APPENDIX - I

GENERAL CONCLUSION
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The present research work has been envisaged to develop new methods for sensitive and selective spectrophotometric determination of germanium, niobium, thorium and uranium at trace levels. The significance of these trace elements has proved to be of utmost importance in studies related complex materials. The conventional methods usually employed for trace analysis pose several difficulties in detection and determination of these metals. This has offered many challenges to analysts to develop methods of high sensitivity and specificity, applicable to the samples in which the analyte is contained in a wide variety of matrix. For this purpose hydroxyamidines have been employed. These reagents have excellent properties of chelate formation with metal ions at specific conditions as well as have been proved to be advantageous over other well known organic reagents like hydroxamic acid, dithizone, cupferron, oxine, etc.

The thesis has been broken up into 5 chapters.

Chapter-I of this thesis comprises the introductory part which deals with the applications of some organic reagents.

Chapter-II introduces exclusively with brief discussion about the availability and uses of germanium. A precise literature survey of the concerned metal is also included in it. The chapter then describes a highly selective, reproducible and rapid method for the extraction- spectrophotometric determination of germanium at trace level.

The method is based on the selective extraction of germanium as its tetraiodo complex in chloroform with N-hydroxy-N,N'-diphenylbenzamidine (HDPBA). The optimization of the analytical variables and composition of the complexes have been studied. The reliability of the method has been evaluated by applying it to the determination of the metal content in standard samples, sphalerite and lead-zinc ore concentrate samples.
Chapter-III describes the availability and uses of niobium. A survey of literature has been made for various spectrophotometric methods reported for the determination of niobium. The method is based on the reaction of niobium with thiocyanate and its selective extraction with chloroform solution of N-hydroxy-N,N'-diphenylbenzamidine in presence of cationic surfactant cetyltrimethylammonium bromide (CTAB). The effect of various analytical and statistical parameters have been discussed. The validity of the method has been tested for the determination of the metal to standard, metallurgical and geological samples.

In Chapter-IV the study regarding a radioactive metal thorium has been carried out. A simple, selective, reproducible and sensitive method is described in which, thorium is quantitatively extracted with N-hydroxy-N,N'-diphenylbenzamidine at pH 2.2 in presence of thorin as an ion-associated interfacial complex in benzene-ethanol mixture. The method is free from many limiting factors of solvent extraction methods, such as interference of diverse ions, variation of $\lambda_{\text{max}}$ position and absorbance with respect to concentration of reagents, non-linearity of Beer's law, etc. The present method is applicable for the determination of thorium in standard and monazite samples.

Lastly, Chapter-V of the thesis summarises the uses of uranium and its toxic effects. The survey of the various spectrophotometric methods used for the determination of the metal has been carried out along with the references. The method is based on the selective extraction of uranium(IV) with N-hydroxy-N,N'-diphenylbenzamidine in presence of thorin as an ion-associated interfacial complex in benzene-ethanol mixture at pH 2.2 which exhibits an absorption maxima at 490 nm. Various experimental parameters have been studied for establishing the optimum conditions for determination of uranium. Application of the method for analysis of the metal to standard sample, geological samples and synthetic matrices has been studied.
APPENDIX - II

LIST OF RESEARCH PAPERS
APPENDIX - II

List of Research Papers of Miss Neena Nashine


2. Extraction-Spectrophotometric Determination of Niobium with Thiocyanate and N-Hydroxy-N,N'-Diphenylbenzamidine.


4. Spectrophotometric Determination of Quadrivalent Uranium with Thorin and N-Hydroxy-N,N'-Diphenylbenzamidine.
   *Proc. 81st Indian Science Congress*, 3-8 January 1994, Jaipur, Abstr. No. 214, Part-III, Section IV.

5. Floated Complex of Thorium with N-Hydroxy-N,N'-Diphenylbenzamidine and Thorin : Spectrophotometric Determination of Thorium in Standard Samples and Monazite Sands.

   *Proc. 82nd Indian Science Congress*, 3-8 January 1995, Calcutta.
पं सुन्दरलाल शर्मा प्रव्यागार 
पं रविचंद्र शर्मा विश्वविद्यालय, रायपुर (म. प.)
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Analytical applications of some organic reagents.