

Plasma Synthesis and Etching of Electronic Materials, Volume 38

1. Introduction to Plasma and Its Applications in Microelectronics

- Definition of plasma and fundamental properties
- Types of plasmas used in electronic processes

2. Physical and Chemical Principles of Plasma Synthesis

- Mechanisms of thin film deposition and growth
- Control of composition and morphology of materials

3. Plasma-Assisted Deposition Techniques

- Plasma-Enhanced Chemical Vapor Deposition (PECVD)
- Physical Vapor Deposition (PVD, sputtering)
- Applications in semiconductors and dielectric films

4. Plasma Etching and Cleaning

- Mechanisms of ionic and chemical etching
- Selectivity, anisotropy, and dimensional control
- Surface treatment and contaminant removal

5. Characterization of Plasma Processes

- Plasma diagnostics (spectroscopy, probes, imaging)
- Analysis of deposited films and etched surfaces

6. Industrial Applications and Technological Advances

- Fabrication of integrated circuits and microcomponents
- Nanomaterials and advanced structures
- Treatment of new materials (oxides, nitrides, graphene, etc.)

7. Modeling and Simulation of Plasma Processes

- Physical and chemical models
- Numerical simulation and process optimization

8. Challenges and Future Perspectives

- Miniaturization and atomic-scale control
- Low-temperature and eco-friendly processes
- Integration with next-generation device manufacturing