

Course Title: Advanced Chemical Kinetics

Semester: VIII

Course Code: CH-484

Credit Hours: 3-0

Pre-requisite: Nil

Course Objectives

1. Students will learn about the reaction rates and the mathematical derivations involved in chemical kinetics. They will also learn about activation energy and other related aspects. Contents
2. Chemical Kinetics. Derivation of the rate equations. Theory of absolute reaction rate. Reversible reactions, parallel reactions and consecutive reactions. Correlation between physical properties and concentration. Comparison of collision and absolute reaction theories. Advanced theories of unimolecular reactions. Potential energy surfaces. Thermodynamic formulation of reaction rates. Calculation of entropy and enthalpy changes. Thermal decomposition of nitrogen pentoxide. Reactions in solutions. Influence of ionic strength on the reaction rate. Effect of dielectric constant of the medium on the rate of the reaction. Single sphere activated complex model. Double sphere activated complex model. Complex reactions. Chain reactions. Single chain carrier with second order breaking. One chain carrier with first order breaking. Two chain carrier with second order breaking. Experimental techniques for fast reactions.

Text Book

3. Espenson, J. H. Chemical Kinetics and Reaction Mechanism 2nd ed., McGraw Hill London (2002).

4. Recommended Books

- a. 1 Albery J., Electrode Kinetics, Clarendon, Oxford (1975).
 - b. Espenson 'J.H. Chemical Kinetics and Reaction Mechanisms 2nd ed. McGrawHill, New York (1995).
 - c. Frost A.A. and Pearson "R.G. Kinetic and Mechanism 2nd ed. John Wiley and Sons Inc, New York (1961).
5. Course Outcomes. Students will be able to conclude about the reaction kinetics and the laws governing this kinetics. They will be able to thermodynamically formalism of reaction mechanisms.