UNIVERSITY of BRADFORD

Module Descriptor

Inorganic Chemistry 2

Module Code:	CFS5016-B
Academic Year:	2018-19
Credit Rating:	20
School:	School of Chemistry and Biosciences
Subject Area:	Chemistry and Forensic Science (ceases 2016)
FHEQ Level:	FHEQ Level 5
Module Leader:	Dr Sanjit Nayak

Additional Tutors:
Dr Rianne Lord

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	36
Tutorials	12
Directed Study	152

Availability Periods

Occurrence	Location/Period
BDA	University of Bradford / Academic Year (Sept - May)

Module Aims

Develop a systematic knowledge & understanding of the principles of coordination chemistry of the transition metals.

Provide an understanding of principles of coordination chemistry to appraise the principle of catalytic reactions & their structure, reactivity, & spectroscopic aspects.

Develop a basic understanding of organometallic chemistry, metal-carbon bonds & their relevance in selected catalytic reactions.

Develop skills to describe and communicate scientific ideas.

Outline Syllabus

Chemistry of transition metals: Group trends & series trends for transition metals; role of lanthanide contraction on group behaviour in transition metals; Coordination number & isomerism; Different kinds of ligands; Nomenclature of coordination compounds; Bonding models for metal ion coordination compounds: Crystal Field Theory & Ligand Field Theory; Calculation of crystal field stabilization energy (CFSE); Consequences of CFSE; Jahn-Teller distortion; Electronic spectra, colour (UV-Vis) & magnetic properties of coordination complexes; Correlation diagram, Stability & reaction mechanisms in coordination complexes.
Organometallic chemistry: The metal-carbon bond: pi-multicentre bonding; the 18 electron rule; isolobal relationships; synergic bonding in metal carbonyls & pi-olefins; bonding of multi-electron donor systems; metal-metal bonding; cluster compounds; electron counting conventions for structure prediction in clusters; Selected catalytic applications of organometallic chemistry: Chemistry at the surface: Langmuir, adsorption, adsorbtion and desorption of gasses, heterogeneous catalysis.

Module Learning Outcomes

On successful completion of this module, students will be able to...

1 Describe characteristics of the d-block elements.

10 Apply IUPAC conventions in naming coordination compounds and organometallic compounds; correlate nuclear and electronic structure to the periodic variation of physical and chemical properties in the d-block; make qualitative predictions of the stability of metal complexes.

11 Identify and relate the knowledge of coordination chemistry and organometallic chemistry in different areas of everyday-life applications and technology.

12 Manage learning activities, seek info from literature sources & apply reporting skills; use a range of data mining tools (e.g., Web of Science, Scifinder) for searching literature & resources.

13 Express, present, & discuss basic concepts of coordination chemistry & organometallic chem synthesized from this module in front of peers & in online forum discussions.

14 Use specialist software packages for preparing scientific presentation, & crystal structure drawing & viewing.

15 Work as a team to discuss, decide, & prep a scholarly presentation on a given subject.

2 Name coordination complexes using IUPAC nomenclature guidelines.

3 Predict different shapes of coordination complexes.

4 Appreciate factors influencing transition metal complex stability.

5 Discuss the chemistry of the F-block.

6 Comment on stability of organometallic compounds.

7 Predict geometry of metal-carbonyl clusters & describe their general synthetic methods & chemistry.

8 Discuss aspects of surface chemistry.

9 Illustrate selected applications of hogeneous and heterogeneous catalysis.

Learning, Teaching and Assessment Strategy

The core content will be delivered by lecture to build up the fundamental knowledge in inorganic chemistry. This will be supported by tutorial sessions where students will be asked to work in small groups to solve problems based on critical thinking. This will help in peer-learning activities. Formative feedback will be given at the end of these activities.

In semester-2 students will be assigned to different groups to make a presentation to the cohort in a seminar style. Each student will be given different topics in each group covering different key concepts from the module content.

The discussion forum in the VLE will be used to encourage peer learning activities with regular monitoring of the discussion threads by the module instructor. The participation in discussions will be assessed with respect to quality of contribution (questions, discussions, and answer).

Assessment 1: A seminar style presentation and online forum discussion based on the questions and answers using the VLE platform will cover LO's: 1-7, 10-14.

Assessment 2: An examination in January will cover LO's: 1-7 and 10-11.

Assessment 3: A summative examination at the end of the module to cover LO's: 1-7 and 10-11.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Presentation	Group work with a percent weighting derived from		30%	No

		peer-review and online discussions			
Summative	Examination - closed book	Summative assessment: closed book examination	2 hours	40%	Yes
Summative	Classroom test	Classroom test	1.5 hours	30%	No

Legacy Code (if applicable)

CT-2027L

Reading List

To view Reading List, please go to **rebus:list**.