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Nota di contenuto	Cover; Related Titles; Title Page; Copyright; Foreword; Preface; Introduction; 1 Introduction; 2 Basic Features of ALD; 3 Short History of the ALD Technology; 4 The ALD Community in the Academia and Industry; 5 Conclusions; References; List of Contributors; Part One: Introduction to ALD; Chapter 1: Theoretical Modeling of ALD Processes; 1.1 Introduction; 1.2 Overview of Atomistic Simulations; 1.3 Calculation of Properties Using Quantum Simulations; 1.4 Prediction of ALD Chemical Mechanisms; 1.5 Example of a Calculated ALD Mechanism: ALD of Al ₂ O ₃ Using TMA and Water; References Chapter 2: Step Coverage in ALD2.1 Introduction; 2.2 Growth Techniques; 2.3 Step Coverage Models in ALD; 2.4 Experimental Verifications of Step Coverage Models; 2.5 Summary; References; Chapter 3: Precursors for ALD Processes; 3.1 Introduction; 3.2 General Requirements for ALD Precursors; 3.3 Metallic Precursors for ALD; 3.4 Nonmetal Precursors for ALD; 3.5 Conclusions; References; Chapter 4: Sol-Gel Chemistry and Atomic Layer Deposition; 4.1 Aqueous and Nonaqueous Sol-Gel in Solution; 4.2 Sol-Gel and ALD: An Overview; 4.3

Mechanistic and In Situ Studies; References

Chapter 5: Molecular Layer Deposition of Hybrid Organic-Inorganic Films5.1 Introduction; 5.2 General Issues for MLD of Hybrid Organic-Inorganic Films; 5.3 MLD Using Trimethylaluminum and Ethylene Glycol in an AB Process; 5.4 Expansion to an ABC Process Using Heterobifunctional and Ring-Opening Precursors; 5.5 Use of a Homotrifunctional Precursor to Promote Cross-Linking in an AB Process; 5.6 Use of a Heterobifunctional Precursor in an ABC Process; 5.7 MLD of Hybrid Alumina-Siloxane Films Using an ABCD Process; 5.8 Future Prospects for MLD of Hybrid Organic-Inorganic Films; Acknowledgments

ReferencesChapter 6: Low-Temperature Atomic Layer Deposition; 6.1 Introduction; 6.2 Challenges of LT-ALD; 6.3 Materials and Processes; 6.4 Toward Novel LT-ALD Processes; 6.5 Thin Film Gas Diffusion Barriers; 6.6 Encapsulation of Organic Electronics; 6.7 Conclusions; Acknowledgments; References; Chapter 7: Plasma Atomic Layer Deposition; 7.1 Introduction; 7.2 Plasma Basics; 7.3 Plasma ALD Configurations; 7.4 Merits of Plasma ALD; 7.5 Challenges for Plasma ALD; 7.6 Concluding Remarks and Outlook; Acknowledgments; References; Part Two: Nanostructures by ALD

Chapter 8: Atomic Layer Deposition for Microelectronic Applications8.1 Introduction; 8.2 ALD Layers for Memory Devices; 8.3 ALD for Logic Devices; 8.4 Concluding Remarks; Acknowledgments; References; Chapter 9: Nanopatterning by Area-Selective Atomic Layer Deposition; 9.1 Concept of Area-Selective Atomic Layer Deposition; 9.2 Change of Surface Properties; 9.3 Patterning; 9.4 Applications of AS-ALD; 9.5 Current Challenges; Acknowledgment; References; Chapter 10: Coatings on High Aspect Ratio Structures; 10.1 Introduction; 10.2 Models and Analysis

10.3 Characterization Methods for ALD Coatings in High Aspect Ratio Structures

Sommario/riassunto

Atomic layer deposition, formerly called atomic layer epitaxy, was developed in the 1970s to meet the needs of producing high-quality, large-area flat displays with perfect structure and process controllability. Nowadays, creating nanomaterials and producing nanostructures with structural perfection is an important goal for many applications in nanotechnology. As ALD is one of the important techniques which offers good control over the surface structures created, it is more and more in the focus of scientists. The book is structured in such a way to fit both the need of the expert reader (du