UNIVERSIDADE ESTADUAL DE CAMPINAS
INSTITUTO DE QUÍMICA

PROGRAMS AND BIBLIOGRAPHY

Subject	
Code	**Name**
QI246	Inorganic Chemistry

Vector
OF:S-2 T:004 P:000 L:000 O:000 D:000 HS:004 SL:004 C:004 AV:N EX:S FM:75%

Pre requirement	QG108

Summary

Lewis acidity and basicity: hard and soft acids and bases. Coordination and organometallic chemistry of transition metals.

Program

Acids and Bases

Lewis Acids and Bases: periodic trends; basic types (adduct formation correlating with OM; displacement reactions, metathesis; solvents as acids or bases; strength of acids and bases). Structural considerations and steric factors in the strength of acids and bases. Hard and soft acids: the concept of Pearson. Acidity and basicity of metal and non-metal oxides.

Coordination Chemistry

Coordination compounds: coordination number, structure, nomenclature, isomerism. Bonding models: molecular orbitals and crystal field theory for octahedral, tetrahedral and square planar geometries. Jahn-Teller effect. Spectrochemical series. Nephelauxetic effect. Interpretation of electronic spectra and determination of ligand field parameters (10 Dq and B); charge transfer spectra (L-M and M-L). The chelate effect (thermodynamic aspects). Macrocyclic ligands. Substitution reactions in octahedral and square planar complexes. The -trans effect and influence. Labile and inert compounds. Redox reactions.

d-block organometallics

Concepts, definitions and main ligands (CO, PR_3). The 18 electrons rule. M-CO and M-PR_3 bonding. Main reactions occurring in the coordination sphere of organometallic, analyzing their mechanisms and the factors affecting them: Ligands replacement; Oxidative addition / reductive elimination; Insertion / migration and reverse reaction. Introduction to organometallic catalysis: definitions, influence of the metal and examples of catalytic cycles.

Bibliography

Textbooks

D. F. Shriver, P. W. Atkins, C.H. Langford. Inorganic Chemistry. 2nd. ed. Oxford: Oxford University Press, 1994. 819p.

J. E. Huheey, E. A. Keiter, R. L. Keiter. Inorganic Chemistry: Principles of Structure and Reactivity. 4th ed. New York: Harper Collins, 1993. 964p.

Supplemental Readings

G. L. Miessler, D. A. Tarr. Inorganic Chemistry. 4th ed., Harlow : Pearson, 2011. 1213p.

C. E. Housecroft, A. G. Sharpe. Inorganic Chemistry. 4th ed. Upper Saddle River. NJ : Prentice-Hall, 2012. 754p.

Evaluation criteria

For grading policy, see: Regimento Geral de Graduação, Seção I – Normas Gerais, Capítulo V – Da Avaliação do Aluno na Disciplina. Students are required to attend 75 % of the lectures. For further details, see: Regimento Geral de Graduação, capítulo VI, seção X, artigo 72.