

Exposure to nanometric pollutants in primary schools: Environmental implications

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Abstract

School children are highly susceptible to chemicals in the atmosphere. Some studies have demonstrated that the pollution is related to respiratory problems and impaired cognitive development in children. In this context, the objective of this study was to determine nanoparticles and associated species and their origin in fresh air currents in La Salle Canoas School in Rio Grande do Sul (Brazil). Different analyses by using high-resolution transmission electron microscopy with energy-dispersive, X-ray spectroscopy (HR-TEM/SAED/EDS), and the scanning (STEM) mode were carried out. The EDS analysis of the atmospheric particles demonstrated that materials contain a significant proportion of elements such as Cr, Fe, Mn, Ni, and Si and other trace metals Zn, Pb, Zr, Ca, Cu, K, Cr, and Cd from exhaust and non-exhaust. The main source of the particles was emission from internal combustion in motor vehicles, road dust, and brake and tire wear. This emphasizes the importance of urban planning to reduce exposure of children to traffic gas emissions.

Keywords:

Hazardous compounds, Metals, School children, Chemometric analysis, Human health