



Contribution ID: 123

Type: not specified

## Carbonaceous particles detection by Laser-Induced Incandescence technique

The study of carbonaceous particulate matter has received particular attention by the research community for different aspects such as the global climate change, environmental pollution and the effects on human health. The need to measure, characterize and monitor these particles emission triggered the interest for the development of advanced diagnostic techniques based either on their thermal or optical properties. Laser-Induced incandescence technique (LII) has been proved to be a powerful tool able to measure concentration and size of carbonaceous particles. Being the technique mainly applied to measure carbonaceous particles in various combustion systems, the aim of this work is to extend the use of the technique to the environmental analysis. Recently, a portable instrument for high sensitivity carbonaceous particles measurements has been developed in our laboratory. Measurements of particulate with the LII instrument were performed in different environmental conditions, covering a wide range of concentration (from ambient air to cars' exhaust). The detection limit of the LII instrument has been estimated to be in the range of 200 ng/m<sup>3</sup>.

Real-time concentration measurements of optically absorbing aerosol particles have been also carried out using a commercial one-wavelength aethalometer for validation. The results show a linear relationship between the two sets of measurements, also in the case where significant variation of the carbon particles concentration has been observed over time.

LII signals strongly depend on different parameters, such as optical and heat-exchange properties of the particles as well as the laser density energy. By using different laser density energies, the particle absorption properties, and consequently the nature of the detected particles, can be investigated. The results are presented and discussed.

### Working group IAS (WG1, WG2, WG3) o sessione speciale (SPR)

WG2

### Tipo di presentazione (orale o poster)

poste

**Primary author:** Dr MIGLIORINI, Francesca (CNR-IENI, Istituto per l'Energetica e le Interfasi)

**Co-authors:** Dr ZIZAK, Giorgio (CNR-IENI, Istituto per l'Energetica e le Interfasi); Dr PALAZZO, Natascia (CNR-IENI, Istituto per l'Energetica e le Interfasi); Dr DONDÈ, Roberto (CNR-IENI, Istituto per l'Energetica e le Interfasi); Dr DE IULIIS, Silvana (CNR-IENI, Istituto per l'Energetica e le Interfasi); Dr MAFFI, Silvia (CNR-IENI, Istituto per l'Energetica e le Interfasi)

**Presenter:** Dr MIGLIORINI, Francesca (CNR-IENI, Istituto per l'Energetica e le Interfasi)