

## SPECIALITY POLYMERS

### Unit I

High temperature and fire resistant polymers improving low performance polymers for high temperature use – polymers, for low fire hazards – polymers for high temperature resistance – Fluoropolymers. Aromatic polymers, polyphenylene sulphide, polysulphones, polyesters, polyamides, polyketones, Heterocyclic polymers.

### Unit II

Polymers with electrical and electronic properties - Conducting polymers, conducting mechanisms, polyacetylene, polyparaphenylene polypyrrole, organometallic polymers, photo conducting polymers, polymers in non-linear optics, polymers with piezoelectric pyroelectric and pyroelectric properties, photoresists for semi conductor fabrication – liquid crystalline polymers. Types of electroactive polymers; Dielectric, Ferroelectric (Electrostrictive and liquid crystalline) and ionic (electrorheological fluid and ion-metal composite) EAP's; Comparison of electronic and ionic behaviors

### Unit III

Ionic Polymers, synthesis, physical properties and applications, Ion-exchange, Hydrophilicity, Ionomers based on polyethylene, elastomeric ionomers. Ionomers based on polystyrene, ionomers based on PTFE, ionomers with polyaromatic backbones, polyelectrolytes for ion exchange, polyelectrolytes based on carboxylates, polymers with integral ions, polyelectrolyte complexes. Biological and inorganic ionic polymers.

### Unit IV

Polymer concrete, polymer impregnated concrete ultra high modulus fibres, polymers for biomedical applications, polymeric binders for rocket propellants, polymer supported reagents. Definition, classification, synthesis, characterization and application of polymer gels.

Polymers in telecommunications and power transmission, polymers as insulators – electrical breakdown strength – capacitance, dielectric loss and cable alteration, polymers in telecommunications – submarine, cable insulation, low fire risk materials, polymers in power transmission – Optical fibre telecommunication cables. Photoactive polymers their design, synthesis, characteristic properties and its application

#### Text Books:

1. R.W. Dyson, Specialty Polymers, Chapman & Hall, 2nd edition, 1998.

#### References:

1. H.F.Mark, (Ed), Encyclopedia of polymer Science & Engineering, John Wiley & Sons, New York, 1989.
2. Matrin.T.Goosey, Plastics for Electronics, Elsevier, Applied Science, 1985.
4. Manas Chanda, Salil.K.Roy, Plastics Technology Hand book, 2nd edition, Marcel Dekker, New York, 1993