UNIVERSIDADE ESTADUAL DE CAMPINAS
INSTITUTO DE QUÍMICA

PROGRAMS AND BIBLIOGRAPHY

Subject	
Code	**Name**
QI245	Solid State Chemistry

Vector
OF:S-5 T:002 P:000 L:000 O:000 D:000 HS:002 SL:002 C:002 AV:N EX:S FM:75%

Pre requirement	QI145

Summary

Close packed structures. Some important crystalline structure types. X-ray diffraction. Defects and non-stoichiometric compounds. Electronic, optical and magnetic properties of solids.

Program

Close packed structures. Unit cells, crystal system and Bravais lattice. Principles of X-Ray diffraction. Lattice planes and Miller indices. Crystallographic card. Some important crystalline structure types (CsCl, NaCl, ZnS, CaF_2, among others).

Defects in ionic crystals. Stoichiometric defects: intrinsic defects (Schottky and Frenkel) and extrinsic defects (solid solution). Non-stoichiometric. Ionic conductivity.

Electronic conductivity in solids: molecular orbital theory and energy-band model (metals, semiconductors, and insulators). Intrinsic and extrinsic semiconductors. Electronic conductivity as a function of temperature.

Optical properties: ruby laser, neodymium laser and light-emitting diodes.

Magnetic properties: magnetic susceptibility, magnetism in metals. Ferromagnetism, ferrimagnetism and antiferromagnetism.

Bibliography

Textbooks

L. E. Smart, E. A. Moore. Solid State Chemistry: An Introduction. Boca Raton: CRC, 2012. 465p.
A. R. West. Basic Solid-State Chemistry. 2nd ed. Chichester: John Wiley, 1999. 480p.
W.D. Callister. Ciência e Engenharia de Materiais: uma Introdução, 8ª. ed. Rio de Janeiro: LTC, 2012. 817p.
C. E. Housecroft, A. G. Sharpe. Inorganic Chemistry. 4th ed. Upper Saddle River. NJ : Prentice-Hall, 2012. 754p.

Supplemental Readings

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

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.