Code: QI245

Name: Química do Estado Sólido

Name in English: Solid State Chemistry

Name in Spanish: Química del Estado Sólido

Subject type: Weekly

Approval Type: Grade and Frequency

Characteristic: Regular

Frequency: 75%

Period Type / Offering period: Semiannual / All periods

Requires Final Exam: Yes.

Vectors

T	L	P	O	PE	OE	SL	WEEKS	CREDITS
2	**-**	**-**	**-**	**-**	**-**	**2**	**15**	**2**

Occurrence on curriculum: 05, 50, 56

Pre requirement: *QI146 ou *QI145

Summary: Close-packing. Crystal systems. Some important structure types. X-ray diffraction. Defects and non-stoichiometry. Electronic, optical and magnetic properties of solids.

Program: Close packed structures. Crystal system, unit cells and Bravais lattices. Principles of X-ray diffraction. Lattices planes and Miller índices. Crystallographic card. Some important structure types (CsCl, NaCl, ZnS, CaF_2, among others).

Defects in ionic crystrals. Intrinsic defects: point defects (Schottky and Frenkel). Extrinsic defects. Solid solution. Non-stoichiometry. Ionic conductivity.

Electronic conductivity in solids: molecular orbital theory and energy band theory (metal, semiconductor, and insulator). intrinsic and an extrinsic semiconductor. Electronic conductivity as a function of temperature.

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

Magnetic properties. Ferromagnetism, ferrimagnetism and antiferromagnetism.

Basic Bibliography

1) SMART, L. E.; MOORE, E. A. **Solid State Chemistry: An Introduction**. 7.Ed. Boca Raton, USA: CRC Press, 2005. 407 p.

2) WEST, A. R. **Basic Solid State Chemistry**. 2. Ed. Chichester, UK: John Wiley, 1999. 480 p.

3) CALLISTER, W.D. **Ciência e Engenharia de Materiais**: **Uma Introdução.** 8. Ed. Rio de Janeiro: LTC, 2012. 817 p

Supplementary Bibliography

1) SHRIVER, D.F.; ATKINS, P.W.; LANGFORD, C.H. **Inorganic chemistry**. 2. Ed. Oxford, UK: Oxford University Press, 1994. 819 p.

2) VAN VLACK, L.H. **Princípios de ciência e tecnologia dos materiais**, 4. Ed. Rio de Janeiro: Elsevier, 2003. 567 p.

3) HOUSECROFT, C.E.; SHARPE, A.G**. Inorganic chemistry**. 4.Ed. Upper Saddle, NJ: Pearson Prentice Hall, 2012. 754p.

4) RODGERS, G.E. **Química Inorgânica Descritiva, de Coordenação e do estado solido**. 3.Ed. São Paulo, SP: Cengage Learning, 2016. 648 p.

5) BROWN, T.L.; LE MAY JR, H.E.; BURSTEN, B.E., BURDGE, J.R. **Química a ciência central**. 9. Ed. São Paulo, SP: Pearson Prentice Hall, 2005. 972 p