DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

Studies on the speciation of chromium and arsenic in size-fractionated urban aerosol

Elements present in the ambient air are the primary source of contamination for other environmental components, and due to its common occurrence in the air of most populated areas, their penetration into the body as a direct effect of inhalation, pose a threat to humans. Along with PM particulates they migrate into other elements of the environment both as dissolved and PM-bound forms. The actual environmental burden of those elements for the whole ecosystems depends on the form of their occurrence. However, the determination of the share of their forms in the total amount of their mass is not always sufficient. Indeed, there are elements whose toxicity depends on its oxidation state in particular chemical compound. Among this group, one of the most important are chromium (Cr), and arsenic (As), mainly due to the documented, high toxicity of their compounds (mainly Cr (VI) and As (III) compounds). Research concerning speciation analysis of PM-bound Cr and As, however of great importance, since now was rarely undertaken. Even more rarely undertaken subject is the analysis of As and Cr speciation in aqueous extracts of PM, simulating their mobility from wet deposition.
The main goal of the project is a multi-criteria analysis of the share of Cr(VI), Cr(III), As(V) and As(III) in a total mass of airborne As and Cr in terms of its PM size-fractionation together with the estimation of the factors mostly influencing their participation in ambient air. Implementation of the project will gain knowledge on the distribution of Cr and As species in size-fractionated samples of atmospheric aerosol and thereby to identify and describe the nature of its distribution between concrete particles. It will also help to establish what amount of airborne Cr and As in a particular form may be released from the PM due to its contact with the rainfall or body fluids. The proposed project will give a broad understanding on the real threat posed by PM-bound As and Cr compounds.