

Literature and Publications

H. Zhang, "Thermal and Electromigration Induced Strain and Microstructure Evolution in Metal Conductor Lines" PhD Thesis, Lehigh University-Bethlehem, 2008.

K. Upadhyayula, "Incremental Damage Superposition Approach for Surface Mount Electronic Interconnect Durability under Combined Temperature and Vibration Environments", PhD Thesis, University of Maryland, College Park, 1999.

H. Zhang, "Non-Destructive Failure Analysis Techniques for Product Reliability", SMTA Chapter Meeting, April 2010.

Antoinette M. Maniatty, G. Slade Cargill III, Youzhang Ge, H. Zhang, and Laura Moyer, "Investigation of microstructural effects on thermal and electromigration induced elastic strains", Session: 12-33-3, IMEC 2010.

H. Zhang, G. S. Cargill, "Electromigration induced strain relaxation in Cu conductor lines", Journal of Materials Research, Vol. 26 (5) 2011.

H. Zhang, G. S. Cargill III, and A. M. Maniatty, "Thermal Strains in Passivated Aluminum and Copper Conductor Lines", Journal of Materials Research, Vol. 26 (5) 2011.

H. Zhang, G. S. Cargill, "X-ray Microbeam Analysis of Electromigration in Cu Interconnects" Chapter 7, Electromigration in Thin Films and Electronic Devices: Materials and Reliability, Woodhead Publishing Limited 2010.

Antoinette M. Maniatty, Youzhang Ge, G. S. Cargill III, and H. Zhang, "Modeling, Simulation, and X-ray Microbeam Studies", Chapter 4, Electromigration in Thin Films and Electronic Devices: Materials and Reliability, Woodhead Publishing Limited 2010.

K. Upadhyayula, "Failure Analysis and Reliability Testing", MedTech, March 2009

K. Upadhyayula, "Why Test for Reliability", EMA/SMTA Chapter Meeting, May 2008

K. Upadhyayula, "Physics of Failure Approach to Product Reliability Workshop", Jan 2008

H. Zhang, G. S. Cargill III, Y. Ge, A. M. Maniatty, and W. Liu, "Strain Evolution in Al Conductor Lines during Electromigration", Journal of Applied Physics, 104, 1063 2008.

Minhua Lu, Paul Lauro, Da-Yuan Shih, Robert Polastre, Charles Goldsmith, Donald W. Henderson, H. Zhang, and Moon Gi Cho, "Comparison of Electromigration Performance for Pb-free Solders and Surface Finishes with Ni UBM", ECTC, Session 8, 2008.

H. Zhang, G. Wang and G. S. Cargill III, "Local Melting During Electromigration in Cu Conductor Lines," Journal of Electronic Materials, 36, 117 2007.

Literature and Publications (Continued)

H. Zhang, G. S Cargill III, Y. Ge, A. M. Maniatty and W. Liu, "Grain-Scale Strain and Orientation Measurements during Electromigration in Al Conductor Lines by Synchrotron X-Ray Microbeam Diffraction", MRS Symp. D, Boston, MA 2007.

H. Zhang, G. S Cargill III, Y. Ge, A. M. Maniatty and W. Liu, "Strain Evolution during Electromigration in Polycrystalline Conductor Lines: An X-Ray Microdiffraction and Finite Element Modeling Study", Advanced Metallization Conference, Albany, NY 2007.

H. Zhang, G. Wang, and G. S. Cargill III, "Electrical Resistance Anomalies During Electromigration Testing of Cu Conductor Lines: Examples of Local Melting?" MRS Symp. Proc. 914, 0914-F06-08 2006.

G. Wang, H. Zhang, G. S. Cargill III, C.-K. Hu, L. Ge, and A. Maniatty, "Thermal and Electromigration-Induced Strains in Copper Conductor Lines: X-ray Microbeam Measurements and Analysis," MRS Symp. Proc. 914, 0914-F06-06 2006.

G. S. Cargill III, L. E. Moyer, G. Wang, H. Zhang, C.-K. Hu, W. Yang, B. C. Larson, and G. E. Ice, "Thermal and Electromigration-Induced Strains in Polycrystalline Films and Conductor Lines: X-ray Microbeam Measurements and Analysis," AIP Conf. Proc. 817, 303 2006.

A. Dasgupta, P. Sharma, K. Upadhyayula, "Micro-Mechanics of Fatigue Damage in Pb-Sn Solder due to Vibration and Thermal Cycling ", International Journal of Damage Mechanics 10, 101-132, 2001.

K. Upadhyayula and A. Dasgupta, "A Physics-of-Failure Example of Acceleration Factor Assessment for Accelerated Qualification of Electronic Systems", Proceedings of Accelerated Stress Testing Workshop, IEEE CPMT, Pasadena, California, 1998.

K. Upadhyayula and A. Dasgupta, "Physics-of-Failure Guidelines for Accelerated Qualification of Electronic Systems", International Journal of Quality and Reliability Engineering, November 1998.

P. Sharma, K. Upadhyayula, L. Lantz, and M. Pecht, "Impact of Preconditioning Voltage Bias and Temperature on Reliability of Plastic Encapsulated Microcircuits", International Journal of Microelectronics Reliability, Vol. 38, No. 4, pp. 581-584, 1998.

K. Upadhyayula and A. Dasgupta, "Application of an Incremental Damage Superposition Approach for Accelerated Durability of Surface Mount Interconnects Under Combined Stresses", 1998 Spring Conference and Exposition, Society of Experimental Mechanics, Houston, Texas, June 1-3, 1998.

K. Upadhyayula and A. Dasgupta, "Guidelines for Physics-of-Failure Based Accelerated Stress Testing", Proceedings of Annual Reliability and Maintainability Symposium, Anaheim, California, January 19-22, 1998.

K. Upadhyayula and A. Dasgupta, "An Incremental Damage Superposition Approach for Interconnect Reliability Under Combined Accelerated Stresses", ASME International Mechanical Engineering Congress & Exposition, Dallas, November 16-21, 1997.

Literature and Publications (Continued)

P. Dujari, K. Upadhyayula, A. Dasgupta, and B. Balachandran, "Applications of Wavelets for Cost-Effective Vibration Response Analysis of Electronic Circuit Card Assemblies", *Experimental and Numerical Mechanics in Electronic Packaging Proceedings*, Society of Experimental Mechanics, Bellevue, Washington, pp. 67-74, June 2-4, 1997.

K. Upadhyayula and A. Dasgupta, "Accelerated Stress Testing of Surface-Mount Interconnects under Combined Temperature and Vibration Loading", chapter in *Accelerated Stress Testing Handbook for Quality Products in a Global Market*, H. Anthony Chan (Ed.), Addison Wesley Longman, MA, 1997.

A. Dasgupta, K. Darbha, P. Dujari, P. Haswell, S. Ling, P. Sharma, C. S. Sealing, K. Upadhyayula, "Miscellaneous Issues in Thermomechanical Stress Analysis of Surface-Mount Interconnects", *Interpack 1997*, ASME International, Intersociety Electronics and Photonics Packaging Conference, June 1997.

A. Dasgupta, K. Darbha, P. Haswell, P. Sharma, S. Sealing, K. Upadhyayula, "Finite Element Modeling Issues in Thermomechanical Stress Analysis of Surface-Mount Interconnects", *Symposium on Applications of FEM and BEM to Electronic Packaging at the 1997 ASME/ASCE/SES Joint Conference*, July 1997.

K. Darbha, S. Ling, K. Upadhyayula, and A. Dasgupta, "Stress Analysis of Surface-Mount Interconnects Under Vibrational Loading", *ASME International Mechanical Engineering Congress & Exposition*, Atlanta, GA, November 1996.

Y. Joshi, A. Dasgupta, K. Darbha, A. Poddar, C. Ramaswamy, C. S. Sealing, L. Tang, K. Upadhyayula, "An Integrated Surface Mount Virtual Factory Based on Mechanistic Process Simulations Part I - Overall Approach", *ASME Winter Annual Meeting Conference*, Nov. 17-22, 1996, Atlanta, Georgia.

Y. Joshi, A. Dasgupta, K. Darbha, A. Poddar, C. Ramaswamy, C. S. Sealing, L. Tang, K. Upadhyayula, "An Integrated Surface Mount Virtual Factory Based on Mechanistic Process Simulations Part II - Examples of Virtual Factory Models for Surface Mount Manufacturing", *ASME Winter Annual Meeting Conference*, Nov. 17-22, 1996, Atlanta, Georgia.

K. Upadhyayula and A. Dasgupta, "Accelerated Testing of CCAs Under Combined Temperature-Vibration Loading", *Proceedings of Accelerated Stress Testing Workshop*, IEEE Components, Packaging, and Manufacturing Technology Society, Ottawa, Canada. October 17-18, 1996.

K. Upadhyayula and A. Dasgupta, "Accelerated Life Test Development for Combined Stresses", *VIII International Congress on Experimental and Numerical Mechanics in Electronic Packaging*, Society of Experimental Mechanics, Nashville, TN, June 10-13, 1996, pp. 35-36.
