

CH-438 Chemical and Statistical Thermodynamics

Credit Hours: (3-0)

Pre-requisite: Nil

Course Objectives

1. This course aims to cover topics of Physical Chemistry related to Thermodynamics.

Course Contents

2. Chemical Thermodynamics Relation of entropy and energy with equilibrium constant, and their dependence on temperature. Clausius-Clapeyron's equation. Chemical potential. Partial molar quantities. Free energy change. Fugacity of gases. Phase diagram and stability of a single component system.

3.

Statistical Thermodynamics Description of various systems. Concepts of states, accessible states and distribution. Probability concepts. Maxwell - Boltzmann's statistics for the systems of independent particles. Partition functions. The relationship of partition function to the various thermodynamic functions. Translational, vibrational and rotational partition functions and equilibrium constant. Statistical thermodynamics. Applications to equilibrium and chemical kinetics. Bose-Einstein's and Fermi-Dirac's statistics.

Recommended Books

1. Alberty, R. A., Robert J.S. and Mounji G. B. "Physical Chemistry". 4th ed, John Wiley and Sons (2004). 2. Ball, D W., "Physical Chemistry" 1st ed., Brooks/Cole Co. Inc. (2003).

2. Engel, Thomas and Philip Reid, "Thermodynamics, Statistical Thermodynamics", and Kinetics 1st ed., Benjamin Cummings (2006).

3. Gasser R.P.H. and Richards W.G. "Entropy and Energy Levels" Oxford University Press (1974).

4. Wayatt P.A.H. "The Molecular Basis of Entropy and Chemical Equilibrium" Royal Institute of Chemistry London (1971)