

Elemental Chemical Composition, Size and Morphological Characterization of Individual Atmospheric Particles Within an Air Quality Program

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The characterization of individual particles was made by using TSP and PM10 filters from the Atmospheric Monitoring Program of Hermosillo, Sonora and the Transmission Electron Microscope Philips CM10 equipped with the EDS and EELS detectors.

The study was carried out from January to December 2007, using a section of 2 cm² from the filters, which was placed in a test tube with isopropyl alcohol analytic grade J.T. Baker for 5 minutes, and then using a capillary, an aliquot was taken for its placement on the grid of the Transmission Electron Microscope.

We obtained 72 images of particles, both TSP and PM10, where it shows a great diversity of chain-like agglomerates or mass whose size is less than 0.2 micrometers. A diversity of aliphatic and aromatic HCs compounds are part of the composition of these agglomerates. Figure 1.

The results from the EDS showed a conformation of Al, Ca, P, Mg, K, Fe, Cl, Na, Si, Ti and S (Figure 2); a microanalysis was developed by EELS, which detected U, C and Cs (Figure 3); but for U and especially Cs, there is a low signal.

The elements found in the filters of TSP and PM10 indicate the importance of the individual characterization of atmospheric aerosols, because of the limited amount of information on the speciation and size of atmospheric particles, which allows us to have very valuable additional information on the potential action that these pollutants have.

References

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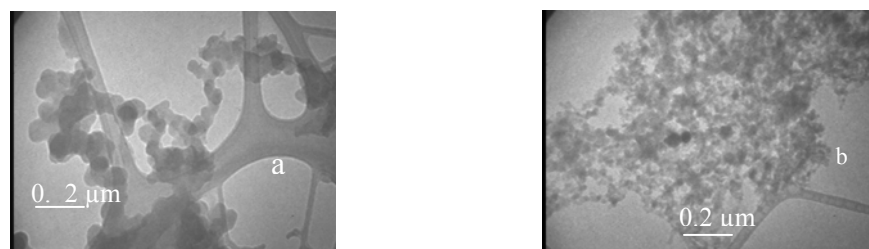


Figure 1.- Organic agglomerates in a) Chain-like and b) Mass obtained trough TEM

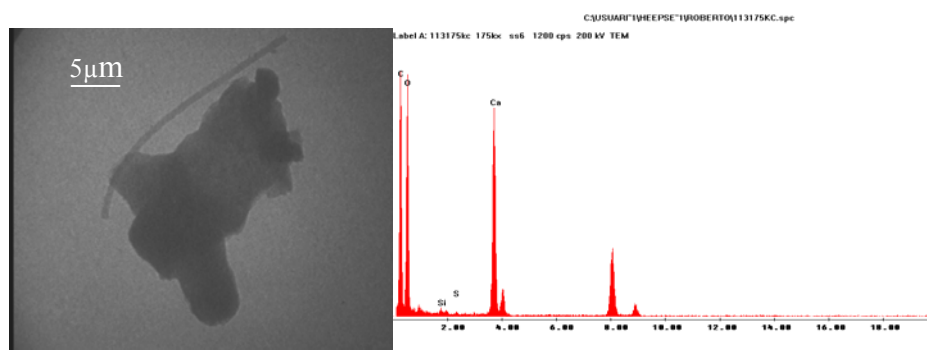


Figure 2.- Image and chemical composition of TSP obtained trough TEM

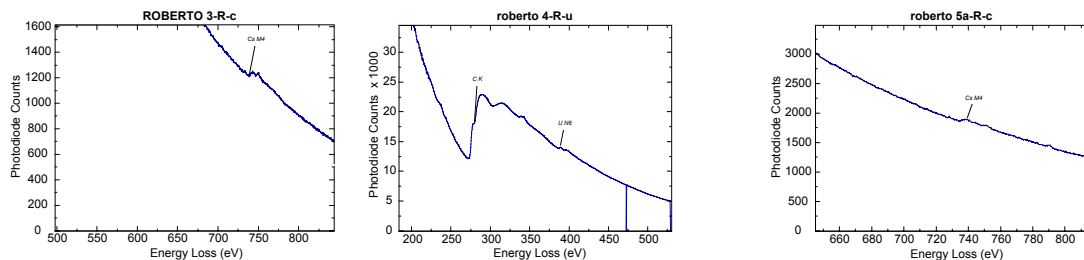


Figure 3.- EELS spectrum that shows the presence of C, U and Cs in particles