



Department of chemistry

College of Education

University of Salahadin

**Subject: Practical Representative Elements
Chemistry**

Course Book – 2nd stage (*Second Course*)

Lecturer's name, Dr. Rezan Ali Saleh. Ph.D.

Academic Year: 2024/2025

Course Book

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| 1. Course name | Practical Representative Elements Chemistry |
| 2. Lecturer in charge | Rezan Ali Saleh |
| 3. Department/ College | Chemistry/ Education |
| 4. Contact | e-mail: rezan.saleh@su.edu.krd Tel:07507300640 |
| 5. Time (in hours) per week | Practical: 10 hrs. |
| 6. Office hours | Sunday 9:30 1:30 or by appointment |
| 7. Course code | |
| 8. Teacher's academic profile | <p>Education: Ph.D. in Inorganic chemistry, Salahaddin University-Erbil, 2024 <i>Dissertation title: Synthesis, characterization, crystal structure, anticancer and computational studies of Ni(II), Pd(II) and Pt(II) mixed ligand complexes of 2,5-dimercapto-1,3,4-thiadiazole, dipyridyl-2yl ketone, saccharinate or benzisothiazolate and tertiary phosphines</i></p> <p>M.Sc. in Inorganic Chemistry, University of Salahaddin-Erbil, 011/2015- 09/ 2016 <i>Thesis: Synthesis and Characterization of Mono and Mixed Ligand, Ni(II), Pd(II) and Pt(II) Complexes of S-5-Phenyl-1,3,4-Oxadiazole-2-yl Benzothioate with some Tertiary Diphosphines Ligands.</i></p> <p>Supervisor: Dr. Dr.Hikmat Ali Mohamad. Assist. Chemistry, 27/11/2007- 21/2/2011 B.Sc. in Chemistry, from University of Salahaddin, college of education, chemistry department 2006-2007. No. of Publications: (6).</p> |
| 9. Keywords | 2nd year , Practical, Representative Elements |

10. Course overview:

Inorganic chemistry is the study of the structures, properties, behaviours and reactions of elements, mixtures e.g. in solutions, and chemical compounds that do not contain carbon-hydrogen bonds.

In some subject – areas of study and research the distinction between organic and inorganic chemistry is unclear and is said to overlap. For example, organometallic chemistry (the study of chemical compounds whose molecules include bonds between carbon and a metal) includes aspects of both inorganic chemistry and organic chemistry. However, most (and often all) of the chemistry normally studied at school level may be clearly defined as either organic or inorganic chemistry.

It is useful to understand what is inorganic chemistry in order to know which books or sections to use when researching chemistry questions, e.g. looking – up information in textbooks and via other sources and media . As much of introductory (school-level) inorganic chemistry is concerned with the chemical elements, a convenient way to identify key topics within introductory inorganic chemistry is using the periodic table. The periodic table is structured in such a way as to group together elements whose structures follow certain patterns and so have particular properties in common.

11. Course objective:

Classification is an important science process skill. In the interactive simulation, students will classify elements based on their physical and chemical properties. This process is part of a larger realm, which is the unifying concept of systems order and organization. According to The

National Science Education Standards, "The natural and designed world is complex; it is too large and complicated to investigate and comprehend all at once. Scientists and students learn to define small portions for the convenience of investigation. The units of investigation can be referred to as 'systems'." The periodic table represents such a system. Systems can be organized into a way that is useful. The standards point out that the "Types of organization include the periodic table of elements and the classification of organisms. Physical systems can be described at different levels of organization-such as fundamental particles, atoms, and molecules.

Dmitri Mendeleev was the first scientist to create a periodic table of the elements similar to the one we use today. You can see Mendeleev's original table (1869). This table showed that when the elements were ordered by increasing atomic weight, a pattern appeared where properties of the elements repeated periodically. This periodic table is a chart that groups the elements according to their similar properties The periodic table helps predict some properties of the elements compared to each other.

12. Student's obligation

The students should attend all the lectures, shouldn't be absent in final exam and should pass the final exam.

Chemistry laboratory activities refer to the practical activities which students undertake using chemicals and equipments in a chemistry laboratory. Inquiry level is a multifaceted activity that

involves making reports, weekly quiz observations posing questions, planning investigations; reviewing what is already known in light of experimental evidence, using tools to gather, analyze, and interpret data; proposing answers, explanations, predictions and communicating the results.

13. Forms of teaching

The principal learning outcome of demonstration activities is to help the student realize the theoretical understanding of the course ***for this reason we use white board for explanation of concepts and using chemicals, equipments and apparatus for building product.***

14. Assessment scheme

The students are required to do Examinations, quizzes, reports, activities in the lab. and etc...

Seeking rate (40%) includes 13% practice part, and 27% theory.

Final exam (60%) includes 20% practice part, and 40% theory.

15. Student learning outcome:

1. Students will be able to understand the objective of their chemical experiments, properly carry out the experiments, and appropriately record and analyze the results.

2. Students will be able to use standard laboratory equipment,

modern instrumentation and classical techniques to carry out experiments.

3. Students will know and follow the proper procedures and regulations for safe handling and use of chemicals.

4. Students will be able to communicate the concepts and results of their laboratory experiments through effective writing and oral communication skills.

5. Opportunity to discuss, to consult with one another and to criticize and be criticized

6. Increased efficiency by division of labor.

7. Opportunity to compare results and to interpret data within the group.

16. Course Reading List and References:

1-Experimental inorganic chemistry, by W.C.palmer , Cambridge press ,1965.

2-Practical inorganic chemistry by J.Mare and Brocate 1985 .

3-Practical inorganic chemistry, by Issam J.sallomi university of Mosul 4-

Introduction to modern inorganic chemistry, K.M.Mackay and R.Ann mackay, London, 1973.

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| <p>5-Chemical bonds: An introduction to atomic and molecular structure by Harry B.Gray , California institute of technology , 1984 .</p> <p>6- Practical inorganic chemistry , by Dr.bassim M.saade Baghdad university 1987.</p> <p>7-Modern inorganic chemistry by William L.jolly ,McGraw-Hill Book company 1st printing 1985.</p> | |
| 17. The Topics: | Lecturer's name |
| | Lecturer's name ex:(2 hrs.) |
| 18. Practical Topics for <u>Second Course</u> Practical Inorganic Chemistry (If there is any) | |
| <p>1-Week(1)- preparation of sodium hydroxide by cosack method</p> <p>2-Week (2)-preparation of sodiumthiosulfate pentahydrate</p> <p>3-Week(3)- Fractional Crystalization of salts, Preparation of Potassium dichromate.</p> <p>4- Week (4)-preparation of Oxygen gas</p> <p>5-Week(5)- preparation of Hydrogen gas</p> <p>6-Week(6)- preparation of carbon dioxide gas</p> <p>7-Week(7)- preparation of Ammonia gas</p> <p>8-Week(8)- preparation of Nitrogen gas</p> | <p>Rezan Ali Saleh Each lecture is (2 hrs.)</p> |

9-Week(9)- preparation of sulfur dioxide gas

10-Week(10)- preparation of carbon monoxide gas

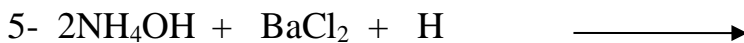
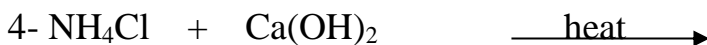
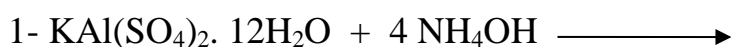
11-Week(11)- preparation of Hydrogen sulfide gas

19. Examinations:

Q1-Write True or False for each the statements:

- 1- The solubility curve is a plotted curve between solubility and pressure.
- 2- The crude of NaCl contains impurities such as soil, calcium, magnesium and sulphate ions.
- 3- Lead acetate is used for detection of hydrogen gas.
- 4- $M^{+1} M^{+2} (SO_4)_2 \cdot 12H_2O$ is general composition of Alum.

Q2- Complete the following reactions:



Q3/ Calculate the theoretical and experimental percentage of iodide in **0.15g** SnI_4 sample if you know that the needed volume of (**0.002M KIO3**) to reach to the end point equal to **18ml**

At.wt. I= 126.9 Sn= 118.69 K= 39.1 O= 16

Q4-A Write the main equations for preparing barium peroxide in the laboratory

B- What is the solubility curve, supporting your answer with available example.

C- Write the main reaction for the preparation and detection of **(three)** of the

following gases in the laboratory:

1- N₂ 2- CO₂ 3- O₂ 4- NH₃ 5- SO₂

D- Write the main reaction for the preparation and detection of **(three)** of the following gases in the laboratory:

2- N₂ 2- CO₂ 3- O₂ 4- NH₃ 5- SO₂

E. Draw the MOT diagram for (1- Nitrogen and 2-Oxygen) gas and calculate their bond order?

F. Draw the geometrical shape and write type of hybridization of: 1- Ammonia 2-Hydrogen 3-Carbon dioxide gas

20. Extra notes:

21. Peer review

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