

- **Lightdrop Harvest, LLC**, St. Marys, PA
Chief Scientist, Managing Member: 9/12– present
 Founded company to pursue scientific consulting, specializing in photovoltaics, and the design, installation, and testing of stand-alone and grid tied solar generators.
- **Suniva, Inc.**, Norcross, GA
Vice President of R&D: 10/07 – 4/10; Chief Scientist: 4/10 – 7/12
 Recruited as a core member to lead the R&D effort of start-up Suniva, a crystalline silicon solar company backed by venture-capital funding. In that role, hired the R&D staff, outfitted the 5,000 square foot R&D laboratory with state-of-the-art equipment to process silicon wafers into high-efficiency solar cells and to characterize that process at every step, introduced ion implantation for p-n junction formation to reduce the number of processing steps while increasing cell efficiency. By the end of 2009, the R&D staff of nine scientists, engineers, and technicians had produced production-worthy full-sized (156 mm pseudosquare) silicon solar cells with 19% efficiency in the R&D laboratory. Such cells are now in daily production at Suniva. As Chief Scientist, emphasis was on creating, protecting, and deploying new cell and module technologies for high-efficiency, production-worthy and cost-effective products. Included in the development activities were innovative, yet simple, n-type cell structures with efficiencies approaching 20%. Coordinated R&D activities with outside organizations. Played a pivotal role in the development of Suniva’s patent portfolio, working closely with patent attorneys to file and prosecute Suniva patent applications.
- **National Renewable Energy Laboratory**, Golden, CO
Senior Scientist II: 9/06 – 10/07
 Led one priority project task team in the Silicon Materials and Devices Group in developing interdigitated back contact crystalline silicon/amorphous silicon heterojunction cell structures and a second team in developing methods for texturing silicon surfaces for light trapping. Served as contract monitor and NREL principal investigator for a project to produce solar-grade silicon feedstock from industrial waste conducted by the Institute of Physics and Technology, Kazakhstan, and sponsored by the International Science and Technology Center and the US Department of Energy.
- **Solar Power Industries**, Pittsburgh, PA
Vice President of Engineering: 10/03 – 9/06
 Provided technical direction for adapting the processes and equipment used in producing dendritic web silicon solar cells to produce solar cells from 150 mm square multicrystalline silicon wafers, and in utilizing these cells in solar modules and systems. Issues regarding throughput, yield, automation, and cost were considered. Provided technical oversight in silicon ingot casting, wafering (156 mm), cell processing, process monitoring and testing. Directed a staff of eight scientists, engineers, and technicians which played a key role in achieving company milestones: shipping the first product (solar cells) near the end of the first quarter of 2004, producing 1.5 MW of cells in 2004, 3.5 MW of cells in 2005, and projecting over 10 MW of cells in 2006, producing over 100,000 wafers per month in early 2006 for internal use, and producing multicrystalline ingots for sale. Acted as Research Director of a \$300k program (one year) sponsored by the Pennsylvania Energy Development Authority aimed at utilizing non-traditional forms of silicon for multicrystalline casting. One outcome of this program is the definition of a process to utilize partially-purified silicon to make market-worthy solar cells.
- **EBARA Solar, Inc. (ESI)**, Pittsburgh, PA
Chief Scientist: 3/94 – 4/03
 Led teams composed of ESI employees and outside organizations (consultants, university groups, specialists from national labs) to develop technologies which were put into production: magnetic

melt stabilization for significantly improved output from dendritic web silicon crystal growth furnaces, front-surface-field solar cell structure (PhosTop), and self-doping front silver contacts. Other prototype products include conformable solar laminates with high specific power, low-cost interdigitated back contact (IBC) solar cells, very low resistivity silicon web, and germanium web.

- **Westinghouse Electric Corporation, Pittsburgh, PA**
Senior Engineer/Fellow Scientist, Superconductive Electronics, Science & Technology Center: 4/89 – 3/94
Fabricated high-speed niobium digital circuits and low-loss YBCO microwave delay lines and filters; led expansion of cryogenics cleanroom, including specification of equipment.
Senior Engineer, Microelectronic Devices, Research and Development Center: 2/84 – 4/89
Fabricated and characterized silicon, gallium arsenide, and indium phosphide solar cells and materials, and characterized silicon MOSFET's, CCD's, and thyristors.
Senior Engineer, Photovoltaics, Advanced Energy Systems Division: 3/80 – 2/84
Developed processes and testing methods for dendritic web silicon solar cells.
- **Carnegie-Mellon University, Pittsburgh, PA**
Research Physicist/Senior Research Physicist: 9/75 – 3/80
Conducted research related to ocean thermal energy conversion (OTEC) in both closed and open systems, with experimental data acquired off the islands of Hawaii and St. Croix.

AWARDS:

Dr. Meier received a Westinghouse Signature Award of Excellence for engineering in 1987, 1989, and 1993.

UNITED STATES PATENTS

D. L. Meier, V. Yelundur, A. M. Payne, and S. X. Wang, "Solderable Interconnect Apparatus for Interconnecting Solar Cells," Patent Application Publication No. US 2012/0279563 A1, published November 8, 2012.

A. M. Payne, D. L. Meier, and V. Chandrasekaran, "Solar Cells and Methods of Fabrication Thereof," Patent No. 8,241,945 issued August 14, 2012.

D. L. Meier and A. Rohatgi, "Solar Cell Having Crystalline Silicon P-N Homojunction and Amorphous Silicon Heterojunction for Surface Passivation," Patent No. 8,076,175 issued December 13, 2011.

D. L. Meier, H. P. Davis, R. A. Garcia and J. A. Jessup, "Method and Apparatus for Self-Doping Contacts to a Semiconductor," Patent No. 6,737,340 issued May 18, 2004.

D. L. Meier, H. P. Davis, R. A. Garcia and J. A. Jessup, "Method and Apparatus for Self-Doping Contacts to a Semiconductor," Patent No. 6,703,295 issued March 9, 2004.

D. L. Meier, H. P. Davis, R. A. Garcia and J. A. Jessup, "Apparatus for Self-Doping Contacts to a Semiconductor," Patent No. 6,664,631 issued December 16, 2003.

D. L. Meier, H. P. Davis, R. A. Garcia and J. A. Jessup, "Method for Self-Doping Contacts to a Semiconductor," Patent No. 6,632,730 issued October 14, 2003.

D. L. Meier, G. T. Neugebauer, E. V. Macuga, R. P. Stoehr, P. J. Simpson and J. Salami, "Method for Stabilizing Dendritic Web Crystal Growth," Patent No. 6,626,993 issued September 30, 2003.

D. L. Meier, G. T. Neugebauer, E. V. Macuga, R. P. Stoehr, P. J. Simpson and J. Salami, "System for Stabilizing Dendritic Web Crystal Growth," Patent No. 6,402,839 issued June 11, 2002.

D. L. Meier, H. P. Davis, R. A. Garcia and J. Salami, "Aluminum Alloy Back Junction Solar Cell and a Process for Fabrication Thereof," Patent No. 6,262,359 issued July 17, 2001.

D. L. Meier and H. P. Davis, "Method and Apparatus for Self-Doping Negative and Positive Electrodes for Silicon Solar Cells and Other Devices," Patent No. 6,180,869 issued January 30, 2001.

J. Salami, A. Shibata, D. L. Meier and E. L. Kochka, "Structure and Fabrication Process for Self-Aligned Locally Deep-Diffused Emitter (SALDE) Solar Cell," Patent No. 5,928,438 issued July 27, 1999.

S. Talisa and D. L. Meier, "Integrated Thin-Film Terminations for High Temperature Superconducting Microwave Components," Patent No. 5,693,595 issued December 2, 1997.

D. L. Meier, "Structure and Fabrication Process for an Aluminum Alloy Junction Self-Aligned Back Contact Silicon Solar Cell," Patent No. 5,641,362 issued June 24, 1997.

PUBLICATIONS

D. L. Meier and B. J. Meier, "Design and Performance of a Solar Generator with Maximum Power Point Tracking," 28th European Photovoltaic Solar Energy Conference, Paris, France, pp. 4460-4465 (2013).

D. L. Meier, V. Chandrasekaran, A. Gupta, V. Yelundur, and A. Rohatgi, "Silver Contact Grid: Inferred Contact Resistivity and Cost Minimization in 19% Silicon Solar Cells," IEEE Journal of Photovoltaics, 3:199-205 (2013).

A. Rohatgi, D. L. Meier, B. McPherson, Y. W. Ok, A. D. Upadhyaya, J. H. Lai, and F. Zimbardi, "High-Throughput Ion-Implantation for Low-Cost High-Efficiency Silicon Solar Cells," Energy Procedia, 15:10-19 (2012).

D. L. Meier, V. Chandrasekaran, H. P. Davis, A. M. Payne, X. Wang, V. Yelundur, J. E. O'Neill, Y-W Ok, F. Zimbardi, and A. Rohatgi, "N-Type, Ion-Implanted Silicon Solar Cells and Modules," IEEE Journal of Photovoltaics, 1:123-129 (2011).

V. Yelundur, B. Damiani, V. Chandrasekaran, A. Adedokun, A. Payne, X. Wang, D. Meier, B. McPherson, A. Rohatgi, A. Gupta, R. J. Low, P. Sullivan, J. Mullin, "First Implementation of Ion Implantation to Produce Commercial Silicon Solar Cells," 26th European Photovoltaic Solar Energy Conference, pp. 831-834 (2011).

A. Rohatgi and D. L. Meier, "Developing Novel Low-Cost, High-Throughput Processing Techniques for 20%-Efficient Monocrystalline Silicon Solar Cells," Photovoltaics International, 10:87-93 (2010).

A. M. Payne, K. Rapolu, P. Davis, V. Chandrasekaran and D. Meier, "Investigation of Laser Ablation of Silicon Nitride Passivation with Self-Doping Paste for Solar Cell Contacts," 35th IEEE Photovoltaic Specialists Conference, Honolulu, HI (2010).

Q. Wang, M. R. Page, E. Iwaniczko, Y. Xu, L. Roybal, R. Bauer, B. To, H. C. Yuan, A. Duda, F. Hasoon, Y. F. Yan, D. Levi, D. Meier, H. M. Branz and T. H. Wang, "Efficient Heterojunction Solar Cells on p-Type Crystal Silicon Wafers," *Applied Physics Letters*, 96:013507 (2010).

H.C. Yuan, V. E. Yost, M. R. Page, P. Stradins, D. L. Meier and H. M. Branz, "Efficient Black Silicon Solar Cell with a Density-Graded Nanoporous Surface: Optical Properties, Performance Limitations, and Design Rules," *Applied Physics Letters*, 95:123501 (2009).

H. C. Yuan, V. E. Yost, M. R. Page, L. Roybal, B. To, P. Stradins, D. L. Meier and H. M. Branz, "Efficient Black Silicon Solar Cells with Nanoporous Anti-Reflection Made in a Single-Step Liquid Etch," 34th IEEE Photovoltaic Specialists Conference, Philadelphia, PA, pp. 141-145 (2009).

H. C. Yuan, M. R. Page, E. Iwaniczko, Y. Xu, L. Roybal, Q. Wang, H. M. Branz and D. L. Meier, "Silicon Solar Cells with Front Hetero-Contact and Aluminum Alloy Back Junction," 33rd IEEE Photovoltaic Specialists Conference, San Diego, CA (2008).

M. R. Page, E. Iwaniczko, Y. Xu, L. Roybal, R. E. Bauer, H. C. Yuan, Q. Wang and D. L. Meier, "Photoconductive Decay Lifetime and Suns-Voc Diagnostics of Efficient Heterojunction Solar Cells," 33rd IEEE Photovoltaic Specialists Conference, San Diego, CA (2008).

D. L. Meier, M. R. Page, E. Iwaniczko, Y. Xu, Q. Wang, and H. M. Branz, "Determination of Surface Recombination Velocities for Thermal Oxide and Amorphous Silicon on Float Zone Silicon," 17th Workshop on Crystalline Silicon Solar Cells and Modules: Materials and Processes, Vail, CO, NREL/BK-520-41973, pp. 214-217 (2007).

D. L. Meier, E. A. Good, R. A. Garcia, B. L. Bingham, S. Yamanaka, V. Chandrasekaran and C. Bucher, "Determining Components of Series Resistance from Measurements on a Finished Cell," Proceedings of the 4th World Conference on Photovoltaic Solar Energy Conversion, Hawaii, pp. 1315-1318 (2006).

P. Hacke, J. Moschner, S. Yamanaka and D. L. Meier, "Efficiency Optimization of the n⁺/n/p⁺ 'PhosTop' Cell," 19th European Photovoltaic Solar Energy Conference, Paris, France, (2004).

D. L. Meier, P. Hacke, J. A. Jessup, S. Yamanaka, J. Salami, N. Ishikawa, M. Emoto and T. Mishima, "Factors Affecting the Performance of Thin Dendritic Web Silicon Front Surface Field (n⁺pp⁺) Solar Cells," 3rd World Conference on Photovoltaic Energy Conversion, Osaka, Japan (2003).

L. M. Porter, A. Teicher and D. L. Meier, "Phosphorus-Doped, Silver-Based Pastes for Self-Doping Ohmic Contacts for Crystalline Silicon Solar Cells," *Solar Energy Materials & Solar Cells*, 73:209-219 (2002).

D. L. Meier, J. A. Jessup, P. Hacke, S. J. Granata, Jr., N. Ishikawa and M. Emoto, "Production of Thin (70-100 μm) Crystalline Silicon Cells for Conformable Modules," Conference Record of the 29th IEEE Photovoltaic Specialists Conference, New Orleans, Louisiana, pp. 110-113 (2002).

M. Hilali, J.-W. Jeong, A. Rohatgi, D. L. Meier and A. F. Carroll, "Optimization of Self-Doping Ag Paste Firing to Achieve High Fill Factors on Screen-Printed Silicon Solar Cells with a 100 Ω/sq. Emitter," Conference Record of the 29th IEEE Photovoltaic Specialists Conference, New Orleans, Louisiana, pp. 356-359 (2002).

P. Hacke and D. L. Meier, "Analysis of Fill Factor Losses Using Current-Voltage Curves Obtained under Dark and Illuminated Conditions," Conference Record of the 29th IEEE Photovoltaic Specialists Conference, New Orleans, Louisiana, pp. 462-464 (2002).

D. W. K. Eikelboom, J. H. Bultman, A. Schönecker, M. H. H. Meuwissen, M. A. J. C. van den Nieuwenhof and D. L. Meier, "Conductive Adhesives for Low-Stress Interconnection for Thin Back-Contact Solar Cells," Conference Record of the 29th IEEE Photovoltaic Specialists Conference, New Orleans, Louisiana, pp. 403-406 (2002).

A. Ebong, M. Hilali, A. Rohatgi, D. Meier and D. S. Ruby, "Belt Furnace Gettering and Passivation of n-Web Silicon for High-Efficiency Screen-Printed Front-Surface-Field Solar Cells," Progress in Photovoltaics: Research and Applications, 9:327-332 (2001).

M. Hilali, A. Ebong, A. Rohatgi and D. L. Meier, "Resistivity Dependence of Minority Carrier Lifetime and Cell Performance in p-Type Dendritic Web Silicon Ribbon," Solid-State Electronics, 45:1973-1978 (2001).

J. R. Hayes, X. Zhang, D. L. Meier and S. Mahajan "Origins of Defect Structures in Dendritic Web Silicon," J. Crystal Growth, 233:451-459 (2001).

D. L. Meier, H. P. Davis, P. Hacke, R. A. Garcia, S. Yamanaka, J. Salami and J. A. Jessup "Self-Doping, Screen-Printed Silver Contacts Applied to IBC and PhosTop Dendritic Web Silicon Solar Cells," Proceedings of the 17th European Photovoltaic Solar Energy Conference, Munich, Germany, pp. 1323-1326 (2001).

A. Rohatgi, M. Hilali, D. L. Meier, A. Ebong, C. Honsberg, A. F. Carroll and P. Hacke "Self-Aligned Self-Doping Selective Emitter for Screen-Printed Silicon Solar Cells," Proceedings of the 17th European Photovoltaic Solar Energy Conference, Munich, Germany, pp. 1307-1310 (2001).

D. L. Meier, H. P. Davis, R. A. Garcia, J. Salami, A. Rohatgi, A. Ebong and P. Doshi "Aluminum Alloy Back p-n Junction Dendritic Web Silicon Solar Cell," Solar Energy Materials and Solar Cells, 65:621-627 (2001).

A. Shibata, K. Terao, K. Fujita, D. L. Meier and J. R. Easoz, "Development of Dendritic Web Silicon Solar Cells," EBARA Engineering Review (in Japanese), 191:50-55 (2001).

D. L. Meier, H. P. Davis, R. A. Garcia and J. A. Jessup "Self-Doping Contacts to Silicon Using Silver Coated with a Dopant Source," Conference Record of the 28th IEEE Photovoltaic Specialists Conference, Anchorage, Alaska, pp. 69-74 (2000).

S. L. Morelhao, J. Härtwig and D. L. Meier, "Dislocations in Dendritic Web Silicon," J. Crystal Growth, 213:288-298 (2000).

A. Rohatgi, V. Yelundur, J. Jeong, A. Ebong, D. Meier, A. M. Gabor and M. D. Rosenblum "Aluminum-Enhanced PECVD SiN_x Hydrogenation in Silicon Ribbons" Proceedings of the 16th European Photovoltaic Solar Energy Conference, Glasgow, Scotland, pp. 1120-1123 (2000).

A. N. Westmeyer, S. Mahajan, B. B. Bathey, G. Neugebauer, J. Jessup and D. L. Meier, "Variations in Dislocation Density with Length in Web Silicon," Materials Science & Engineering, B65:177-183 (1999).

S. Narasimha, G. Crotty, A. Rohatgi and D. L. Meier, "Back Surface Field Effects in the 17.3% Efficient n-Type Dendritic Web Silicon Solar Cells," *Solid-State Electronics*, 42:1631-1640 (1998).

D. L. Meier, H. P. Davis, A. Shibata, T. Abe, K. Kinoshita, C. Bishop, S. Mahajan, A. Rohatgi, P. Doshi and M. Finnegan, "Self-Doping Contacts and Associated Silicon Solar Cell Structures," *Proceedings of the 2nd World Conference on Photovoltaic Solar Energy Conversion*, Vienna, Austria, pp. 1491-1494 (1998).

U. Ortabasi, D. L. Meier, J. R. Easoz, R. D. Schaeffer, M. Stepanova, W. Ho, J. A. Stokes, S. Dummer, J. Jafolla and P. McKenna, "Excimer Micromachining for Texturing Silicon Solar Cells," *SPIE Conference Proceedings Volume 2993*, San Jose, CA (1997).

J. Salami, A. Shibata, D. L. Meier, E. L. Kochka, S. Yamanaka, H. P. Davis, J. R. Easoz, T. Abe, and K. Kinoshita "Self-Aligned Locally-Diffused Emitter (SALDE) Silicon Solar Cell," *Solar Energy Materials and Solar Cells*, 48:159-165 (1997).

S. Narasimha, G. Crotty, T. Krygowski, A. Rohatgi and D. L. Meier, "Back Surface Field and Emitter Passivation Effects in the Record High Efficiency n-Type Dendritic Web Silicon Solar Cell," *Conference Record of the 26th IEEE Photovoltaic Specialists Conference*, Anaheim, California, pp. 235-238 (1997).

P. Doshi, A. Rohatgi, M. Ropp, Z. Chen, D. Ruby and D. L. Meier "Rapid Thermal Processing of High-Efficiency Silicon Solar Cells with Controlled In-Situ Annealing," *Solar Energy Materials and Solar Cells*, 41/42:31-39 (1996).

S. H. Talisa, M. A. Janocko, D. L. Meier, J. Talvacchio, C. Moskowitz, D. C. Buck, R. S. Nye, S. J. Pieseski, and G. R. Wagner "High Temperature Superconducting Space-Qualified Multiplexers and Delay Lines," *IEEE Transactions on Microwave Theory and Techniques*, 44:1229-1239 (1996).

A. Rohatgi, P. Doshi, M. Ropp, L. Cai, A. Doolittle, S. Narasimha, T. Krygowski, K. Tate, D. Yang, M. A. El-Sayed, J. Rand, D. Ruby, and D. L. Meier "Improved Understanding and Optimization of RTP and PECVD Processes for High-Efficiency Silicon Solar Cells," *13th European Photovoltaic Solar Energy Conference*, Nice, France, October 1995.

S. L. Morelhao, D. L. Meier, G. T. Neugebauer, B. B. Bathey and S. Mahajan, "Analysis of Dislocation Networks and Electronic Properties of Dendritic Web Silicon," *Materials Research Society Symposium Proceedings Volume 378 (Defect and Impurity Engineered Semiconductors and Devices)*, San Francisco, pp. 29-34 (1995).

S. H. Talisa, M. A. Janocko, D. L. Meier, C. Moskowitz, R. L. Grassel, J. Talvacchio, P. Lepage, G. Hira, D. C. Buck, S. J. Pieseski, J. C. Brown and G. R. Wagner, "High-Temperature Superconducting Four-Channel Filterbanks," *IEEE Transactions on Applied Superconductivity* 5:2079-2082 (1995).

S. H. Talisa, M. A. Janocko, D. L. Meier, C. Moskowitz, R. L. Grassel, J. Talvacchio, P. Lepage, D. C. Buck, R. S. Nye, S. J. Pieseski and G. R. Wagner, "High-Temperature Superconducting Wide Band Delay Lines," *IEEE Transactions on Applied Superconductivity*, 5:2291-2294 (1995).

- D. L. Miller, J. X. Przybysz, D. L. Meier, J. H. Kang and A. H. Worsham, "Characterization of a Superconductive Sigma-Delta Analog to Digital Converter" IEEE Transactions on Applied Superconductivity, 5:2453-2456 (1995).
- P. Doshi, A. Rohatgi, M. Ropp, Z. Chen, D. Ruby and D. L. Meier, "Rapid Thermal Processing of High-Efficiency Silicon Solar Cells with Controlled *In-Situ* Annealing," 1st World Conference on Photovoltaic Energy Conversion, Waikoloa, Hawaii, pp. 1299-1302 (1994).
- D. L. Meier, J. H. Kang, D. L. Miller, J. X. Przybysz and A. H. Worsham, "Single Flux Quantum Pulse Amplifier," Extended Abstracts of the Fourth International Superconductive Electronics Conference, Boulder, Colorado, p. 100 (1993).
- D. L. Meier and J. X. Przybysz, "Performance of MVTL OR-AND Gates when Data Precedes Bias," IEEE Transactions on Applied Superconductivity, 3:2736-2739 (1993).
- J. H. Kang, J. X. Przybysz, D. L. Miller, D. L. Meier and M. G. Forrester, "Prospect of Single Flux Quantum Logic in Superconducting Digital Electronics," Superconductivity Science and Technology, 4:579-582 (1991).
- D. L. Meier, J. X. Przybysz and J. H. Kang, "Fabrication of an All-Refractory Circuit Using Lift-Off With Image-Reversal Photoresist," IEEE Transactions on Magnetics, 27:3121-3124 (1991).
- J. X. Przybysz, D. L. Meier and J. H. Kang, "Shift Register Performance at 4 GHz," IEEE Transactions on Magnetics, 27:2773 (1991).
- J. H. Kang, J. X. Przybysz, D. L. Miller and D. L. Meier, "Fabrication of Superconducting Digital Electronic Circuits with Nb/AlO_x/Nb Josephson Junctions," Microelectronics Manufacturing Technology, pp. 16-19 (December 1991).
- J. X. Przybysz, D. L. Miller, J. H. Kang, and D. L. Meier, "Superconductive A/D Converters and Digital Circuits for FPA Preprocessing," Proceedings of the International Society for Optical Engineering, SPIE Conference 1292: Superconductivity Applications for Infrared and Microwave Devices, Orlando, Florida (1990).
- D. L. Meier, J. A. Spitznagel, J. Gregg and R. B. Campbell, "Antimony-Doped Dendritic Web Silicon Solar Cells," 20th IEEE Photovoltaic Specialists Conference, Las Vegas, Nevada, pp. 415-422 (1988).
- M. A. Chung, D. L. Meier, J. Bartko and J. R. Szedon, "Electron Radiation and Annealing of MOCVD GaAs and GaAs/Ge Solar Cells," 20th IEEE Photovoltaic Specialists Conference, Las Vegas, Nevada, pp. 924-929 (1988).
- D. L. Meier, J. R. Szedon, J. Bartko and M. A. Chung, "Response of Single Junction GaAs/GaAs and GaAs/Ge Solar Cells to Multiple Doses of 1 MeV Electrons," 9th Space Photovoltaic Research and Technology Conference, NASA-Lewis Research Center, Cleveland, Ohio, (1988).
- K. Joardar, C. O. Jung, S. Wang, D. K. Schroder, S. J. Krause, G. H. Schwuttke and D. L. Meier, "Electrical and Structural Properties of Twin Planes in Dendritic Web Silicon," IEEE Transactions on Electron Devices, 35:911-918 (1988).

D. L. Meier, R. H. Hopkins and R. B. Campbell, "Dendritic Web Silicon Solar Cells," AIAA Journal of Propulsion and Power 4:58-590 (1988).

D. L. Meier, J. M. Hwang and R. B. Campbell, "The Effect of Doping Density and Injection Level on Minority Carrier Lifetime as Applied to Bifacial Dendritic Web Silicon Solar Cells," IEEE Transactions on Electron Devices, ED-35:70-79 (1988).

R. K. Dawless R. L. Troup, D. L. Meier and A. Rohatgi, "Production of Extreme Purity Aluminum and Silicon by Fractional Crystallization Processing," Journal of Crystal Growth, 89:68-74 (1988).

J. L. Bradshaw, W. J. Choyke, Z. C. Feng, D. L. Meier and R. L. Messham, "Study of Diffusion Length and Alloy Segregation in MOCVD AlGaAs, 1987 Materials Research Society Fall Meeting, December 1987.

D. L. Meier, R. H. Hopkins and R. B. Campbell, "Dendritic Web Silicon Solar Cells," Proceedings of the 22nd Intersociety Energy Conversion Engineering Conference (AIAA), Philadelphia, Pennsylvania, 1:70-75 (August 1987).

R. B. Campbell, D. L. Meier, and J. M. Hwang, "The Fabrication and Analysis of Bifacial Solar Cells from Dendritic Web Silicon Substrates," Journal of the Electrochemical Society, 134:3160-3164 (1987).

D. L. Meier, J. M. Hwang, J. Gregg and R. B. Campbell, "Resistivity and Thickness Effects in Dendritic Web Silicon Solar Cells," 19th IEEE Photovoltaic Specialists Conference, New Orleans, Louisiana, pp. 506-513 (1987).

J. Gregg, D. L. Meier, S. Mahajan and J. A. Spitznagel, "Characterization of Dendritic Web Si Solar Cells by Cross-Sectional TEM," Institute of Physics Conference, Serial No. 87: Section 6, Microscopy of Semiconductor Materials Conference, Oxford, England, pp. 517-522 (1987).

R. H. Hopkins, J. Easoz, J. P. McHugh, P. Piotrowski, R. Hundal, F. Przywarty, R. G. Seidensticker, R. Spreccace, D. L. Meier and R. B. Campbell, "Advancements in Silicon Web Technology," Journal of Crystal Growth, 82:142-150 (1987).

R. Jayaram, J. A. Spitznagel, D. L. Meier, J. Gregg and M. G. Burke, "Dislocation-Solute Interactions at Twin Boundaries in Dendritic Web Silicon," Material Research Society Symposium Proceedings, 82:27-276 (1987).

A. Rohatgi, D. L. Meier, P. Rai-Choudhury, S. J. Fonash and R. Sing, "Effect of Low-Energy Hydrogen Ion Implantation on Dendritic Web Silicon Solar Cells," Journal of Applied Physics, 59:4167-4171 (1986).

R. B. Campbell and D. L. Meier, "The Fabrication and Testing of Bifacial Solar Cells Fabricated on Dendritic Web Silicon," Extended Abstracts of 169th Electrochemical Society Meeting, Boston, Massachusetts, 86-1:454-455 (May 1986).

R. B. Campbell and D. L. Meier, "Simultaneous Junction Formation Using a Directed Energy Light Source," Journal of the Electrochemical Society, 133:2210-2211 (1986).

D. L. Meier, J. Gregg, A. Rohatgi, T. W. O'Keeffe, P. Rai-Choudhury, R. B. Campbell and S. Mahajan, "Twin Plane Effects in Dendritic Web Silicon," 18th IEEE Photovoltaic Specialists Conference, Las Vegas, Nevada, pp. 596-603 (1985).

A. Rohatgi, D. L. Meier, T. W. O'Keeffe and P. Rai-Choudhury, "High Efficiency Solar Cells on Low-Resistivity Dendritic Web Silicon Ribbon," 18th IEEE Photovoltaic Specialists Conference, Las Vegas, Nevada, pp. 50-54 (1985).

R. B. Campbell, E. Dombrowski, J. R. Easoz, E. L. Kochka, C. S. Duncan, R. H. Hopkins, D. L. Meier, J. P. McHugh, A. Rohatgi, P. Rai-Choudhury, R. G. Seidensticker, S. L. Hester, and K. Firor, "Status of Solar Cells and Modules Fabricated from Dendritic Web Silicon," 18th IEEE Photovoltaic Specialists Conference, Las Vegas, Nevada, p. 465-469 (1985).

S. P. Tobin A. C. Greenwald, R. G. Wolfson, D. L. Meier and P. J. Drevinsky, "Rapid Diffusion of Molybdenum Trace Contamination in Silicon," Proceedings of the Materials Research Society Fall Meeting on Impurity Diffusion and Gettering in Semiconductors (November 1984).

D. L. Meier, A. Rohatgi, R. B. Campbell, P. Alexander, S. J. Fonash and R. Sing, "Emitter Formation in Dendritic Web Silicon Solar Cells," 17th IEEE Photovoltaic Specialists Conference, Orlando, Florida, pp. 427-433 (1984).

A. Rohatgi, P. Rai-Choudhury, D. L. Meier and J. G. Milstein, "Surface-Passivated High-Efficiency Silicon Solar Cells," 17th IEEE Photovoltaic Specialists Conference, Orlando, Florida, pp. 409-414 (May 1984).

D. K. Schroder and D. L. Meier, "Solar Cell Contact Resistance, A Review," IEEE Transactions on Electron Devices, ED-31:637-647 (1984).

D. L. Meier and D. K. Schroder, "Contact Resistance: Its Measurement and Relative Importance to Power Loss in a Solar Cell," IEEE Transactions on Electron Devices, ED-31:647-653 (1984).

D. L. Meier, M. Karnezos and S. A. Friedberg, "Magnetic and Thermal Behavior of $\text{NiSnCl}_6 \cdot 6\text{H}_2\text{O}$ at Low Temperatures," Physical Review B, 28:2668-2676 (1983).

J. C. Bonner, S. A. Friedberg, H. Kobayashi, D. L. Meier and H. W. J. Blote, "Alternating Linear-Chain Antiferromagnetism in Copper Nitrate $\text{Cu}(\text{NO}_3)_2 \cdot 2.5\text{H}_2\text{O}$," Physical Review B, 27:248-260 (1983).

D. L. Meier and P. Rai-Choudhury, "Control of Staining in a High-Temperature Diborane Diffusion Process by Hydrogen Injection," Proceedings of the 163rd Meeting of Electrochemical Society, San Francisco, California, 83-1:593-594 (May 1983).

D. L. Meier and P. Rai-Choudhury, "Generalized Technique for Measuring Specific Contact Resistance," Proceedings of the 163rd Meeting of Electrochemical Society, San Francisco, California, 83-1:611-612 (May 1983).

D. L. Meier, R. B. Campbell, J. R. Davis, P. Rai-Choudhury and L. J. Sienkiewicz, "Solar Cell Contacts," 16th IEEE Photovoltaic Specialists Conference, San Diego, California pp. 904-910 (1982).

D. L. Meier and A. G. Milnes, "Enhancement of Solar Array Performance by Selective Grouping of Individual Cell Parameters," Proceedings of the 1980 Annual Meeting of American Section of the International Solar Energy Society, Phoenix, Arizona pp. 1042-1046 (June 1980).

M. Karnezos, D. L. Meier and S. A. Friedberg, "Uniaxial Ferromagnetism in $\text{NiZrF}_6 \cdot 6\text{H}_2\text{O}$," Physical Review B, 17:437-4383 (1978).

J. G. Fetkovich, G. N. Grannemann, D. L. Meier, L. M. Mahalingam and F. C. Munchmeyer, "Degradation of Heat Transfer Rates Due to Biofouling and Corrosion at Keahole Point, Hawaii," Proceedings of the OTEC Biofouling and Corrosion Symposium, Seattle, Washington (October 1977).

D. L. Meier, J. Hirshman, R. S. C. Munier and B. F. Taylor, "Overview of St. Croix Biofouling and Corrosion Study," Proceedings of the OTEC Biofouling and Corrosion Symposium, Seattle, Washington (October 1977).

J. G. Fetkovich, G. N. Grannemann, D. L. Meier, L. M. Mahalingam and F. C. Munchmeyer, "Studies of Biofouling in Ocean Thermal Energy Conversion Plants," Proceedings of the 4th Ocean Thermal Energy Conversion Conference, University of New Orleans, New Orleans, Louisiana (March 1977).

D. L. Meier, J. G. Fetkovich, G. N. Grannemann and C. W. Fette, "A Novel Method of Measuring Heat Transfer Coefficients with High Precision," Proceedings of the 12th Southeastern Seminar on Thermal Sciences, Charlottesville, Virginia (June 1976).

J. G. Fetkovich, G. N. Grannemann, D. L. Meier and F. C. Munchmeyer, "Heat Transfer Problems in an Ocean Thermal Power Plant," Proceedings of the 12th Southeastern Seminar on Thermal Sciences, Charlottesville, Virginia (June 1976).

S. A. Friedberg, D. L. Meier and M. Karnezos "Magnetic Interactions in $\text{NiSnCl}_6 \cdot 6\text{H}_2\text{O}$," Proceedings of the 21st Annual Conference on Magnetism and Magnetic Materials (AIP Conference Proceedings No. 29), Philadelphia, Pennsylvania (December 1975).

S. A. Friedberg, M. Karnezos and D. L. Meier, "Singlet Ground State Effects in $\text{NiSnCl}_6 \cdot 6\text{H}_2\text{O}$ and Related Compounds," Proceedings of the 19th Annual Conference on Magnetism and Magnetic Materials (AIP Conference Proceedings No. 18), Boston, Massachusetts (November 1973).