ICP 506: SYNTHESIS OF COMPLEXES, CATALYSTS AND ESTIMATION OF ALLOYS

Objectives

- To gain the basic analytical and technical skills to work effectively in different fields of chemistry.
- To demonstrate the ability to synthesize and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.
- To learn advance techniques in gravimetric and volumetric analysis.
- To synthesize complexes and nanocatalysts.

1. Analysis of brass–Cu gravimetrically using ∝-Benzoinoxime & Zn complexometrically.
2. Analysis Cu-Ni alloy.
3. Analysis of Stainless Steel-Insoluble residue by gravimetry, Ni gravimetrically using DMG complex.
4. Fe volumetrically using Ce(IV) & Cr(III) volumetrically by persulphateoxidation.
5. Flame photometric determination of Na, Kmixtures.
6. Chemical SeparationTechniques

a. Cu(II) + Fe(II)-Cu gravimetrically as CuSCN and Fe usingCe(IV).
b. Cu(II) + Ni(II)-Cu gravimetrically as CuSCN and Ni usingEDTA.
c. Fe(III) + Ca(II)-Fe gravimetrically as Fe_2O_3 and Ca usingEDTA.
d. Cr(III) + Fe(III)-Using EDTA by Kinetic masking method.

7. Synthesis and characterization of potassium trioxalato chromate (III) trihydrate
8. Solid phase synthesis of transbis glycinatocopper(II)
9. Preparation of tris acetyl-acetoacetanato iron(II)
10. Preparation of cis and –dichlorobis (ethylenediamine) cobalt (III)chloride.
11. Preparation of bis-dichlorotriphenyl phosphine nickel (II)
12. Synthesis of hexamine cobalt (II) chloride
13. Preparation of Silver nanoparticles
14. Preparation of ZnO nanoparticles

Course Outcome:

Students will have the ability to:

- Think critically and analyze chemical problems.
- Present scientific and technical information resulting from laboratory experimentation in both written and oral formats.
- Work on advance techniques in gravimetric and volumetric analysis.
- Synthesize characterize complexes and nano catalysts

References

1. G.H.Jeffrey, J.Bassette, J.Mendham and R.C.Denny, Vogel's TextBook of QuantitativeChemical Analysis ,5th Edition, Longman, 1999.
2. Vogel, "Textbook of Qualitative Inorganic Analysis", 3 Edition, ELBS. 1976.
3. D.A.Skoog and D.M.West, Fundamentals of Analytical Chemistry, IV Edition, Old Reinhord& Winston, Publication, 1982.
4. B.K. Sharma, Instrumental methods of Chemical analysis, Goel Publishing House, 24th Edition, 2005
5. Gurdeep R. Chatwal, Sham K. Anand, Instrumental Methods of Chemical Analysis, Himalaya Publication, 1979.

6. Industrial Applications of Homogeneous Catalysis, Editors: **Mortreux**, A., **Petit**, F. (Eds.) Springer,1988
7. Louis S. Hegedus, Björn C. G. SöderbergTransition Metals in the Synthesis of Complex Organic Molecules Björn C. G. Söderberg, Springer1994.
8. Nikolay Gerasimchuk, Sergiy Tyukhtenko: Inorganic Synthesis: A Manual for Laboratory Experiments Cambridge Scholars Publishing, 2021.
9. Colquhoun, H M, Holton, J, Thompson, D J, and Twigg, M V. New pathways for organic synthesis. Practical applications of transition metals. United States: N. p., 1984.

ICP 507: SYSTEMATIC QUALITATIVE ANALYSIS AND IDENTIFICATION OF ORGANIC COMPOUNDS

Course Objectives:

- To learn separation and estimation of binary mixture.
- To understand the identification of organic compounds by using spectroscopic technique such as ^{1}H-NMR, FT-IR,MASS,^{13}C-NMR.

1. Separation and estimation of binary mixtures.
2. Structural elucidation of organic compounds by spectroscopic techniques.

Course Outcomes:

- Students learn about separation and estimation of binary mixtures
- Students can able to identify functional groupsand determine the structure of organic compounds by spectroscopic techniques.

References:

1. Comprehensive practical organic chemistry: Qualitative analysis by VK Ahluwalia, Sunita Dhingara
2. More Spectroscopic Problems in Organic Chemistry-A.J. Baker et al., Hayden,1975.
3. Spectral Problems in Organic Chemistry, Davis& Wells, Chapman &Hall,1984.
4. Elementary Practical organic chemistry, Part 2: Quantitative organic analysis by Arthur I. Vogel, 2nd Edition, CBS Publishers and distributors,1987.