Solid Phase Extraction Sample Processing for AAS Detection

Krystyna Pyrzynska

Department of Chemistry, University of Warsaw, Pasteura 1, 02-093 Warsaw, Poland

Atomic absorption spectrometry (AAS), despite its single-element capabilities, is a powerful tool to monitor many elements in different kinds of samples. However, there are some drawbacks. In environmental and biological samples, complex matrices cannot be directly processed as they pose severe interferences, which often cannot be minimised even by existing efficient background correction devices. Successful matrix separation and removal combined with the simultaneously enrichment of the analytes can be achieved by several techniques including solvent and solid phase extraction, coprecipitation, generation of volatile compounds or dialysis. Column separation systems utilizing different kinds of solid sorbents are the most often used in analytical procedures.

The separation/preconcentration systems based on the sorption principles could be executed in off-line or on-line mode. Application of off-line approach is adequate when higher preconcentration factors are needed. However, these procedures require a great amount of reagent and sample volumes. When on-line systems are considered, the main advantage is the possibility of automation which increases precision and accuracy. Further, it reduces the risk of sample contamination and could be easily combined with AAS detection.

The lecture will provide an account of the state-of-art of solid phase extraction sample processing before the determination step by AAS method. Different solid sorbents will be described and presented with selective application for the environmental monitoring of metals and metalloids as well for their speciation analysis. Advantages, limitations and potentials of on-line sample pretreatment will be also discussed.