

Content

1. Introduction to Electronic Materials Processing

- Role of materials in electronics
- Processing technologies and applications

2. Semiconductor Materials

- Silicon and compound semiconductors
- Material properties and purity requirements

3. Crystal Growth Techniques

- Single-crystal growth
- Epitaxial growth methods
- Defect control in crystals

4. Thin-Film Processing

- Thin-film deposition methods
- Chemical Vapor Deposition (CVD)
- Physical Vapor Deposition (PVD)

5. Oxidation and Diffusion Processes

- Thermal oxidation
- Dopant diffusion in semiconductors
- Process parameters and control

6. Ion Implantation Technology

- Principles of ion implantation
- Doping control and applications

7. Lithography and Pattern Transfer

- Photolithography techniques
- Masking and etching processes

8. Metallization and Interconnections

- Contact formation
- Metallization materials and techniques

9. Characterization of Electronic Materials

- Structural analysis
- Electrical and optical characterization
- Surface and interface analysis

10. Reliability and Quality Control

- Defect analysis
- Process monitoring
- Reliability of electronic devices

11. Advanced Electronic Materials and Applications

- Microelectronics
- Optoelectronics
- Emerging technologies