

## SYNOPSIS OF THE DISSERTATION ENTITLED

### " STUDIES ON MERCAPTOPYRIMIDINES AS EXTRACTANTS FOR SOME NOBLE METALS "

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The present investigation incorporates studies on the use of 1-(4<sup>1</sup>-Chloro-2<sup>1</sup>-tolyl)-4,4,6-trimethyl (1H,4H)-2-pyrimidinethiol (4<sup>1</sup>-chloro-2<sup>1</sup>-tolyl TPT) as analytical reagent in the extraction separation and determination of Palladium (II), Copper (II) and Ruthenium (III). The dissertation consists of five chapters.

#### Chapter I

This chapter includes the description of theory of spectrophotometry, the laws of absorption, limitations to the applicability of Beer's law, instrumentation, working of spectrophotometer and analytical applications of sepctrometry.

#### Chapter II

This chapter gives detailed account of the synthesis and characterisation of 1-(4<sup>1</sup>-chloro-2<sup>1</sup>-tolyl)-4,4,6-trimethyl (1H,4H)-2-pyrimidinethiol. The broad review of mercaptopyrimidines reported in the literature is also given. The mercaptopyrimidines also known as cyclicthioureas react with platinum metals to form sufficiently stable and coloured

complexes which are easily extractable. Hence these are suitable for use in spectrophotometric measurement. The purity of the reagent was checked from the elemental analysis, melting point, TLC and also by non aqueous titrimetric determination of thiol group of 4'-chloro-2'-tolyl-TPT.

### Chapter III

In this chapter, extractive photometric procedure for determination of Pd(II) using 4'-chloro-2'-tolyl-TPT is presented. The Pd(II) in aqueous medium (2 M HCl) is extractable with 10 ml 0.01 M reagent in chloroform within 15 min shaking. The yellow complex of Pd(II) with 4'-chloro-2'-tolyl-TPT is measured at 420 nm against solvent blank. The system obeys Beer-Lambert's law in the range 1-17.5 ppm Pd(II) at 420 nm. The molar extinction coefficient of the complex is  $4256 \text{ L mol}^{-1} \text{ cm}^{-1}$  with Sandell's sensitivity  $25.0 \text{ ng cm}^{-2}$ . The interference study is also reported. This method is simple, sensitive and reproducible.

### Chapter IV

This chapter is devoted to describe the use of 4'-chloro-2'-tolyl-TPT in the extractive separation and determination of copper (II) in presence and absence of pyridine. The yellow complex of Cu(II) with 4'-chloro-2'-tolyl-TPT is formed at pH 5 in presence of pyridine. The presence of pyridine enhanced the extraction of Cu(II) from lower pH and enabled its determination without

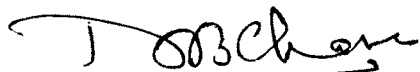
interference of many ions. The system obeys Beer-Lambert's law upto 7 ppm Cu(II) at 390 nm. The molar extinction coefficient of the complex is 8260 L mol<sup>-1</sup> cm<sup>-1</sup> with Sandell's sensitivity 7.6 ng cm. The effect of all parameters and interference is studied. The recovery of Cu(II) is quantitative and the results are reproducible.

## Chapter V

The study of photometric determination of Ruthenium (III) using 4'-chloro-2'-tolyl-TPT is described in this chapter. Ruthenium (III) reacts with 4'-chloro-2'-tolyl-TPT in dioxan solution (10 min heating on water bath) at 4.0 M HCl to form blue complex extractable with chloroform. The complex is measured at 620 nm against solvent blank. The system obeys Beer-Lambert's law in the range 1-12.5 ppm Ru(III) at 620 nm. The molar extinction coefficient of the complex is 6102 L mol<sup>-1</sup> cm<sup>-1</sup> with Sandell's sensitivity 16.6 ng cm. The interference study shows that Ru(III) can be determined without interference of many ions and fairly large amount of common anions. The method is simple, sensitive and also reproducible.

Every chapter from III to V opens up with brief but upto date literature survey of reagents reported for extractive photometric determination of the respective elements. An attempt has been made to study the method

described critically with regard to sensitivity, accuracy and precision. The proposed ligand appears versatile and promising as an extractant and photometric reagent for Pd(II), Cu(II) and Ru(III).



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