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**CHAPTER - LX**

***SUMMARY***

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The dissertation is divided into two parts.

**Part-I:** Spectrophotometric determinations of some metal ions with 2-acetyl thiophene guanylhydrazone.

**Part-II:** pH-Metric determinations of stability constants of guanylhydrazone complexes with some metal ions.

#### **Part One**

First part deals with the spectrophotometric determinations of some metal ions with 2-acetyl thiophene guanylhydrazone (ATG).

The first chapter includes synthesis and characterization of the reagent (ATG). It also deals with the literature survey of the reagent. Determinations of gold(III), palladium(II) and iron(III) are discussed in the chapters two, three and four respectively. The spectral characteristics of these metals are summarized in table 9.1. The applications of the reagent are given in table 9.2. The interference and tolerance limits of foreign ions are given for each element separately.

Table 9.1 : Spectral characteristics of Metal-ATG complexes

Spectral Characteristics	Metal-ATG complexes		
	Au (III)	Pd (II)	Fe (III)
Colour	Yellow	Yellow	Yellow
$\lambda_{\max}$ , nm	375	375	365
pH	10.0	12.6	2.5
Molar extinction coefficient, $\text{ex}10^4 \text{ l mole}^{-1} \text{ cm}^{-1}$	0.3131	0.7492	0.1197
Validity of Beer's law, ppm	28.0	12.0	17.0
Stoichiometry (M:L)	1:1	1:2	1:2
Sandell's Sensitivity $S, \mu\text{g}/\text{cm}^2$	0.1210	0.0627	0.3503
Degree of dissociation, $\alpha$	0.1296	0.1395	0.0652
Instability constant, K	$3.9207 \times 10^{-6}$	$0.4011 \times 10^{-10}$	$0.1537 \times 10^{-10}$

Table 9.2 : Applications of the reagent, ATG.

Metal ion	Analysis of	Certified value	Experimental value
Au (III)	Gold-copper-silver alloy	50.0 %	49.50 %
		40.0 %	39.20 %
Pd (II)	Ni-Al catalyst	0.125 %	0.123 %
Fe (III)	Iron ore	13.60 %	13.53 %

Part Two

Second part deals with the pH-metric determinations of stability constants of guanyldiazotized complexes with some metal ions.

The fifth and sixth chapters include introduction and experimental part of the work respectively. The seventh chapter deals with stability constants of 2-acetyl thiophene guanyldiazotized (ATG) with some metal ions. While eighth chapter reports the stability constant of 5-bromo-2-acetyl thiophene guanyldiazotized (Br-ATG) with some metal ions. Stability constants of  $\text{Cu}^{++}$ ,  $\text{Ni}^{++}$ ,  $\text{Co}^{++}$ ,  $\text{Mn}^{++}$  and  $\text{Cd}^{++}$  are given in table 9.3.

Table 9.3 : Proton-ligand and metal-ligand stability constants.

Reagent	Proton-ligand stability constant	Metal-ligand stability constant				
		$\text{Cu}^{++}$	$\text{Ni}^{++}$	$\text{Co}^{++}$	$\text{Mn}^{++}$	$\text{Cd}^{++}$
ATG	9.85	8.835	9.32	8.00	6.79	7.72
(Br-ATG)	8.645	7.365	8.035	7.725	6.905	6.50

Thus, it can be concluded that ATG is a fairly good photometric reagent for the determinations reported in the dissertation. While the reagents, ATG and (Br-ATG) have been used to study the formation constants with the metal ions reported in this.