

Jay J. Senkevich Ph.D.

Executive Summary:

Dr. Senkevich's primary expertise is in deposition of organic thin films and coatings. He advised Kisco to pitch to Steve Jobs to waterproof the Apple i-Phone, I-Pod and earbuds in 2009. He has extensive publications and advised companies with both the vapor deposition and spray deposition of organic coatings to protect printed circuit boards. Although he has held academic positions in this area it is his industrial experience, where he has the most expertise. As can be seen from his CV he has worked internationally and has advised companies on topics of: solving manufacturing problems, developing technology and business investment opportunities.

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Education

Ph.D. Engineering Science - Rensselaer Polytechnic Institute 2002
(Surface Physics/Chemistry)

- Dissertation Research: Atomic Layer Deposition of Metals, Chemical Vapor Deposition of Polymers, Plasma Modification of Dielectric Surfaces, Self-Assembled Chemical Systems, Silane Chemistries, Molecular Layer CVD.

M.S. Metallurgical Engineering – University of Nevada, Reno 1994
(Electrochemistry/Corrosion)

- Thesis Research: Impedance analysis of oxidation of ferrous metals and the degradation of polymer coatings. Electrochemistry and Corrosion.

B.S. Chemistry – California Polytechnic State University, San Luis Obispo 1993

- Thesis Research: Nitrogen (N_{14}^+) ion implantation into β -SiC.

Professional Experience

2017-Current: Research Affiliate, Massachusetts Institute of Technology, Cambridge, MA

- Laboratory for Manufacturing and Productivity. Helped graduate a Ph.D. student to develop a low-cost portable milk analyzer (protein + fat). Pranay went to Apple Health. Advised a masters degree student in the area of alfa toxins in cereal grains in India. The technology is a low cost option to monitor temperature warehoused in open air spaces. Nidhi graduated and went to work for Amazon-Robotics.

Collaborated with a German master's student in Munich (Munich University of Applied Sciences) and with Plasma Parylene Systems (Rosenheim, Germany) on the synthesis of fluorocarbon polymer precursors based on a phenoxy leaving group (free-radical polymerization in vacuum).

A multi-institute collaboration in Taiwan (National Taiwan University and National Taipei University of Technology) to develop 'colored' parylene. This is attaching a hydrocarbon chromophore directly to [2.2]paracyclophane. Unfortunately, these chromaphores are free-radical scavengers and interfere with the free-radical polymerization of parylene.

2007-Current: Independent Consultant (Innovation Advisor, Business Development, Scientific Advisor)

- Working with Bio-Device, Bio-Medical Device, Aerospace, Refractory Metal Suppliers, Analytical Chemistry, Semiconductor, Microelectronic Component, Textile, and VC-funded companies, in Asia (Taiwan, Korea and Japan), Europe, Mexico and the United States to solve manufacturing issues and develop new technology related to polymer membranes and coatings, silane passivation, adhesion, corrosion, wet chemical etching and thin film integration reliability including analytical tools and metrology. The work is either associated with acute manufacturing issues, long-term manufacturing quality/yield, or technology development.
- Partial List of Companies Served: W.L. Gore, Daktronics, Life Technologies, Advanced Bionics, Boston Scientific, HzO, Daetec, H.C. Starck (US and Germany), Moxtek, Giner, Phenomemex, Sunrise Systems, D3 LED, Apple, Triton Systems, Kisco Conformal Coating (US and Japan), Comelec SA (Switzerland), NCS Power, Honeywell, Invisage, Stratamet Thin Film, Goodrich Aerospace, DRS Technologies, Paratech Coating, VSI Parylene, Amptek, Interlub (Mexico), Macimex (Mexico), Blackhawk (Mexico), QCT (Mexico), Grupo Quimmco (Mexico), Nemak (Mexico, Grupo Alfa), Coviden/Medtronic, REBASA (Mexico) and Grupo Industrial Monclova (Mexico), Autlan (Mexico), Pumex (Mexico), Barrera Family (San Pedro Garza Garcia, Mexico), E25Bio, GE Precision Healthcare (Stockholm, Sweeden), Curtis-Wright.
- I have been working in the capacity of advisor for the owner of a 1.5 billion USD group in Mexico. In this capacity introducing new technologies which are profitable for manufacturing and for new investment opportunities as stand-alone businesses. Some of the topics are waste valorization (foundry, mining, steel, construction materials, agricultural products), business development opportunities with algas (algae, seaweed, kelp), fungi (pharma platform, homeopathic remedies and agricultural products).

2022-Current: Monterrey, NL, Mexico

My business partners and I set-up a new company to address the Circular Economy and Zero-Waste Initiatives. We are currently working with ferrous and non-ferrous foundry waste, mushroom substrate waste, mango and papaya waste.

2010-2014: Research Scientist, Massachusetts Institute of Technology, Cambridge, MA

- Managed a research group (four doctoral students and a master's student) at MIT involved with portable energy conversion devices based on thermophotovoltaics. I also advised multiple other faculty, post-docs and doctoral students on materials integration issues related mostly to energy generation and conversion and the fabrication of meta-materials. Principal day-to-day activities surrounded making key connections to companies, universities, and national laboratories to provide materials and processes and metrology support. This is often achieved through

collaboration.

- Developed the first Deep Reactive Ion Etch (DRIE) process for tantalum and tantalum/tungsten alloys.
- Developed novel sputtered (DC magnetron sputtering) tantalum coatings (up to 40 μm thick), which can be deep reactive ion etched (DRIE) for high temperature photonics 900-1000 $^{\circ}\text{C}$.
- Co-developed with Cabot Microelectronics the ability to grind/lap/polish tantalum and tantalum/tungsten alloys to silicon wafer like quality (roughness and flatness)
- Worked with the energy conversion devices involves: micromachining, e-beam and laser welding, die-attach, wire bonding, anti-reflective coatings (quarter wave stacks and Rugate filters), reactive ion etch (RIE), interference lithography, sputtering, e-beam deposition, doping and metallization of III-V semiconductors (mostly GaSb and InGaAs, boule and epitaxial grown). Many novel processes have been developed, especially focused around coatings technologies (polymer and refractory metal/ceramic).

2008-2010: Visiting Scientist, Massachusetts Institute of Technology, Cambridge, MA

- Visiting Scientist at the Institute of Soldier Nanotechnologies for Triton Systems (Chelmsford, MA). Developed technology on initiated CVD platform (polymer/metal oxide multilayer stacks, Distributed Bragg Reflectors) for laser eye protection and infrared applications. The low temperature oxide layers (mostly TiO_2) were deposited by hot-filament CVD, remote pyrolysis CVD, or PECVD via a pulsed magnetron source. The PECVD method yielded high quality scratch-resistant thin films and multilayer stacks, which were highly flexible (180° bending) without mechanical failure.

2009-2010: Technical Advisor, Kisco Conformal Coatings USA

- Technical Business Development and Technical Advisor for the parylene polymers. Interfaced and provided leadership to Apple Inc. to address their technical and manufacturing issues associated with protecting their primary circuit cards (iPod touch and iPhone) towards moisture, sweat, and other aggressive liquids. Worked with their National Sales and Marketing Manager to increase the sales of their parylene coating service business.

2004 – 2007: Scientist, R&D Division, Brewer Science Inc.(BSI), Rolla, MO

- Managed a 1.9 million USD congressional appropriations contract to develop new polymer CVD precursor chemistries. Transferred technology to BSI involved with parylene polymers (thermal CVD polymers). Later BSI returned this technology to me for commercialization purposes. I invented parylene X: a cross-linkable parylene chemistry. Built an alpha-300 mm CVD system, a unique research grade 100 mm CVD system, and a vacuum anneal system. Managed the CVD program consisting of multiple Ph.D. synthetic chemists as well as a research engineer. We accomplished the scale-up synthesis of the parylene X precursor to manufacturing and the manufacturability of the parylene X process.
- Invented a non-corrosive non-toxic inexpensive set of monomer precursors used to deposit known and novel parylene polymers. This included a novel scalable inexpensive route to parylene AF-4, α -methylated parylene (parylene AM-2), and alkyl- and aryl-ethynyl functionalized parylene polymers. Some of these precursors exist in the liquid-phase as well enable high volume manufacturing.

2002 – 2004: Research Assistant Professor of Physics, Rensselaer Polytechnic Institute

- Advised and graduated a chemical engineer doctoral student. Managed two post-docs and a research associate. Undertook research and was awarded grants to study how proteins interact with nanostructured surfaces. Undertook funded research with parylene polymers and self-assembled systems. This included synthesizing unique polymer systems (CVD precursors). The doctoral student worked on the adhesion of sputtered (PVD) tantalum to dielectric surfaces. He is now a Principal Engineer at Samsung Electronics, the research associate is now an Associate Professor of Chemistry at Princeton University, the post-doc is a Senior Process Engineer at Intel. Most of my research was focused on ease of manufacturing and on niche business opportunities, which could be scaled to high volume manufacturing.

1999-2002: Graduate Fellow, School of Science, Rensselaer Polytechnic Institute

- Prof. Toh-Ming Lu brought me on board the RPI interconnect/metallization center to work on research related to 3-D integration, with a primary focus to develop metallization techniques for through silicon vias (TSVs) for wafer-to-wafer stacking.
- Finished Ph.D. at RPI. Senior member and manager of a research group consisting of personnel with physics, EE, ChemE, chemistry, and materials science backgrounds. Extensively used Variable Angle Spectroscopic Ellipsometry (VASE), X-ray Photoelectron Spectroscopy (XPS), and Rutherford Backscattering (RBS) as characterization techniques. Invented noble metal atomic layer deposition (ALD) and novel methods of controlling the stress in PVD thin films (predominately tungsten but can be applied to all refractory metals).

1998-1999: Director of R&D, ACT-MicroDevices (later Haleos, then the Electro-optic division of Shipley, later Rohm&Haas, now Nuvotronics) Blacksburg, VA

- With the core research group at ACT, invented a MEMS-based pressure transducer (Si membrane) to monitor the pressure of combustion for automobiles. This was a joint partnership between ACT-MicroDevices and Bookham Technologies Inc. in 1999 and was later marketed to the German auto show. Bosch ultimately acquired the technology. ACT-MicroDevices was a major MEMS fab and was later bought out by Shipley (later Rohm & Haas and now Dow Chemical). Research was directed for design and fabrication of MEMS for numerous companies looking to make market entry into MEMS.

-ACT-MicroDevices grew rapidly manufacturing Si V-groove chips used to passively align optical fibers, with polished low loss connectors. We were a full MEMS foundry and had major contracts with Lucent to deposit anti-reflective coatings for ball lenses. We had full etching (RIE, ECR plasma) deposition (thermal, e-beam, plasma-assisted CVD), and lithography (contact) capabilities as well.

-While at ACT much work was undertaken with etching GaAs-based VCSEL arrays, selective etch of Si vs. SiN_x, ashing processes, selective etch of Si vs. SiO₂ with the use of an remote ECR microwave plasma with an rf chuck to control the DC self bias and also with a traditional rf capacitively coupled plasma system in RIE mode, and LPCVD oxide processes (TiO₂, low stress SiN_x, SiO₂, and boron and phosphorous doped SiO₂).

1995-1998: Research Assistant (Doctoral Work), Virginia Tech, Blacksburg, VA

- Published 20 peer-reviewed research papers, 3 patents, 3 conference proceedings, and won numerous awards including the Materials Research Society Graduate Student Award (Spring

98')

- Dissertation: Low Temperature Chemical Vapor Depositible Thin Films.
- Undertook research with low temperature remote pyrolysis CVD processes. Invented a low temperature SiO₂ deposition technique that could be combined with the parylene polymers to produce nanocomposite, multilayer, and graded optical films. Undertook extensive classes in adhesion, polymer physics, and all aspects of materials science while at VPI. Invented nanoporous SiO₂ using parylene C as a sacrificial material.

1993-1994: Research Assistant, University of Nevada, Reno, NV

- Worked under a DOE grant to study remote electrical methods to monitor the corrosion of the canisters that would hold high level nuclear waste at the Yucca Mt. waste repository. Took fundamental ChemE classes, electrochemistry and corrosion, and related chemistry classes.

1993: Chemist, Lawrence Livermore National Laboratory, Livermore, CA

- Worked on a grant from Boeing to study the corrosion in the aluminum skin of the jet fuselage. This was in response to a jet that had its fuselage ripped open after departing from Honolulu in 1988. This work was undertaken in chemistry division of LLNL.

1992: Research Assistant, Oak Ridge National Laboratory, Oak Ridge, TN

- Worked at the Surface Modification and Characterization Center (SMAC) that consisted of ion-implantation, Rutherford Backscattering, ion-channeling, and laser annealing techniques in the solid-state division of ORNL. I also interfaced with the high temperature materials laboratory and learned Auger Electron Spectroscopy, X-ray Photoelectron Spectroscopy, High-Resolution TEM and related thin film characterization techniques. Ge implanted amorphous Si research was undertaken to create more efficient photovoltaics (multi-level band-gap PVs).

Inventions

- Invented (with Justin Gaynor (Texas Instruments) and Doug Guerrero (Brewer Science)) parylene VT-4 (also called parylene F)
- Invented a near-room temperature thermal SiO₂ CVD process
 - First parylene C/SiO₂ nanocomposite
 - First parylene C/SiO₂ nano-multilayer film stack
- Co-inventor (with ACT-MicroDevices engineering team) of the MEMS (epi-Si membrane) optical-based automobile pressure transducer
- Invented noble metal Atomic Layer Deposition (ALD) (palladium and all group VIII metals) on noble metal and dielectric surfaces
- Invented Molecular Layer Chemistry via phenyl-phenyl ring interaction (selective against transition metals and no pre-treatment of the surfaces necessary). This can be accomplished via parylene chemistry or silanes with phenyl ring moieties.
- Invented parylene X (cross-linkable parylene, CVD adhesive, can undergo click chemistry)
- Invented a non-corrosive oxidative CVD process. Can polymerize coal-tar derivatives including polyacenaphthene, polyacenaphthylene, polyindane, polypyrrole, which are both non-conjugated (dielectrics) and conjugated (photoluminescent) with the potential to be conducting once doped.
- Developed (with MIT research group and Bob Geil at UNC-Chapel Hill) the first deep

- reactive ion etching (DRIE) process for tantalum (Ta)
- Developed (with MIT research group) the first tantalum (Ta) 2-D photonic crystal stable at 900 °C for extended periods of time that can also be machined and welded for combustion reactors.
- Developed (with MIT research group) the first alloy 2-D photonic crystal (Ta 3%W)
- Invented a liquid precursor route (alkoxide leaving groups) to parylene N
- Invented poly(α,α' -dimethyl-*p*-xylylene) and poly($\alpha,\alpha,\alpha',\alpha'$ -tetramethyl-*p*-xylylene)-co-poly(*p*-xylylene) from inexpensive scalable alkoxide precursors
- Invented phenylethynyl-parylene
- Invented *t*-butylethynyl-parylene
- Invented an alternative route to parylene AF-4 based on phenoxy leaving groups and a radical trap
- Invented an ultra-thin spray-on adhesive (~500 Å thick), which is thermal or UV-cured.
- Co-Developed with Moxtek the first carbon fiber/polymer membrane X-ray window for energy dispersive X-ray analysis

Teaching Experience

Guest Lecturer (Physics Dept. RPI) 2003

General Chemistry Laboratory (CHEM 1045), Teaching Assistant, Virginia Tech, Fall 1998.
Taught 3 sections of general chemistry for engineering students

Physical Ceramics Laboratory (MSE 4424), Teaching Assistant, Virginia Tech, Fall 1995.

Polymer Engineering (MSE 4554), Teaching Assistant, Virginia Tech, Spring 1995.

Tutor, University of Nevada, 1993-94' General Physics, Calculus, Differential Equations, Engineering Statics and Dynamics, Physical Chemistry, Organic Chemistry

Honors

- Best Poster Presentation Award “56th Annual Meeting of the International Society of Electrochemistry” 09/05 Busan, Korea (with Y.-S. Kim, H.-I. Kim, M. A. Dar, H.-K. Seo, H.-S. Shin, and T.-M. Lu)
- Ray Palmer Baker Faculty Fellowship, School of Science, RPI, 08/02 to 08/04
- Ray Palmer Baker Graduate Fellowship, School of Science, RPI, 08/99 to 08/02
- Materials Research Society Graduate Student Award Winner, Spring Meeting 98'
- Graduate Research Development Grant, Virginia Tech, 02/98
- Dr. Roy G. Mikalson Scholarship, Virginia Tech
- Mackay School of Mines Graduate Scholarship, University of Nevada 05/94
- Scholarship-Air & Waste Management Assoc., Cal Poly - 05/93
- Physical Polymer Chemistry Scholarship, Cal Poly - 10/92
- Doyle Scholarship, Santa Rosa Junior College - 03/90

Journal Peer Reviewer

Advanced Materials
Applied Surface Science
Chemistry of Materials
Chemical Vapor Deposition
Electrochemical and Solid-State Letters
IEEE Transactions Semiconductor Manufacturing
Langmuir
Macromolecular Rapid Communications
Macromolecules
Journal of Applied Polymer Science
Journal of Vacuum Science and Technology A
Journal of Vacuum Science and Technology B
Journal of the Electrochemical Society
Materials Science and Engineering B
Materials Science and Engineering C
Polymer Degradation and Stability
Thin Solid Films

Patents & Patent Applications

1. Patent World Intellectual Property Organization (WIPO) #**WO9957330(A1)** (Nov 11, 1999) and U.S. Patent #**6,358,863** (March 19, 2002) S.B. Desu, J.J. Senkevich, "Oxide/Organic Polymer Multilayer Thin Films Deposited by Chemical Vapor Deposition."
2. U.S. Patent #**6,316,055** (November 13, 2001) S.B. Desu, J.J. Senkevich, "Near-Room Temperature Thermal Chemical Vapor Deposition of Oxide Films."
3. U.S. Patent #**6,495,208** (December 17, 2002) S.B. Desu, J.J. Senkevich, "Near-room temperature CVD synthesis of organic polymer/oxide dielectric nanocomposites"
4. Patent World Intellectual Property Organization (WIPO) #**WO2004016672(A3)** (May 13, 2004) and U.S. Patent #**7,501,154** (March 10, 2009) J.J. Senkevich, T.-M. Lu, G. Yang, "Surface modification of CVD polymer films"
5. U.S. Patent Application #**20060093848** "Atomic Layer Deposition of Noble Metals" J.J. Senkevich and Toh-Ming Lu
6. Patent World Intellectual Property Organization (WIPO) #**WO2004035858(A2)** (April 29, 2004) and U.S. Patent Application #**20070042609** "Molecular Caulk: A Pore Sealant for Ultra-Low k dielectrics" J.J. Senkevich, C. Jezewski, C.J. Wiegand, T.-M. Lu
7. Patent World Intellectual Property Organization (WIPO) #**WO2006101902(A3)** (March 22, 2007) and U.S. Patent Application #**20070260097** "Deposition of Polymeric Materials and Precursors Therefor" J.J. Senkevich

Invited Talks

1. Brewer Science Inc. (Rolla, MO) September 2002 "Ultra-thin Organic Diffusion and Wetting Layers for Cu/low κ Integration"
2. LSI-Logic (Gresham, OR) September 2002 "Materials Solutions for the End of the Roadmap: Cu/low κ Integration"

3. Specialty Coating Systems (Indianapolis, IN) November 2002 "New Business Opportunities with Novel parylenes"
4. Texas Tech University (Depts. of EE and Physics), February 2003 "The Activation of Dielectric Surfaces: Implications for the Metal/Dielectric Interface"
5. LSI-Logic (Gresham, OR) April 2003 "Materials Solutions for the End of the Roadmap: Cu/Low κ integration: Molecular Caulking Technology"
6. University of Oregon (Materials Science Institute), April 2003 "The Atomic Layer Deposition of Palladium via beta-diketonates"
7. University of Missouri - Columbia (Depts. of ECE and Physics), October 2003 "Molecular Caulk: A Pore Sealing Technology for Ultra-Low K Dielectrics"
8. Brewer Science Inc. (Rolla, Mo) October 2003 "Molecular Caulk: A Pore Sealing Technology for Ultra-Low K Dielectrics"
9. Materials Research Society Symposium (Symposium F Materials, Technology, and Reliability for Advanced Interconnects and Low-k Dielectrics), April 2004 "Molecular Caulk: A Pore Sealing Technology for Ultra-Low K Dielectrics"
10. Southwest Missouri State University (Dept of Physics, Astronomy, and Materials Science), January 2004 "The Atomic Layer Deposition of Palladium via beta-diketonates"
11. University of Maryland (Materials Science & Engineering Dep.) April 2004 "Control of Chemistry at Nanostructured/Metal Interfaces via Palladium Atomic Layer Deposition"
12. KLA-Tencor (San Jose, CA) April 2004 "Molecular Caulk: A pore sealing technology for ultra-low k dielectrics & Cu Electroless Plating of Atomic Layer Deposited Pd Passivated Barriers"
13. Novellus Systems (San Jose, CA) April 2004 "Palladium Atomic Layer Deposition: Interfacial Chemical Aspects"
14. Applied Materials (Santa Clara, CA) June 2004 "Molecular Caulk: A Pore Sealing Technology for Porous Dielectrics"
15. Novellus Systems (San Jose, CA) June 2004 "Molecular Caulk: A pore sealing technology for ultra-low k dielectrics "
16. University of Auckland (Chemical Engineering Department, Auckland, New Zealand) July 2004 "Control of Chemistry at Nanostructured/Metal Interfaces via Palladium Atomic Layer Deposition"
17. Sematech (Austin, TX) November 2004 "Advanced Molecular Caulk: *Enabling Aspects*"
18. Eighth International Symposium on Silicon Nitride and Silicon Dioxide Thin Insulating Films and Other Emerging Dielectrics 207th ECS Meeting – May 15-20, 2005 Quebec City, Canada "Pore Sealing for Low-k Dielectric Integration into Integrated Circuits"

19. PEUG/TFUG Annual Symposium (San Jose, CA) October 2005 “Ultra Low K integration for 45nm Molecular Caulk”
20. IMEC (Leuven, Belgium) February 2006 “Molecular Caulk: Beyond Electrical Testing”
21. Chonbuk National University, Jeonju, Korea April 2007 “Unique Vapor Depositible Polymers”
22. Intermolecular Inc., San Jose, CA August 2007 “Molecular Layer Chemistry”
23. University of Missouri – Rolla October 2007 “Unique Vapor Depositible Polymers”
24. GVD Inc., Cambridge, Mass April 2008 “Molecular Layer Chemistry *via* Parylenes”
25. Sematech, Austin, TX July 2008 “Molecular Layer Chemistry *via* Parylenes”
26. Analog Devices, Cambridge, Mass September 2008 “Molecular Layer Chemistry – Parylenes”
27. Comelec, La Chaux-de-Fonds, Switzerland October 2008 “Molecular Layer Chemistry – Parylenes”
28. TEL/Epion at Albany Nanotech, Albany, NY October 2008 “Molecular Layer Chemistry – Parylene and Parylene X”
29. Triton Systems, Lowell, Mass November 2008 “Unique Processing of CVD Polymers, Molecular Layer Chemistry, and Parylene X”
30. Moxtek Inc., Orem, Utah February 2011 “Materials Integration Issues for High-Efficiency Millimeter-Scale Thermophotovoltaic Devices”
31. Phenomenex Inc., Torrance, CA March 2013 “Micro-TPV power system on chip: MEMs based approach”
32. Saudi Aramco Services Cambridge, MA January 2015 “High-temperature Nanophotonics-Enabled Solid-State Energy Conversion”
33. Interlub Annual Conference, Guadalajara, Jalisco, Mexico, December 2015 “A Short Tale of Two Research Projects”

Non-Technical Publications

1. “Waterfall Magnetism” *LIVE. LOVE. LOCAL. MICHIGAN* November 2023
2. “Magical Michigan” *LIVE. LOVE. LOCAL. MICHIGAN* December 2023
3. “Funky Fungi” *The North Star Magazine* Spring 2024
4. "Paddling with the Eagles: 434 miles along the Wisconsin" *In Press*

Conference Talks, Proceedings & Trade Journals

1. J.J. Senkevich, S.B. Desu "Poly(tetrafluoro-*p*-xylylene), a New Low Dielectric Constant Thermal CVD Polymer" *Proc. Adv. Metallization and Interconnect Systems for ULSI Appl.*, San Diego, CA Sept. 30-Oct. 2, 1997 (Materials Research Society, Warrendale, PA 1998) p. 331-5.
2. J.J. Senkevich, S.B. Desu "Anisotropy in CVD Polymer Thin Films" *Semicond. International* **21**(6), 151-6 (June 1998).
3. J.J. Senkevich, V. Simkovic, S.B. Desu "Optical Birefringence to Determine Morphological Changes in Low- κ Thin Film CVD Polymers, *Mat. Res. Soc. Symp. Proc.* **511**, 139-44 (1998)
4. P.-I. Wang, Y.-P. Zhao, E. Barnat, J.J. Senkevich, A. Vijayaraghavan, T.-M. Lu "TEM studies of the in situ heating of nano-structured Cu" Materials Research Society Spring Meeting, San Francisco, CA, April 1-3 (2002).
5. Dae-Lok Bae, Jay J. Senkevich, Yongchai Kwon, Timothy S. Cale "Direct Copper Metallization on Low-k SiLK Activated by Plasma Enhanced Chemical Vapor Deposition (PE-CVD) of Sulfur, Santa Clara, CA, AVS 4th International Conference on Microelectronics and Interfaces, March 3-6 (2003).
6. Dae-Lok Bae, J.J. Senkevich, Y. Kwon, T.S. Cale "Effect of Plasma Sulfur Activation of SiLK on the Adhesion of Copper", 203rd Meeting of the Electrochemical Society in Paris, France April 27-May 2 (2003).
7. Christopher Jezewski, William F. Lanford, Jay J. Senkevich, Toh-Ming Lu "Remote Atomic Hydrogen Activated Metal Atomic Layer Deposition on Insulating Surfaces Via Metallorganic Precursors", SRC Techcon Conference, Augst 25-27 Dallas, TX (2003).
8. Christopher J. Wiegand, Christopher Jezewski, Dexian Ye, Anupama Mallikarjunan, Deli Lu, William F. Lanford, Gwo-Ching Wang, Jay J. Senkevich, and Toh-Ming Lu "Molecular Sealing of Porous Ultra-low k Films", SRC Techcon Conference, Augst 25-27 Dallas, TX (2003).
9. Hisham Bani-Salameh, Roger Lichti., Jay Senkevich, C. Wiegand "Free Radicals Formation By Annealing Of Parylene N" Joint Fall Meeting of the Texas Sections of the American Physical Society and American Association of Physics Teachers, Zone 13 Society of Physics Students October 23-25, 2003, Texas Tech Campus, Lubbock, Texas.
10. T. Karabacak, J.J. Senkevich, G.-C. Wang, T.-M. Lu, "Reduced Stress Magnetron Sputtered Tungsten Thin Films via Nanostructured Compliant Layer" MRS Spring Meeting 04'
11. J.J. Senkevich, G.A. Ten Eyck, F. Tang, D. Liu, S. Pimanpang, G.-C. Wang, T.-M. Lu, C. Jezewski and W.A. Lanford, "Plasma Assisted ALD of Pd on W and TaN Barrier Layers" Fifth International Conference on Microelectronics and Interfaces March 1-3 2004 Santa Clara, CA
12. J.J. Senkevich, G.A. Ten Eyck, F. Tang, D. Liu, S. Pimanpang, G.-C. Wang, T.-M. Lu, C. Jezewski and W.A. Lanford, "J.J. Senkevich, Y.S. Kim, D. Liu, T. Karabacak, D. Ye, G.A. Ten Eyck, G.-C. Wang, and T.-M. Lu" Fifth International Conference on Microelectronics and Interfaces March 1-3 2004 Santa Clara, CA
13. J.J. Senkevich, C. Jezewski, D. Liu, W.A. Lanford, G.-C. Wang, T.-M. Lu, *Materials Research Society Symposium* (Symposium F Materials, Technology, and Reliability for Advanced Interconnects and Low-k Dielectrics), "Molecular Caulk: A Pore Sealing Technology for Ultra-Low K Dielectric **812**, F1.2.1 (2004).
14. Christopher Jezewski, William A. Lanford, Christopher J. Wiegand, Jay J. Senkevich, and Toh-Ming Lu "Effective Pore Sealing of Ultralow-k Dielectrics" *Semiconductor*

International May 2004.

15. T. Karabacak, J.J. Senkevich, G.-W. Wang, T.-M. Lu, “Stress Reduction in Sputter Deposited Thin Films using Physically Self-Assembled Nanostructures as Compliant Layers” 47th Annual SVC Technical Conference and Smart Materials Symposium, April 24–29, 2004 Dallas, TX
16. T. Karabacak, J.J. Senkevich, G.-W. Wang, T.-M. Lu, “Stress Reduction in Sputter Deposited Thin Films using Nanostructures by High Working Gas Pressures” *AVS 51st International Symposium*, November 14-19, 2004, Anaheim, CA
17. Y.-S. Kim, J. Senkevich, T.-M. Lu, H.-S. Shin, "Pd deposited by atomic layer deposition on TaN substrate and Cu fill-up of the damascene structure using electroless deposition", Proceeding of 2004 KICChE Spring Meeting in Korea
18. Y.-S. Kim, H.-I. Kim, J.-H. Cho, H.-K. Seo, G.-S. Kim, H.-S. Shin, J. Senkevich, G.A. Ten Eyck, T.-M. Lu “Substrate-dependent Copper Electroless Deposition” Electrochemical Processing in ULSI Fabrication and Electrodeposition of and on Semiconductors VI, 207th ECS Meeting – May 15-20, 2005 Quebec City, Canada.
19. J.J. Senkevich, D.-L. Bae and T.S. Cale “Improving the Fracture Toughness of Porous Methyl Silsesquioxane Pore Sealed with Molecular Caulk” Sixth International Conference on Microelectronics and Interfaces March 21-23 2005 Santa Clara, CA
20. B.P. Carrow, R.E. Murray, B.W. Woods, and J.J. Senkevich “Poly(ethynyl-*p*-xylylene) An Advanced Molecular Caulk CVD Polymer” *Materials Research Society Symposium Proceedings* **863**, no. Materials, Technology and Reliability of Advanced Interconnects-- 2005 (2005): 189-194.
21. T.S. Cale, C. Jezewski, D. Bae and J.J. Senkevich "Pore Sealing for Low-k Dielectric Integration into Integrated Circuits" Eighth International Symposium on Silicon Nitride and Silicon Dioxide Thin Insulating Films and Other Emerging Dielectrics, 207th ECS Meeting – May 15-20, 2005 Quebec City, Canada.
22. J.J. Senkevich, B.P. Carrow, B.W. Woods, R.E. Murray “Parylene X: A Candidate Cross-Linkable Chemical Vapor Depositible Polymer for Wafer-to-Wafer Bonding” The Twenty Second International VLSI/ULSI Multilevel Interconnection Conference (2005 VMIC), October 3 – 6, 2005, Fremont, CA.
23. J.J. Senkevich, B.P. Carrow, B.W. Woods, D.-L. Bae, T.S. Cale, and P.-I Wang “Molecular Caulk: Enabling aspects for ultra-low κ dielectric integration” *Advanced Metallization Conference (AMC) 2005*, September 27-29, 2005, Colorado Springs, Colorado.
24. J.J. Senkevich, B.P. Carrow, and P.-I Wang “Thermal and Dielectric Stability of Parylene X” *Materials Research Society Symposium Proceedings (F)* **914**, no. Materials, Technology, and Reliability of Low-k Dielectrics and Copper Interconnects (2006), F03-06.
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