

SYNOPSIS OF THE DISSERTATION ENTITLED
"PHOTOMETRIC DETERMINATION OF SOME TRANSITION
METAL IONS WITH SCHIFF BASES," SUBMITTED BY
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The present investigation embodies the results of intensive studies on the use of 5-nitrosalicylaldehyde thiosemicarbazone (5-nitro SAT) as a spectrophotometric reagent for Molybdenum(V), Copper(II) and Iron(II). The dissertation consists of five chapters.

Chapter - I :

In this chapter theory of Spectrophotometry is given covering the laws of absorption, limitation to applicability of Beer's law etc.

Chapter - II :

The chapter second gives an account of synthesis and characterisation of 5-nitrosalicylaldehyde thiosemicarbazone .

The broad review of thiosemicarbazones reported in the literature is also given. This reagents form stable complexes with metal ions and posses properties desirable for spectrophotometry. The purity of the reagent was checked from their elemental analysis and melting point. Further the purity of the 5-nitrosalicylaldehyde thiosemicarbazone was checked by

spectral characteristics. It was found that the reagent is of 99.6% pure.

Chapter - III :

In this chapter photometric procedure for determination of Mo(VI) using 5-nitrosalicylaldehyde thiosemicarbazone is presented. The Mo(VI) reacts with 5-nitro SAT at 0.75M HCl to form pink complex. The absorbance of pink colour complex of Mo(VI) is measured at 520 nm against reagent blank. The system obeys Beer-Lambert's law upto 50 ppm Mo at 520 nm. The molar extinction coefficient of the complex is $3840 \text{ L Mole}^{-1} \text{ cm}^{-1}$ with sandell sensitivity 25 ng/cm^{-2} . The interference study is also reported. The method is simple, sensitive and reproducible.

Chapter - IV :

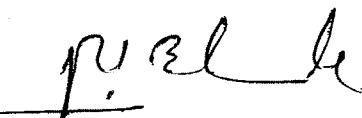
The study of photometric determination of Cu(II) using 5-nitrosalicylaldehyde thiosemicarbazone is described in this chapter. Copper(II) reacts with 5-nitrosalicylaldehyde thiosemicarbazone at 1M HCl to form green complex. The complex is measured at 630 nm against reagent blank. The system obeys Beer-Lambert's law upto 40 ppm Cu(II) at 630 nm. The molar extinction coefficient of the complex is $2859 \text{ L mole}^{-1} \text{ cm}^{-1}$ with Sandell sensitivity 22.22 ng/cm^{-2} . The effect of foreign ions on the complex is also studied. The

method is simple, sensitive and reproducible.

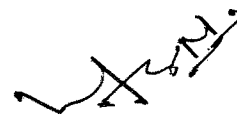
Chapter - V :

The study of photometric determination of Iron(II) using 5-nitro SAT is described in this chapter. Iron(II) reacts with 5-nitrosalicylaldehyde thiosemicarbazone in presence of reducing agent ascorbic acid at 0.15M HCl to form green complex. The complex is measured at 560 nm against reagent blank. The system obeys Beer-Lambert's law upto 40 ppm Fe(II) at 560 nm. The molar extinction coefficient of the complex is $2267 \text{ L Mole}^{-1} \text{ cm}^{-1}$ with sandell sensitivity 24 ng/cm^{-2} . The effect of foreign ions on the complex is also studied. The method is simple, sensitive and reproducible.

Every chapter from II-V opens up with a brief but upto-date literature survey of reagent reported for spectrophotometric determination of Mo(VI), Copper(II) and Iron(II). An attempt has been made to study the methods described critically with regard to sensitivity, accuracy and precision. The proposed ligand appears versatile and promising as an photometric reagent.



(Dr. P.N. Bhosale)
Research Guide



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