



“Gheorghe Asachi” Technical University of Iasi, Romania



CHEMICAL AND OPTICAL CHARACTERIZATION OF SUBMICRONIC AEROSOL SOURCES

Luminita Marmureanu^{1*}, Jeni Vasilescu^{1*}, Horatiu Stefanie², Camelia Talianu¹

¹National Institute of R&D for Optoelectronics, Magurele, Romania

²“Babeş-Bolyai” University of Cluj-Napoca, Faculty of Environmental Science and Engineering, Cluj-Napoca, Romania

Abstract

This study analyses the relationship between the scattering properties and the chemical compounds internal mixture of the aerosols near Bucharest, Romania. Several cases of local aerosols influenced by heating sources, like wood or fossil fuel, are characterized in order to retrieve the winter period specificity. Correlation between organic and inorganic aerosols composition from mass spectrometry measurements made with Compact Time (CT) of Flight Aerosol Mass Spectrometer (AMS) and scattering coefficient derived from Nephelometer measurements is highlighted. The scattering coefficient tendency can be assigned to some of the chemical components of the aerosols, exploiting the correlation coefficient with some fragments during the measurements period. High concentrations of organic markers specific for CO₂ fragment (m/z 44) indicate the presence of oxygenated organic aerosols with low volatility. The aerosols aging process is emphasized by ratio between markers with different degrees of oxidation, as f_{44} and f_{43} (high oxidized marker, m/z 44 to total signal and low oxidized marker m/z 43 to total signal). Lower values are characteristic for the beginning of February and higher at the end of February and beginning of March. During winter, several aerosol sources were present, the m/z 57 marker being related to traffic. Strong correlations were revealed between m/z 43, 60 and 73 and the scattering coefficient.

Keywords: aerosol sources, organic and inorganic species, size distribution

Received: November, 2016; Revised final: August, 2017; Accepted: September, 2017

* Author to whom all correspondence should be addressed: e-mail: jeni@inoe.ro, mluminita@inoe.ro; Phone: +4 0314053303