

SEASONAL VARIATIONS OF CHEMICAL COMPOSITIONS IN FINE PARTICLES OF BEIJING

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Along with rapid economic growth, urbanization and vehicle increase in the last decade; the features of air pollution in Beijing are changing from typical coal-combustion pollution to a compound pollution, which combines primary aerosols from coal combustion and vehicle emission with the secondary aerosol formation, resulting in unsolved aerosol pollution. Thus, pollution by particulate matter is one of the most formidable air quality and public health issues facing Beijing. Field measurement for PM_{2.5} was conducted at Peking University, Beijing during 2002-2003. PM_{2.5} concentrations are 66.0, 77.5 and 77.3 mg/m³ in summer, fall and winter, in which organic components are predominant, accounted for 24%, 50% and 51%; the next is secondary ions of sulfate, nitrate and ammonium, totally accounting for 49, 27 and 26%, respectively. While element carbon fraction in PM_{2.5} are 4.7, 4.2 and 5.8% with less discrepancy. The sum of quantified extractable organic matter analyzed by GC-MS in three seasons was 502, 1471, and 1403 ng/m³, respectively, accounted for 3.6% of bulk organic mass, and 1.5% of PM_{2.5}. Averagely 47, 20 and 10% of the quantified organic compounds mass were fatty acid, n-alkanes and PAHs, respectively. Total 10 organic acids were determined by Capillary Electrophoresis, including oxalic, malonic, succinic, glutaric, azelaic, glycolic, malic, glyoxylic, pyruvic, and methanesulfonic acids. The sum of their concentrations in summer, fall, winter were 721, 362, 325 ng/m³. Oxalic acid was the most abundant. Seasonal variations of the organic acids implied that secondary photochemical transformation was major sources for low molecular weight organic acids.