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SEM/EDS Characterization of Radioactive Particles in Samples of PM10

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The physical and chemical nature of aerosol particles are critical to estimating their potential contributions to environmental and health effects. The physical aspect is basically particle size and shape, while the chemical aspect relates to dust particles composition The activity size distributions of the radionuclides attached to aerosol particles are the result of a combination of atmospheric processes like, e.g. coagulation of ultrafine particles, fog and cloud droplet formation, evaporation and condensation, washout, rainout and the contribution of e.g. dust storms and combustion products to the troposheric aerosol mixture.(1) Airborne radionuclides are adsorbed on the surface of aerosol particles and form radioactive aerosol. Therefore the behavior of the airborne radionuclide particles is determined by the behavior of their carrier aerosol particles.

In this context, it is of fundamental importance to understand the origin (natural or anthropogenic) of particles in the atmosphere. Previous studies on aerosols have been focused on their classification based on size, concentration, and chemical composition of whole particle masses; with relatively few details on the size, shape and chemical composition of their individual components, thus the focus of this study. (2)

This work is based on samplings PM10 (particles less than 10 microns) collected in three atmospheric monitoring stations of the Air Quality Improvement Municipal Program for the City of Hermosillo, Sonora, Mexico.

The characterization of individual particles was completed by using SEM combined with EDS (JEOL JSM-5800LV). Specimens were initially processed by separating the collected particles from the quartz filters by means of submersing a 2 cm^2 section of each filter into isopropyl alcohol within a test tube for 5 minutes. Then, an aliquot of the suspension was placed over a sample holder and into the SEM.

We obtained 132 images of particles PM10, the structure of particles can be diverse and they usually present a two dimensional aspect. It is often found that such particles have outlying edges and fracture lines. The particles have a matrix based on oxides and carbonates of silicon, calcium and uranium **Fig. 1**

Based on their morphological characteristics and chemical composition it is classified as a natural source particles (3). Given that there is relatively little knowledge on morphology, speciation and size of radioactive particles, caught on the PM10 filters it highlights the importance of individual characterization of atmospheric aerosol. This knowledge is valuable additional information, within air quality program, about the possible actions and potential effects that air pollutants, of natural or anthropogenic origins; may have on the population in the study area.

References
1. J.J. Goldstein et al, Scanning Electrón Microscopy and X-ray Microanálisis, Plenum, New York, 1992.
2. Ramirez-Leal,R., Esparza-Ponce,H and Duarte-Moller,A. 2007. Characterizatioin of inorganic atmospheric particles in air quality program with sem, tem and xas. Revista Mexicana de Fisica 53(3): 102-107.
3. R. Ramirez-Leal, *Microsc. Microanal.* 15 (Suppl. 2) (2009) 1300-1301

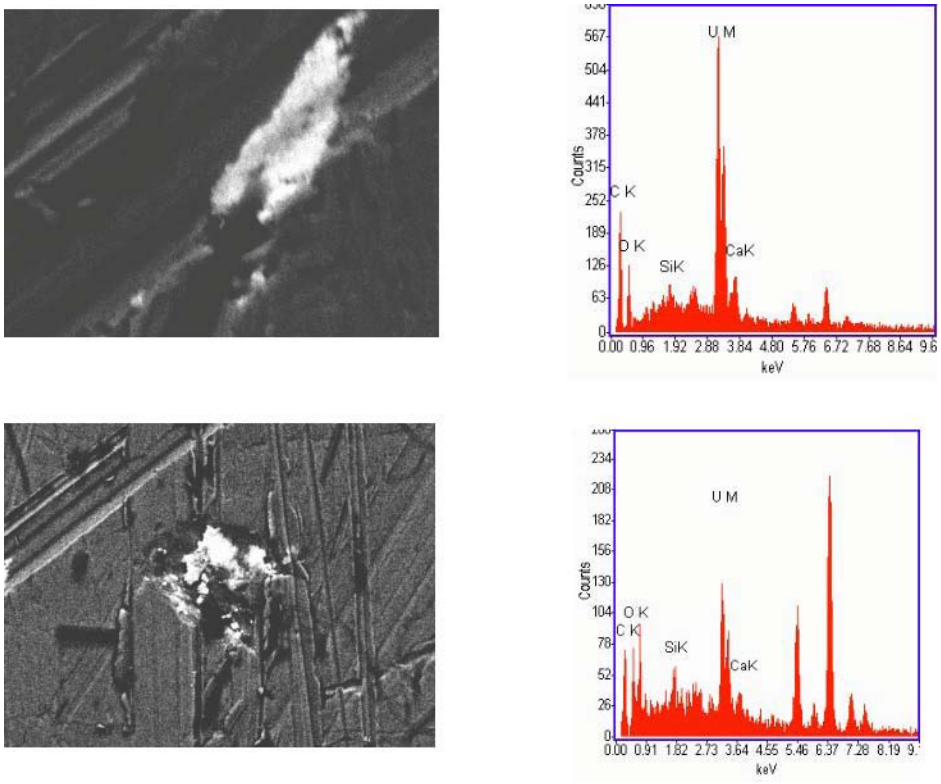

Fig.1 PM10 Analysis by SEM-EDS

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