

Professor Alex A. Volinsky, Ph.D.

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Education	University of Minnesota, Ph.D. Materials Science and Engineering Thesis title: <i>“The Role of Geometry and Plasticity in Thin, Ductile Film Adhesion”</i> Academic advisor: Professor W.W. Gerberich	Minneapolis, MN 6/96 - 10/00
	Moscow State University of Aviation Technology (MATI) <i>Engineering Degree (MS) Metallurgical Engineering, Materials Science, GPA: 4.0</i> Thesis title: <i>“Mathematical Model and Process Development for Producing Metal Matrix Composite Tubes by Means of Thermocompression”</i>	Moscow, Russia 9/90 - 2/96
Experience	University of South Florida, Mechanical Engineering Department <i>Assistant Professor</i> Research interests: Thin films processing, mechanical properties and characterization. Adhesion and fracture of thin films. Microelectronics and MEMS reliability. Irradiated materials properties and X-Ray diffraction. Funding: NACE International, NSF, Seagate Technology, Motorola, Freescale Semiconductor Courses developed and taught: Materials Selection in Mechanical Design (Materials II), Advanced Materials Graduate Course, Solid Mechanics. Lab Equipment: Hysitron Triboindenter, Rigaku Rotaflex 200BH X-Ray source, Bohlin CS-50 rheometer, Tencor P-20H profiler, Tukon Microhardness tester, optical microscopes, misc. equipment	Tampa, FL 8/03 – present
	Jagiellonian University, Faculty of Physics, Astronomy and Computer Science <i>Visiting Professor, Marie Curie Host Fellow</i>	Krakow, Poland 5/05 – 6/05
	Motorola: Digital DNA Labs, Process and Materials Characterization Lab <i>Engineering Materials Senior Staff Member</i> Platforms and Strategic Research Group Conducted principal research employing XRD, SEM, FIB, FA analytical techniques for advanced technologies development	Tempe, AZ 12/02 – 08/03
	<i>Team Leader, Senior Member of Technical Staff</i> Combinational & Power Technology, HiPerMOS & Bipolar Analysis Groups Managing and conducting analytical support for production and R&D with SEM, FIB, XRD, FA (Hip6, 7; CDR1, 3; SmartMOS; MRAM Motorola technologies)	Mesa, AZ 10/00 – 12/02
	Motorola: Advance Product Research and Development Labs/MOS13 fab <i>Senior Yield Enhancement Engineer</i> Excite dark filed defect metrology tool owner (Applied Materials). Solving problems with new HIP6/HIP7 copper technology in production, improving yield and product quality. Work conducted saved Motorola 3.6 million dollars	Austin, TX 04/01 – 10/01
	Motorola: Digital DNA Labs, Semiconductor Product Sector <i>Summer Intern Engineer</i> Worked in the Interconnect Systems Lab, Process and Materials Characterization Lab, and Physical Science Research Lab on Cu and low-K materials adhesion and mechanical properties, solving problems on the metallization and packaging levels.	Phoenix, AZ 4/00 - 7/00
	Sandia National Labs: Materials and Engineering Science Center <i>Graduate Research Associate</i> Developed and implemented test techniques and models for measuring thin film adhesion by nanoindentation. Developed equipment for measuring thin film mechanical properties and adhesion at elevated temperatures. Investigated the effect of film thickness, test temperature and environment on the adhesion and mechanical properties of metallic thin films on dielectric substrates. Investigated mechanical properties of soft polymer films on metal substrates.	Livermore, CA 5/99 - 8/99
	Microtechnology Laboratory (MTL) / Center for Interfacial Engineering (CIE) <i>Graduate Researcher</i> Microelectronics fabrication (thermal oxidation, thin film deposition and thermal processing, pattern transfer, thin film characterization, etc.)	Minneapolis, MN 6/96 - 10/00

Investigated the micro-mechanical and tribological properties of thin films using nanoindentation techniques, SEM and SPM microscopy, established scaling laws for adhesion of metallic films to semiconductor substrates for interconnect applications. Developed data acquisition system for IBM continuous micromechanical tester.

Department of Chemical Engineering and Materials Science

Minneapolis, MN

Teaching/Research Assistant

9/96 - 10/00

Conducted principle research focused on novel techniques for thin film adhesion measurement and investigation of nano-mechanical properties of thin films and multilayers. This contributes to an understanding of film thickness, temperature and contamination layer effects on the adhesion and plasticity induced dislocation structures in thin films and coatings. Developed and conducted lectures and lab experiments, assigned and graded homework and exams for Introduction to Materials Science, Failure Analysis, and Materials Design and Performance courses

Moscow State University of Aviation Technology

Moscow, Russia

Research Scientist, Instructor for CAD/CAM applications class

1/91 - 2/96

Developed a CAD/CAM system for hot stamping and forging of light alloys for turbine blades. Developed a model and tested equipment for production of metal matrix fiber composite tubes by means of thermocompression. Conducted lectures and labs.

Funding

NACE International, National Science Foundation, Motorola, Freescale Semiconductor, Seagate Technology

Professional Societies

Materials Research Society (Public Affairs Committee Member), ASME International, ASM International, TMS

Technical Skills

Scanning electron microscopy (SEM); Focused Ion Beam (FIB) microscopy/micro machining; X-Ray diffractometry (XRD), Failure analysis (Emission microscopy, FIB), atomic force microscopy (AFM); Mechanical testing using Hysitron Triboscope, Triboindenter, Nanoindenter II, XP and IBM micromechanical tester (MMT), and servohydraulic testing equipment; dynamic mechanical analysis (DMA); thin film deposition and general microelectronics processing; mechanical and electrochemical sample preparation.

Honors and Activities

- Reviewer for: NSF, DOE, NC State University, Journal of Materials Research, Thin Solid Films, International Journal of Fracture, ASME and MRS Proceedings, Fatigue and Fracture of Engineering Materials and Structures, and others
- Who's who in Engineering Academia listing at www.academickeys.com
- 2006 Spring MRS F Symposium Organizer: Materials, Technology, and Reliability of Low-k Dielectrics and Copper Interconnects, 05-06
- Marie Curie Host Fellowship recipient, 5-7/05
- International Journal of Nanotechnology Guest Editor, 7/05
- NanoPol 2005 "Frontiers of Nanomechanical Testing" Workshop Organizer, Krakow, Poland, 6/05
- NGCM2004 Best Presentation Award, 9/04
- Board of Review Member and Key Reader for Metallurgical and Materials Transactions A, since 1/04
- One of the most cited recent papers in the field of Materials Science determined by ISI®: A..A. Volinsky, N.R. Moody, W.W. Gerberich, Acta Mater. Vol. 50/3, pp. 441-466, 2002, 2/04
- 2004 Mechanical Integrity and Reliability of Electronic Materials Symposium Organizer for the 2004 ASME International Mechanical Engineering Congress, 11/04
- 2004 Nano and Giga Challenges in Microelectronics Conference Organizer, 9/04
- Microelectronic Engineering July 2004 Special Issue Guest Editor, 04
- 2003 Symposium Organizer for the Summer ASME Meeting of the Applied Mechanics and Material Division, Symposium on Characterization and Mechanical Reliability of Advanced Electronic Materials at Nanoscale, 6/03
- 2002 Fall MRS Best Poster Award Nominee, 12/02
- 2002 Nano and Giga Challenges in Microelectronics Conference Organizer, 9/02
- 2001 Fall MRS Graduate Student Awards Committee, 11/01
- 2001 Motorola Bravo Award for Hip7 technology certification, 10/01
- Motorola SPS Engineering Technical Ladder Awards, since 4/01
- Silver Quill Motorola Publication Awards, since 10/00
- Motorola Direct Scholarship, 9/00
- Materials Research Society Public Affairs Committee, since 8/98
- Materials Research Society Gateway Taskforce, 11/99 - 11/01

- Materials Research Society Minnesota Chapter Travel Scholarship, 11/99
- Materials Research Society Graduate Student Award, 4/99
- 1998 Fall MRS Conference, Intergranular/Interfacial Fracture Symposium Session Chair, Boston, MA, 11/98
- University of Minnesota Graduate School Fellowship, 9/96.
- XXI and XXII Gagarin Conference First Prizes, 4/95 and 4/96
- The Russian Ministry of Science and Higher Education Research Scholarship, 1/95
- Bauman University, Moscow Universities Engineering Drawing Competition Award, 3/91
- Moscow State University of Aviation Technology, First Prize in the Technical Olympiad, 2/90
- Moscow State University of Aviation Technology, Scientific Council Fellowship Award, 2/90-2/96

Presentations

1. *Mechanical Aspects of Anti-Corrosive Coatings Performance Tests*, A.A. Volinsky, NACE International Corrosion 2006 Conference, San Diego, CA, 3/06
2. *Moisture-induced Thin Film Adhesion Degradation*, A.A. Volinsky, P. Waters, NACE International Corrosion 2006 Conference, San Diego, CA, 3/06
3. *Wear-induced Nanoscale Surface Reconstruction Patterns*, A.A. Volinsky, B. Such, M. Szymonski, 135th TMS 2006 Annual Conference, San Antonio, TX, 3/06
4. *Thickness Effects on the Plasticity of Gold Films*, M. J. Cordill, N.R. Moody, D.P. Adams, D.F. Bahr, A.A. Volinsky, W.W. Gerberich, 135th TMS 2006 Annual Conference, San Antonio, TX, 3/06
5. *Microchannel Manufacturing for Lab-on-a-chip Applications*, A.A. Volinsky, 2006 US-Japan Young Researchers Exchange Program Workshop for Nanotechnology and Nanomanufacturing, Boston, MA, 3/06
6. *Moisture and Stress Effects on Thin Film and Coating Adhesion*, A.A. Volinsky, P. Waters, Army Corrosion Summit 2006, Clearwater, FL, 2/06
7. *Novel Adhesion Test for Environmentally Assisted Fracture in Thin Films*, A.A. Volinsky and P.J. Waters, Tri-service Corrosion Conference, Orlando, FL, 11/05
8. *Simulation of Periodic Crack Growth in Thin Films*, A.A. Volinsky, B. Yang, 2005 ASME Mechanical Engineering Congress, Orlando FL, 11/05
9. *Moisture Effects on Copper Thin Film Adhesion*, A.A. Volinsky, P.J. Waters, 2005 ASME Mechanical Engineering Congress, Orlando FL, 11/05
10. *Acoustic Emission of Thin Film Indentation-Induced Fracture*, A.A. Volinsky, D. Hess, W.W. Gerberich, 2005 ASME Mechanical Engineering Congress, Orlando FL, 11/05
11. *Probing Thin Film Mechanical Properties by Nanoindentation*, A.A. Volinsky, Technische Universität Dresden, Institut für Strukturphysik, Dresden, Germany, 8/05 (invited seminar)
12. *Multidisciplinary Field of Materials Science and Engineering*, Jagiellonian University, A.A. Volinsky, Department of Physics, Astronomy and Computer Science, Krakow, Poland, 6/05 (invited lecture)
13. *Nanoindentation for Thin Film Fracture Testing*, A.A. Volinsky, NanoPol 2005:Frontiers of Nanomechanical Testing Workshop, Krakow, Poland, 6/05
14. *Bridging Thin Film Fracture and Surface Science*, A.A. Volinsky, Jagiellonian University, Department of Physics, Astronomy and Computer Science, Krakow, Poland, 5/05 (invited seminar)
15. *Stress-Induced Periodic Fracture Patterns in Thin Films*, A.A. Volinsky, N.R. Moody, D.C. Meyer, 11th International Congress on Fracture, Turin, Italy, 3/05
16. *Sub-Critical Telephone Cord Delamination Propagation and Adhesion Measurements*, Materials Research Society 2004 Fall Meeting, A.A. Volinsky, P.J. Waters, J.D. Kiely, E.C. Johns, Stability of Thin Films and Nanostructures Symposium, Boston, MA, 12/04
17. *Micro-fluidics Applications of Telephone Cord Delamination Blisters*, A. A. Volinsky, P.J. Waters, G. Wright, (Poster), Materials Research Society 2004 Fall Meeting, Mechanically Active Materials Symposium, Boston, MA, 12/04
18. *Irradiated Single Crystals for High Temperature Measurements in Space Applications*, A.A. Volinsky, V.A. Nikolaenko, V.A. Morozov, V.P. Timoshenko, Materials Research Society 2004 Fall Meeting, Materials for Space Applications Symposium, Boston, MA, 12/04
19. *Thin Films Periodic Fracture Patterns*, A.A. Volinsky, 2004 ASME Mechanical Engineering Congress, Anaheim, CA 10/04
20. *Nanoindentation for advanced microelectronic interconnects mechanical characterization*, A.A. Volinsky, Symposium and Summer School on: Nano and Giga Challenges in Microelectronics 2004, Cracow, Poland, 9/04 (invited poster)
21. *Low-K Dielectrics Metrology*, A.A. Volinsky, Porotech Ltd., Vaughan, ON, Canada, 8/04 (invited talk)
22. *Thin Film Mechanical Reliability: Environmental Effects*, A.A. Volinsky, NIST Workshop on Reliability Issues in Nanomaterials, Boulder, CO, 8/04
23. *Stress-induced Fracture Patterns in Thin Films*, A.A. Volinsky, Gordon Research Conference, Thin Film and Small Scale Mechanical Behavior, Waterville, ME, 7/04 (poster),
24. *Nanoindentation for Microelectronic Materials Characterization*, A.A. Volinsky, Intel, Chandler, AZ, 3/04 (invited talk)

25. *Mechanical Reliability of Advanced Interconnect Structures*, [A.A. Volinsky](#), IEEE Nanoscale Device and System Integration Conference, Miami, FL 2/04 ([invited talk](#))
26. *Nanoindentation Techniques for Assessing Mechanical Reliability of Microelectronic Interconnect Structures*, [A.A. Volinsky](#), USF Physics Colloquium, 1/04
27. *Irradiated Cubic Single Crystal SiC as a High Temperature Sensor*, [A.A. Volinsky](#), L. Ginzburgsky, V.A. Morozov, Materials Research Society 2003 Fall Meeting, Radiation Effects and Ion Beam Processing of Materials Symposium, Boston, MA, 12/03
28. *Fracture patterns in Thin Films and Multilayers*, [A.A. Volinsky](#), D.C. Meyer, T. Leisegang, P. Paufler, Materials Research Society 2003 Fall Meeting, Thin Films-Stresses and Mechanical Properties X Symposium, Boston, MA, 12/03
29. *Application of FIB/SEM and TEM to Single Bit Failure Analysis in SRAM arrays*, [A.A. Volinsky](#), W. Qin, L. Rice, L. Johnston, N.D. Theodore, Materials Research Society 2003 Fall Meeting, Micro- and Nanosystems Symposium, Boston, MA, 12/03 ([poster](#))
30. *Surface Oxide Evolution on Al-Si Bond Wires*, [A.A. Volinsky](#), W. Qin, R. Doyle, T. Scharr, M. Shah, M. Kottke, D. Werho, N.D. Theodore, Materials Research Society 2003 Fall Meeting, Materials, Integration, and Packaging Issues for High-Frequency Devices Symposium, Boston, MA, 12/03
31. *Oxide Reduction in Advanced Metal Stacks for Microelectronic Application*, [A.A. Volinsky](#), W. Qin, D. Werho, N.D. Theodore, Materials Research Society 2003 Fall Meeting, Fundamentals of Novel Oxide/Semiconductor Interfaces Symposium, Boston, MA, 12/03 ([poster](#))
32. *Microstructure and Mechanical Behavior of Novel Low-K Dielectric Films*, [A.A. Volinsky](#), Society of Engineering Science 40th Annual Technical Meeting, Ann Arbor MI, 10/03 ([invited talk](#))
33. *Mechanical Reliability and Characterization of Modern Microelectronic Interconnect Structures*, [A.A. Volinsky](#), Nano-Engineering World Forum, Marlborough MA, 6/03 ([invited talk](#))
34. *SEM-related FAB Analytical Support*, [A.A. Volinsky](#), 2003 Phoenix Technical Forum, Chandler AZ, 3/03
35. *Characterization and Reliability of Advanced Microelectronic Interconnect Structures*, [A.A. Volinsky](#), Purdue University School of Materials Engineering invited colloquium, 1/03 ([invited talk](#))
36. *"Incompressible" Pore Effect on the Mechanical Behavior of Low-K Dielectric Films*, [A.A. Volinsky](#), M.B. Palacio, W.W. Gerberich, Materials Research Society 2002 Fall Meeting, Surface Engineering 2002-Synthesis, Characterization, and Applications, Boston, MA, 12/02
37. *Experiments with In-situ Thin Film Phone Cord Delamination Propagation*, [A.A. Volinsky](#), Materials Research Society 2002 Fall Meeting, Morphological and Compositional Evolution of Thin Films Symposium, Boston, MA, 12/02
38. *Nanomechanical Fracture Testing for Assessing the Durability of Hybrid Microcircuit Films*, N.R. Moody, D.P. Adams, N.Y.C. Yang, [A.A. Volinsky](#), W.W. Gerberich, 3rd European Symposium on Nano-Mechanical Testing, Applications of Nano-Mechanical Testing, Hukelhoven, Germany, 9/02 ([invited](#), [video linked](#))
39. *Nanoindentation Techniques for Assessing Mechanical Reliability at Nanoscale*, [A.A. Volinsky](#), Symposium and Summer School on: Nano and Giga Challenges in Microelectronics, Moscow, Russia, 9/02 ([invited talk](#))
40. *Wireless Phones have Phone Cords Attached: Thin Film Phone Cord Delamination Propagation*, [A.A. Volinsky](#), Gordon Research Conference, Thin Film Mechanical Behavior, Waterville, ME, 7/02 ([poster](#))
41. *A Comparison Study of Ti/GaAs Ti/Si Fracture*, [A.A. Volinsky](#), M.L. Kottke, Mechanics of Thin Films and Other Small Structures Symposium, 14th U.S. National Congress of Theoretical and Applied Mechanics, Blacksburg, Virginia, 6/02 ([invited talk](#))
42. *Mechanical Properties, Adhesion and Fracture Toughness of Low-K Dielectric Thin Films for Microelectronic Applications*, [A.A. Volinsky](#), I.S. Adhietty, J.B. Vella, C. Goldberg, W.W. Gerberich, 10th International Congress on Fracture (ICF), Honolulu, HI, 12/01 ([invited talk](#))
43. *Effects of Diffusion on the Interfacial Fracture of Multilayer Hybrid Microcircuit Films*, N.R. Moody, D.P. Adams, D. Medlin, [A.A. Volinsky](#), N. Yang, and W.W. Gerberich, (Invited) 10th International Congress on Fracture (ICF), Honolulu, HI, 12/01 ([invited talk](#))
44. *Fiducial Marks as a Measure of Thin Film Crack Arrest Toughness*, [A.A. Volinsky](#), M.L. Kottke, N.R. Moody, I.S. Adhietty, W.W. Gerberich, 10th ICF, Honolulu, HI, 12/01
45. *Residual Stress and Microstructure of Electroplated Cu Film on Different Barrier Layers*, [A.A. Volinsky](#), M. Hauschildt, J.B. Vella, N.V. Edwards, R. Gregory, W.W. Gerberich, Materials Research Society 2001 Fall Meeting, Thin Films-Stresses and Mechanical Properties IX Symposium, Boston, MA, 11/01
46. *The Role of Geometry and Plasticity in Thin, Ductile Film Adhesion*, [A.A. Volinsky](#), University of Texas Seminar, Austin, 9/01 ([invited seminar](#))
47. *Adhesion and Fracture Testing of Multilayer Films in Hybrid Microcircuits*, N.R. Moody, D.P. Adams, [A.A. Volinsky](#), and W.W. Gerberich, Department of Materials Science and Engineering, University of Newcastle, Newcastle, United Kingdom, 3/01 ([invited seminar](#))
48. *The Effects of Composition and Structure on Interfacial Fracture: Chromium Diffusion and the Adhesion of Gold Films*, N.R. Moody, D. Medlin, D.P. Adams, [A.A. Volinsky](#), N. Yang, W.W. Gerberich, Materials Science Department Seminar, University of California, Berkeley, CA, 05/01 ([invited seminar](#))
49. *Fracture Toughness and Adhesion of Low K Dielectric Thin Films*, [A.A. Volinsky](#), J.B. Vella, B.W. Fowler, I.S. Adhietty, and W.W. Gerberich, Merence, San Diego, CA, 6/01 ([invited talk](#))

50. *Finite Element Analysis of the Precracked Line Scratch Test*, [A.A. Volinsky](#), L. Mercado, V. Sarihan, W.W. Gerberich, Materials Research Society 2000 Fall Meeting, Materials Science of Microelectromechanical Systems (MEMS) Devices Symposium, Boston, MA, 11/00 ([poster](#))
51. *Adhesion and Fracture Testing of Gold Chromium Films in Hybrid Microcircuits*, N.R. Moody, [A.A. Volinsky](#), D.P. Adams, M. Kriese, W.W. Gerberich, AVS International Conference on Metallurgical Coatings and Thin Films, San Diego, CA, 3/00 ([invited talk](#))
52. *Assessing Thin Film Reliability Using Nanoindentation*, N.R. Moody, D.P. Adams, K.A. Peterson, W.M. Clift, P. Hlava, [A.A. Volinsky](#), W.W. Gerberich, Critical Materials and Processes Program-Low Force Testing, ASMI Fall Meeting, St. Louis, MO, 11/00 ([invited talk](#))
53. *Aging of Gold-Chromium Multilayer Films in Hybrid Microcircuits: Techniques for Assessing Thin Film Reliability*, N.R. Moody, D.P. Adams, K.A. Peterson, W.M. Clift, P. Hlava, [A.A. Volinsky](#), W.W. Gerberich, Department Seminar, Department of Mechanics and Materials, Michigan State University, East Lansing, MI, 11/00 ([invited seminar](#))
54. *Microstructure and Mechanical Properties of Electroplated Cu Thin Films*, [A.A. Volinsky](#), J. Vella, I.S. Adhietty, V. Sarihan, L. Mercado, B.H. Yeung, W.W. Gerberich, Materials Research Society 2000 Fall Meeting, Fundamentals of Nanoindentation and Nanotribology II Symposium, Boston, MA, 11/00
55. *Superlayer Indentation Test for Thin Film Adhesion Measurement*, [A.A. Volinsky](#), W.W. Gerberich, Gordon Research Conference, Thin Film Mechanical Behavior, Plymouth, NH, 7/00 ([poster](#))
56. *Thin Film Adhesion Measurement Techniques*, [A.A. Volinsky](#), W.W. Gerberich, Motorola, AZ, 4/00 ([invited talk](#))
57. *Superlayer Residual Stress Effect on the Indentation Adhesion Measurement*, [A.A. Volinsky](#), N.R. Moody, W.W. Gerberich, Materials Research Society 1999 Fall Meeting, Thin Films – Stresses and Mechanical Properties VIII Symposium, Boston, MA, 11/99
58. *Indentation-Induced Ductile Film Interfacial Debonding*, [A.A. Volinsky](#), W.M. Clift, N.R. Moody, W.W. Gerberich, Materials Research Society 1999 Fall Meeting, Interfacial Engineering for Optimized Properties II Symposium, Boston, MA, 11/99 ([poster](#))
59. *Annealing Effects on Interfacial Fracture of Gold Chromium Films in Hybrid Microcircuits*, N.R. Moody, [A.A. Volinsky](#), D.P. Adams, M. Kriese, W.W. Gerberich, MRS Symposium on Interfacial Engineering for Optimized Properties II, MRS Fall Meeting, Boston, MA, 11/99 ([invited talk](#))
60. *Assessing Reliability of Gold-Chromium Films in Hybrid Microcircuits Using Nanoindentation*, N.R. Moody, [A.A. Volinsky](#), D. Adams, S. Guthrie, W.W. Gerberich, Chemical Engineering and Materials Science Special Seminar, University of Minnesota, Minneapolis, MN, 99
61. *Ductile Thin Layers/Brittle Substrate Fracture. Superlayer Test for Practical Adhesion Measurements*, [A.A. Volinsky](#), W.W. Gerberich, Symposium on the Mechanics of Multilayered Materials 1999 IMECE Nashville, TN, 11/99
62. *Indentation-induced Ductile Film Fracture*, [A.A. Volinsky](#), W.W. Gerberich, Sandia National Laboratories, Livermore, CA, 8/99
63. *Macroscopic Modeling of Fine Line Adhesion Tests*, [A.A. Volinsky](#), J.C. Nelson, W.W. Gerberich, Materials Research Society 1999 Spring Meeting, Materials Reliability in Microelectronics Symposium IX, San Francisco, CA, 4/99
64. *Quantitative Modeling and Measurement of Copper Thin Film Adhesion*, [A.A. Volinsky](#), N.I. Tymiak, M.D. Kriese, W.W. Gerberich and J.W. Hutchinson, Materials Research Society 1998 Fall Meeting, Intergranular/Interfacial Fracture Symposium, Boston, MA, 11/98 ([invited talk](#))

Publications

Books:

1. *Thin Films for Microelectronics and Photonics: Physics, Mechanics, Characterization, and Reliability Chapter*, D.T. Read, [A.A. Volinsky](#), in *Micro- and Opto-Electronic Materials and Structures: Physics, Mechanics, Design, Reliability, Packaging*, in honor of Ephraim Suhir, submitted, 2005
2. *Nanoindentation Methods in Interfacial Fracture Testing, Chapter 13 in Comprehensive Structural Integrity (I. Milne, R.O. Ritchie, B. Karihaloo, Editors-in-Chief), Volume 8: Interfacial and Nanoscale Failure (W.W. Gerberich, W. Yang, editors)*, [A.A. Volinsky](#), D.F. Bahr, M.D. Kriese, N.R. Moody, W.W. Gerberich, Elsevier 2003

Journals:

1. International Journal of Nanotechnology Special Issue, “Nanotechnology Toolkit”, Proceedings of the 2004 Nano and Giga Challenges in Microelectronics Conference, Krakow Poland
2. Microelectronic Engineering Special Issue, Volume 75, Issue 1, Pages 1-126 (July 2004), Proceedings of the Symposium on Characterization and Mechanical Reliability of Advanced Electronic Materials at Nanoscale, 2003 ASME Mechanics and Materials Conference, Phoenix, AZ, USA, 17 - 20 June 2003, edited by Alex A. Volinsky

Journal Articles:

1. *Stress and Moisture Effects on Thin Film Buckling Delamination*, P. Waters, [A.A. Volinsky](#), submitted to *Experimental Mechanics*, 2005
2. *Application of the Standard Porosimetry Method for Nanomaterials*, Y.M. Volfkovich, A.V. Sakars and [A.A. Volinsky](#), *International Journal of Nanotechnology*, Vol. 2, No. 3, pp. 292-302, 2005
3. *Gate Oxide Metrology and Silicon Piezo-optics*, S. Zollner, R. Liu, [A.A. Volinsky](#), B.-Y. Nguyen, C.S. Cook, *Thin Solid Films* 455-456, pp. 261-265, 2004

4. *FIB Failure Analysis of Memory Arrays*, A.A. Volinsky, L. Rice, W. Qin, N.D. Theodore, *Microelectronic Engineering*, Vol. 71/1, pp. 3-11, 2004
5. *Tensile Crack Patterns in Mo/Si Multilayers on Si Substrates Under High-temperature Bending*, D.C. Meyer, T. Leisegang, A.A. Levin, P. Paufler, A.A. Volinsky, *Appl. Phys. A* 78, pp. 303-305, 2004
6. *Nanoindentation of Au and Pt/Cu Thin Films at Elevated Temperatures*, A.A. Volinsky, N.R. Moody, W.W. Gerberich, *Journal of Materials Research*, Vol. 18, No. 9, pp. 2650-2657, 2004
7. *TEM Study of Spontaneous Surface Oxide Reduction in Metal Stacks*, W. Qin, A.A. Volinsky, N.D. Theodore, *Thin Solid Films* 473, pp. 236-240, 2005
8. *Effects of Near-tip Rotation on Pre-buckle Crack Growth of Compressed Beams Bonded to a Rigid Substrate*, Q.D. Yang, A.A. Volinsky, *International Journal of Solids and Structures* 41, pp. 2711-2729, 2004
9. *Nanoindentation Techniques for Assessing Mechanical Reliability at Nanoscale*, A.A. Volinsky and W.W. Gerberich, *Microelectronic Engineering*, Vol. 69/2-4, pp. 519-527, 2003
10. *Effects of Diffusion on Interfacial Fracture of Gold-chromium Hybrid Microcircuit Film*, N.R. Moody, D.P. Adams, D. Medlin, T. Headley, N. Yang, A.A. Volinsky, *International Journal of Fracture*, Vol. 119, No. 4, pp. 407-419, 2003
11. *Mechanical Properties and Fracture Toughness of Organo-silicate Glass (OSG) Low-k Dielectric Thin Films for Microelectronic Application*, J.B. Vella, I.S. Adhietty, K. Junker, and A.A. Volinsky, *International Journal of Fracture*, Vol. 119, No. 4, pp. 487-499, 2003
12. *Length Scales for the Fracture of Nanostructures*, W.W. Gerberich, J.M. Jungk, M. Li, A.A. Volinsky, J.W. Hoehn, K. Yoder, *International Journal of Fracture*, Vol. 119, No. 4, pp. 387-405, 2003
13. *Fiducial Mark and CTOA Estimates of Thin Film Adhesion*, A.A. Volinsky, N.R. Moody, W.W. Gerberich, *International Journal of Fracture*, Vol. 119, No. 4, pp. 431-439, 2003
14. *Fracture Toughness, Adhesion and Mechanical Properties of Low-K Dielectric Thin Films Measured by Nanoindentation*, A.A. Volinsky, J.B. Vella, W.W. Gerberich, *Thin Solid Films* 429/1-2 pp. 201-210, 2002
15. *Fiducial Mark and Nanocrack Zone Formation During Thin Film Delamination*, A.A. Volinsky, N.R. Moody, M.L. Kottke, W.W. Gerberich, *Philosophical Magazine A*, Vol. 82, No. 17/18, pp. 3383-3391, 2002
16. ***Interfacial Toughness Measurements for Thin Films on Substrates*, A.A. Volinsky, N.R. Moody, W.W. Gerberich, *Acta Mater.* Vol. 50/3, pp. 441-466, 2002**
17. *Crack Arrest Toughness Assessment Through Thin Film Fiducial Marks*, A.A. Volinsky, M.L. Kottke, N.R. Moody, W.W. Gerberich, *Engineering Fracture Mechanics* Vol. 69, No. 13, pp. 1511-1515, 2002
18. *Nanoindentation-Induced Defect-Interface Interactions: Phenomena, Methods and Limitations*, W.W. Gerberich, D. Kramer, N. Tymiak, A.A. Volinsky, D.F. Bahr, and M. Kriese, *Acta mater.* 47(15), p. 4115-23, 1999
19. *The Role of Plasticity in Bi-material Fracture With Ductile Interlayers*, N.I. Tymiak, A.A. Volinsky, M.D. Kriese, S.A. Downs and W.W. Gerberich, *Metallurgical and Materials Transactions A*; Vol. 31A; No. 3A; pp 863-872A, 2000
20. *Substrate Effects on Indentation Plastic Zone Development in Thin Soft Films*, D.E. Kramer, A.A. Volinsky, N.R. Moody, W.W. Gerberich, *Journal of Materials Research*, Vol. 16, No. 11, p 3150-3157, 2001

Conference Proceedings:

1. *Novel Adhesion Test for Environmentally Assisted Fracture in Thin Films*, A.A. Volinsky and P. Waters, Tri-Service Conference on Corrosion, November 14-18, 2005, Orlando, FL, Proceedings Paper 104, 2005
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