13th International Workshop on Stress-Induced Phenomena and Reliability in Microelectronics
The University of Texas at Austin
J.J. Pickle Research Campus
October 15-17. 2014

2014 Stress Workshop Program

Wednesday, October 15, 2014

8:00 AM to 8:30 AM Registration and Check-In

8:25 AM Welcome and Announcement, *Paul S. Ho, UT Austin*

Session 1: Cu EM and BEOL Reliability

8:30 AM - 10:30 AM (Chair: Paul S. Ho)

C.-K. Hu – Impact of Impurities, Liner, Co Cap and Short Length on Electromigration in Cu Damascene Lines

Oliver Aubel/Meike Hauschildt – Massive-Scale Statistical Study of BEOL Reliability

Christian Witt – Electromigration Void Dynamics by In-situ Microscopy and In-situ EBSD

Linjun Cao – Effect of Scaling on Grain Structure and Electromigration in Cu Interconnects

Break (10:30 AM – 10:50 AM)

10:50 AM – 12:20 PM (Chair: C. K. Hu)

Tony Oates – Modeling of Electromigration Failure in Integrated Circuits

Farid N. Najm – Full Chip statistical Electromigration Checking

Sheldon Tan – Physics-Based Electromigration Assessment for Power Grid Networks

Lunch (12:30 PM – 1:30 PM)

Session 2: TDDB/Low k Dielectrics Films

1:30 PM – 3:00 PM (Chair: Robert Rosenberg)

Martin Gall – In-situ Investigation of TDDB Mechanisms in Cu/Low k Interconnects

S. C. Lee – Scaling Impact on Porous Low-k Reliability

S. K. Sitaraman – Study of BEOL Reliability Through Experiments and Simulations

Break (3:00 PM – 3:30 PM)

3:30 PM – 5:00 PM (Chair: Rui Huang)

Hajdin Ceric – Quantum Chemical Calculations of EM Characteristics

Conal Murray – Analyzing the Evolution of Strain Energy during Recrystallizatin of Anisotropic Films

Mikhail Treger – Stress Relaxation and Recrystalliztion in Blanket Cu Films

RECEPTION AND POSTER SESSION (5:30 PM – 7 PM)

Poster Session (6 to 8 papers)

Thursday, October 16, 2014

8:00 AM to 8:30 AM Registration and Check-In

Session 4: 3D Integration and Reliability

8:30 AM - 10:30 AM (Chair: Ehrenfried Zschech)

Alan Lucero – Package Reliability and Performance Trends in an Era of Product Integraion

Tengfei Jiang – Effect of Grain Structures on Plasticity and Cu Extrusion for TSV in 3D Interconnects

Xiaopeng Xu – TCAD Modeling for Strain Engineering in Transistors and Stress Management in Chips and 3D IC Packages

Chih Chen – Low-Temperature and Low-Pressure Direct Copper-to-Copper Bonding Enabled by Surface Creep on (111) Surfaces

Break (10:30 AM – 10:50 AM)

10:50 AM – 12:20 PM (Chair: Martin Gall)

Rui Huang – Mechanisms of Copper Extrusion in Through-Silicon Vias

Olivier Thomas – Strain Mapping in Silicon Around Cu Filled TSVs Using Advanced X-ray Nano-diffraction

Sven Niese – Multi-scale XCT Studies of 3D TSV Stacks

Lunch (12:30 pm – 1:30pm)

Session 5: Multiscale Modeling/Multi-Chip Stacks

1:30 PM – 3:00 PM (Chair: Valeriy Sukharev)

Daniel Pantuso – Thermomechanical Enabling of High Porous ILD Materials

Jon Molina Aldareguia – The Role of Interfaces on the High Temperature Deformation of Nanoscale Multilayers

Paul Conway – Quantitative Characterization of Multiscale Microstructure in Interconnects for Multi-Chip Stacking

Break (3:00 PM – 3:30 PM)

3:30 PM – 5:00 PM (Chair: Jon Molina Aldareguia)

Nobuyuki Shishido – Estimate of Defect Size Initiating Interfacial Fracture in Interconnect Structures

Shoji Kamiya – Study of Local Interface Toughness in ULSI Interconnects Using a Mechanical Test in a Scanning Electron

Microscope

A.P. Singulani – Stress Evolution in the Metal Film of an Unfilled Trough Silicon Via

BANQUET (5:30 PM -- 7:30 PM)

Friday, October 17, 2014

8:00 AM to 8:30 AM Registration and Check-In

8:30 AM – 10:30 AM

Session 6: Sn-based Solders (Chair: Minhua Lu)

Minhua Lu – EM Kinetics and Critical Current in Pb-free Interconnects

Matt Pharr – Concurrent Electromigration and Creep in Lead-Free Solder

Hongbin Lu – Measurement of Viscoplastic Parameters of Lead Free Solder Bumps Using Nanoindention

Xuejun Fan – Does Electromigration Failure Occur Likely at Current Crowding Location?

Break (10:30 AM – 10:50 AM)

10:50 AM – 12:20 PM

Session 7: TDDB and Novel Structures (Chair: James Lloyd)

James Lloyd – The TDDB Zoo

Thomas Shaw – Stress Induced Switching in Rare-Earth Chalcogenide Thin Films

Walter Weber – Dopant Free CMOS Enabled by Strain Incorporation into Silicon Nanowires

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Lunch (12:30 PM – 1:30 PM)

1:30 PM – 3:00 PM (Chair: Thomas Shaw)

Donglei Fan – Rational Synthesis of Three Dimensional Nano-superstructures by designed catalysts

Chenglin Wu – Structure and Properties of Aerogels at the Nanoscale

Lado Filpovic – Stress Considerations for System-on-Chip Gas Sensor Integration in CMOS Technology

Meeting Adjourned and Announcement

Poster Session

Sajanti Bayernee – TEM Analysis of Si Nanowires for Reconfigurable 1D Electronics

Santo Papaleo – Stress Evolution During the Nanoindentation in Open TSVs

Wolfhard H. Zisser – Void Evolution in Open TSVs

Avinash Nayak -- Metallization of MOS2 and Strain on Graphene

Laura Spinella – Stress Characterization of TSV Structures by Wafer Curvature Measurements

Qiu Zhao – Extension of Micro-Raman Spectroscopy for Full-Component Stress Characterization of TSV Structures

Nassibe Rahimi – Wafer-scalable graphene growth for heterogeneous nanoelectronics