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Chemical-Mechanical Polishing—Fundamentals and Challenges

Editors: S. V. Babu, S. Danyluk, M. Krishnan and M. Tsujimura

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Chemical-Mechanical Polishing—Fundamentals and Challenges

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PREFACE

Chemical-mechanical planarization (CMP) has emerged over the last few years as a key enabling technology in the relentless drive of the semiconductor industry to smaller, faster, less expensive ICs. As pointed out in the National Technology Roadmap for Semiconductors, there is a need for a better understanding of the science and technology underlying CMP. Ever-increasing surface planarity and defect requirements in IC fabrication are being driven by increasing process complexity, increasing wafer sizes, and decreasing device dimensions as well as the rapid rate at which new materials are being introduced. These increasing planarity and defect requirements make the understanding of planarization fundamentals, extending to different length scales and for different material surfaces, even more important. Multi-length scale (nm to several cms) planarization and a defect-free finish of surfaces, consisting of composite regions of dielectric and metal films, can be achieved only if the characteristics like hardness and chemical functionality of the abrasive powders are tailored to the properties of the surface and to the chemical environment used during the polish process.

This symposium, "Chemical-Mechanical Polishing—Fundamentals and Challenges," held April 5–7 at the 1999 MRS Spring Meeting in San Francisco, California, was aimed at bringing together many of the active players in this field from all parts of the world. It reflects to some extent the role played both by academic institutions and multinational corporations in opening up the frontiers in the field of CMP for wider dissemination.

This volume is divided into six parts; Part I: Overview and Oxide Polishing, Part II: Pads and Related Issues, Part III: Metal Polishing—W and Al, Part IV: Copper Polishing and Related Issues, Part V: CMP Modeling and Fluid Flow, and Part VI: Particle Adhesion and Post-Polish Cleaning.

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