Ion imprinted polymer for preconcentration and determination of ultra-trace of cadmium employing FIA-TS-FF-AAS

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Introduction

Cadmium can be found as a contaminant in water, foods and also cigarettes[1]. It is a toxic element therefore its concentrations must be monitored. Thermospray Flame Furnace Atomic Absorption Spectrometry (TS-FF-AAS) was used in the present work due its good sensitivity[2]. This work's aim was to synthesize a new IIP with cadmium adsorption capacity for using as solid phase extractor coupled on a FIA-TS-FF-AAS system.

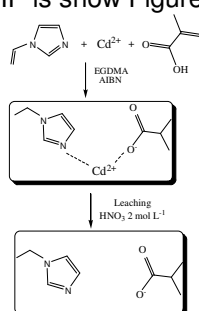## Results and Discussion

The synthesis of IIP is show Figure 1.

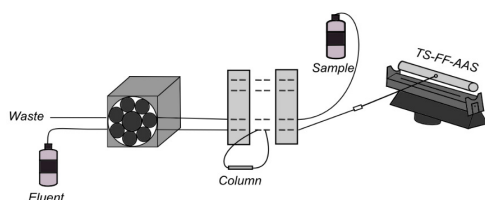**Figure 1.** IIP synthesis diagram.

Figure 2. Manifold of the FIA system.

The Figure 2 show FIA-TS-FFAAS manifold for cadmium preconcentration and determination. Eluent: HNO_3 4.8mol L^{-1} (1.2mL min^{-1}); Sample: 0.01mol L^{-1} of the phosphate buffer, pH = 5.8.
The eluent concentration and also the pH and buffer concentration were assessed using a full 2^3 factorial design. The significant parameter (pH and eluent concentration) was optimized employing a Doehlert matrix. The obtained optimum values were: pH of 5.8

and concentration of 0.48mol L^{-1}. The buffer concentration value was fixed at 0.01mol L^{-1}. The detection and quantification limits were of 24 and 81ng L^{-1}, respectively. The preconcentration factor was 165; consumptive index 0.06mL; concentration efficiency, readings frequency $25h^{-1}$. Table 1 shows determination of Cd(II) in different samples.

Table 1. Cd(II) determination and recovery in spiked different samples.

Samples	Cd(II) added amount ($\mu g\ kg^{-1}$)	[a]Cd(II) found amount ($\mu g\ kg^{-1}$)	Recovery (%)
Jewelry	0	2.38±0.28	-
	50	65.48±0.24	106.0
Green tea	0	3.85±013	-
	50	54.24±0.19	102.2
Cigarette	0	38.37±0.22	-
	50	83.02±0.20	94.0
Hair	0	0.35±0.02	-
	50	49.86±0.11	99.4

[a]Results are expressed as mean value±standard deviation based on three replicates (*n=3*).

Conclusions

The present work reported the synthesis and use of an ion imprinted polymer for on line preconcentration and Cd determination in FIA system with detection by TS-FF-AAS. The method was applied in samples of: jewelry, green tea, hair and cigarettes and the results are satisfactory.

Acknowledgements

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2 Gáspár, A. and Berndt, H. *Spectrochim. Acta.* **2010**, *55*, 587-597.