

## Gregory S. Herman

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Adjunct Professor, Materials Science  
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### EDUCATION:

Ph.D. in Physical Chemistry, University of Hawaii, Honolulu, HI, 1992  
B.S. in Chemistry, University of Wisconsin-Parkside, Kenosha, WI, 1985

### ACADEMIC POSITIONS:

Professor, Oregon State University, Corvallis, OR, 2015 to present  
Associate Professor, Oregon State University, Corvallis, OR, 2009 to 2015  
Research/Teaching Assistant, University of Hawaii, Honolulu, HI, 1985 to 1992

### NON-ACADEMIC POSITIONS:

Senior Scientist, Sharp Laboratories of America, Camas, WA, 2007 to 2009  
R&D Engineer, Hewlett-Packard Company, Corvallis, OR, 2001 to 2007  
Senior Research Scientist, Pacific Northwest National Laboratory, Richland, WA, 1992 to 2001  
Postdoctoral Research Fellow, Naval Research Laboratory, Washington, DC, 1992

### PUBLICATIONS:

#### Journal and Refereed Publications (reverse chronological order)

As of December 1, 2015 Google Scholar reports 7649 citations, an h index of 39, and an i10-index of 74 for all publications and patents.

98. "Mechanisms directing the nanoscale patterning of thin films of hafnium clusters", F. Luo, R.E. Ruther, R.P. Oleksak, J.M. Amador, S.R. Decker, M.N. Jackson, J.R. Motley, D. W. Johnson, G.S. Herman, E.L. Garfunkel, D.A. Keszler, *Chemistry of Materials* (in preparation).
97. "Glucose Sensing Using Functionalized Amorphous In-Ga-Zn-O Field Effect Transistors", X. Du, R.T. Frederick, Y. Li, J. Motley, W.F. Stickle, G.S. Herman, *ACS Applied Materials and Interfaces* (submitted).
96. "Non-uniform Composition Profiles in Inorganic Thin Films from Aqueous Solutions", K.C. Fairley, D.R. Merrill, K.N. Woods, J. Ditto, C. Xu, R.P. Oleksak, T. Gustafsson, D.W. Johnson, E.L. Garfunkel, G.S. Herman, D.C. Johnson, C.J. Page, *ACS Applied Materials and Interfaces* **8**, 209-213 (2016).
95. "Thermal Stability of Amorphous Ta-Ni-Si Diffusion Barriers", R.P. Oleksak, A. Devaraj, G.S. Herman, *Materials Letters* **164**, 9-14 (2016).

94. "Thermal oxidation of Zr-Cu-Al-Ni amorphous metal thin films", R.P. Oleksak, E.B. Hostetler, B.T. Flynn, J. McGlone, N.P. Landau, J.F. Wager, W.F. Stickle, G.S. Herman, *Thin Solid Films* **595**, 209-213 (2015).
93. "Amorphous In-Ga-Zn-O Thin-Film Transistors Fabricated by Microcontact Printing", X. Du, R.T. Frederick, Y. Li, Z. Zhou, W.F. Stickle, G.S. Herman, *Journal of Vacuum Science and Technology B* **33**, 214504-1-052208-6 (2015).
92. "Structural and optical characterization of CuInS<sub>2</sub> quantum dots synthesized by microwave-assisted continuous flow methods", R.C. Fitzmorris, Z. Zhou, R.P. Oleksak, B.D. Mangum, J.N. Kurtin, G.S. Herman, *Journal of Nanoparticle Research* **17**, 319 (2015).
91. "Gas-liquid segmented flow microwave-assisted synthesis of MOF-74(Ni) under moderate pressures", G.H. Albuquerque, R.C. Fitzmorris, M. Ahmadi, P.K. Thallapally, B.P. McGrail, G.S. Herman, *CrystEngComm* **17**, 5502-5510 (2015).
90. "Aqueous-based Synthesis of Gallium Tungsten Oxide Thin Film Dielectrics", R.P. Oleksak, W.F. Stickle, G.S. Herman, *Journal of Materials Chemistry C* **3**, 3114-3120 (2015).
89. "Fabrication and Characterization of an Amperometric Glucose Sensor on a Flexible Polyimide Substrate", X. Du, C.J. Durgan, D. J. Matthews, J.R. Motley, X. Tan, K. Pholsena, L. Árnadóttir, J.R. Castle, P.G. Jacobs, R.S. Cargill, W.K. Ward, J.F. Conley, G.S. Herman, *ECS Journal of Solid State Science and Technology* **4**, P3069-P3074 (2015).
88. "Growth and Surface Modification of LaFeO<sub>3</sub> Thin Films Induced By Reductive Annealing", B.T. Flynn, H. Zhang, V. Shutthanandan, T. Varga, R.J. Colby, R.P. Oleksak, S. Manandhar, M.H. Engelhard, S.A. Chambers, M.A. Henderson, G.S. Herman, S. Thevuthasan, *Applied Surface Science* **330**, 309-315 (2015).
87. "A continuous microwave-assisted gas-liquid segmented flow reactor for controlled nucleation and growth of nanocrystals", K.-J. Kim, R.P. Oleksak, E.B. Hostetler, D.A. Peterson, P. Chandran, G.S. Herman, B.K. Paul, D.M. Schut, C.-H. Chang, *Crystal Growth & Design* **14**, 5349-5355 (2014).
86. "Role of Self-Assembled Monolayers on Improved Electrical Stability of Amorphous In-Ga-Zn-O Thin-Film Transistors", X. Du, B.T. Flynn, J.R. Motley, W.F. Stickle, H. Bluhm, G.S. Herman, *ECS Journal of Solid State Science and Technology* **3**, Q3045-Q3049 (2014).
85. "Characterization of high-resolution HafSO<sub>x</sub> inorganic resists", R.P. Oleksak, G. S. Herman, *Proceedings of SPIE 9048, Extreme Ultraviolet Lithography V*, 90483H (2014).
84. "Synthesis of colloidal PbSe nanoparticles using a microwave-assisted segmented continuous flow reactor", E.B. Hostetler, K.-J. Kim, R.P. Oleksak, R.C. Fitzmorris, C.-H. Chang, D.A. Peterson, P. Chandran, B.K. Paul, D.M. Schut, G.S. Herman, *Materials Letters* **128**, 54-59 (2014).
83. "Rapid and Continuous Synthesis of Chalcopyrite Copper Indium Diselenide Nanocrystal Ink", K.-J. Kim, R.P. Oleksak, M.W. Knapp, P.B. Krieder, G.S. Herman, C.-H. Chang, *RSC Advances* **4**, 16418-16424 (2014).

82. "In-situ Characterization of Aqueous-based Hafnium Oxide Hydroxide Sulfate Thin Films", B. Flynn, D. Kim, B.L. Clark, A. Telecky, L. Arnadottir, J. Szanyi, D.A. Keszler, G.S. Herman, *Surface and Interface Analysis* **46**, 210-215 (2014).
81. "Chemical and structural investigation of high-resolution patterning with HafSOx", R.P. Oleksak, R.E. Ruther, F. Luo, K. Fairley, S.R. Decker, W.F. Stickle, D.W. Johnson, E.L. Garfunkel, G.S. Herman, D.A. Keszler, *ACS Applied Materials and Interfaces* **6**, 2917-2921 (2014).
80. "Microwave-assisted Synthesis of CuInSe<sub>2</sub> Nanoparticles in Low-absorbing Solvents", R.P. Oleksak, B.T. Flynn, D. M. Schut, G.S. Herman, *Physica Status Solidi A* **211**, 219-225 (2014).
79. "Improved stability of amorphous zinc tin oxide thin film transistors using molecular passivation", M.S. Rajachidambaram, A. Pandey, S. Vilayurganapathy, P. Nachimuthu, S. Thevuthasan, G.S. Herman, *Applied Physics Letters* **103**, 171602-1-171602-5 (2013).
78. "Continuous Flow Mesofluidic Synthesis of Cu<sub>2</sub>ZnSnS<sub>4</sub> Nanoparticle Inks", B. Flynn, I. Braly, P. Glover, R.P. Oleksak, C. Durgan, G.S. Herman, *Materials Letters* **107**, 214-217 (2013).
77. "Characterization of Oxygen and Titanium Diffusion at the Anatase TiO<sub>2</sub>(001) Surface", G.S. Herman, R.T. Zehr, M.A. Henderson, *Surface Science* **612**, L5-L8 (2013).
76. "Bipolar Resistive Switching in an Amorphous Zinc Tin Oxide Memristive Device", J.S. Rajachidambaram, S. Murali, J.F. Conley, S.L. Golledge G.S. Herman, *Journal of Vacuum Science and Technology B* **31**, 01A104-1-01A104-6 (2013).
75. "Resistive Switching in Zinc-Tin-Oxide", S. Murali, J.S. Rajachidambaram, S.-Y. Han, C.-H. Chang, G.S. Herman, J.F. Conley, *Solid-State Electronics* **79**, 248-252 (2013).
74. "Microwave Assisted Synthesis of Cu<sub>2</sub>ZnSnS<sub>4</sub> Colloidal Nanoparticle Inks", B. Flynn, W. Wang, C.-H. Chang, G.S. Herman, *Physica Status Solidi A* **209**, 2186-2194 (2012).
73. "Characterization of Amorphous Zinc Tin Oxide Semiconductors", J.S. Rajachidambaram, S. Sanhavi, P. Nachimuthu, V. Shutthanandan, T. Varga, B. Flynn, S. Thevuthasan, G.S. Herman, *Journal of Materials Research* **27**, 2309-2317 (2012).
72. "Formation and Characterization of Zinc Oxide Films Using Zinc Nanoparticle Dispersions", M.S. Rajachidambaram, T. Varga, L. Kovarik, R. Sanghavi, V. Shutthanandan, S. Thevuthasan, S.-Y. Han, C.-H. Chang, G.S. Herman, *Journal of Vacuum Science and Technology B* **30**, 041805-1-041805-7 (2012). (**Journal Cover Art**)
71. "Low-Temperature, High-Performance, Solution-Processed Indium Oxide Thin-Film Transistors", S.Y. Han, G.S. Herman, C.-H. Chang, *Journal of the American Chemical Society* **133**, 5166-5169 (2011).
70. "Inkjet-Printed High Mobility Transparent-Oxide Semiconductors", S.Y. Han, D.H. Lee, G.S. Herman, C.-H. Chang, *Journal of Display Technology* **5**, 520-524 (2009).
69. "Inkjet Printed High-Mobility Indium Zinc Tin Oxide Thin Film Transistors", D.-H. Lee, S.-Y. Han, G.S. Herman, C.-H. Chang, *Journal of Materials Chemistry* **19**, 3135-3137 (2009).

## **PATENTS:**

66. "Semiconductor film composition", G.S. Herman, D. Punsalan, R. Hoffman, J. Anderson, D. Keszler, D. Blessing, US8969865, (2015).
65. "Semiconductor devices and methods of making", G.S. Herman, P.P. Mardilovich, R.L. Hoffman, US8823100, (2014).
64. "Microelectronic device", G.S. Herman, B. Clark, Z. Chen, US8686412, (2014).
63. "Method of making a semiconductor device having a multicomponent oxide", R.L. Hoffman, G.S. Herman, P.P. Mardilovich, US8647031, (2014).
62. "Multilayer device with organic and inorganic dielectric material", P.P. Mardilovich, R.L. Hoffman, G.S. Herman, US8587093, (2013).
61. "Metal oxide semiconductor thin film transistors", G.S. Herman, J.-S. Maa, K. Puntambekar, A.T. Voutsas US8513720, (2013).
60. "Solution process for fabricating a textured transparent conductive oxide (TCO)", J.-S. Maa, G.S. Herman, A.T. Voutsas, US8404302, (2013).
59. "Semiconductor device with multiple component oxide channel", R.L. Hoffman, G.S. Herman, P.P. Mardilovich, US8314420, (2012).
58. "Semiconductor device having a metal oxide channel", R. Hoffman, G.S. Herman, P. Mardilovich, US8203144, (2012).
57. "Method of forming a component having dielectric sub-layers", P. Mardilovich, L. Kramer, G.S. Herman, R. Hoffman, D. Punsalan, US8143706, (2012).
56. "Making a structure", G.S. Herman, P. Mardilovich, C. Betrabet, C.-H. Chang, Y.-J. Chang, D.-H. Lee, M.W. Hoskins, US8143616, (2012).
55. "Multilayer dielectric defect method", G.S. Herman, P. Mardilovich, R.L. Hoffman, L.L. Kramer, K.M. Ulmer, US8143128, (2012).
54. "System and method for manufacturing a thin-film device", R. Hoffman, G. Herman, US8101947, (2012).
53. "Microelectronic Device", G.S. Herman, R. Hoffman, T. Yamashita, D.J. Smith, US8058096, (2011).
52. "Fuel cell with integral manifold and laterally spaced electrodes", D.A. Kearl, D. Champion, G.S. Herman, R.B. Peterson, US7981560, (2011).
51. "Inkjet ink compositions and methods of making the same", L.J. Rolly, T. Etheridge, S. Moller, G. Hinch, G.S. Herman, US7867328, (2011).

### **News Media & Press Releases**

16. NSF awards \$4.5 million nanotechnology grant to OSU partnership, OSU Press Release, October 5, 2015, Krista Klinkhammer.
15. “Quantum dot” technology may help light the future, OSU Press Release, August 19, 2015, David Stauth.
14. “Additive manufacturing” could greatly improve diabetes management, OSU Press Release, March 16, 2015, David Stauth.
13. “NSF grant gives OSU unique materials characterization capability”, OSU Press Release, September 2, 2014, David Stauth.
12. “Technology Using Microwave heating May Impact Electronics Manufacture”, OSU Press Release, June 10, 2014, David Stauth.
11. “LED Lighting that is Better, Cheaper and Could Save Billions”, Oregon BEST Press Release, July 31, 2013, Gregg Kleiner.
10. “Antifreeze, cheap materials may lead to low-cost solar energy”, OSU Press Release, July 3, 2013, David Stauth.
9. “Microwave Ovens May Help Produce Lower Cost Solar Energy Technology”, OSU Press Release, August 24, 2012, David Stauth.
8. “Bright Idea”, Terra, Fall 2010 Issue
7. “Bright Idea”, OSU Press Release, September 14, 2011, David Stauth.
6. “Inkjet Printing Could Change the Face of Solar Cell Industry”, OSU Press Release, June 28, 2011, David Stauth.
5. “OSU Solar Vehicle Team and the Oregon Process Innovation Center (OPIC) Lab”, Green Science Oregon, Episode 11, broadcast February 5, 2011, Rick Coyle.
4. “New OSU Solar Research Center to Open in May”, Portland Business Journal, Sustainable Business Oregon, March 15, 2010, Erik Siemers.
3. “Solar Cell Research”, KMTR-16, broadcast February 8, 2010, Matt Templeman.
2. “New Solar Reactor Facility to Open in Corvallis in Spring”, The Daily Barometer, January 20, 2010, Michelle Ofelt.
1. “Solar Research Center May Spur Innovation, Industry Development in Oregon”, OSU Press Release, January 8, 2010, David Stauth.

### **Professional Society Membership (present)**

American Chemical Society, American Vacuum Society, Materials Research Society

**Awards (recent)**

16. Oregon State University, College of Engineering, Research Collaboration Award, 2015
15. American Vacuum Society Fellow, 2014
14. Sharp Laboratories of America Invention of the Year, 2010
13. Sharp Laboratories of America Faculty Scholar, 2010, 2011, 2012
12. ONAMI Signature Faculty Fellow, 2009-present