

# MRS SYMPOSIUM PROCEEDINGS

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## Materials Reliability Issues in Microelectronics

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CAMBRIDGE

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# Materials Reliability Issues In Microele

**Sabine Zange**

## **Materials Reliability Issues In Microele:**

Materials Reliability Issues in Microelectronics: Volume 225 James R. Lloyd, Frederick G. Yost, Paul S. Ho, 1991-10-22 With the increased complexity of modern integrated circuits it is important that reliability problems be attacked properly with the appropriate tools. This volume recognizes that almost all reliability problems are materials problems and helps to put reliability physics on a firm scientific foundation. Topics include electromigration, stress effects on reliability, stress and packaging, metallization, device oxide and dielectric reliability, new investigative techniques, corrosion. Materials Reliability Issues in Microelectronics, 1991 Proceedings of the MRS Symposium on Materials Reliability Issues in Microelectronics Dedication p xiii **Materials Reliability in Microelectronics**, 1999 *Materials Reliability in Microelectronics V: Volume 391* Anthony S. Oates, 1995-10-24 This long standing proceedings series is highly regarded as a premier forum for the discussion of microelectronics reliability issues. In this fifth book emphasis is on the fundamental understanding of failure phenomena in thin film materials. Special attention is given to electromigration and mechanical stress effects. The reliability of thin dielectrics and hot carrier degradation of transistors are also featured. Topics include modeling and simulation of failure mechanisms, reliability issues for submicron IC technologies and packaging stresses in thin films, lines, gate oxides, barrier layers, electromigration mechanisms, reliability issues for Cu metallizations, electromigration and microstructure, electromigration and stress voiding in circuit interconnects and resistance measurements of electromigration damage.

*Materials Reliability in Microelectronics VII: Volume 473* J. Joseph Clement, 1997-10-20 The inexorable drive for increased integrated circuit functionality and performance places growing demands on the metal and dielectric thin films used in fabricating these circuits as well as spurring demand for new materials, applications and processes. This book directly addresses issues of widespread concern in the microelectronics industry: smaller feature sizes, new materials and new applications that challenge the reliability of new technologies. While the book continues the focus on issues related to interconnect reliability such as electromigration and stress, particular emphasis is placed on the effects of microstructure. An underlying theme is understanding the importance of interactions among different materials and associated interfaces comprising a single structure with dimensions near or below the micrometer scale. Topics include adhesion and fracture, gate oxide growth and oxide interfaces, surface preparation and gate oxide reliability, oxide degradation and defects, microstructure, texture and reliability, novel measurement techniques, interconnect performance and reliability, modeling, electromigration and interconnect reliability and stress, and stress relaxation. Dielectric Material Integration for Microelectronics William D. Brown, Electrochemical Society, Dielectric Science and Technology Division, Electrochemical Society Meeting, 1998 **Materials Reliability in Microelectronics VIII** John C. Bravman, 1998 *Materials Reliability in Microelectronics VI: Volume 428* William F. Filter, 1996-11-18 MRS books on materials reliability in microelectronics have become the snapshot of progress in this field. Reduced feature size, increased speed and larger area are all factors.

contributing to the continual performance and functionality improvements in integrated circuit technology. These same factors place demands on the reliability of the individual components that make up the IC. Achieving increased reliability requires an improved understanding of both thin film and patterned feature materials properties and their degradation mechanisms how materials and processes used to fabricate ICs interact and how they may be tailored to enable reliability improvements. This book focuses on the physics and materials science of microelectronics reliability problems rather than the traditional statistical accelerated electrical testing aspects. Studies are grouped into three large sections covering electromigration, gate oxide reliability and mechanical stress behavior. Topics include historical summary, reliability issues for Cu metallization, characterization of electromigration phenomena, modelling, microstructural evolution and influences, oxide and device reliability, thin oxynitride dielectrics, noncontact diagnostics, stress effects in thin films and interconnects and microbeam X ray techniques for stress measurements. *Handbook of Lead-Free Solder Technology for Microelectronic Assemblies* Karl J. Puttlitz, Kathleen A. Stalter, 2004-02-27. This reference provides a complete discussion of the conversion from standard lead tin to lead free solder microelectronic assemblies for low end and high end applications. Written by more than 45 world class researchers and practitioners, the book discusses general reliability issues concerning microelectronic assemblies as well as factors specific to them. *Materials Reliability in Microelectronics II: Volume 265* C. V. Thompson, J. R. Lloyd, 1992-09-30. The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners. **Electromigration in Metals** Paul S. Ho, Chao-Kun Hu, Martin Gall, Valeriy Sukharev, 2022-05-12. Learn to assess electromigration reliability and design resilient chips building from fundamental physics to advanced methodologies.

### **An Assessment of the National Institute of Standards and Technology Measurement and Standards Laboratories**

**National Research Council**, Division on Engineering and Physical Sciences, Board on Assessment of NIST Programs, 2002-09-26. This assessment of the technical quality and relevance of the programs of the Measurement and Standards Laboratories of the National Institute of Standards and Technology is the work of the 165 members of the National Research Council's NRC's Board on Assessment of NIST Programs and its panels. These individuals were chosen by the NRC for their technical expertise, their practical experience in running research programs and their knowledge of industry's needs in basic measurements and standards. This assessment addresses the following: The technical merit of the laboratory programs relative to the state of the art worldwide; The effectiveness with which the laboratory programs are carried out and the results disseminated to their customers; The relevance of the laboratory programs to the needs of their customers and the ability of the laboratories facilities, equipment and human resources to enable the laboratories to fulfill their mission and meet their customers' needs. **Introduction to Microelectronics to Nanoelectronics** Manoj Kumar Majumder, Vijay Rao Kumbhare, Aditya Japa, Brajesh Kumar Kaushik, 2020-11-24. Focussing on micro and nanoelectronics design and technology, this book provides thorough analysis and demonstration starting from semiconductor devices to VLSI fabrication, designing

analog and digital on chip interconnect modeling culminating with emerging non silicon nano devices It gives detailed description of both theoretical as well as industry standard HSPICE Verilog Cadence simulation based real time modeling approach with focus on fabrication of bulk and nano devices Each chapter of this proposed title starts with a brief introduction of the presented topic and ends with a summary indicating the futuristic aspect including practice questions Aimed at researchers and senior undergraduate graduate students in electrical and electronics engineering microelectronics nanoelectronics and nanotechnology this book Provides broad and comprehensive coverage from Microelectronics to Nanoelectronics including design in analog and digital electronics Includes HDL and VLSI design going into the nanoelectronics arena Discusses devices circuit analysis design methodology and real time simulation based on industry standard HSPICE tool Explores emerging devices such as FinFETs Tunnel FETs TFETs and CNTFETs including their circuit co designing Covers real time illustration using industry standard Verilog Cadence and Synopsys simulations

[Physics Briefs ,1994](#) **Low-dielectric Constant Materials-- Synthesis and Applications in Microelectronics** Toh-Ming Lu,1995 [New Serial Titles ,1995](#) A union list of serials commencing publication after Dec 31 1949 [Low Energy Ion Beam and Plasma Modification of Materials: Volume 223](#) James M. E. Harper,1991-08-16 The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners **Stress-Induced Phenomena in Metallization** P. S. Ho,1996 Annotation Proceedings of the June 1995 workshop reporting on new and basic results in electromigration and stress induced void formation Sections on stress characteristics and void formation in thin films and interconnects and electromigration and damage mechanisms in interconnects contain research in areas such as stresses in passivated gold and metal lines electrical measurement of stress induced void growth modeling electromigration in multi level interconnects comparison of electromigration in submicron Al Cu and Cu thin film lines and resistance oscillations induced by DC electromigration No index Annotation c by Book News Inc Portland Or **Metals Abstracts ,1994**

**Photons and Low Energy Particles in Surface Processing: Volume 236** Carol I. H. Asby,James H. Brannon,Stella W. Pang,1992-04-10 The MRS Symposium Proceeding series is an internationally recognised reference suitable for researchers and practitioners

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