NOVEL TRAPS IN VAPOUR GENERATION ATOMIC SPECTROMETRY

O. Yavuz Ataman

Department of Chemistry, Faculty of Arts and Sciences,
Middle East Technical University, 06531 Ankara, Turkey

Vapour generation is one of the most common ways of sample introduction into flame, plasma, heated quartz tube or even electrothermal atomizers for AAS, ICP-OES and ICP-MS. In the last decade, the same idea is used for electrothermal vaporizer (ETV) devices. Separation of analyte in form of atomic vapour in case of Hg, and in the form of hydride gas for a number of elements has advantages, such as elimination of the matrix and thus providing a simpler, less loaded environment in the atomization and measurement zone. A detailed study for hydride generation can be found in the monograph by Tsalev and Dedina [1].

We have been working on atom traps, mainly concentrating on slotted quartz tubes [2-4]. This on-line preconcentration technique allows one to obtain ng/mL detection limts for some volatile elements, such as Cd, Pb, Zn, In.

Cold vapour AAS method has been applied for Cd determination [5,6]. A novel on-line trap has been developed by our group for CVAAS determination of Cd. In this work, we had an attempt to improve sensitivity by using a Pt trap between the gas/liquid separator and the quartz tube. The Pt trap temperature was controlled electrically where it is employed as a resistor. The Cd was collected at room temperature. After collection period, the Pt wire is resistively heated to hot red temperatures to release the pre-collected analyte which is then pushed to quartz tube for determination. The analytical parameters were, the concentrations of HCl and $NaBH_4$, flow rate of Ar, flow rates of HCl and $NaBH_4$ solutions, collection and releasing temperatures for analyte. Using a 2 mL sample loop and flow injection technique, detection limit (3s) was 3.7 ng/L .

Another novel trap under development is a quartz chamber placed between the atomizer and the vapour generation device. Pb can be trapped at around 300 °C, followed by atomization using a H_2/O_2 flame. The technique

can be applied to some other hydride forming elements as well as Cd and possibly Hg.

References

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