

60619 - Advanced inorganic chemistry

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	542 - Master's in Chemical Research
ECTS	6.0
Course	1
Period	First semester
Subject Type	Compulsory
Module	---

1. Basic info

1.1. Recommendations to take this course

1.2. Activities and key dates for the course

2. Initiation

2.1. Learning outcomes that define the subject

2.2. Introduction

3. Context and competences

3.1. Goals

3.2. Context and meaning of the subject in the degree

3.3. Competences

3.4. Importance of learning outcomes

4. Evaluation

5. Activities and resources

5.1. General methodological presentation

5.2. Learning activities

5.3. Program

Introduction to transition metal chemistry

General characteristics of block d elements. Electronic configurations. Trends in chemical properties. Relative stability of

60619 - Advanced inorganic chemistry

their oxidation numbers. Singularity of the header element. Relativistic effects.

Group 4 elements

General characteristics. Obtention and applications. Oxides and halides.

Group 5 elements

General characteristics. Obtention and applications. Oxides and oxoanions.

Group 6 elements

General characteristics. Obtention and applications. Oxides and oxoanions. Tungsten bronzes.

Group 7 elements

General characteristics. Obtention and applications. Oxides and halides. Metal-metal multiple bonds.

Group 8 elements

General characteristics. Obtention and applications. Rutenates and osmiates.

Group 9 elements

General characteristics. Obtention and applications. Oxidative addition reactions.

Group 10 elements

General characteristics. Obtention and applications. Substitution reactions. Conformational changes.

60619 - Advanced inorganic chemistry

Group 11 elements

General characteristics. Obtention and applications. Clusters and nanoparticles.

Lantanide and actinide elements

General characteristics. Obtention and applications. Magnetic behavior and electronic properties. Nuclear reactions.

Elements in biological systems

Coordination complexes of biological interest. Types of ligands. Macrocyclic ligands. Aminoacid side chains. Nucleobases.

Bioinorganic chemistry of cobalt and iron

Cobalamines. Reactions of alkylcobalamines. Hemoproteins. Ferredoxines. Systems containig Fe-O-Fe units. Iron metabolism.

Bioinorganic chemistry of copper and zinc

Types of copper. Blue and non-blue oxidases. Cytochrome oxidase. Superoxide dismutase. Hemocyanines. Monooxygenase. Carbonic anhidrase. Carboxypeptidase and other hydrolases. Zinc fingers.

Biological functions of other transition metals

Biological functions of nickel, molybdenum, wolfram, vanadium and chromium.

Bioinorganic chemistry of toxic metals

Bioinorganic chemistry of lead, cadmium, thallium, mercury, aluminium and beryllium.

Applications of Bioinorganic chemistry in Medicine

60619 - Advanced inorganic chemistry

Metallic complexes with antitumor activity.

5.4.Planning and scheduling

5.5.Bibliography and recommended resources

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2. Advanced Inorganic Chemistry (6ª edición). F. A. Cotton, G. Wilkinson, C. A. Murillo y M. Bochmann. Ed. Wiley-Interscience 1999.
3. Chemistry of the Elements (2ª edición). N. N. Greenwood y A. Earnshaw. Ed. Butterworth-Heinemann 1997.
4. Descriptive Inorganic Chemistry (4ª edición). G. W. Rayner-Canham. Ed. Palgrave Macmillan 2006.
5. Inorganic Chemistry (34 edición). A. F. Holleman y E. Wiberg. Ed. Academia Press 2001.
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8. Bioinorganic Chemistry: Inorganic Elements in the Chemistry of Life (2ª edición). W. Kaim, B. Schwederski, A. Klein. Ed. Wiley-VCH, 2013.
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