

AMLT24 POLYMER SCIENCE AND TECHNOLOGY

UNIT-1 SCIENCE OF MACROMOLECULES

- 1.1 Basic concepts, molecular forces and chemical bonding in polymers,
- 1.2 Molecular weight and its distribution.

UNIT-2 STEP REACTION POLYMERISATION

- 2.1 Classification of polymers and polymerisation mechanisms,
- 2.2 Mechanisms of step growth polymerisation, kinetics,
- 2.3 Polyfunctional step growth polymerisation.

UNIT-3 RADICAL CHAIN POLYMERISATION:

- 3.1 Mechanism of vinyl polymerisation,
- 3.2 Kinetics of chain growth polymerisation,
- 3.3 Molecular weight and its distribution,

UNIT-4 IONIC AND CO-ORDINATION CHAIN POLYMERISATION

- 4.1 Similarity and contrasts in ionic polymerisation,
- 4.2 Mechanisms and kinetics of anionic,
- 4.3 Cationic and co-ordination polymerisations.

UNIT-5 COPOLYMERISATION

- 5.1 Kinetics of copolymerisation, composition of copolymers,
- 5.2 Mechanism of copolymerisation, blocks and graft polymers.

UNIT-6 POLYMERISATION CONDITIONS AND POLYMER REACTIONS

- 6.1 Polymerisation in homogeneous and heterogeneous systems,
- 6.2 Polymerisation engineering,
- 6.3 Chemical reaction of polymers.

UNIT-7 POLYMER SOLUTIONS

- 7.1 Criteria for polymer solution,
- 7.2 Conformation of dissolved polymer chains,
- 7.3 Thermodynamics of polymer solution.

UNIT-8 MEASUREMENT OF MOLECULAR WEIGHT AND SIZE

- 8.1 End group analysis,
- 8.2 Colligative properties measurement.

UNIT-9 STRUCTURE-PROPERTY RELATIONSHIP

- 9.1 Polymer folding, thermodynamic and kinetic flexibility,
- 9.2 Crystallisation and melting of polymers and the factors responsible,
- 9.3 Glass transition and phase transition of polymers.

UNIT-10 DETERMINATION OF THERMAL BEHAVIOUR OF POLYMERS

10.1 Principles of DSC, DTA, TGA analyses.

UNIT-11 PLASTICIZATION AND CROSSLINKING OF POLYMERS

11.1 Theory and mechanisms of plasticization, kinds of plasticizers,

11.2 Crosslinking of polymers and its effect in the physical property of polymer network.

Reference Books:

1. Textbook of Polymer Science-Billmeyer, F.W. Jr. (1994), 3rd Edn. Wiley Interscience Publication N.Y.
2. Polymer Science and Technology of Plastics and Rubbers -Ghosh, P.M. (1990), 2nd Edn.Tata McGrawHill Publishing Co. N.D.

