



www.mrs.org/meetings/spring2006/

CALL FOR PAPERS

ABSTRACT DEADLINE: NOVEMBER 1, 2005

REMINDER: *In fairness to all potential authors, late abstracts will not be accepted.*

MRS Symposium F: Materials, Technology, and Reliability of Low-*k* Dielectrics and Copper Interconnects

In order to improve resistance-capacitance (RC) delay between interconnect lines, low dielectric constant insulators (low-*k*) and copper metallization are commonly used in advanced semiconductor products. With the demand for device size reduction and increased speed performance expected to continue, innovations in material fabrication techniques and integration methods are required for future technology nodes. Porous dielectrics, advanced dielectric curing, atomic-layer metal deposition, copper-alloy metallization, and integrated interconnect air gaps are some of the inventive approaches applicable to future-generation back-end-of-line (BEOL) structures. However, incorporating these new technologies into interconnect schemes becomes a serious issue for both electrical and mechanical reliability. In addition to traditional reliability concerns, such as electrical leakage, dielectric breakdown, electromigration, and stress migration, new failure modes associated with future materials are expected during fabrication and packaging processes. The objective of this symposium is to provide opportunities for researchers to discuss the latest advances in reliability characterization methods, fabrication, and fundamental material properties of these advanced interconnects. Novel integration techniques enhancing product performance and reliability will be explored in conjunction with the investigation of their associated failure mechanisms. The symposium will also address potential packaging difficulties and recent developments in this area, as well as introduce the new topic of tribology, advancing our understandings of dielectric and metal chemical-mechanical polishing.

Proposed session topics include, but are not limited to:

- Advanced electrical and mechanical characterization techniques
- Material issues during ULSI integration, fabrication, and packaging
- Copper interconnects, microstructures, and resistivity scaling
- Mechanical properties, adhesion, and stress issues facing dielectrics and metals
- Reliability issues for dielectrics—time-dependent-dielectric-breakdown (TDDB), moisture absorption effects, and oxygen diffusion
- Metal reliability issues—stress migration, electromigration, metal extrusion, fatigue, and corrosion
- Copper alloying
- Novel packaging techniques and their challenges
- Modeling—thermal, electrical, and mechanical issues
- Tribology and chemical-mechanical polishing of interconnect dielectrics and metals
- Advanced materials characterization, reliability, and testing techniques
- Dielectric pore-sealing techniques
- Future interconnects—3-D interconnects, optical interconnects, and carbon nanotubes

A tutorial complementing this symposium is tentatively planned. Further information will be included in the program that will be available in January.

Invited speakers include: **Martin Gall** (Freescale Semiconductor Inc.), **Alfred Grill** (IBM T.J. Watson Research Ctr.), **Gaddi Haase** (Texas Instruments), **Romano Hoofman** (Philips Research Leuven, Belgium), **Kurt Junker** (Freescale Semiconductor Inc.), **Choong-Un Kim** (Univ. of Texas-Arlington), **Junichi Koike** (Tohoku Univ., Japan), **Franz Kreupl** (Infineon Tech AG, Germany), **Joost Vlassak** (Harvard Univ.), and **Do Y. Yoon** (Seoul National Univ., Korea).

Symposium Organizers

Ting Y. Tsui

Texas Instruments Inc., MS 3736, 13560 N. Central Expwy., Dallas, TX 75243
Tel 972-995-1121, Fax 972-995-6383, ttsui@ti.com

Young-Chang Joo

Seoul National University, School of Materials Science & Engineering
Seoul 151-744, Korea
Tel 82-2-880-8986, Fax 82-2-883-8197, ycjoo@snu.ac.kr

Alex A. Volinsky

University of South Florida, Dept. of Mechanical Engineering
ENB 118, 4202 E. Fowler Ave., Tampa, FL 33620
Tel 813-974-5658, Fax 813-974-3539, volinsky@eng.usf.edu

Lynne Michaelson

Freescale Semiconductor Inc., 3501 Ed Bluestein Blvd., Austin, TX 78721
Tel 512-933-6462, Fax 512-933-6962, l.michaelson@freescale.com

Michael Lane

IBM T.J. Watson Research Center, Reliability and Materials Sciences
Rte. 134, 1101 Kitchawan Rd., Yorktown Heights, NY 10598
Tel 914-945-2692, Fax 914-945-2141, mwlane@us.ibm.com

For additional meeting information, visit the MRS Web site at www.mrs.org/meetings/ or contact:



Member Services
Materials Research Society

506 Keystone Drive, Warrendale, PA 15086-7573 • Tel 724-779-3003 • Fax 724-779-8313 • info@mrs.org