CURRICULUM VITAE

NAME:	HWANG, Huey-Liang
BIRTH:	Oct. 6, 1946
BIRTH PLACE	Guangzhou China
SEX	Male
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EDUCATION:

Brown University	Ph. D. Electrical Engineering	Sep.1972-May 1976
National Cheng Kung University	M.S.E. Electrical Engineering	Sep.1969-May 1971
National Cheng Kung University	B.S.E. Electrical Engineering	Sep.1965-May 1969

PROFESSIONAL HISTORY:

From (year) to (year)	Name of Organization	Position Held and Responsibilities
2003.8-	National Tsing Hua University	Tsing Hua Professor of Electrical Engineering and Computer Sciences
2002.12-	National Tsing Hua University	Hsu S-Y Chair Professor of Nano Technology
2001-now	National Tsing Hua University	Director, Center for Nano Technology and MEMS, Responsible for set-up the research capability and 80 professors participate in this Center
1976-now	National Tsing Hua University	Associate Professor, Professor., Founder of the Electrical Engineering Department. His persistent efforts over 32 years have contributed to the establishment of one of the very best Electrical Engineering Department in Taiwan
1992-1994	National Chung Hsing University	Prof. and Head, Responsible for set-up a new Electrical Engineering Department
1983-1986	National Tsing Hua University	Director, Electronic Material Research Center, Responsible for build-up the University Material Research Capability. He contributed greatly to the establishment of Tsing Hua University semiconductor research set-up, the VLSI Lab. he developed is rated as one of the very best university VLSI Laboratories worldwide
1981.8-1982.7	University of Delaware	Visiting Scientist, Institute of Energy of Conversion
1982.8-1982.9	Brown University	Visiting Professor, Engineering Division
1987.7-1987.10	Stuttgart University	Visiting Professor, Physikalisches Institut
1990.9-1991.11	University of Tokyo	Visiting Professor, Electronic Engineering Department

1999.2	Danish Technical University	Visiting Professor, Microelectronics Center
1999.3-1999.8	Stanford University	Visiting Professor, Center for Integrated Systems
2000.2-2000.7	Hong Kong University of Science and Technology	Visiting Professor,
2000.10-now		Adjunct Professor, Department of Electrical and Electronic Engineering
2002.9	Max Planck Institute	Visiting Professor at the invitation of Prof. Von Klitzing, Nobel Laureate, 1985
1996-1999	Lang Chou University	Visiting Professor, Physics Department
1996-1999	Beijing Technical University	Visiting Professor, Applied Physics Department
1988-now	Tze-Chiang Foundation of Science and Technology	Board Member, General Director, Founder of this organization, and Responsible for set-up Industry-University cooperation scheme. The Foundation he headed contributed greatly to industrial research and training, which becomes a model example for University-industry cooperation in Taiwan.
1984-now	Hsin-chu Science Park Semiconductor Engineers Training Center	Director, Responsible for training a large majority of semiconductor engineers employed in the Hsin-chu Science Park. The training operations (since 1984) he developed have trained 220,000 man-time (each time = three months) semiconductor engineers, approximating 90% of semiconductor engineers working at the Park receiving this training, which is essential to the success of Science Park in the IC productions. Taiwan produced 10% of worldwide integrated circuits.
1994-now	Cando Corp. (located at Hsinchu Science Park)	Model example of <u>INCUBATOR</u>. Founder and Board director. Cando is the major producer in the world for Color Filter for LCD/TFT.
2002-	Integrated Digital Technology Inc. (located at Hsinchu Science Park)	Chairman and CEO, IDTI is the distinguished establishment of the Industry-University Cooperated Research Projects on "Light-Pen Based Digital Boards".
2008	Lof Solar Corp.	Chairmand and CEO, Developed and Manufactured the 1st high efficiency color cell in the world
<u>PV PROGRAM</u>		
(1) 1976-1980	Institute of Nuclear Energy Research	Consultant
(2) 1980-1987	Energy Laboratories, Industrial Technology Research Institute	Consultant
(3) 1987-now	Sinonar (Amorphous Si) Corp.	Senior consultant
(4) 1980-1986	National Science Council	Program Director of National Silane (silicon materials) Project. The project he led has laid down the foundation for Taiwan's Si materials development. The project set-up a model for joint research program at a national level. His persistent efforts over 35 years have contributed

to the establishment of ROC solar cell developments. The 5 MW amorphous Si solar cell production (for consumer products) at Taiwan has become a major force in the international market place.

HONORS AND AWARDS

Ranked 1st, Tai-Dong High School Entrance Examination, 1962
Best High School Student Award on Edison Birthday Ceremony, 1964
Member of Sigma Xi, 1975
Best Research Award of National Tsing Hua University (one of the two engineering Awardees), 1984
Three times Distinguished Research Awards of National Science Council of ROC (1986,1989,1992)
Fellow of National Science Council of ROC, 1996
Best Paper Award of Chinese Engineers Society (Electrical Engineering Category), 1987
Distinguished Engineering Professor Award of Chinese Engineers Society, 1992
Dr. Sun Yat-Sen Academic Award (Engineering Category), 1988
International Member, American Association for the Advancement of Science, 1995
APEC Exemplary Award on High Tech Engineers Training, 1995
IEEE Fellow, 1994
Hou C-H Distinguished Honorable Award (Material Science Category), 1996
Japan Prize Nominator (1986-1994)
Who is who in R.O.C., 1991
Who is who in Asia, 1992
Who is who in the World, 1995
American Vacuum Society Fellow, 1998
Member, Asia-Pacific Academy of Materials, 1998
Vice President, Asia-Pacific Academy of Materials, 2000
Distinguished Alumni Award on 50th Anniversary of Hua-Lien Normal College's Elementary School, 1999
Hsu S-Y Chair Professor Award (on Nano Science), 2002
Distinguished Fellow Award of National Science Council of ROC, 2002
Tsing Hua Chair Professor of Electrical Engineering and Computer Sciences, 2003
Global School for Advanced Studies Fellow for Solar Cells, 2006
Brown Engineering Alumni Medal (BEAM), 2007
ROC 10th Optoelectronics Product Award, 2007

Tung Yuan Award, 2007
Pan Wen Yuan Distinguished Research Award, 2008
Hsin-Chu Science Park Innovative Product Award, 2008

PROFESSIONAL RECORD:

Referee	Thin Solid Films, Solar Energy Materials, Solid State Electronics, J. Appl. Phys., IEEE Trans. Electron Devices
Editor	VLSI Design
Editor	Progress in Photovoltaic
Review Board	Material Chemistry and Physics
Organizing Committee Chairman	1st R.O.C. Solar Cell Workshop, June 1980
Secretary	6th Electron Devices and Materials Symp. Hsinchu, June 1980
Organizing Committee Chairman	2nd R.O.C. Solar Cell Workshop, June 1983
General Chairman	10th Electron Devices and Materials Symp. And 1st Int. Conf. on Electron Devices and Materials, Hsinchu, Sep. 1984
Session Chairman (Structure and Bonding Properties)	6th Int. Conf. on Ternary and Multinary Compounds, Caracas, Venezuela, Aug. 15-17, 1984
Session Chairman (National Project)	1st Int. Photovoltaic Science and Engineering, Kobe, Japan, Nov. 15-18, 1984
Invited Speaker	1984 Seoul Int. Symp. On the Physics of Semiconductor and its Applications, Seoul, Korea, Aug. 27-29, 1984
Invited Speaker	Electrochemical Society Meeting, New Orleans, U.S.A., Oct. 1984
Member of Advisory Committee	Int. 17th and 18th IEEE Photovoltaic Specialists Conf., 1984 & 1985
Invited Speaker	1985 Seoul National University, Semiconductors Research Institute Inauguration Conference
Invited Speaker	Jet Prop. Lab Flat Panel Solar Array Project Final Review Meeting, 1985
Organizer	1986 Symp. On Amorphous Silicon Physics and Devices
Organizer	1986 Silicon Materials Research Symp.
Organizing Committee Chairman	4th ROC-ROK Symposium on the Condensed Matter Physics, Taipei, Dec. 11-12, 1987
Session Chairman	3rd (1987) Int. Conf. Photovoltaic Science and Engineering, Tokyo, Japan, Nov. 1988
Tech Committee Co-Chairman	1988 Int. Electron Devices and Materials Symp. Kaoshiung, Taiwan, Aug. 29-31, 1988
Session Chairman	20th IEEE Photovoltaic Specialists Conf., Las Vegas, U.S.A., Sep. 1988
Invited Speaker	1989 Electron Devices and Materials Symp. Hsinchu, Taiwan, R.O.C.
Member of Int. Committee & **Keynote Speaker**	5th Int. Conf. on Solid Films and Surfaces, Prov. R.I., U.S.A., Aug. 1990
Invited Speaker	1990 Seoul Int. Symp. On the Physics of Semiconductor and its

	Applications, Seoul, Korea, Aug. 1990
Symposium Chairman	Int. Conf. on Advanced Materials Symp. A3: Non-Stoichiometry in Semiconductors, May 27-31, 1991, Strasbourg, France
Member of International Advisory Committee and Program Committee	6th Int. Conf. on Solid Films and Surfaces, Paris, France, June, 1992
Member of International Advisory Committee	7th Int. Conf. Photovoltaic Science and Engineering, Nagoya, Japan, Nov. 1992
Invited Speaker	8th ROC-ROK Symp. On Condensed Matter and Statistical Physics, Taipei, Feb. 15, 1992
Invited Speaker	Int. Symp. On Trends in Surface Science, Mar. 30 - Apr. 2, 1992
Invited Speaker	Integrated Circuits Technology, Beijing, China, Oct. 1992
Invited Speaker	Conf. on Electronic Materials, Novosibirsk, USSR, Aug. 1992
Invited Speaker	Int. Conf. for 50th Anniversary of Osaka University, Osaka, Japan, Nov. 1992
Member of International Advisory Committee	1993 Semiconductor Modeling Symp. Taipei, Taiwan, R.O.C.
Session Chairman & Member of International Advisory Committee	9th Int. Conf. on Ternary and Multinary Compounds, Tokyo, Japan, Aug. 1993
Invited Speaker	1993 Meeting for Asia Pacific Society for Advanced Materials, Novosibirsk, Russia, Aug. 1993
Conference Chairman	7th Int. Conf. on Solid Films and Surfaces, Hsinchu, Taiwan, R.O.C., Dec. 1994
Member of International Advisory Committee	1st World Conf. on Photovoltaic Energy Conversion, Hawaii, Dec. 1994
Invited Speaker	Symp. On II-VI Materials `94, Strasbourg, France
Invited Speaker	1st Chinese Optoelectronics Workshop `94, Hong Kong
Invited Speaker	3rd Int. Conf. on Materials and Devices Characterization for VLSI, Kuming, Nov. 1994
Invited Speaker	1994 General Assembly and Science Assembly, Rep. Uzbekistan, Sep. 1994
Member of International Advisory Committee	5th Int. Conf. on Formation of Semiconductor Interface, Princeton University, May 1995
Member of International Advisory Committee	10th Int. Conf. on Ternary and Multinary Compounds, Stuttgart, Germany, Sep. 1995
Invited Plenary Speaker and Panelist of Round-Table Discussion	10th Int. Conf. on Ternary and Multinary Compounds, Stuttgart, Germany, Sep. 1995
Invited Speaker	2nd Chinese Optoelectronics Workshop, Tainan, Sep. 1995
Member of International Advisory Committee	9th Int. Conf. Photovoltaic Science and Engineering, Miyazaki, Japan, Nov. 1996
Member of International Advisory Committee	8th Int. Conf. on Solid Films and Surfaces, Osaka, Jul. 1996
Program Chairman	Int. Electron Devices and Materials Symp. Hsinchu, Dec. 1996
Invited Speaker	Int. Conf. on Microelectronics, Bundung, Indonesia, Jan. 1996
Invited Speaker	1996 General Assembly and Science Assembly, Asia-Pacific Academy of Materials, Bagalore, India, Dec. 1996

Member of Executive Committee	Asia-Pacific Academy of Materials, 1993-now
Workshop Co-Chairman	Workshop on Semiconductor Processing, Packaging, and Materials into 21 Century, Hsinchu, Apr. 1997
Guest Editor and Workshop	Progress in Photovoltaics 6, 3 (1998) Special Issues
Chairman	1997 World Forum on Advanced Solar Cell Materials (In Memory of the late Professor J. J. Loferski), Hsinchu, May 1997
Member of International Advisory Committee	6th Int. Conf. on the Formation of Semiconductor Interfaces, Cardiff, UK, June 1997
Invited Speaker and Organizer	Taipei International Sym. on Recent Trends in Technological Developments, Taipei, June, 1997
Member of International Advisory Committee	11th Int. Conf. On Ternary and Multinary Compounds, Salford, UK, Sep. 1997
Member of International Advisory Committee	4th Int. Symp. On Atomically Controlled Surfaces and Interfaces, Tokyo, Japan, Oct. 1997
Member of International Advisory Committee and Steering Committee	9th International Conference on Solid Films and Surfaces, Copenhagen, Denmark, Sep. 1998
Special Invited Speaker	Workshop on The Technology of Thin Film Fabrication and Characterization for Photovoltaic Solar Cells, Dempasai, Bali, Jan. 1998
Invited Speaker	2nd Int. Conf. On Insulating Crystalline and Amorphous Thin Films, Hong Kong, Oct. 1998
Invited Speaker	Int. Conf. On Solid Integrated Circuit Technology, Beijing, Dec. 1998
Keynote Speaker	1998 Workshop on Ternary and Multinary Compounds, Osaka, Japan, Dec. 1998
Seminar Chairman and Invited Speaker	Energy Problem Solving by Thin Film Photovoltaics, Hsinchu, Dec. 1998
Guest Editor and General Chairman	Material Physics and Chemistry (Special Issue) APAM (Asia-Pacific Academy of Materials) Topical Seminar on Asian Priorities in Materials Developments, Hsinchu, Dec. 1998
Member of Program Committee	1998 International Electron Devices and Materials Symp. Tainan, Dec. 1998
Conference Chairman	12th International Conf. on Ternary and Multinary Compounds, Hsin-chu, Taiwan, Mar. 2000
Member of International Advisory Committee	11th Int. Photovoltaic Science and Engineering Conference ”Photovoltaic Energy for the Coming Century”, Sapporo, Hokkaido, Japan, Sep. 20-24, 1999
Member of Advisory Committee	12th National Conf. On Semiconductor Physics, Shanghai, China, Oct. 18-22, 1999
Member of International Advisory Committee and Steering Committee	10th International Conference on Solids Films and Surface, Princeton University, Princeton, July, 2000
Plenary Speaker	2000 Hong Kong Electron Device Meeting, Hong Kong, July, 2000
Member of International Advisory Committee	8th Int. Conf. on the Formation of Semiconductor Interfaces, Japan, 2001

Member of Program Committee & Invited Speaker	Conference on Microelectronics Advanced Processing Techniques, SPIE Symposium on Microelectronics and Assembly, Singapore, Nov. 2000
Member of International Advisory Committee	11th International Conference on Solid Films and Surfaces, Marseille, July 2002
Chairman of International Advisory Committee	13th International Conf. On Ternary and Multinary Compounds, Paris, 2002
Member of International Advisory Committee	12th International Conference Photovoltaic Science and Engineering, Jichou, Korea, 2002
Conference Co-chairman	International Conference on Nano Materials Data Networking, Hsin-chu, Aug. 2002
Plenary Speaker	2001 Hong Kong Electron Device Meeting, Hong Kong, July 2000
Invited Speaker	Sino-UK Conference on Academia-Industry Links, Hsinchu, April 2001
Invited Speaker	The 6th Int. Conf. on Solid-state and Integrated-circuit Technology, Shanghai, Oct. 2001
Plenary Speaker	International Workshop on Nanoelectronic Circuits and Giga-Microsystems (IWNCGM), Miao-li, Oct. 2001
Member of International Advisory Committee	1st International Symposium on Point Defects and Non-stoichiometry, Sendai, Japan, Mar.20-22, 2003
Member of International Advisory Committee	13th International Conference on Photovoltaic Science and Engineering, Bangkok, Tailand, 2004
Member of International Advisory Committee and Invited Speaker	2002 APAM Topic Seminar on Nanotechnology, Novosibirsk, 2002
Member of International Advisory Committee	14th International Conference on Ternary and Multinary Compounds, Golden, Colorado, USA, Sep. 2004.
Conference Chairman	2nd International Symposium on Point Defects and Non-stoichiometry, Hsin-chu, Taiwan, ROC, 2005

I. 專利

名　　稱	取得年月	頒發機構	備　註
"Design and Construction of a Gas-Assisted-Solidification System for Polycrystalline Si Crystal Growth" (C.H. Chu, C.Y. Sun and H.L. Hwang)	73	中華民國中央標準局	Patent No. 23422
低溫成長複晶矽膜的製造方法	85	中華民國中央標準局	Patent No 00291575
" A Novel Technology to deposit Poly Si Thin Films on silicon oxide and glass substrate" (K.C. Wang, J.R. Yew and H.L. Hwang)	86	中華民國中央標準局	Patent No.082623.
"Process to Improve Temperature Uniformity during RTA by Deposition of In-Situ Poly on Wafer Backside" (J.R. Shih, B.L. Lin and H.L. Hwang)	87	中華民國中央標準局、美國專利局	US Patent No. 09/148,563 ROC Patent No. 87111143
"New ESD Protection Device Structure and Process with High Tilt Angle" (J.R. Shih, B.L. Lin and H.L. Hwang)	87	中華民國中央標準局、美國專利局	US Patent No. 09/252,630 ROC Patent No. 87109013
"Light-Pen Based Digital Board System"(K.Y.J. Hsu, H.L. Hwang, Y.L. Jiang and J.C. Tsai)	93	中華民國中央標準局、美國專利局	ROC Patent No.197891 USA patent filed
"Amorphous Si/Amorphous SiGe Position Sensitive Detectors for Infrared Light-Pen Based Digital Boards"), (K.Y.J. Hsu, H.L. Hwang, Y.L. Jiang, J.C. Tsai)	2004	中華民國中央標準局、美國專利局	ROC Patent No.170607 US Patent No.680478 B2
"低啟始電壓之n型金氧半場效電晶體" (荊鳳德、吳建宏、王水進、黃惠良)	96/2/16	中華民國中央標準局	中華民國 96106141
"低啟始電壓之互補式金氧半場效電晶體" (荊鳳德、吳建宏、王水進、黃惠良)	96/4/13	中華民國中央標準局	中華民國 96113021

II. 榮譽

名　　稱	取得年月	頒　發　機　構	備　　註
愛迪生誕辰科學優良學生代表	52	愛迪生誕辰科學優良學生選拔委員會	
清華大學研究獎(工科)(1984)	73	清華大學	
中國工程師學會最佳論文獎	76	中國工程師學會	
國科會傑出研究獎(1983, 1986, 1989), 為國科會首屆特約研究員(Fellow, NSC, 1996)	72-85	國科會	
中山學術獎(1988)	77	中山文教基金會	
中國工程師學會傑出工程教授獎	81	中國工程師學會	
國際電機電子工程師學會傑出會員(IEEE Fellow,1994)	83	IEEE	
APEC科技培訓最佳典範獎	84	亞太經合會(APEC)	
侯金堆傑出榮譽獎材料類	85	侯金堆文教基金會	
美國真空學會傑出會員(Fellow, American Vacuum Society	87	American Vacuum Society	
亞太材料科學院院士(Member, Asia Pacific Academy of Materials, 1998)	87	亞太材料科學院(Asia Pacific Academy of Materials)	
花蓮師範附小傑出校友	88	花師校友會	
國科會傑出特約研究員獎(2002)	91	國科會	
(首屆)有庠奈米科技講座 (2002)	91	徐有庠先生紀念基金會	
清華大學電機資訊講座教授(2003)	92	清華大學	
Global School for Advanced Studies (Fellow, Solar Cells 2006)	95	NSF (USA) & NSC (ROC)	
Brown大學傑出校友獎(工科)	96	Brown Engineering Alumni Medal (BEAM) Committee	
第十屆中華民國光電產品獎	96	光電協進會	
東元科技獎(電機/資訊/通訊類)	96	東元科技文教基金會	
潘文淵研究傑出獎	97	潘文淵文教基金會	
大學產業經濟貢獻獎	99	經濟部	

PUBLICATION LISTS

(A) Published Journal Paper:

1. "Growth of $CuInS_2$ and Its Characterizations", Revue De Physique Appliqué Tom **13** (1978) 745 (H.L. Hwang, C.Y. Sun, C.Y. Leu, C.L. Cheng and C.C. Tu)
2. "Applications of Electron Microscopy to the Study of $CuInS_2$ Layers", Chinese J. Materials Science 11(4) (1979) 7, (C.L. Cheng, B.H. Tseng, H.L. Hwang and C.Y. Sun)
3. "On the Preparation of $CuInS_2$ Thin Films by Flash Evaporation", Solar Energy Materials **2** (1980) 433 (H.L. Hwang, C.C. Tu, J.S. Maa and C.Y. Sun)
4. "Growth and Properties of Sputter-Deposited $CuInS_2$ Thin Films", Thin Solid Films **67** (1980) 83 (H.L. Hwang, C.L. Chang, L.M. Liu, Y.L. Liu and C.Y. Sun)
5. "Growth and Properties of $CuInS_2$ Epitaxial Layers Obtained by Chemical Vapor Transport", Solar Energy Materials **4** (1980) 67 (H.L. Hwang, B.H. Tseng, C.Y. Sun and J.J. Loferski)
6. "Heteroepitaxial Growth of GaP on $CuInS_2$ and Their Characterization", Thin Solid Films **81(2)** (1981) 145 (C.Y. Sun, H.L. Hwang, C.Y. Liu, L.M. Liu and B.H. Tseng)
7. "Vapor Growth of $CuInS_2$ Single Crystals and Its Thermodynamic Considerations", Jpn. J. Appl. Phys. **19** Supple. 19-13 (1980) 81 (C.Y. Sun, H.L. Hwang, C.Y. Leu, L.M. Liu and B.H. Tseng)
8. "Thermodynamic Considerations of Vapor Epitaxial Growth of $CuInS_2$/GaP Heterojunctions", Jpn. J. Appl. Phys. **19** Supple. 19-3 (1980) 41 (H.L. Hwang, B.H. Tseng and C.Y. Sun)
9. "Raman Studies on Optical Phonons in $CuInS_2$", Chinese J. Phys. 19(2/3) (1981) 50 (D.M. Hwang, C.C. Chen and H.L. Hwang)
10. "The Substrate Heating Effects on Ion-Beam Sputter-Deposited $CuInS_2$ and GaP Thin Films", Application of Surface Science **11/12** (1982) 552 (J.R. Chen, C.C. Nee, H.L. Hwang, L. Lu and Y.C. Liu)
11. "Preparation of $CuInS_2$ on GaP Grown by LPE", Electronics Lett., 19(5) (1981) 245 (H.L. Hwang, W.J. Lin, H.J. Chang and C.Y. Sun)
12. "Growth and Process Identification of $CuInS_2$ on GaP by CVD", J. Cryst. Growth **55** (1981) 245 (H.L. Hwang, C.Y. Sun, C.S. Fan, S.D. Chang, C.H. Cheng, M.H. Yang, H.H. Lin and H. Tuwan-Mu)
13. "Analytical Characterization of $CuInS_2$", Talanta **31(4)** (1984) 259 (C.F. Hung, P.Y. Chen, L.Y. Weng, H.L. Hwang and M. H. Yang)
14. "Compositional Determination of $CuInS_2$ by a Chemical Analysis Method", Solar Energy Materials **7** (1982) 225 (H.L. Hwang, L.M. Liu, M.H. Yang, J.S. Chen, J.R. Chen and C. Y. Sun)
15. "Determination of Trace Elements in $CuInS_2$", Solar Energy Materials **7** (1982) 237 (H.L. Hwang, L. M. Liu, M.H. Yang, P.Y. Chen, J.R. Chen and C.Y. Sun)
16. "Note on Melt-Solidified $CuInS_2$ Single Crystals", Chinese J. Material Sci. **13(1)** (1981) 1 (L.M. Liu, C.Y. Sun and H.L. Hwang)
17. "An Oscillation Circuit for Growing Large $CuInS_2$ Single Crystal by Chemical Vapor Transport", Chinese J. Phys. **12(2)** (1980) 17 (G.D. Diau and H.L. Hwang)
18. "A Design of $CuInS_2$ Single Crystal Growth by Traveling Heater Method", Nuovo Cimento IL **2D(6)** (1983) 1762 (H.L. Hwang, Y.L. Yen, D.C. Liu, C.Y.

Sun and C.Y. Sun)

19. "A Theoretical Analysis of Epitaxial Growth of $CuInS_2$ by Chemical Vapor Deposition", Nuovo Cimento IL **2D(6)** (1983) 1658 (C.Y. Sun, H.L. Hwang, C.S. Fang, D.C. Liu and M.H. Horng)
20. "Determination of Trace-elements in $CuInS_2$ Ternary Chalcopyrite Compound Semiconductor", J. Electrochem. Soc. **129(3)** (1982) 1 (M.H. Yang, L.M. Liu and H.L. Hwang)
21. "Modulation Reflectance Spectra of $CuInS_2$", Phys. Lett. **99A(5)** (1983) 255 (T.M. Hsu, S.F.Fan and H.L. Hwang)
22. "Growth of $CuInS_2$ Single Crystals by THM", Electronics Lett. **20(9)** (1984) 376 (H.J. Hsu, C.Y. Sun and H.L. Hwang)
23. "Cu_2S-In_2S_3 Phase Diagram", Chinese J. Materials Sci. 1985 (M. L. Peng, C.Y. Sun and H.L. Hwang)
24. "Photoluminescence of $CuInS_2$ Prepared by Different Methods", Prog. on Cryst. Growth & Characterization **10** (1984) 337 (H.L. Hwang, P. Chen, Y. Hamakawa, L.Y. Liu, M.H. Yang and R. S. Tang)
25. "On the Obstacles in the Material Preparation of $CuInS_2$", Prog. on Cryst. Growth & Characterization **10** (1984) 207 (H.L. Hwang, C.Y. Sun, M. H. Yang, R.S. Liu, T.M. Hsu, J. H. Hsu, Y.L. Wu and P.C. Lin)
26. "Wavelength Modulated Reflectance Data for $CuInS_2$ Single Crystals and Thin Films", Prog. on Cryst. Growth & Characterization **10** (1984) 277 (T.M. Hsu, T.W. Nee, S.F. Nee and H.L. Hwang)
27. "Some Comments on Physical and Chemical Methods in Compositional Analysis of Cu I-III-VI_2 Compounds", Prog. On Cryst. Growth & Characterization **10** (1984) 175 (H.L. Hwang, C.M. Fou, S. Shea, V. Dalton, M.H. Yang and C.Y. Sun)
28. "Physics, Chemistry and Materials Preparation of a Ternary Chalcopyrite Semiconductor – $CuInS_2$", Proc. 1984 Seoul Int. Conf. of Semiconductor Physics and Its Applications, Seoul, Korea, 1984, p. 195 ***(Invited)***; Proc. National Science Council Part A, No. 1 (1986) 72d ***(Review Article)*** (H.L. Hwang, M.H. Yang, C.Y. Sun and T.M. Hsu)
29. "A Novel Method to Grow Large $CuInS_2$ Single Crystals", J. Cryst. Growth **70** (1986) 378 (H.J. Hsu, M.H. Yang, R.S. Tang, T.M. Hsu and H.L. Hwang)
30. "Some Remarks on Doping and Annealing in $CuInS_2$", J. Appl. Phys. **59(2)** (1986) 378 (J.L. Lin, L.M. Liu, J.T. Lue, M.H. Yang and H.L. Hwang)
31. "$CuInS_2$ Semiconductor Reseach", National Science Monthly **1(1)** (1986) 1 ***(Invited Review Report)*** (H.L. Hwang)
32. "Liquid Phase Epitaxial Growth of $CuInS_2$", Thin Solid Films **144** (1986) 229 (L.W. Chang, J. Gong, C.Y. Sun and H.L. Hwang)
33. "Pulse Electron Beam Annealing of Phosphorus Implanted $CuInS_2$", Appl. Phys. Lett. **48(16)** (1986) 1057 (I.L. Lin, J.T. Lue, M.H. Yang and H.L. Hwang)
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35. "Defects and Doping Effects in CdTe and $CuInS_2$ by Phosphorus Ion Implantation and Pulsed Electron Beam Annealing", *Ion Implantation in Semiconductors* (Trans Tech Publications Ltd., Switzerland, 1988), Editor: D. Stievenard & J. C. Bourgoin, p. 343-359 ***(Review Article)***. Defects and Diffusion Foum Vol. 57-58 (1988) 445. Also in Proc. National Science Council of R.O.C.

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V. Control

(I) Published Journal Paper

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