

**Materials, Processes, and Reliability
for Advanced Interconnects
for Micro- and Nanoelectronics—2011**

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Materials, Processes, and Reliability for Advanced Interconnects for Micro- and Nanoelectronics—2011

Symposium held April 25–29, 2011, San Francisco, California, U.S.A.

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PREFACE

The present book includes selected papers based on the presentations reported at the Symposium O, “Materials, Processes, and Reliability for Advanced Interconnects for Micro- and Nanoelectronics”, held at the April 25–29, 2011 MRS Spring Meeting in San Francisco, California. This Symposium included the sessions related to Low-k dielectrics, Integration, Reliability, Metallization, Packaging, and Emerging Technologies.

The Low-k sessions included 13 presentation with 3 invited talks related to Development of PECVD Ultralow-k films (A. Grill), Advanced low-k materials based on organic polymers (M. Pantouvaki) and analysis of molecular structure and design of low-k hybrid glasses (R. Dauskardt). All three invited talks presented state-of-the-art of the modern ultralow-k materials that are considered as candidates for 22 nm technology node and beyond. Seven regular presentations and three invited talks were presented during the integration session. Two of them were related to micropatterning: application of cryogenic plasma for low damage processing (F. Iacopi) and low-k integration with metal hard masks (O. Joubert). The third talk reported ESR results allowing to analyze intrinsic and induced defects in low-k materials. The Reliability session included four papers with the invited talk related to the impact of dielectric materials in BEOL reliability (G. Bonilla). The metallization session included 16 papers with 2 invited talks: Possibilities of CVD Mn Oxide as a Diffusion Barrier Layer for Advanced LSI Interconnections (Junichi Koike) and Microstructure-based Statistical Model on Cap Layer Effects for Electromigration in Cu Interconnects Beyond the 45 nm Node (Paul S. Ho). The Packaging sessions included nine papers with one invited talk “Sub-micron Scale Local Strength Evaluation for LSI Interconnect Structures” (Shoji Kamiya). The last session was related to the Emerging Technologies for advanced interconnects (eight presentations). Optical Interconnect Technologies Based on Silicon Photonics presented by Wim Bogaerts was the invited talk at this session. The presentations related to application and analysis of carbon based materials (carbon nanotubes, graphene) attracted attention of the Symposium participants.

The organizers would like to thank all the authors for the on time submission of their manuscripts. The invited speakers are acknowledged for making this symposium possible by sharing their perspectives and insights. We also would like to thank the contributions of the Session Chairs in chairing and guiding the sessions.

We also would like to thank to the companies who provided sponsorship for the symposium: Air Liquide, Air Products, Applied Materials Inc., GLOBALFOUNDRIES, IBM Almaden Research Center, JSR Micro Inc., and Tokyo Electron America.

Mikhail R. Baklanov
Geraud Dubois
Christian Dussarrat
Terukazu Kokubo
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August 2011

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