

CHAPTER 7

CONCLUSION AND DISCUSSION

Anodic stripping analysis of trace amount of As (III), Sb (III), Bi (III) and Sn (IV) are presented in this thesis. The concentrations of higher than 10^{-4} M of each ion are not attempted owing to its capability to be determined by most analytical methods. Optimum conditions for the anodic stripping analysis of each ion are selected for determination in the concentration range of 10^{-5} M and below, as low as possible. The longer electrodeposition time, more than 20 minutes is impractical for trace analysis. Thus the sensitivity of the method is considered for the electrodeposition time in between 20 minutes.

From the study, different concentration of electrolyte must be used in order to obtain the highest sensitivity in stripping voltammogram except bismuth. Conditions for anodic stripping analysis and sensitivity of the method are concluded. The anodic stripping analysis for As (III) in 4 - 6 M HCl using electrodeposition time of 3 - 20 minutes at -0.60 V gives a detection limit of 2.00×10^{-7} M As (III). In the case of Sb (III) in 1 - 2 M HCl the detection limit is 1.98×10^{-7} M Sb (III), using 3 - 20 minutes at -0.40 V. for electrodeposition. For

Bi (III) in 0.5 - 0.06 M HNO_3 , the highest sensitivity obtained is $2.00 \times 10^{-7} \text{M}$ using 10 - 20 minutes and -0.20 V for electro-deposition. Using 10 minutes for electrodeposition, as the concentration of Bi (III) is higher than $2.50 \times 10^{-5} \text{M}$ the stripping current slightly decreases. Since the GCE used has a definite electrode area for electrodeposition or preconcentration, the saturation of electrodeposition of Bi (III) in GCE for 10 minutes should be $2.50 \times 10^{-5} \text{M}$ Bi (III). Thus for the concentration of higher than $2.50 \times 10^{-5} \text{M}$ Bi (III) and using 10 minutes for deposition, the conditions for the anodic stripping analysis are saturated and almost the same value of stripping current is resulted. Thus, for the determination of higher concentration of Bi (III), more than $2.50 \times 10^{-5} \text{M}$, time of less than 10 minutes should be tried for the electrodeposition. Finally, the anodic stripping analysis of Sn (IV) in 1 M HCl gives a detection limit of $1.86 \times 10^{-6} \text{M}$ for the deposition between 4 - 15 minutes at -0.80 V. Using 15 minutes or even 20 minutes for electrodeposition of Sn (IV) in 1 M HCl, no stripping peak is obtained for the concentration of less than $1.86 \times 10^{-6} \text{M}$.

By this study, stripping peaks of As (III) in 4 - 6 M HCl, Sb (III) in 1 - 2 M HCl and Sn (IV) in 1 M HCl show at +0.40 V, 0 V and ca.-0.50 V, respectively. It seems to be able to determine As (III), Sb (III) and Sn (IV) simultaneously in 1 - 6 M HCl electrolyte while Bi (III) is precipitated out as BiOCl . This would be another interesting project to study.

The methods described in this thesis would be applicable for determination of trace amounts of arsenic, antimony, bismuth and tin in environmental samples, biological samples, nutrients, etc. Thus, the determination of these elements in the mentioned samples would be suggested for future projects.