

## **GENERAL**

Stanford R. Ovshinsky, President and Chief Scientist and Technologist, Energy Conversion Devices, Inc. (ECD Ovonic), founded ECD Ovonic in 1960 with his wife, the late Dr. Iris M. Ovshinsky, to continue his pioneering work in amorphous and disordered materials which he began in 1955. His fundamental and basic contributions established the field, resulting in transforming the old approaches to glasses to one of unexpected new physical, chemical and electronic mechanisms. Periodicity, then the basis of solid state physics, now had an amorphous twin where disorder was a positive factor, offering new degrees of freedom in his inventions. These inventions have become the enabling technology in four major areas: *energy generation*, including photovoltaics and fuel cells; *energy storage*, including Ovonic nickel metal hydride consumer and electric and hybrid vehicle batteries and solid hydrogen storage; *information systems*, including amorphous semiconductors, switching and phase-change memories, both optical and electrical; and, *atomically designed synthetic materials* for a wide variety of uses.

Stan Ovshinsky is a fellow of both the American Physical Society “for his contributions to the understanding, applications and development of amorphous electronic materials and devices” and of the American Association for the Advancement of Science. He is recipient of the 2005 Innovation Award for Energy and the Environment by *The Economist*, the American Solar Energy Society *Hoyt Clarke Hottel Award*, the *Karl W. Böer Solar Energy Medal of Merit*, the International Association for Hydrogen Energy *Sir William Grove Award* and the Frederick Douglass/Eugene V. Debs Award (2006). He was named “Hero for the Planet” by *Time* magazine (1999), Hero of Chemistry 2000 by the American Chemical Society, and inducted into the 2005 *Solar Hall of Fame*. In 1968, he received the *Diesel Gold Medal* presented by German Inventors Association (Deutscher Erfinderverband), in recognition of his discovery of the semiconductor switching effect in disordered and amorphous materials. He is among 35 American inventors over the past century profiled in *Inventing Modern America*.

## **HONORS**

Recipient of the 2005 Innovation Award for Energy and the Environment by *The Economist* for "his pioneering work in the development of the high-powered NiMH battery" and one of seven leaders and innovators who were honored for "transforming the businesses, industries and markets in which they work" at the Economist's 4<sup>th</sup> Annual Innovation Summit and Awards, London, England (November 2005)

Inducted into the US-based *Solar Hall of Fame* for 2005 for “promoting excellence in the field of solar energy utilization through public testimonials and tribute to outstanding contributors in the field.”

Keynote speaker at E\*PCOS<sup>05</sup>, E\*PCOS<sup>04</sup>, E\*PCOS<sup>03</sup> and E\*PCOS<sup>01</sup>. In honor of the work of S.R. Ovshinsky the name of the organization changed at E\*PCOS<sup>03</sup> from

*European Symposium on Phase Change Optical Storage to European Symposium on Phase Change and Ovonic Science*

Recipient of the *Hoyt Clarke Hottel Award* presented by the American Solar Energy Society in recognition for his “significant contribution to the advancement of solar energy technologies,” Solar 2004, A Solar Harvest: Growing Opportunities Conference, in Portland, OR (July 2004)

Ovonic Way, location of Cobasys' state-of-the-art manufacturing plant in Springboro, Ohio, named in his honor as the inventor of Ovonic NiMH batteries (Nov. 2003)

Profiled in a book published by the MIT Press, in association with Lemelson-MIT Program for Invention and Innovation, as one of the 35 American inventors over the past century “who helped to shape the modern world” (*Inventing Modern America: From the Microwave to the Mouse*, MIT Press, December 2001)

The Stanford R. Ovshinsky Award for Excellence in Non-Crystalline Chalcogenides was established in 2001 — by members of the *Forum of Chalcogeniders* — to honor Stan Ovshinsky's pioneering work in the field of Non-Crystalline Chalcogenides and is awarded yearly to recognize the outstanding contributions of scientists and technologists who work in this field

Named, along with his wife, Dr. Iris M. Ovshinsky, as *Heroes of Chemistry 2000* by the American Chemical Society for “advances in electrochemical, energy storage and energy generation, including the development of Ovonic nickel metal hydride (NiMH) rechargeable batteries, regenerative fuel cells, solid hydrogen storage system, and amorphous silicon photovoltaics” and for having “made significant and lasting contributions to global human welfare” (August 2000)

Recipient of the International Association for Hydrogen Energy Sir William Grove Award (June 2000)

Recipient of Karl W. Böer Solar Energy Medal of Merit awarded jointly by University of Delaware and the International Solar Energy Society (1999)

Named “Hero for the Planet” by *Time* magazine (1999)

Keynote speaker, Electric & Hybrid Vehicle Technology TOPTEC, Society of Automotive Engineers (1992 and 1994)

Corporate Detroiter of the Year, *Corporate Detroit Magazine* (1993)

First prize for best paper, 1992 International Electric Vehicle Symposium

Honorary Member, The International Association of Machinists and Aerospace Workers, Local Lodge PM2848 (1992)

*Toyota Award for Advancement* – Presented for Ovonic nickel-metal hydride batteries for electric vehicles (May 1991)

Inducted into Coors American Ingenuity Hall of Fame (March 1991)

1989 Distinguished Lecturer, Photovoltaic Energy, Its Future in the Pacific Basin, University of Hawaii

*Coors American Ingenuity Award* – Presented in recognition of his work in the field of amorphous materials, particularly photovoltaics (August 1988)

1988 Distinguished Lecturer in Materials Science, Johns Hopkins University  
Profiled as "Japan's American Genius" on *NOVA*, public television's science series  
(October 1987)

1987 Michigan Scientist of the Year by Impression 5 Science Museum  
Michigan Chemical Engineering Hall of Fame (1983)

Honorary Doctor of Engineering, Bowling Green State University, Bowling Green,  
Ohio (1981)

Great Man Lecture, Wayne State University (1972)

*Diesel Gold Medal* – Presented by German Inventors Association (Deutscher  
Erfinderverband), "in recognition of his discovery of the semiconductor switching  
effect in disordered and amorphous materials" (1968)

Honorary Doctor of Science, Lawrence Technological University, Southfield, Michigan  
(1980)

Honorary Doctor of Science, Jordan College, Cedar Springs, Michigan (1989)

Adjunct Professor of Engineering, College of Engineering, Wayne State University,  
Detroit, Michigan

Adjunct Professor of Physics, University of Cincinnati, Cincinnati, Ohio

Vice-Chairman, National Advisory Board, Center for Bioproducts Development,  
University of Hawaii

Honorary Professor of Physics, University of Toledo, Toledo, Ohio

Honorary Advisor for Science & Technology at Beijing University of Aeronautics and  
Astronautics, Beijing, China

Foreign Member, Academy of Engineering Sciences of Kiev, Ukraine

Fellow, American Physical Society, "for his contributions to the understanding,  
applications and development of amorphous electronic materials and devices," *Bull.*  
*Am. Phys. Soc.* II **30**, 92 (1985)

Fellow, American Association for the Advancement of Science (1987)

Member, Sigma XI (1990)

### **PROFESSIONAL SOCIETIES**

- American Association for the Advancement of Science – Fellow
- American Chemical Society
- American Physical Society – Fellow
- American Vacuum Society
- Electrochemical Society
- Engineering Society of Detroit
- Institute of Electrical and Electronic Engineers – Senior Member

- Michigan Center for Theoretical Physics, University of Michigan – Associate Member, Member of Director's Council
- New York Academy of Sciences
- Society of Automotive Engineers – Life Member

## **AFFILIATIONS**

### **ECD Ovonics**

- President and Chief Scientist and Technologist, Energy Conversion Devices, Inc.
- Chief Executive Officer, Ovonic Battery Company, Inc.
- Chairman and Chief Executive Officer, United Solar Ovonic Corp.
- Chairman and Chief Executive Officer, United Solar Ovonic LLC
- Chairman, Institute for Amorphous Studies
- Chairman and Chief Executive Officer, Ovonic Fuel Cell Company LLC
- President and Chief Executive Officer, Ovonic Hydrogen Systems, LLC
- Member of the Management Committee, Cobasys LLC (f/k/a Texaco Ovonic Battery Systems)
- Member, Strategic Alliance Board, Ovonic Media  
(a joint venture between ECD Ovonics and the General Electric Company)
- Chairman, Ovonyx, Inc. (a joint venture which includes Intel Corporation)
- Co-Chairman, Sovlux (the ECD Ovonics-Russian energy joint venture with the State Research and Production Enterprise Kvant and enterprises of the Russian Ministry of Atomic Energy (Minatom))
- Advisor and Consultant, Rare Earth High-Tech Co., Ltd. of Baotou Steel Company of Inner Mongolia (China)

### **OTHER**

Member of Editorial Board, Journal of Ovonic Research

Member, International Advisory Committee of the National Conference on Advanced Materials (ROCAM), Bucharest, Romania

Member of Consulting Board, Journal of Optoelectronics and Advanced Materials

Member, Board of Advisors, Department of Mechanical and Aeronautical Engineering, University of California, Davis

Past Member, Reischauer Center Advisory Council, John Hopkins University, School of Advanced International Studies

Trustee, Heart and Vascular Institute Advisory Board, Henry Ford Health System

Past Member, Advisory Council for the College of Arts and Science, Lawrence Technological University

Past Member, Board of Advisors, Hawaii China Asia Energy & Technology Corporation

Past Member, Advisory Council for the Metropolitan Center for High Technology (1982-1992)

Charter member of the Materials Research Laboratory Industrial Liaison Committee for The James Franck Institute of The University of Chicago

Member of the Electric Engineering Department Advisory Committee, University of North Carolina

Member of the College of Science Advisory Board, Wayne State University

Member, Advisory Board, Wayne State University Center for Peace and Conflict Studies

Past Member, Board of Governors, Cranbrook Institute of Science

Board of Trustees, Cranbrook Peace Foundation

**PATENTS** Holder of about 350 U.S. Patents.

### **SOME SIGNIFICANT EARLY ARTICLES ABOUT THE IMPORTANCE OF HIS WORK**

- Multiple-Ball Relays – Newest Components for Reliable Switching, John D. Cooney, *Control Engineering*, February 1958, Cover Story.
- How Liquid-State Switch Controls A-C, *Electronics*, August 14, 1959.
- The Threshold Switch – New Component for Ac Control, Mason P. Southworth, *Control Engineering*, April 1964, Cover Story.
- On the Threshold of Success: Glass Semiconductor Circuits, James A. Perschy, *Electronics*, July 24, 1967, Cover Story.
- The Printed Word Goes Electronic, Lawrence Lessing, *Fortune*, September 1969, p. 116.
- Amorphous-Semiconductor Switching, By H.K Henisch, *Scientific American*, November 1969, p. 30.
- Great Hopes from Ovshinsky's Little Switches Grow, Lawrence Lessing, *Fortune*, April 1970, p. 110.
- Amorphous Semiconductor Devices, by David Adler, *Scientific American*, May 1977, p. 36; *Japanese Scientific American*, 1977.
- Les Semi-Conducteurs Amorphes, H. Fritzsche, *La Recherche*, November 1970, p. 527.
- *Solar Energy Materials*, Vol. 8, No. 1-3, Nov. 1982, 1-348. Festschrift in honor of Stanford R. Ovshinsky on the occasion of his 60<sup>th</sup> birthday.
- Inventors at Work, Interviews with 16 notable American inventors by Kenneth A. Brown, *Tempus Books of Microsoft Press*, 1988, pp. 147-165.
- Critical Review of Amorphous and Microcrystalline Silicon Materials and Solar Cells, edited by H. Fritzsche & S. Guha (Elsevier Science Publishers, 2002). Festschrift in honor of Stanford R. Ovshinsky on the occasion of his 80<sup>th</sup> birthday.

- Physics and Applications of Disordered Materials, edited by M. Popescu (INOE, Bucharest, 2002). Dedicated to Stanford R. Ovshinsky in honor of his pioneering contributions to the physics and applications of disordered materials.
- *Journal of Optoelectronics and Advanced Materials* **4**, 3 (September 2002). Dedicated to Stanford R. Ovshinsky on the occasion of his 80<sup>th</sup> anniversary.
- Reminiscences and Appreciations, presented to Stanford R. Ovshinsky on the Occasion of his 80<sup>th</sup> birthday (November 24, 2002).

## **PUBLICATIONS AND PRESENTATIONS** (great majority invited papers and plenary presentations)

### **Physics and Chemistry**

1. The Ovonic Switch as an Amorphous Switching Device, Presented at IV Symposium on Vitreous Chalcogenide Semiconductors, Academy of Sciences of the USSR, Leningrad (May 23-27, 1967).
2. Ovonic Switching Devices, Presented at the International Colloquium on Amorphous and Liquid Semiconductors, Academy of the Socialist Republic of Romania, Bucharest (September 28-October 3, 1967).
3. Ovonic Switching Devices, Presented at the 2<sup>nd</sup> Conference on the Characterization of Materials, Rochester, NY (November 8-10, 1967).
4. Reversible Electrical Switching Phenomena in Disordered Structures, *Phys. Rev. Lett.* **21**, 1450 (1968).
5. Ovonic Switching Devices, Presented at the American Ceramic Society Meeting, Chicago, IL (April 20-25, 1968).
6. Ovonic Switching Devices, Presented at the 1968 Electronic Components Conference, Washington, D.C. (May 9, 1968) p. 313.
7. Radiation Hardness of Ovonic Devices (with E. Evans, D. Nelson and H. Fritzsche), *IEEE Trans. Nuclear Sci.* **NS-15**, 311 (1968).
8. Ovonic Switches and Their Applications (with D. Nelson), Proceedings of IEEE International Convention, New York (March 1969).
9. Switching Devices, Presented at the Dalhousie Seminars on Solid State Physics, Dalhousie University, Halifax, Nova Scotia (June 30-July 2, 1969) p. 76.
10. Amorphous Semiconductors, *Science Journal* **5A**, 73 (August 1969).
11. The Ovshinsky Switch, Proceedings of the 5th Annual National Conference on Industrial Research, Chicago, IL (September 1969) p. 86.
12. Amorphous Semiconductors, *Electronic Material* (Japan) **8**, 30 (1969).
13. Simple Band Model for Amorphous Semiconducting Alloys (with M.H. Cohen and H. Fritzsche), *Phys. Rev. Lett.* **22**, 1065 (1969).
14. Hopping Conduction in an Amorphous Chalcogenide Alloy Film (with E.A. Fagen and H. Fritzsche), *Bull. Am. Phys. Soc. II* **14**, 311 (1969).

15. Photostimulated Conductivity in an Amorphous Chalcogenide Alloy Film (with H. Fritzsche and E.A. Fagen), *ibid.*
16. Electronic Conduction in Amorphous Semiconductors and the Physics of the Switching and Memory Phenomena (with H. Fritzsche), Presented at SEAS Symposium, NYC (May 14-17, 1969); *J. Non-Cryst. Solids* **2**, 393 (1970).
17. An Introduction to Ovonic Research, *ibid.*, p. 99.
18. Reversible Conductivity Transformations in Chalcogenide Alloy Films (with E.J. Evans and J.H. Helbers), *ibid.*, p. 334.
19. Structural Studies of Amorphous Semiconductors (with A. Bienenstock and F. Betts), *ibid.*, p. 347.
20. Conduction and Switching Phenomena in Covalent Alloy Semiconductors (with H. Fritzsche), Proceedings of the International Conference on Amorphous and Liquid Semiconductors, Cavendish Laboratory, Cambridge, England (September 24-27, 1969); *J. Non-Cryst. Solids* **4**, 464 (1970).
21. A Qualitative Theory of Electrical Switching Processes in Monostable Amorphous Structures (with H.K. Henisch and E.A. Fagen), *ibid.*, p. 538.
22. Radial Distribution Studies of Amorphous  $\text{Ge}_x\text{Te}_{1-x}$  Alloys (with F. Betts and A. Bienenstock), *ibid.*, p. 554.
23. Reflectivity Studies of the Te (Ge, As)-Based Amorphous Semiconductor in the Conducting and Insulating States (with J. Feinleib), *ibid.*, p. 564.
24. Time Delay for Reversible Electric Switching in Semiconducting Glasses (with K.W. Boer and G. Doehler), *ibid.*, p. 573.
25. Physics and Device Applications of Switching and Memory Effects in Vitreous Semiconductors (with H. Fritzsche), Presented at V Symposium on Vitreous Chalcogenide Semiconductors, Leningrad, USSR (May 25-29, 1970).
26. Switching Effects in Amorphous Semiconductor Thin Films (with H.K. Henisch and R.W. Pryor), Presented at the International Congress on Thin Films, Cannes, France (October 5-10, 1970).
27. Development and Application of Amorphous Semiconductors (with R.G. Neale), Presented at 4th International Congress Microelectronics, Munich, Germany (November 9-11, 1970).
28. Ovonics and Its Applications, Presented at 1970 International Hybrid Microelectronics Symposium, Beverly Hills, CA (November 16-18, 1970).
29. Amorphous Semiconductors, *Detroit Engineers* **34**, #5, 13 (1970).
30. Analog Models for Information Storage and Transmission in Physiological Systems (with Iris M. Ovshinsky), *Mat. Res. Bull.* **5**, 681 (1970). (Mott Festschrift)
31. Calorimetric and Dilatometric Studies on Chalcogenide Alloy Glasses (with H. Fritzsche), *J. Non-Cryst. Solids* **2**, 148 (1970).
32. Electrical Conductivity of Amorphous Chalcogenide Alloy Films (with E.A. Fagen and H. Fritzsche), *ibid.*, p. 170.

33. Electrothermal Initiation of an Electronic Switching Mechanism in Semiconducting Glasses (with K.W. Boer), *Appl. Phys.* **41**, 2675 (1970).
34. Reversible High-Speed High-Resolution Imaging in Amorphous Semiconductors (with P.H. Klose), Presented at 1971 Society for Information Display International Symposium, Philadelphia, PA (May 4-6, 1971); Digest of Technical Papers (May 1971) p. 58.
35. Glass Switch, McGraw-Hill Encyclopedia of Science and Technology **13**, 360 (1971).
36. New Materials for Electronics (with H. Henisch), Encyclopedia of Science and Technology, Italy (1971) p. 400 [I semiconduttori amorfi, Stanford R. Ovshinsky e Heinz K. Henisch, in Encyclopedia della Scienza e della Tecnica 71, A. Mondadori, Editore, 1971, p. 402].
37. Rapid Reversible Light-Induced Crystallization of Amorphous Semiconductors (with J. Feinleib, J. deNeufville and S.C. Moss), *Appl. Phys. Lett.* **18**, 254 (1971).
38. Reversible Structural Transformations in Amorphous Semiconductors for Memory and Logic (with H. Fritzsche), *Metallurgical Transactions* **2**, 641 (1971).
39. Imaging in Amorphous Materials by Structural Alteration (with P.H. Klose), Presented at 4th International Conference on Amorphous and Liquid Semiconductors, Ann Arbor, MI (August 9-13, 1971); *J. Non-Cryst. Solids* **8-10**, 892 (1972).
40. Reversible Optical Effects in Amorphous Semiconductors (with J. Feinleib, S. Iwasa, S.C. Moss and J.P. deNeufville), *ibid.*, p. 909.
41. The Transmission, Storage and Control of Information in Amorphous Materials, Presented at 4th Annual Spring Meeting of the Metallurgical Society of AIME, Boston, MA (May 8-11, 1972).
42. New Thin-Film Tunnel Triode Using Amorphous Semiconductors (with R.F. Shaw, H. Fritzsche, M. Silver, P. Smejtek and S. Holmberg), *Appl. Phys. Lett* **20**, 241 (1972).
43. Ovonics Revisited, *Industrial Research* **14**, 48 (1972).
44. Optical Information Encoding in Amorphous Semiconductors, Presented at the Topical Meeting on Optical Storage of Digital Data, Aspen, CO (March 19-21, 1973).
45. Amorphous Materials and the Computer, Presented at Engineering Society of Detroit (October 11, 1973).
46. Amorphous Semiconductors for Switching, Memory, and Imaging Applications (with H. Fritzsche), *IEEE Trans. on Electron Devices*, **ED-20**, 91 (1973).
47. Mechanism of Reversible Optical Storage in Evaporated Amorphous AsSe and Ge<sub>10</sub>As<sub>40</sub>Se<sub>50</sub> (with J.P. deNeufville, R. Seguin and S.C. Moss), Proceedings of the 5th International Amorphous and Liquid Semiconductors Conference, Garmisch-Partenkirchen, Germany (September 1973), edited by J. Stuke & W. Brenig (Taylor and Francis, London, 1974) p.737.



48. Three Dimensional Model of Structure and Electronic Properties of Chalcogenide Glasses (with K. Sapru), *ibid.*, p. 447.
49. Photostructural Transformations in Amorphous  $\text{As}_2\text{Se}_3$  and  $\text{As}_2\text{S}_3$  Films (with J.P. deNeufville and S.C. Moss), *J. Non-Cryst. Solids* **13**, 191 (1973/1974).
50. Amorphous Materials as Information Storage Media, Presented at Iowa State University, Joint Electrical Engineering and Physics Colloquium (January 28, 1974).
51. Applications of New Memory Material to Electronic Imaging, Presented at University of Pittsburgh, Medical School, Pittsburgh, PA (February 13, 1974).
52. Amorphous Read Mostly Memory, Presented at University of Illinois, Urbana, IL (March 12, 1974).
53. Optical Information Encoding in Amorphous Semiconductors (with Iris M. Ovshinsky), Presented at the 14th Annual Fall Symposium of Society of Photographic Scientists and Engineers, Washington, D.C. (October 23-26, 1974).
54. Imaging by Photostructural Changes (with P.H. Klose), Proceedings of the Symposium on Nonsilver Photographic Processes, held at New College, Oxford (September 1973); *Non-Silver Photographic Processes*, edited by R.J. Cox (Academic Press, London, 1975) p. 61.
55. Electronic and Structural Changes in Amorphous Materials as a Means of Information Storage and Imaging, Proceedings of the 4th International Congress for Reprography and Information, Hanover, Germany (April 13-17, 1975) p.109.
56. A New Means of Information Storage, Presented at the 1975 Summer Symposium of the Society of Photographic Scientists and Engineers, Bloomington, MN (June 24-27, 1975).
57. Amorphous Materials as Optical Information Media, Presented at the International Laser Exposition and Electro-Optical Systems Design Conference, Anaheim, CA (November 11-13, 1975); *J. Appl. Photographic Eng.* **3**, 35 (1977).
58. Amorphous Materials as Interactive Systems, Proceedings of the 6th International Conference on Amorphous and Liquid Semiconductors, Leningrad (November 18-24, 1975) p. 426.
59. An Experimental Study of Threshold Switching in Some Binary Chalcogenide-Based Glass Films (with R.A. Flasck, M.P. Shaw and K. Dec), *ibid.*, p. 490.
60. The Basic Concepts of Amorphous Semiconductors, Presented at Stanford University, Stanford, CA (January 21, 1976).
61. Lone-Pair Relationships and the Origin of Excited States in Amorphous Chalcogenides, Proceedings of the International Topical Conference on Structure and Excitation of Amorphous Solids, Williamsburg, VA (March 24-27, 1976) p. 31.
62. Localized States in the Gap of Amorphous Semiconductors, *Phys. Rev. Lett.* **36**, 1471 (1976).
63. Amorphous Materials as Optical Information Media, Presented at SPIE/SPSE Technical Symposium, East Reston, VA (March 22-25, 1976); *J. Appl. Photographic Engineering* **3**, 35 (1977).

64. Chemical Modification of Amorphous Chalcogenides, Proceedings of the 7th International Conference on Amorphous and Liquid Semiconductors, Edinburgh, Scotland (June 27-July 1, 1977) p. 519.
65. Optical and Electronic Properties of Modified Amorphous Materials (with R.A. Flasck, M. Izu, K. Sapru, T. Anderson and H. Fritzsche), *ibid.*, p. 524.
66. Modification of SiO<sub>x</sub> (with K. Sapru and K. Dec), Proceedings of the International Topical Conference on the Physics of SiO<sub>2</sub> and its Interfaces, Yorktown Heights, NY (March 22-24, 1978) p. 304.
67. Local Structure, Bonding and Electronic Properties of Covalent Amorphous Semiconductors (with D. Adler), Presented at the APS March Meeting, Washington, D.C. (March 27-30, 1978); *Contemp. Phys.* **19**, 109 (1978).
68. Amorphous Photovoltaic Cells (with A. Madan), Proceedings of the Solar Energy Symposia of the 1978 Annual Meeting of the American Section of the International Solar Energy Society, Inc., Denver, CO (August 28-31, 1978).
69. Photovoltaic Solar Energy Conference, book review, edited by A.S. Strub, *American Scientist* **66**, 616 (September-October 1978).
70. Solar Electricity Speeds Down to Earth, *New Scientist* **80** (November 30, 1978), p. 674.
71. A New Amorphous Silicon-Based Alloy for Electronic Applications (with A. Madan), *Nature* **276**, 482 (November 30, 1978).
72. Low-Cost Photovoltaic Devices Using Amorphous Materials (with A. Madan), Presented at the Symposium on Applied Technology to Solar Energy Systems, Jurica, Queretaro, Mexico (January 29 - February 3, 1979).
73. New Amorphous Materials for Computer Use, Presented at the 18th IEEE Computer Society International Conference, San Francisco, CA (February 26-March 1, 1979) p. 158.
74. The Inventor as a Catalyst, Proceedings of the 33rd National Conference on the Advancement of Research, Pennsylvania State University State College, Pennsylvania (October 7-10, 1979).
75. An Innovative Approach to New Sources of Energy Through Amorphous Materials, Presented at the UNITAR Conference on Long Term Energy Resources, Montreal, Canada (November 26-December 7, 1979) p. 783.
76. Electrical and Optical Properties of Amorphous Si:F:H Alloys (with A. Madan and E. Benn), *Phil. Mag.* **B.40**, 259 (1979).
77. The Shape of Disorder, *J. Non-Cryst. Solids* **32**, 17 (1979). (Mott Festschrift)
78. Some Electrical and Optical Properties of A-Si:F:H Alloys (with A. Madan, W. Czubytyj and M. Shur), Presented at the 21<sup>st</sup> Electronic Materials Conference, University of Colorado, Boulder, CO (June 27-29, 1979); *J. Elect. Mat.* **9**, 385 (1980).

79. Properties of Amorphous Si:F:H Alloys (with A. Madan), Presented at the 8th International Conference on Amorphous and Liquid Semiconductors, Cambridge, MA (August 27-31, 1979); *J. Non-Cryst. Solids* **35/36**, 171 (1980).
80. Book Review on The Physics of Selenium and Tellurium, edited by E. Gerlach and P. Grosse, *American Scientist* **68** (May-June 1980) p.316.
81. The Chemistry of Glassy Materials and Their Relevance to Energy Conversion, Proceedings of the International Conference: Frontiers of Glass Science, Los Angeles, CA (July 16-18, 1980); *J. Non-Cryst. Solids* **42**, 335 (1980).
82. Effect of an Interfacial Oxide in Amorphous Si:F:H Alloy Based MIS Devices (with A. Madan, J. McGill, W. Czubytyj, J. Yang and M. Shur), Presented at the SPIE – The International Society for Optical Engineering Conference on Role of Electro-Optics in Photovoltaic Energy Conversion, San Diego, CA (July 31-August 1, 1980); SPIE Proc. Vol. 248, p. 26.
83. Electronic and Vibrational Properties of Glow-Discharge Amorphous Si:F:H (with R. Tsu, M. Izu and V. Cannella), Proceedings of the 15th International Conference on Physics of Semiconductors, Kyoto, Japan (September 1-5, 1980); *J. Phys. Soc. Japan* **49** (1980) Suppl. A, p.1249.
84. The Important Roles Played by Selenium and Tellurium in Amorphous Materials, Presented at the International Symposium on Industrial Uses of Selenium and Tellurium, Toronto, Canada (October 21-23, 1980).
85. Electroreflectance and Raman Scattering Investigation of Glow-Discharge Amorphous Si:F:H (with R. Tsu, M. Izu and F.H. Pollak), *Solid State Comm.* **36**, 817 (1980).
86. Metal-Insulator-Semiconductor Solar Cells Using Amorphous Si:F:H Alloys (with A. Madan, J. McGill, W. Czubytyj and J. Yang), *Appl. Phys. Lett.* **37**, 826 (1980).
87. New Experiments on Threshold Switching in Chalcogenide and Non-Chalcogenide Alloys (with K. Homma and H.K. Henisch), *J. Non-Cryst. Solids* **35/36**, 1105 (1980).
88. Threshold Switching in Chalcogenide Glass Thin Films (with D. Adler, M. Shur and M. Silver), *J. Appl. Phys.* **51**, 3289 (1980).
89. The Immediacy of Alternative Energy, presentation sponsored by Nihon Keizai Shimbun, the Japanese Economic Journal and Science, *Japanese Scientific American* (February 26, 1981) and several presentations in the 1970s.
90. High Efficiency, Large-Area Photovoltaic Devices Using Amorphous Si:F:H Alloy (with A. Madan, W. Czubytyj, J. Yang and J. McGill), Presented at the 9<sup>th</sup> International Conference on Amorphous and Liquid Semiconductors, Grenoble, France (July 2-8, 1981); *J. de Physique* **42**, Suppl. 10 (1981) p. C4-463.
91. The Nature of Intermediate Range Order in Si:F:H:(P) Alloy Systems (with R. Tsu, S.S. Chao, M. Izu, G.J. Jan and F.H. Pollak), *ibid.*, p. C4-269.
92. Principles and Applications of Amorphicity, Structural Change, and Optical Information Encoding, *ibid.*, p. C4-1095.

93. The Chemical Basis of Amorphicity: Structure and Function, *Revue Roumaine de Physique* **26**, 893 (1981). (Grigorovici Festschrift)
94. This Week's Citation Classic [S.R. Ovshinsky, Reversible Electrical Switching Phenomena in Disordered Structures, *Phys. Rev. Lett.* **21**, 1450 (1968)], *Current Contents* **22**, 18 ( March 8, 1982).
95. Progress in Large Area Photovoltaic Devices Based on Amorphous Silicon Alloys (with J.P. deNeufville and M. Izu), Proceedings of the 16th Intersociety Energy Conversion Engineering Conference, Atlanta, GA (August 9-14, 1981); *Photovoltaics, The Solar Electric Magazine* **3**, 2217 (August/September 1982).
96. Correlation Between the Superconducting and Normal State Properties of Amorphous Molybdenum – Silicon Alloys (with A.S. Edelstein, H. Sadat-Akhavi and J. Wood), *Solid State Comm.* **41**, 139 (1982).
97. Switch, Glass (with D. Adler) McGraw-Hill Encyclopedia of Science and Technology (McGraw-Hill Book Company, 5th through 8th Editions, 1982-1994).
98. Commercial Development of Ovonic Thin Film Solar Cells, Presented at the SPIE – The International Society for Optical Engineering Symposium on Photovoltaics for Solar Energy Applications II, Arlington, VA (April 5-6, 1983); SPIE Proc. Vol. 407, p. 5.
99. Production of Tandem Amorphous Silicon Alloy Solar Cells in a Continuous Roll-to-Roll Process (with M. Izu), *ibid.*, p. 42.
100. Innovation: Building a New Industrial Society, Presented at the American Association for the Advancement of Science (AAAS) Youth Symposium, Detroit, MI (May 26, 1983).
101. Improving the Business Environment in the Midwest for High Industry, Presented at OHMCON/83 on Hi-Technology, Hi-Growth Industries – Cultivating them in the Midwest, Detroit, MI (June 14-16, 1983).
102. Amorphous Photovoltaics – Introduction and Scientific Background, Presented at the Conference on Nonconventional Energy Sources and Summer Workshop on the Physics of Nonconventional Energy Sources, Miramare-Trieste, Italy (June 20 - July 8, 1983).
103. Amorphous Photovoltaics – Technology and Production, *ibid.*
104. Present Status of the Science and Technology of Amorphous Solids (with D. Adler), *Nikkei Science* (Japanese Scientific American) (August 1983) p. 60.
105. Laser-Induced Fluorescence Detection of Reactive Intermediates in Diffusion Flames and in Glow-Discharge Deposition Reactors (with H.U. Lee and J. deNeufville), Presented at the 10<sup>th</sup> International Conference on Amorphous and Liquid Semiconductors, Tokyo, Japan (August 1983); *J. Non-Cryst. Solids* **59/60**, 671 (1983).
106. The Role of Free Radicals in the Formation of Amorphous Thin Films, Proceedings of the International Ion Engineering Congress, ISIAT '83 & IPAT '83, Kyoto, Japan (September 12-16, 1983) p. 817.

107. Order Parameters in a-Si Systems (with R. Tsu, J. Gonzales-Hernandez and J. Doehler), *Solid State Comm.* **46**, 79 (1983).
108. Roll-to-Roll Plasma Deposition Machine for the Production of Tandem Amorphous Silicon Alloy Solar Cells (with M. Izu), Presented at the International Conference on Metallurgical Coatings, San Diego, CA (April 9-13, 1984); *Thin Solid Films* **119**, 55 (1984).
109. Amorphous Silicon Solar Cells, Presented at the American Vacuum Society Symposium on Coatings for Large-Scale Metallurgical, Optical, and Electronic Applications, Exxon Research and Engineering Co., Annadale, NJ (June 13, 1984); *J. Vacuum Science and Technology B* **2**, 835 (1984).
110. Roll-to-Roll Mass Production Process for a-Si Solar Cell Fabrication, Presented at the 1<sup>st</sup> International Photovoltaic Science and Engineering Conference, Kobe, Japan (November 13-16, 1984) p. 577.
111. Asymmetric Flux-Flow Behavior in Superconducting Multi-layered Composites (with A.M. Kadin, R.W. Burkhardt, J.T. Chen and J.E. Keem), Proceedings of the 17th International Conference on Low Temperature Physics, edited by U. Eckern, A. Schmid, W. Weber and W. Wühl (Elsevier Science Publishers, 1984).
112. Properties of Amorphous Semiconducting Multilayer Films (with J. Kakalios, H. Fritzsche and N. Ibaraki), *J. Non-Cryst. Solids* **66**, 339 (1984).
113. Reply to "Comment on 'Threshold Switching in Chalcogenide Glass Thin Films'," (with D. Adler, M.S. Shur and M. Silver), *J. Appl. Physics* **56**, 579 (1984).
114. Amorphous Materials – Past, Present and Future, Presented at the Symposium on Glass Science and Technology – Problems and Prospects for 2004, Vienna, Austria (July 3, 1984); *J. Non-Cryst. Solids* **73**, 395 (1985). (Kreidl Festschrift)
115. Superconducting Properties of Amorphous Multilayer Metal-Semiconductor Composites (with A.M. Kadin, R.W. Burkhardt, J.T. Chen and J.E. Keem), Presented at the Materials Research Society Meeting, Boston, MA (November 26-30, 1984); in "Layered Structures Epitaxy and Interfaces," edited by J. M. Gibon and L. R. Dawson; *Mat. Res. Soc. Symp. Proc.* **37**, 503 (1985).
116. Basic Anticrystalline Chemical Bonding Configurations and Their Structural and Physical Implications, Presented at the International Conference on the Theory of the Structures of Non-Crystalline Solids, Institute for Amorphous Studies, Bloomfield Hills, MI (June 3-6, 1985); *J. Non-Cryst. Solids* **75**, 161 (1985).
117. Chemical Bond Approach to Glass Structure (with J. Bicerano), *ibid.*, p. 169.
118. Amorphous Photovoltaics (with D. Adler), *Chemtech* **15**, 538 (September 1985).
119. Low Pressure Microwave Glow Discharge Process for High Deposition Rate Amorphous Silicon Alloy (with S.J. Hudgens and A.G. Johncock), Presented at the 11<sup>th</sup> International Conference on Amorphous and Liquid Semiconductors, Rome, Italy (September 2-6, 1985); *J. Non-Cryst. Solids* **77/88**, 809 (1985).

120. The Chemical and Configurational Basis of High Efficiency Amorphous Photovoltaic Cells, Proceedings of the 18th IEEE Photovoltaic Specialists Conference, Las Vegas, NV (October 21-25, 1985) p. 1365.
121. Experience in Licensing, Presented at the Conference on Technology Transfer and Licensing Opportunities in the Energy Sector, Copenhagen, Denmark (November 11-13, 1985).
122. Chemical Bond Approach to the Structures of Chalcogenide Glasses with Reversible Switching Properties (with J. Bicerano), *J. Non-Cryst. Solids* **74**, 75 (1985).
123. Chemistry and Structure in Amorphous Materials: The Shape of Things to Come, in "Physics of Disordered Materials," edited by D. Adler, H. Fritzsche and S. R. Ovshinsky, Institute for Amorphous Studies Series (Plenum Press, New York, 1985) p. 37. (Mott Festschrift)
124. Critical Materials Parameters for the Development of Amorphous Silicon Alloys (with D. Adler), Presented at the 1985 Materials Research Society Spring Meeting, San Francisco, CA (April 15-18, 1985); in "Materials Issues in Applications of Amorphous Silicon Technology," D. Adler, A. Madan and M. J. Thompson, editors; *Mat. Res. Soc. Symp. Proc.* **49**, 251 (1985).
125. A Figure of Merit Evaluation of Amorphous Silicon Alloy Solar Cells (with J.A. Yang), Proceedings of the 1985 International Conference on Solar and Wind Energy Applications, China (Academic Publishers) p. 75.
126. Fundamentals of Amorphous Materials, in "Physical Properties of Amorphous Materials," edited by D. Alder, B.B. Schwartz and M.S. Steele, Institute for Amorphous Studies Series (Plenum Press, 1985) p. 105.
127. Nevill Mott Appreciation (with I.M. Ovshinsky), in "Appreciations" *Philosophical Magazine B* **52**, pp. 215-224 (1985). (Mott Festschrift)
128. A New Role for Vacuum Technology (with D. Adler), Proceedings of the 28th Annual Technical Conference of the Society of Vacuum Coaters, Washington, D.C. (1985) p. 1.
129. Superconducting Properties of Sputtered Mo-C Films and Columnar Microstructure (with J. Wood, J.E. Keem, J.T. Chen, A.M. Kadin and R.W. Burkhardt), *IEEE Transactions on Magnetism* **MAG-21**, 842 (1985).
130. Intuition and Quantum Chemistry, Proceedings of the Nobel Laureate Symposium on Applied Quantum Chemistry (in honor of G. Herzberg, R.S. Mulliken, K. Fukui, W. Lipscomb and R. Hoffman), Honolulu, HI (December 16-21, 1984); *Applied Quantum Chemistry*, edited by V. H. Smith, Jr. et al. (D. Reidel Publishing, 1986) p. 27.
131. Chemical Bonding and the Nature of Glass Structure (with J. Bicerano), *ibid.*, p.325.
132. Amorphous Semiconductors for Microelectronics, Presented at the SPIE – The International Society for Optical Engineering on Amorphous Semiconductors for Microelectronics, Los Angeles, CA (January 21-22, 1986); *SPIE Proc.* Vol. 617, p. 2.

133. Macro-Engineering: The Crucial Element in Creating a Photovoltaic Industry, Presented at the American Society for Macro-Engineering conference on Macro-Engineering: The New Challenge, Washington, D.C. (March 13-14, 1986).
134. Solving the Problems of Efficiency, Stability and Production in Amorphous Photovoltaic Devices, Presented at Electronic Materials Processing, AIChE Meeting, Boston, MA (August 24-26, 1986).
135. Progress in the Science and Application of Amorphous Materials (with D. Adler), Proceedings of the International Conference on Non-Crystalline Semiconductors '86, Balatonszeplak, Hungary (September 15-20, 1986); *J. Non-Cryst. Solids* **90**, 229 (1987).
136. The Breaking of the Efficiency-Stability-Production Barrier in Amorphous Photovoltaics (with J. Yang), Presented at the SPIE – The International Society for Optical Engineering Conference on Photovoltaics for Commercial Solar Power Applications, Cambridge, MA (September 18-21, 1986); SPIE Proc. Vol. 706, p. 88.
137. New Material Innovation – Birth of Synthetic Material Age, Presented at the 1<sup>st</sup> International New Materials Conference & Exhibition, Osaka, Japan (October 16-19, 1986).
138. Crucial Parameters in Amorphous Solar Cells (with J. Yang), Presented at the 7<sup>th</sup> European Photovoltaic Solar Energy Conference, University of Seville, Spain (October 27-31, 1986).
139. Effects of Transition-Metal Elements on Tellurium Alloys for Reversible Optical-Data Storage (with R. Young, D. Strand and J. Gonzales-Hernandez), *J. Appl. Physics* **60**, 4319 (1986).
140. A Simplified Summary of the ECD Model Explaining the Mechanism of High Temperature Superconductivity in “Topics in Non-Crystalline Semiconductors – In Memory of David Adler 1937 – 1987,” edited by Hellmut Fritzsche and Ai-Lien Jung, Beijing University of Aeronautics and Astronautics, (1987), p. 186.
141. Amorphous Silicon Alloys – The Basis for High Efficiency, High Stability, Low Cost Photovoltaics (with J. Yang), Presented at the International Symposium-Workshop on Silicon Technology Development and its Role in the Sun-Belt Countries, Islamabad, Pakistan (June 14-18, 1987).
142. Superconductivity in Fluorinated Copper Oxide Ceramics (With R.T. Young, B.S. Chao, G. Fournier and D.A. Pawlik), Presented at the International Conference on High Temperature Superconductivity, Drexel University, Philadelphia, PA (July 29-30, 1987); *Reviews of Solid State Science* **1**, 207 (1987).
143. Fluorinated Amorphous Silicon-Germanium Alloys Deposited from Disilane-Germane Mixture (with S. Guha, J.S. Payson and S.C. Agarwal), Presented at the 12<sup>th</sup> International Conference on Amorphous and Liquid Semiconductors, Prague (August 24-28, 1987); *J. Non-Cryst. Solids* **97/98**, 1455 (1987).
144. Superconductivity at 155K and Room Temperature, Presented at Superconductors in Electronics Commercialization Workshop, San Francisco, CA (September 14-15, 1987).

145. 1 MW Amorphous Silicon Thin-Film PV Manufacturing Plant (with P. Nath, K. Hoffman, J. Call, C. Vogeli and M. Izu), Presented at the 3<sup>rd</sup> International Photovoltaic Science and Engineering Conference, Tokyo, Japan (November 3-6, 1987) p. 395.
146. Continuous Web Deposition of Amorphous Photovoltaics (with P. Nath), Presented at 1<sup>st</sup> International Conference on Vacuum Web Coating, New Orleans, LA (November 29 - December 1, 1987).
147. Superconductivity in the Fluorinated YBaCuO (with R.T. Young, B.S. Chao, G. Fournier and D.A. Pawlik), Presented by the Materials Research Society Meeting, Boston, Massachusetts (November 30 - December 5, 1987).
148. Passivation of Dangling Bonds in Amorphous Si and Ge by Gas Absorption (with R. Tsu, D. Martin and J. Gonzalez-Hernandez), *Physical Review B* **35**, 2385 (1987).
149. The Quantum Nature of Amorphous Solids in "Disordered Semiconductors," edited by M. A. Kastner, G. A. Thomas and S. R. Ovshinsky, Institute for Amorphous Studies Series (Plenum Press, New York, 1987) p. 195. (Fritzsche Festschrift)
150. A Structural Chemical Model for High  $T_c$  Ceramic Superconductors (with S.J. Hudgens, R.L. Lintvedt and D.B. Rorabacher), *Modern Phys. Lett. B* **1**, 275 (1987).
151. Superconductivity at 155K (with R.T. Young, D.D. Allred, G. DeMaggio and G.A. Van der Leeden), *Phys. Rev. Lett.* **58**, 2579 (1987).
152. Keynote address at the Hydrogen Photo Production Workshop II, Hawaii (January 13, 1988).
153. A New, Inexpensive, Thin Film Photovoltaic Power Module (with P. Nath, K. Hoffman, C. Vogeli and K. Whelan), Presented at the 20<sup>th</sup> IEEE Photovoltaic Specialists Conference, Las Vegas, NV (September 26-30, 1988) p. 1315.
154. Yield and Performance of Amorphous Silicon Based Solar Cells Using Roll-to-Roll Deposition (with K. Hoffman, P. Nath, J. Call, G. DiDio and C. Vogeli), *ibid.*, p. 293.
155. Conversion Process for Passivating Current Shunting Paths in Amorphous Silicon Alloy Solar Cells (with P. Nath, K. Hoffman and C. Vogeli), *Appl. Phys. Lett.* **53**, 986 (1988).
156. A Novel Design for Amorphous Silicon Alloy Solar Cells (with S. Guha, J. Yang, A. Pawlikiewicz, T. Glatfelter and R. Ross), Proceedings of the 20<sup>th</sup> IEEE PVSC (1988) p. 79.
157. A Personal Adventure in Stereochemistry, Local Order and Defects: Models for Room Temperature Superconductivity, in "Disorder and Order in the Solid State: Concepts and Devices," Institute for Amorphous Studies Series, edited by R. W. Pryor, B. B. Schwartz and S. R. Ovshinsky (Plenum Press, New York, 1988) p. 143. (Heinz Henisch Festschrift)
158. Fabrication and Performance of Amorphous Silicon Based Tandem Photovoltaic Devices and Modules (with P. Nath and K. Hoffman), Presented at the 4<sup>th</sup> International Photovoltaic Science and Engineering Conference (PVSEC-4), Sydney, Australia (February 1989).



159. Solar Energy and Superconductivity – Opposite Sides of the Same Coin, Presented at the ISES Solar World Congress, Kobe, Japan (September 4-8, 1989).
160. Band Gap Profiling for Improving the Efficiency of Amorphous Silicon Alloy Solar Cells (with S. Guha, J. Yang, A. Pawlikiewicz, T. Glatfelter and R. Ross), *Appl. Phys. Lett.* **54**, 2330 (1989).
161. This Week's Citation Classic [S.R. Ovshinsky, R.T. Young, D.D. Allred, G. DeMaggio and G.A. Van der Leeden, Superconductivity at 155K, *Phys. Rev. Lett.* **58**, 2579 (1987)], *Current Contents* **30**, 20 (February 19, 1990).
162. Production of 20 A Sec<sup>-1</sup> a-Si Alloys for Use in Solar Cells (with P. Nath, K. Hoffman, J. Call and G. DiDio), Proceedings of the 21<sup>st</sup> IEEE Photovoltaic Specialists Conference, Kissimmee, FL (May 21-25, 1990).
163. Unusual Fluorination Effects of Superconducting Films (with R.T. Young), Presented at the SPIE – The International Society for Optical Engineering Symposium on Modeling of Optical Thin Films II, San Diego, CA (July 12-13, 1990); SPIE Proc. Vol. 1324, p. 32.
164. Ovonic Ni-Metal Hydride Batteries for Electric Vehicles (with S. Venkatesan, M. Fetcenko and S. Dhar), Presented at the 24<sup>th</sup> ISATA, Florence, Italy (May 21, 1991). (Awarded the Toyota Prize for Advancement)
165. Structural Changes Induced by Thermal Annealing in W/C Multilayers (with B.S. Chao, J. Gonzalez-Hernandez, D. Pawlik, J. Scholhamer, J. Wood and K. Parker), Presented at the SPIE – The International Society for Optical Engineering on Multilayer Optics for Advanced X-ray Applications, San Diego, CA (July 22-23, 91); SPIE Proc. Vol. 1547, 196 (1991).
166. An Approach to the Puzzle of High Temperature Superconductivity – A Letter to David Adler, Epilogue to “Disordered Materials: Science and Technology – Selected Papers by Stanford R. Ovshinsky,” 2<sup>nd</sup> Edition, edited by David Adler, Brian B. Schwartz and Marvin Silver, Institute for Amorphous Studies Series (Plenum Press, New York, 1991).
167. The Chemical Basis of High Temperature Superconductivity: Structure and Function, *Revue Roumaine De Physique* **36**, 761 (1991). (Grigorovici Festschrift)
168. Performance Advances in Ovonic Nickel-Metal Hydride Batteries for Electric Vehicles (with S. Dhar, S. Venkatesan, M. Fetcenko, P. Gifford and D. Corrigan), Presented at the 11<sup>th</sup> International Electric Vehicle Symposium, Florence, Italy (September 1992). (Awarded best paper on batteries)
169. Amorphous Silicon Alloys – The Future Technology in Photovoltaics (with M. Izu and H.C. Ovshinsky), Presented at World Renewable Energy Congress, Reading, United Kingdom (September 1992).
170. Crystallization Studies of Ge:Sb:Te Optical Memory Materials (with J. Gonzalez-Hernandez, B. Chao, D. Strand, D. Pawlik and P. Gasiowski), *Appl. Phys. Comm.* **11**, 557 (1992).
171. High Quality Epitaxial YBCO (F) Films Directly Deposited on Sapphire (with R. Young, K. Young and M. Muller), *Physica C* **200**, 437 (1992).

172. Optically Induced Phase Changes in Amorphous Materials, *J. Non-Cryst. Solids* **141**, 200 (1992). (Tauc Festschrift)
173. The Origin of Pairing in High- $T_c$  Superconductors, *Chem. Phys. Lett.* **195**, 455 (1992).
174. The Relationship Between Crystal Structure and Performance as Optical Recording Media in Te-Ge-Sb Thin Films (with D. Strand, J. Gonzalez-Hernandez, B. Chao and P. Gasiorowski and D. Pawlik), *Mat. Res. Soc. Symp. Proc.* **230**, 251 (1992).
175. Toward the Elimination of Light-Induced Degradation of Amorphous Si by Fluorine Incorporation (with X. Deng, E. Mytilineou and R. Young), *Mat. Res. Soc. Symp. Proc.* **258**, 491 (1992).
176. A Mechanism for High Temperature Superconductivity, Presented at the 3<sup>rd</sup> International Conference & Exhibition, World Congress on Superconductivity, Munich, Germany (September 1992); *Applied Superconductivity* **1**, 263 (1993).
177. Advancements in Ovonic Nickel Metal Hydride Batteries for Portable and EV Applications (with P. Gifford, S. Venkatesan, M. Fetcenko, D. Corrigan and S. Dhar), Presented at the 10<sup>th</sup> International Seminar on Primary and Secondary Battery Technology and Applications, Deerfield Beach, FL (March 1993).
178. Manufacturing of Triple-Junction 4 ft<sup>2</sup> a-Si Alloy PV Modules (with M. Izu, X. Deng, A. Krisko, K. Whelan, R. Young, H.C. Ovshinsky and K.L. Narasimhan), Proceedings of the 23<sup>rd</sup> IEEE Photovoltaic Specialist Conference, Louisville, KY (May 10-14, 1993).
179. Continuous Roll-to-Roll Amorphous Silicon Photovoltaic Manufacturing Technology, Presented at the National Renewable Energy Laboratory Program Review Meeting, Denver, CO (October 1993).
180. A Nickel Metal Hydride Battery for Electric Vehicles (with M.A. Fetcenko and J. Ross), *Science* **260**, 176 (1993).
181. Ovonic NiMH Batteries for Electric Vehicle Application (with S.K. Dhar and M.A. Fetcenko), Presented at the Symposium of the Society of Automotive Engineers of Japan, Inc. (February 1994).
182. Ovonic NiMH Batteries for Portable and EV Applications (with S. Dhar, M. Fetcenko, S. Venkatesan, A. Holland, P. Gifford and D. Corrigan), Presented at the 11<sup>th</sup> International Seminar on Primary and Secondary Battery Technology Application (March 1, 1994).
183. Amorphous Silicon Alloy Photovoltaic Technology – From R&D to Production (with S. Guha, J. Yang, A. Banerjee, T. Glatfelter, K. Hoffman, M. Izu, H. Ovshinsky and X Deng), Presented at Materials Research Society Spring Meeting, San Francisco, CA (April 1994).
184. Historique du Changement de Phase, *Memoires Optiques & Systems*, No. 127 (September 1994) p. 65.
185. Advances in Ovonic Nickel Metal Hydride Batteries for Electric and Hybrid Vehicles (with P.R. Gifford, M.A. Fetcenko, S. Venkatesan, D.A. Corrigan, A. Holland and

- S.K. Dhar), Presented at the 186<sup>th</sup> Meeting of the Electrochemical Society, Miami, FL (October 1994).
186. Ovonic Nickel Metal Hydride Batteries for Consumer and Electric Vehicle Applications (with S. Venkatesan, S.K. Dhar, D.A. Corrigan, M.A. Fetcenko and P.R. Gifford), Presented at the 5<sup>th</sup> International Symposium on Advances in Electrochemical Science and Technology, Madras, India (November 24-26, 1994).
  187. Roll-to-Roll Microwave PECVD Machine for High Barrier Film Coatings (with M. Izu and B. Dotter), Presented at the International Conference of Vacuum Web Coating (November 1994).
  188. Ovonic Nickel-Metal Hydride Electric Vehicle Batteries: From the First 10,000 Miles to the First 10,000 Vehicles (with D.A. Corrigan, S. Venkatesan, P.R. Gifford, M.A. Fetcenko and S.K. Dhar), Presented at the 12<sup>th</sup> International Electric Vehicle Symposium, Anaheim, CA (December 1994).
  189. Continuous Roll-to-Roll Serpentine Deposition for High Throughput a-Si PV Manufacturing (with M. Izu, H.C. Ovshinsky, X. Deng, A.J. Krisko, K.L. Narasimhan, R. Cruet, T. Larman and A. Myatt), Presented at the 1994 IEEE First World Conference on Photovoltaic Energy Conversion, Waikoloa, HI (December 5-9, 1994) p. 820.
  190. Dependence of a-Si Solar Cell  $V_{oc}$  on Deposition Temperatures (with X. Deng, K.L. Narasimhan, J. Evans and M. Izu), *ibid.*, p. 678.
  191. Lightweight Flexible Rooftop PV Module (with M. Izu, H.C. Ovshinsky, K. Whelan and L. Fatalaki), *ibid.*, p. 990.
  192. The Material Basis of Efficiency and Stability in Amorphous Photovoltaics, *Solar Energy Materials and Solar Cells* **32**, 443 (1994). (Seraphin Festschrift)
  193. Stability Test of 4 FT<sup>2</sup> Triple-Junction a-Si Alloy PV Production Modules (with X. Deng, M. Izu and K.L. Narasimhan), Presented at the MRS Spring Meeting on Amorphous Silicon Technology, San Francisco, CA (1994); *Mat. Res. Soc. Symp. Proc.* **336**, 699 (1994).
  194. Lifting the Tyranny of the Lattice: A Revolution in Progress (with I.M. Ovshinsky), Norbert Kreidl's Festschrift, Liechtenstein (July 3-8, 1994); Proceedings of the Norbert Kreidl Symposium on Present State and Future Prospects of Glass Science and Technology Vol. 70C (1997).
  195. Ovonic NiMH Battery Technology for Portable and Electric Vehicle Application (with M. Fetcenko, S. Dhar, S. Venkatesan, A. Holland, P. Gifford and D. Corrigan), Presented at the 12<sup>th</sup> International Seminar on Primary and Secondary Battery Technology Application, Deerfield Beach, FL (March 1995).
  196. Using Materials Physics to Develop Novel Batteries, Presented at the March 1995 Meeting of the American Physical Society, San Jose, CA.
  197. Ion and Neutral Argon Temperatures in Electron Cyclotron Resonance Plasmas by Doppler Broadened Emission Spectroscopy (with David V. Tsu, R.T. Young, C.C. Klepper\* and L.A. Barry\* (\*Oak Ridge Natl. Lab.)), *J. Vac. Sci. Technol. A* **13**, 935 (May/June 1995).

198. Product Development Through Advances in Materials Science at ECD/OBC (with M.A. Fetcenko and S.J. Hudgens), *Daido Journal* (1995).
199. Ovonic NiMH Battery Technology for Portable and Electric Vehicle Application (with M. Fetcenko, S. Venkatesan, S. Dhar, A. Holland, R. Young, P. Gifford, D. Corrigan, A. Ng\* and R. Tsang\* (\*GP Batteries)), Presented at the 13<sup>th</sup> International Seminar on Primary and Secondary Battery Technology and Application, Deerfield Beach, FL (March 1996).
200. PV Metal Roofing Module (with T. Ellison, L. Fatalaki, R. Kopf, H. Ovshinsky, M. Izu, R. Souleyrette, K. Whelan, J. Wiehagen and L. Zarker), Presented at the 25<sup>th</sup> IEEE Photovoltaic Specialist Conference, Washington D.C. (May 13-17, 1996).
201. Ovonic NiMH Batteries Technology – Advanced Technology for Electric Vehicle and Hybrid Electric Vehicle Applications (with R.C. Stempel, S.K. Dhar, M.A. Fetcenko, P.R. Gifford, S. Venkatesan, D.A. Corrigan and R. Young), Presented at the 29<sup>th</sup> International Symposium on Automotive Technology and Automation, Florence, Italy (June 1996).
202. Amorphous Silicon Alloys – The Optoelectronic Materials that Set the Trend for Photovoltaic Applications (with J.C. Yang), Presented at the International Materials Research Congress, Cancun, Mexico (September 1-5, 1996).
203. Ovonic Nickel-Metal Hydride EV Batteries Powering Electric Cars, Trucks, Scooters and Bicycles Worldwide (with D.A. Corrigan, S. Venkatesan, P.R. Gifford, A. Holland, M.A. Fetcenko and S.K. Dhar), Presented at 13<sup>th</sup> International Electric Vehicle Symposium (EVS-13), Osaka, Japan (October 1996).
204. The Structure of W/C ( $0.15 < \gamma < 0.8$ ) Multilayers Annealed in Argon or Air (with J. Gonzalez-Hernandez, B.S. Chao and D.D. Allred), *Journal of X-Ray Science and Technology* **6**, 1-31 (1996).
205. Ovonic Nickel-Metal Hydride Batteries Making Electric Vehicles Practical (with R.C. Stempel), *ibid.*; Proceedings of the Japanese Society of Electric Vehicles, Tokyo, Japan (February 1997).
206. Ovonic NiMH Battery Technology – Improved Energy and Performance (with M. Fetcenko, J. Im, C. Fierro, B. Reichman, K. Young, B. Chao and S. Venkatesan), Presented at the 14<sup>th</sup> International Seminar on Primary and Secondary Batteries, Ft. Lauderdale, FL (March 1997).
207. Nickel Metal Hydride Technology for Consumer and Electric Vehicle Batteries – A Review and Up-Date (with P.R. Gifford, S.K. Dhar, D.A. Corrigan, M.A. Fetcenko and S. Venkatesan), Presented at the 65<sup>th</sup> Power Sources Symposium, Brighton, England (April 1997).
208. New High Speed, Low Cost, Roll-to-Roll Antireflectivity Coating Technology (with T. Ellison, B. Dotter and M. Izu), Proceedings of the 1997 Society for Vacuum Coaters, New Orleans (April 14-17, 1997).
209. Ovonic Nickel-Metal Hydride Batteries for Electric Vehicles (with D. Corrigan, S. Venkatesan, A. Holland, P. Gifford and S. Dhar), Presented at the 30<sup>th</sup> International

- Symposium on Automotive Technology and Automation (ISATA), Florence, Italy (June 1997).
210. Development of a Small Scale Hydrogen Production Storage System for Hydrogen Applications (with K. Sapru, N.T. Stetson, J. Yang, G. Fritz, M. Fairlie\* and A. Stuart\* (\*of SunFuel Energy Systems)), Presented at IECEC, Honolulu, HI (July 27-August 1, 1997).
  211. Comment on "Vacuum catastrophe: An elementary exposition of the cosmological constant problem" (with H. Fritzsche), *Am. J. Phys.* **65**, 927 (September 1997).
  212. Effect of hydrogen dilution on the structure of amorphous silicon alloys (with D.V. Tsu, B.S. Chao, S. Guha and J. Yang), *Appl. Phys. Lett.* **71**, 1317 (September 8, 1997).
  213. Improved  $\mu\text{-Si}$  p-Layer and a-Si i-Layer Materials Using VHF Plasma Deposition (with X. Deng, S.J. Jones, T. Liu and M. Izu), Presented at the 26<sup>th</sup> IEEE Photovoltaic Specialists Conference, Anaheim, CA (September/October 1997).
  214. Amorphous Materials – The Key to New Devices, Presented at the 20<sup>th</sup> edition of the International Semiconductor Conference (CAS '97) in Sinaia, Romania (October 1997).
  215. Ovonic Phase Change Memory Making Possible New Optical and Electrical Devices, Keynote address at the 9<sup>th</sup> Symposium on Phase Change Recording, Numanzu-City, Japan (November 27-28, 1997).
  216. Higher Power Ovonic Nickel-Metal Hydride Batteries for Electric and Hybrid Vehicles (with D.A. Corrigan, S. Venkatesan, A. Holland, P.R. Gifford, M.A. Fetcenko and S.K. Dhar), Presented at the 14<sup>th</sup> International Electric Vehicle Symposium (EVS-14), Orlando, FL (December 1997).
  217. Advanced Ovonic High-Power Nickel-Metal Hydride Batteries for Hybrid Electric Vehicle Applications (with I. Menjak, P.H. Gow, D.A. Corrigan, S. Venkatesan, S.K. Dhar and R.C. Stempel), Presented at the 13<sup>th</sup> Annual Battery Conference on Applications and Advances, Long Beach, CA (January 1998).
  218. Advanced Materials for Next Generation NiMH Portable, HEV and EV Batteries (With S.K. Dhar, M.A. Fetcenko, D.A. Corrigan, B. Reichman, K. Young, C. Fierro, S. Venkatesan, P. Gifford and J. Koch), Presented at the 15<sup>th</sup> International Seminar on Primary and Secondary Batteries, Ft. Lauderdale, FL (March 3, 1998).
  219. Improved Hydride/Dehydride Process to Prepare Metal Powders for Ovonic NiMH Battery Applications (with K.H. Young, M.A. Fetcenko, S. Tang and A. Ku), Presented at PM<sup>2</sup>TEC'98 Conference on Powder Metallurgy & Particulate Materials, Las Vegas, NV (June 1998).
  220. Ovonic Nickel-Metal Hydride Power for Hybrid Electric Vehicle Applications (with D. Corrigan, P. Gow, I. Menjak, S. Venkatesan, S. Dhar and R. Stempel), Presented at the 31<sup>st</sup> International Symposium on Automotive Technology and Automation, Dusseldorf, Germany (June 1998).
  221. High Power Ovonic NiMH Batteries for Hybrid Electric Vehicle Applications (with D. Corrigan, P. Gow, I. Menjak, S. Venkatesan, S. Dhar and R. Stempel), Presented at

- the 15<sup>th</sup> International Electric Vehicle Symposium, Brussels, Belgium (October 1998).
222. Fundamentals and Implications of Amorphous and Disordered Materials, Presented at the University of Toledo (October 22, 1998).
  223. Nickel Metal Hydride Batteries: The Enabling Technology for Electric and Hybrid Electric Vehicles (With R.C. Stempel, P.R. Gifford and D.A. Corrigan), *IEEE Spectrum* (November 1998).
  224. Nickel Metal Hydride Batteries – The Enabling Technology for Electric and Hybrid Vehicles, Presented at the 39<sup>th</sup> Battery Symposium, Japan (November 25-27, 1998).
  225. Advancing Batteries (with R.C. Stempel, S.K. Dhar and P.R. Gifford), *Electric & Hybrid Vehicle Technology '98* (1998) p. 80.
  226. *Mott's Room*, in Reminiscences and Appreciations, edited by E.A. Davis (Taylor & Francis Ltd, London, 1998) p. 282.
  227. Nickel-Metal Hydride: Ready to Serve (with R.C. Stempel, P.R. Gifford and D.A. Corrigan), *IEEE Spectrum* **35**, 29 (1998).
  228. Amorphous and Disordered Materials – The Basis of New Industries, Presented at Materials Research Society (MRS), Boston, MA (November 30 - December 4, 1998); *Mat. Res. Soc. Symp. Proc.* **554**, 399 (1999); *Bulk Metallic Glasses*, William L. Johnson, Akihisa Inoue and C.T. Liu (Eds.).
  229. Advanced Materials for 100+ Wh/kg NiMH Batteries (with M.A. Fetcenko, K. Young, B. Reichman, C. Fierro, J. Koch, W. Mays, B. Sommers, A. Zallen, S.K. Dhar and R. Young), Presented at the Sixteenth International Seminar on Primary and Secondary Batteries, Ft. Lauderdale, FL (March 2, 1999).
  230. Electric Cars and Scooters Powered by Ovonic Nickel-Metal Hydride Batteries (with N. Karditsas, D.A. Corrigan and S.K. Dhar), Presented at the 3<sup>rd</sup> International Symposium on Advanced Electromechanical Motion Systems, Patras, Greece (July 8-9, 1999).
  231. The Story of Phase Change for Optical Storage, *Balzers Materials* **9**, 6 (October 1999).
  232. Innovation, Corporate Strategy and Business Growth – The Challenge and Promise of the Hydrogen Economy, Keynote address at the Montreux Energy Roundtable, Cambridge, England (November 8, 1999).
  233. High Temperature Charge Acceptability Improvements in Ovonic Nickel Metal Hydride Batteries (with S. Venkatesan, B. Aladjov, K. Fok, T. Hopper, B. Prasad, L. Taylor, J. Strebe, M. Amo and S. Dhar), Proceedings of the 39<sup>th</sup> Power Sources Conference, Cherry Hill, NJ (March 31, 2000) p. 278.
  234. High Conductivity Negative Electrode Substrates for EV and HEV Ovonic NiMH Batteries (with S. Venkatesan, B. Prasad, B. Aladjov, D. Corrigan and S. Dhar), *ibid.*, p. 263.

235. Metal Hydride Technologies for Fuel Cell Vehicles (with D.A. Corrigan, R.C. Young and S.K. Dhar), Presented at the Commercializing Fuel Cell Vehicles 2000 Conference, Berlin, Germany (April 12-14, 2000).
236. Performance of Ovonic NiMH Batteries with New Generation of Positive Electrode Active Materials (with S. Venkatesan, B. Aladjov, T. Hopper, K. Fok, J. Strebe, and S. Dhar), Presented at the 197<sup>th</sup> Meeting of the Electrochemical Society, Toronto, Canada (May 14-18, 2000).
237. New Developments in Optical Phase Change Memory (with W. Czubyj), Presented at the 5<sup>th</sup> International Symposium on Optical Storage (ISOS 2000), Shanghai, China (May 22-26, 2000); *SPIE Proc.* Vol. 4085, p. 15 (2001).
238. The Road to Decarbonized Energy – Speeding towards a hydrogen economy – and the obstacles along the way, Book Review, *Nature* (August 3, 2000) p. 457.
239. Fuel Cells: Necessary But Not Sufficient, Keynote address at the Fuel Cell 2000 R&D, Philadelphia, PA (September 25-27, 2000).
240. Nickel-Metal Hydride Batteries for ZEV-Range Hybrid Electric Vehicles (with D. Corrigan, I. Menjak, B. Cleto and S. Dhar), Presented at the 17<sup>th</sup> International Electric Vehicle Symposium, Montreal, Canada (October 2000).
241. Technology's Tortoise and Hare – The sociological dynamics are now right for the electric car to eclipse its rival, book review, *Nature* (November 16, 2000) p. 289.
242. Applications of Glasses, Amorphous, and Disordered Materials” in P. Boolchand (Ed.) *Insulating and Semiconducting Glasses*, Series on Directions in Condensed Matter Physics, Vol. 17 (World Scientific, Singapore, 2000) p. 729.
243. Effect of Alloy Composition on the Structure of Zr Based Metal Alloys (with B.S. Chao, R.C. Young, D.A. Pawlik, B. Huang, J.S. Im and \*B.C. Chakoumakos), *Proceedings of Materials Research Society Symposium Vol. 575*, 193 (2000) [\*Neutron Scattering Section, Oak Ridge National Lab., Oak Ridge, TN 37831].
244. Ovonic NiMH Batteries: The Enabling Technology for Heavy-Duty Electric & Hybrid Electric Vehicles (with R.C. Stempel, S.K. Dhar, S. Venkatesan, D. Corrigan, G. Fritz and N. Karditsas), Presented *Society of Automotive Engineers* (2000).
245. Ovonic Memories, Presented at MINATEC 2001 – The Second International Meeting on Micro and Nanotechnologies, Grenoble (April 2-6, 2001).
246. The Basic Mechanisms Unique to Amorphous and Disordered Semiconductor Devices, Keynote address at the 19<sup>th</sup> International Conference on Amorphous and Microcrystalline Semiconductors, Nice, France (August 23-31, 2001).
247. Phase Change Optical Storage, Keynote speech “given by the great father of phase-change memory, Dr. Stanford R. Ovshinsky,” E\*PCOS<sup>01</sup> European Symposium on Phase Change Optical Storage, Santis, Switzerland (September 3-4, 2001).

248. The Hydrogen Economy, Keynote address at the Florida Educational Seminars, Inc. Conference on Fuel Cells for Stationary, Automotive and Portable Applications, Fort Lauderdale, FL (November 12-14, 2001).
249. Development of High Catalytic Activity Disordered Hydrogen-Storage Alloys for Electrochemical Application in Nickel-Metal Hydride Batteries (with M.A. Fetcenko), *Appl. Phys. A* **72**, 239 (2001).
250. Heterogeneity in Hydrogenated Silicon: Evidence for Intermediately Ordered Chainlike Objects (with D. Tsu, B.S. Chao, S. Jones, J. Yang, S. Guha and R. Tsu), *Phys. Rev. B* **63** (2001).
251. Solving Serious Societal Environmental Problems Through New Approaches to Catalysis, Keynote address at Symposium on Catalysis-Dependent New Commercial/Near Commercial Technologies for Improving Air Quality, 223<sup>rd</sup> American Chemical Society National Meeting, Orlando, FL (April 7-11, 2002).
252. Roadmap for the Future of Phase Change, Keynote address, E\*PCOS<sup>03</sup> European Symposium on Phase Change Optical Storage, Lake Lugano, Switzerland (March 10-11, 2003).
253. Phase Change Storage Media (with T. Ohta), *Encyclopedia of Optical Engineering* (Marcel Dekker, Inc., 2003), pp. 1939-1968. Online: [www.dekker.com](http://www.dekker.com).
254. Phase Change Optical Storage Media (with T. Ohta), in "Photo-Induced Metastability in Amorphous Semiconductors," edited by Alexander V. Kolobov (John Wiley & Sons Canada, Ltd.) 1<sup>st</sup> edition (July 24, 2003) Ch. 18.
255. Transformative New Science and Technology Affecting Energy and Information, The Twin Pillars of our Global Society, Armstrong Lecture, Newcastle University, U.K. (October 28, 2003).
256. Phase Change Data Storage, Tutorial at the 2003 MRS Fall Symposium on Phase Change and Nonmagnetic Storage Materials for Data Storage, Boston, MA (December 1-5, 2003).
257. Optical Cognitive Information Processing – A New Field, Keynote presentation at the International Symposium on Optical Memory '03, Nara, Japan (November 4, 2003); *Japanese J. Appl. Phys.* **43**, 4695 (2004).
258. New Science and Technology - The Basis of the Hydrogen Economy, Keynote address at the 2003 Materials Research Society (MRS) Fall Symposium on Materials and Technologies for a Hydrogen Economy, Boston, MA (December 1-5, 2003); *Mat. Res. Soc. Symp. Proc.* **801**, 3 (2004).
259. Innovation Providing New Multiple Functions in Phase-Change Materials to Achieve Cognitive Computing (with B. Pashmakov), Invited talk at the 2003 MRS Fall Symposium on Phase Change and Nonmagnetic Storage Materials for Data Storage, Boston, MA (December 1-5, 2003); *Mat. Res. Soc. Symp. Proc.* **803**, 49 (2004).
260. Hydrogen-Fueled Hybrid: Pathway to a Hydrogen Economy [with R. Geiss, B. Webster, R. Stempel (ECD Ovonics), R.C. Young, Y. Li, V. Myasnikov (Ovonic



- Hydrogen Systems), B. Falls and A. Lutz (Quantum Technologies)], Presented at the SAE 2004 World Congress, Detroit, Michigan (March 8-11, 2004).
261. A Hydrogen ICE Vehicle Powered by Ovonic Metal Hydride Storage (with R. C. Young, B. Chao, Y. Li, V. Myasnikov, and B. Huang) , Presented at the SAE 2004 World Congress, Detroit, Michigan (March 8-11, 2004).
  262. Transition Away From Fossil Fuels, panel presentation at the Bridging the Divide 2004 conference on Technology, Innovation and Learning in Developing Economies, University of California Berkley (April 1-3, 2004).
  263. A new information paradigm - the Ovonic Cognitive Computer, in "Non-Crystalline Materials for Optoelectronics," Optoelectronic Materials and Devices Series, 1 (INOE Publishing House, June 2004).
  264. Emerging technologies with emphasis on the workforce, skills panel at the Alternative Energy conference on "Training the Workforce of the Future," Wayne State University, Detroit (June 2, 2004).
  265. Phase Change Electronic Memories: Towards Cognitive Computing, *Encyclopedia of Materials: Science and Technology* (Elsevier Science, Ltd., 2005), pp. 1-6. Online: [www.sciencedirect.com](http://www.sciencedirect.com).
  266. Photovoltaics, the Beginning of the Hydrogen Economy, Featured speech, *Emerging Opportunities* session at "Solar 2004, A Solar Harvest: Growing Opportunities Conference," Portland, OR (July 11-13, 2004).
  267. The Ovonic Cognitive Computer: A New Paradigm, Keynote address, E\*PCOS<sup>04</sup> Third European Symposium on Phase Change and Ovonic Science (name of organization changed at E\*PCOS<sup>03</sup> in honor of the work of S.R. Ovshinsky), Liechtenstein (September 2004).
  268. Novel Storage Mechanisms Using Ovonic Phase Change Materials (with B. Pashmakov, D. Strand and T. Ohta), Presented at 2004 Asia-Pacific Data Storage Conference (APDSC'04), Taoyuan, Taiwan (September 27-30, 2004).
  269. The Ovonic Regenerative Fuel Cell, A Fundamentally New Approach (with S. Venkatesan and D.A. Corrigan), Presented at the Hydrogen and Fuel Cells Conference Trade Show, Toronto, Canada (September 2004).
  270. Technical Tendencies and Innovations in Fuel Cells, Invited Talk at Congress on Renewable Energy, Guanajuato, Mexico (November 8-12, 2004).
  271. The Mechanism of Ovonic Phase Change Cognitive Devices, Invited talk at Glass & Optical Materials Division Fall 2004 Meeting (ISNOG XIV), Cape Canaveral, Florida (November 10, 2004).
  272. The Principles of Disorder and Their Applicability to Condensed Matter Physics, Neurophysiology and Cosmology, presented at the monthly colloquium of the Michigan Center for Theoretical Physics, University of Michigan, Ann Arbor, MI (January 11, 2005).

273. Ovonic Instant Start Fuel Cells for UPS and Emergency Power Applications (with K. Fok, S. Venkatesan and D.A. Corrigan), Presented at the National Hydrogen Association Annual Conference 2005, Washington, DC (March 29-April 1, 2005).
274. Ovonic Chalcogenide Non-Binary Electrical and Optical Devices, Presented at 7<sup>th</sup> International Symposium on Optical Storage (ISOS 2005), Zhanjiang, China (April 2-6, 2005).
275. Metal Hydride Fuel Cells for UPS and Emergency Power Applications (with K. Fok, S. Venkatesan and D.A. Corrigan), Presented at Battcon 2005, Miami, FL (May 2005).
276. Metal Hydride Fuel Cells, A New Approach (with D.A. Corrigan), *Fuel Cell Magazine*, p. 25 (June/July 2005).
277. The Hydrogen Loop – The Means for Making the Hydrogen Economy Realistic, Proceedings of International Hydrogen Energy Congress and Exhibition IHEC 2005, Istanbul, Turkey (July 13-15, 2005); to be published in the Int. J. of Nuclear Hydrogen Production and Applications (IJNHPA), Vol. 1, No. 2.
278. Electro-optical investigations of Ovonic chalcogenide memory devices (with E. Mytilineou, B. Pashmakov, D. Strand and D. Jablonski), Presented at ICANS 21, Lisbon, Portugal (September 4-9, 2005).
279. The Future of Ovonic Phase Change Optical and Electrical Devices, Keynote address, E\*PCOS<sup>05</sup> European Symposium on Phase Change and Ovonic Science, Cambridge, U.K. (September 5-6, 2005).
280. 25/30 MW Ovonic Roll-To-Roll PV Manufacturing Machines (with M. Izu), presented at 15th International Photovoltaic Science and Engineering Conference and Solar Energy Exhibition, Shanghai, China (October 10-15, 2005); presented at VacMeSS Third International Symposium on Vacuum Coatings of Metal Strips and Sheets, Dresden, Germany (September 29-30, 2005).
281. Roll-to-Roll Manufacturing Technology for Ovonic a-Si PV Modules (with M. Izu, J. Doehler and S.J. Jones), to be presented at the 2006 IEEE 4th World Conference on Photovoltaic Energy Conversion (IEEE WCPEC-4), Waikoloa, Hawaii (May 7-12, 2006).

### **Neurophysiology and Neuropsychiatry**

1. Combined Cortical and Cerebellar Stimulation (with F. Morin and G. Lamarche), Department of Anatomy, Wayne State University, College of Medicine, *Anat. Rec* **127**, 436 (1957).
2. A Concept of Schizophrenia, *J. Nerv. and Ment. Disease* **Vol. 125**, 578 (1957).
3. Cortical and Cerebellar Stimulation in Walking Cats, Presented before the Detroit Physiological Society (December 19, 1957).
4. Functional Aspects of Cerebellar Afferent Systems and of Cortico-Cerebellar Relationships (with F. Morin and G. Lamarche), *Laval Médical* **Vol. 26**, 633 (1958).
5. Suggested Biochemical Factors in Schizophrenia, *J. Nerv. and Ment. Disease* **127**, 180 (1958).
6. The Physical Base of Intelligence – Model Studies, Presented at the Detroit Physiological Society (December 17, 1959).
7. The Reticulo-Endothelial Systems and its Possible Significance in Schizophrenia, *J. Neuropsychiatry* **3**, 38 (1961).

### **Books**

“Disordered Materials: Science and Technology – Selected Papers by S.R. Ovshinsky,” edited by David Adler (Amorphous Institute Press, Bloomfield Hills, Michigan, 1982).

“Disordered Materials: Science and Technology – Selected Papers by Stanford R. Ovshinsky,” 2nd Edition, edited by David Adler, Brian B. Schwartz and Marvin Silver, *Institute for Amorphous Studies Series* (Plenum Press, New York, 1991).

### **Books Edited**

“Physics of Disordered Materials,” edited by David Adler, Hellmut Fritzsche and Stanford R. Ovshinsky, *Institute for Amorphous Studies Series* (Plenum Press, New York, 1985).

“Disordered Semiconductors,” edited by Marc A. Kastner, Gordon A. Thomas and Stanford R. Ovshinsky, *Institute for Amorphous Studies Series* (Plenum Press, New York, 1987).

“Disorder and Order in the Solid State – Concept and Devices,” edited by Roger W. Pryor, Brian B. Schwartz and Stanford R. Ovshinsky, *Institute for Amorphous Studies Series* (Plenum Press, New York, 1988).

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