

## **Behavior and size-resolved characteristics of elements in fine particles in roadside atmosphere**

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### **Abstract**

Atmospheric fine particles are of concern due to their potential to affect human health. Recently, it has been revealed that high concentrations of nanoparticles existed in diesel exhaust and roadside atmosphere. However, their chemical composition and the emission sources are not fully understood. In this study, time variation of elements in PM<sub>2.5</sub> and elemental composition of size-resolved (nano- to micro-scale) particles at roadside were investigated respectively. Observation sites were located at Ikegami-Shincho Crossing in Kawasaki City, and Kitanomaru atmospheric pollution monitoring station in Tokyo. PM<sub>2.5</sub> samples were collected on thin PTFE filters by a beta-ray attenuation PM mass monitor every hour. Size-resolved particles were collected on poly-carbonate filters by a cascade low-pressure impactor (LPI) for 24 hours. Elements were analyzed by Proton Induced X-ray Emission (PIXE) method at NMCC.

Na, Al, Si, S, K, Ca, Fe and Zn were the major elements in PM<sub>2.5</sub> samples. S accounted for a half of mass concentration of total element. Mass concentrations of total element were 3-15% in PM<sub>2.5</sub>, and temporal variations of element did not correspond with that of PM<sub>2.5</sub>. Na, Mg, S were major elements in the particles of 0.028-0.056 μm, and Cr, Ni, Cu, Ga, Br, and Pb were also detected. Some of these elements might be contained by lubricating oil of automobiles. This result supports the existing knowledge that nuclei mode particles contained high amount of volatile compounds.