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3.2.2.2 Effects of Secondary Electron Emission3.2.2.3 Negative Ion Extraction; 3.3 Fluid Simulations; 3.3.1 Capacitively Coupled Discharges; 3.3.2 Large Area Plasma Source; 3.4 Summary; References; 4 Modeling and Diagnostics of He Discharges for Treatment of Polymers; 4.1 Introduction; 4.2 Experimental; 4.3 Model Description; 4.4 Results and Discussion; 4.4.1 Electrical Properties; 4.4.2 Gas-Phase Chemistry; 4.4.3 Plasma-Surface Interactions; 4.5 Conclusions; References; 5 Three-Dimensional Modeling of Thermal Plasmas (RF and Transferred Arc) for the Design of Sources and Industrial Processes 5.1 Introduction5.2 Inductively Coupled Plasma Torches; 5.2.1 Modeling Approach; 5.2.1.1 Modeling Assumptions; 5.2.1.2 Governing Equations of the Continuum Phase; 5.2.1.3 Governing Equations of the Discrete Phase; 5.2.1.4 Computational Domain and Boundary Conditions; 5.2.2 Selected Simulation Results; 5.2.2.1 High-Definition Numerical Simulation of Industrial ICPTs; 5.2.2.2 Numerical Simulation of the Trajectories and Thermal Histories of Powders Injected in Industrial ICPTs; 5.3 DC Transferred Arc Plasma Torches; 5.3.1 Modeling Approach; 5.3.1.1 Modeling Assumptions 5.3.1.2 Governing Equations5.3.1.3 Computational Domain and Boundary Conditions; 5.3.2 Selected Simulation Results; 5.3.2.1 Magnetically Deflected Transferred Arc; 5.3.2.2 The Twin Torch; 5.3.2.3 The Cutting Torch; References; 6 Radiofrequency Plasma Sources for Semiconductor Processing; 6.1 Introduction; 6.2 Capacitively Coupled Plasmas; 6.2.1 Dual-Frequency CCPs; 6.3 Inductively Coupled Plasmas; 6.3.1 General Description; 6.3.2 Anomalous Skin Depth; 6.3.3 Magnetized ICPs; 6.4 Helicon Wave Sources; 6.4.1 General Description; 6.4.2 Unusual Features; 6.4.3 Extended Helicon Sources; References 7 Advanced Plasma Diagnostics for Thin-Film Deposition

Sommario/riassunto

A panel of internationally renowned scientists discuss the latest results in plasma technology. This volume has been compiled with both a didactic approach and an overview of the newest achievements for industrial applications. It is divided into two main sections. One is focused on fundamental technology, including plasma production and control, high-pressure discharges, modeling and simulation, diagnostics, dust control, and etching. The section on application technology covers polymer treatments, silicon solar cell, coating and spray, biomaterials, sterilization and waste treatment, plasma