

	8. A. G. Sykes, <i>Advances in Inorganic Chemistry</i> , Academic Press Ltd., UK Ed. 1991. 9. H. J. Arnikar, <i>Essentials of Nuclear Chemistry</i> , New Age Intl. Publishers, 2011, 4 th Revised Ed. 10. G. Friedlander, J. W. Kennedy, E. S. Macias, J. M. Miller, <i>Nuclear & Radiochemistry</i> , John Willey & Sons, New York, 1981, 3 rd Ed.	
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Programme: M. Sc. Part-II Inorganic Chemistry

Course Code: ICC-505

Title of the Course: Experiments in Inorganic Chemistry

Number of Credits: 03

Effective from AY: 2019-20

Prerequisites for the course:	Students should have studied the courses ICC-401, ICC-402 and ICO-401 at M. Sc.-I level	No. of lectures
Course Objectives:	1. To introduce to practical knowledge in Inorganic Chemistry. 2. To learn techniques of crystallization of ligands and synthesis of coordination compounds 3. To learn characterization of compounds using different instruments 4. To provide experience of synthesis and characterization of materials 5. To introduce analysis of ores for metal content	
Course Outcomes:	1. Students will be in a position to understand general aspects involved in purification of ligands and synthesis of coordination of compounds 2. Students will be able to understand the methods for characterization of coordination compounds. 3. Students will be in a position to understand the solid state material synthesis and characterization. 4. Students will be able to separate metal ions by ion exchange chromatography. They will also gain knowledge about the analysis of ores and alloys	
Content:	EXPERIMENTS IN INORGANIC CHEMISTRY <i>Total sixteen experiments to be performed from the following.</i> Group – 1: Experiments in coordination chemistry: Ligand and complex synthesis, metal analysis (Minimum 3) 1) Purification (distillation / recrystallization) of ligands like acacH, en, carboxylic acids etc) 2) Preparation of manganic tris(acetylacetonate) and estimation of manganese 3) Preparation of tris(thiourea) copper(I) sulfate and estimation of copper 4) Preparation of isomers; <i>cis</i> & <i>trans</i> dichloro-(ethylenediamine)-cobalt(III) chloride and estimation of cobalt 5) Preparation and resolution of tris(ethylenediamine)cobalt(III) ion and estimation of chloride 6) Preparation of <i>cis</i> and <i>trans</i> - potassium dioxalatodiaquo-chromate(III) and estimation of chromium 7) Preparation of nitro and nitrito-penta aminecobalt(III)chlorides and estimation of cobalt 8) IR spectral characterization of free ligands and coordinated ligands	18

	9) Single crystal structure analysis <i>NOTE: In complex synthesis, the student is expected to recrystallize the product, record IR spectra and carry out metal analysis. Spectral analysis can be carried over.</i> Group –2 Experiments in Solid State Chemistry (Minimum 3) 1) Preparation of spinel oxides by precursor method and estimation of metals in precursors and oxides, 2) Characterization of precursors by thermal analysis and infrared analysis 3) X-ray diffraction studies of oxides 4) Electrical characterization: i) Direct current electrical resistivity of semiconductor (Ge/Si) by Four Probe 4) Curie temperature determination of dielectric material (PZT) by measurement of dielectric constant v/s temperature 5) Measurement of magnetization parameter: M_s, M_r and H_c, 6) Determination of Curie temperature of magnetic oxides by A.C. susceptibility studies. Group – 3: Instrumental methods / spectral analysis / ion exchange (Minimum 3) A) Determination of stability constant of complex ions in solution 1) Fe(III) – thiocyanate compound B) Determination of instability constant of complex ions in solution 2) Determination of instability constant for the reaction between Ag^+ and NH_3 3) Determination of instability constant for the reaction between Ag^+ and en 4) Determination of instability constant for the reaction between Cu^{2+} and NH_3 5) Determination of instability constant for the reaction between Cu^{2+} and en C) Ion exchange chromatography 6) Separation of Mg^{2+} and Co^{2+}/Zn^{2+} by anion exchange column 7) Separation of transition metal cations by anion exchange column Group – 4: Ore / Alloy/ commercial sample analysis (Minimum 3) 1) Analysis of Goan Iron ore: Hematite / magnetite 2) Analysis of Devardas alloy 3) Analysis of Solder (Pb and Sn) 4) Analysis of Calcite/ Dolomite 5) Analysis of Pyrolusite 6) Analysis of Nickel-Aluminium alloy 7) Analysis of Brass / Bronze	18 18 18
Pedagogy	Pre-labs, practical / self-study or a combination of some of these could also be used to some extent.	

Reference Books	1. G. Brauer, Handbook of Preparative Inorganic chemistry, Vol. 1 & 2, Academic Press New York, 1967, 2nd Ed. 2. J. Bassett, R.C. Denny, G. H. Jeffery & J. Mandham, <i>Vogel's Text Book of Quantitative Inorganic Analysis</i> ELBS, 1985, 4th Ed. 3. G. Marr & B. W. Rockett, <i>Practical Inorganic Chemistry</i>, Van Nostrnad Reinhold London, 1972. 4. G. Pass & H. Sutcliffe, <i>Practical Inorganic Chemistry</i>, Chapman and Hall, 1985, 2nd Ed. 5. J. D. Woolins, <i>Inorganic Experiments</i>, Wiley–VCH Verlag GmbH and Co, 2003.	
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