European Metrology Programs for Innovation and Research) projects, AEROMET I and the ongoing AEROMET II, funded by EURAMET. NTUA participated in these programs as academic partner, among 21 participants from 15 E.U. countries, mainly National Metrological Institutes. The main objectives of the projects are: Design and building of a demonstration aerosol mixing chamber delivering reference aerosol used for the calibration of automated instruments for PM<sub>10</sub> and PM<sub>2.5</sub> particulates; The application of traceable validated methods for determination of various species of carbon and the toxic elements, such as arsenic, cadmium, lead, nickel and mercury on the particulates; The use of a new mobile X-ray spectrometer for the real time and on site quantification of the composition of particulates and the comparison with conventional lab-based techniques; Construction of suitable substrates with different fabrication techniques for the sampling of the particulates with appropriate cascade impactors, is under development. Finally, our aerosol research in the atmosphere of the Attica basin, in combustion of wood pellets and in exhaust of automobile catalysts will be presented.