

Size-resolved Sampling and Analysis of Organics in urban airborne Particles by means of Curie-Point-Pyrolysis-GC/MS

A contribution to subprojekt AEROSOL

A. Plewka, K. Müller and H. Herrmann

*Institut für Troposphärenforschung, Permoserstr. 15
D-04318 Leipzig*

Organic compounds form an important part of aerosols, especially in polluted urban areas. The distribution of these substances between the different aerosol size fractions is important because of their influence on chemistry in the troposphere, the potential risk for the human health and may lead to indications about the origin of the organics identified.

Size segregated aerosol samples were collected in summer 1999 (16.6.-6.7.) in Leipzig using an impaktor (Berner-type, 0,05-0,14; 0,14-0,42; 1,2-3,5; 3,5-10 μm). Aluminium foils were used to determine mass and organic and elemental carbon. Two pieces of Curie-Point-foils (590°C) were placed on stage 1 to 4 for analysis of organic compounds. In Curie-Point-pyrolysis the ferromagnetic foil is heated rapidly (0,2 s) by eddy currents in the presence of an RF frequency magnetic field and the volatilized species were introduced into the GC/MS.

Alkanes, fatty acids, ketones, polycyclic aromatic compounds and oxygenated polycyclic aromatic compounds were quantified. Generally, the mass fraction of the analysed compounds decreases with particle size. n-Alkanes are good candidates to study the origin and fate of atmospheric aerosols. Highest concentrations were found for alkanes with C-29. The biogenic character of the particulate n-alkanes was also demonstrated by a CPI (Carbon Preference Index)-value > 1 . The CPI-value calculated from C21 to C32 increased with decreasing particle size.

In this summer campaign the concentrations of the analysed substances are, except for the fatty acids, lower than in winter samples.