

ANODIC STRIPPING VOLTAMMETRY OF COPPER USING A MERCURY & THIN MERCURY FILM ELECTRODE IN THE PRESENCE OF THE COMPLEXING AGENT

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The electrochemical techniques like the stripping methods ensure the determination of the traces –ppb- metals ions[1]. There are two main stages in the stripping analysis:

- Preconcentration (plating) consists in the application of a constant reductive potential for a period of time, when takes place the adsorbative accumulation of metal on Hg surface: $Me^{n+} + ne^- \Rightarrow Me(Hg)$
- Stripping, when the metal ions or metal-complex accumulated on Hg surface is oxidised and the oxidation current, proportional with the metal concentration, is determined.

Copper could be determined by the anodic stripping voltammetry directly in organic solvents [1]. There are two conditions for that: solubility of the copper (II) complex species in given solvent and the possibility to assure the conductivity of the supporting organic electrolyte[2].

We have evaluated procedures to improve the reproducibility and sensitivity of the method and found the influence of the analytical parameters (pH, electrolyte composition, and deposition time and potential), in the presence of the ligands. The optimal analytical conditions were found. In these conditions, the limit of detection was 5-8 pM copper, with standard deviation 2-2,5%.

Using these methods the copper concentration in the waste water after the electrochemical synthesis of the m-amino sulfonic acid and after the copper recovery by electrochemical methods were determined.

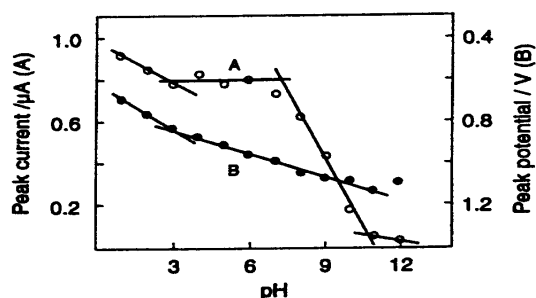


Fig.1. Dependence of the peak current on pH, for the uncomplexed (B) and complexed Cu ions.

The proposed stripping method is selective and sensitive enough for the determination of low concentration of Co(II).

Table 1. Results for three replicated determinations after different extraction time

No.	Cu(II) [ppm] Added	Found	
		t= 15 mn	t=5 mn
1.	2	1.8	1.8
2.	4	4.2	3.9
3.	6	6.1	5.8
4.	8	8.1	7.7
5.	10	10.05	9.8
6.	12	12.1	11.8

The obtained results were compared with the simple anodic stripping method, using the Wagtech PTEA (Portable Trace Element Analyser) equipped with thin mercury film on glassy carbon electrode. The sensitivity of the method is twice lower, due to the presence of other ions (Cd^{2+} and Hg^{2+}).

For the future, we propose to continue our research by using different complexing agents for the determination of other polluting ions, because the environment components quality must be according to the national and international standards.

REFERENCES

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