

## COMPARATIVE STUDY OF PRETREATMENT METHODS FOR THE DETERMINATION OF METALS IN ATMOSPHERIC AEROSOLS BY ELECTROTHERMAL AAS

A. KARANASIOU<sup>1</sup>, N. S. THOMAIDIS<sup>2</sup>, K. ELEFThERiADIS<sup>3</sup>, P. A. SISKOS<sup>1</sup>

<sup>1</sup> Laboratory of Analytical Chemistry, Chemistry Department, University of  
Athens

<sup>2</sup> Laboratory of Water and Air Quality, Department of Environmental Studies,  
University of the Aegean

<sup>3</sup> E.R.L., I.N.T.-R.P., N.C.S.R. "Demokritos"

### ABSTRACT

A comparative study of pretreatment methods for the determination of metals in atmospheric aerosols by ETAAS was conducted. For the digestion of the filters, the following six methods were compared: (1) 3,00 ml HNO<sub>3</sub> + 1,25 ml HClO<sub>4</sub> + 1,25 ml HF, (2) 2,50 ml HNO<sub>3</sub> + 0,50 ml HClO<sub>4</sub> + 1,50 ml HF, (3) 2,50 ml HNO<sub>3</sub> + 0,20 ml HClO<sub>4</sub> + 1,50 ml HF, (4) 2,00 ml HNO<sub>3</sub> + 2,00 ml HCl + 1,00 ml HF, (5) 2,00 ml HNO<sub>3</sub> + 2,00 ml H<sub>2</sub>O<sub>2</sub> + 1,00 ml HF και (6) 2,00 ml HNO<sub>3</sub> + 1,00 ml HF. The samples were placed in Teflon vessels, the corresponding acid mixtures were added, the vessels were placed in Parr bombs and heated in a conventional oven at 170°C for 5 h. After digestion, samples were diluted with ultra pure water to 10 ml. The extraction efficiency and blanks were compared for the following metals and metalloids: Pb, Cd, As, Cu, Ni, Cr, V, Al, Fe, Mn. It was proved that methods (4) and (5) were insufficient for the extraction of most of the metals. Methods (1), (2), (3) and (6) proved to be equivalent. Therefore, digestion was performed with the HNO<sub>3</sub>-HF mixture. This method was applied to a developed microwave digestion method which its operating parameters were optimized to obtain quantitative recovery of the reference material NIST 1649a urban dust. ETAAS conditions were carefully optimized for the compensation for or elimination of interferences.