

International Photovoltaic Science and Engineering Conference

Technical Digest

Search



[TOP](#) > PVSEC-11 (1999) / Sapporo, Japan

PVSEC-11 (1999) / Sapporo, Japan

[International PVSEC-11 Committees](#)

[Acknowledgement](#)

[Chairperson's Message](#)

Tadashi Saitoh

[PREFACE](#)

Takashi Fuyuki

[PVSEC AWARD](#)

Makoto Konagai

[PVSEC SPECIAL AWARD](#)

Kazuo Inamori

[▲ Back to TOP](#)

■ Plenary Session I

PL-1-1

[Current Status and Future Prospect of PV Program in Japan](#)

A. Kamata

Agency of Natural Resources & Energy, MITI, Japan

PL-1-2

[R&D on PV in Japanese New Sunshine Program](#)

K. Masuda

Agency of Industrial Science and Technology, MITI, Japan

PL-1-3

[The Case for a 40% Efficiency Goal for Photovoltaic Cells in 2005](#)

J. Rannels

Department of Energy, USA

PL-1-4

[Current Status and Future Prospect of PV Program in Europe](#)

W. Palz

EU DG XII(European Union)

[▲ Back to TOP](#)

■ Plenary Session II

PL-2-1

[Photovoltaics R&D Perspectives: Into the 21st Century](#)

L. Kazmerski

National Center for Photovoltaics, NREL USA

PL-2-2

[Progress and Outlook for High Efficiency Crystalline Silicon Solar Cells](#)

M. A. Green, J. Zhao, A. Wang and S. R. Wenham

Univ. of New South Wales, Australia

PL-2-3

[The Status of Thin Film Solar Cell Research and Development for the 21st Century -Roles and Potential of Amorphous/Polymer Crystalline Si, CIGS and CdTe Thin Film Solar Cells](#)

M. Konagai

Tokyo Institute of Technology, Japan

PL-2-4

[Amorphous Silicon Photovoltaics: The Past, Present and Future](#)

	D. E. Carlson BP Solarex, USA
PL-2-5	Compound Polycrystalline Solar Cells: Recent Progress and Y2K Perspective R. W. Birkmire IEC, Univ. of Delaware, USA
PL-2-6	Present and Future Prospects of Super High-Efficiency Tandem Solar Cells M. Yamaguchi Toyata Technological Institute, Japan
PL-2-7	PV Power of the Sydney Olympic Village D. Morphett Pacific Power, Australia

[▲ Back to TOP](#)

■ Session 21-A-1 Symposium C Massproduction of a-Si based Cells

21-A-1-1	invited Towards Large-Area, High Efficiency a-Si/a-SiGe Tandem Solar Cells S. Okamoto, E. Maruyama, A. Terakawa, W. Shinohara, S. Nakano, Y. Nishikawa, K. Wakisaka and S. Kiyama Sanyo Electric Co., Ltd., Japan
21-A-1-2	Production Technology for Amorphous Silicon Based Flexible Solar Cells (invited) Y. Ichikawa, T. Yoshida, T. Hama, H. Sakai and K. Harashima Fuji Electric Co. Research and Development, Ltd., Japan
21-A-1-3	Mass-production of Large Size a-Si Modules and Future Plan (invited) Y. Tawada and H. Yamagishi Kaneka Corp., Japan
21-A-1-4	Requirements for the PCVD Equipments in a Mass Production Plant (invited) Y. Watabe Anelva Co., Japan
21-A-1-5	Recent Progress in TCO Coated Glass Substrates for a-Si Solar Cells (invited) K. Sato Asahi Glass, Japan
21-A-1-6	New Monolithic Structure of Substrate-type a-Si:H Module S. Kidoguchi, K. Nakanishi, H. Sannomiya, T. Hayakawa, H. Taniguchi, H. Sawai and H. Takiguchi Sharp Corp., Japan
21-A-1-7	Development of Highly Efficient Thin Film Silicon Solar Cells on Texture Etched Zinc Oxide Coated Glass Substrates B. Rech, O. Kluth, S. Wieder, H. Siekmann, J. Müller, W. Reetz, O. Vetterl, D. Lundszen, A. Lambertz, F. Finger and H. Wagner Institut für Schicht- und Ionentechnik, Germany

[▲ Back to TOP](#)

■ Session 21-B-1 High-efficiency & Cd-free CIGS Solar Cells

21-B-1-1	Electrical Characterization of Cu(In,Ga)Se₂ Thin Film Solar Cells and the Role of Defects for the Device Performance Device Performance U. Rau, M. Schmidt, A. Jasenek, G. Hanna and H. W. Schock Universität Stuttgart, Germany
21-B-1-2	Effects of Sodium on non-stoichiometric Cu_x(In_{0.5}Ga_{0.5})Se₂ Thin Films by Co-evaporation Method *S. H. Kwon, *D. Y. Lee, *B. T. Ahn, **K. H. Yoon and **J. Song *Korea Advanced Institute of Science and Technology, Korea ** Korea Institute of Energy Research, Korea
21-B-1-3	Role of Incorporated Sulfur into the Surface of Cu(InGa)Se₂ Thin-Film Absorber Y. Nagoya, K. Kushiya, M. Tachiyuki and O. Yamase Showa Shell Sekiyu K. K., Japan
21-B-1-4	High Efficiency CIGS Solar Cells with Modified CIGS Surface

*T. Wada, **Y. Hashimoto, **S. Nishiwaki, **T. Sato, **S. Hayashi, **T. Negami and ***H. Miyake
*Ryukoku Univ., Japan **Matsushita Electric Industrial Co., Ltd., Japan *** Mie Univ., Japan

21-B-1-5	<u>Improved Performance of Cu(InGa)Se₂ Thin-Film Solar Cell with High Resistivity ZnO Buffer Layer</u> S. Chaisitsak, T. Sugiyama, A. Shimizu, A. Yamada and M. Konagai Tokyo Institute of Technology, Japan
21-B-1-6	<u>High Efficiency Cd-Free CIGSS Thin Film Based Solar Cell with Solution Grown Zinc Compound Buffer Layers</u> *A. Ennaoui, *M. Ch. Lux-Steiner and **F. Karg *Hahn-Meitner-Institut, Germany **Siemens Solar, Germany
21-B-1-7	<u>High Efficiency Cd-Free Cu(In,Ga)Se₂ Thin Film Solar Cells</u> T. Nakada, K. Furumi, M. Mizutani, Y. Hagiwara and A. Kunioka Aoyama Gakuin Univ., Japan
21-B-1-8	<u>Improved Jsc in CIGS Thin Film Solar Cells using a Transparent Conducting ZnO:B Window Layer</u> Y. Hagiwara, T. Nakada and A. Kunioka Aoyama Gakuin Univ., Japan
21-B-1-9	<u>A New Approach to High Efficiency Solar Cells by Band Gap Grading in Cu(In,Ga)(S,Se)₂ Chalcopyrite Semiconductors</u> T. Dullweber, G. Hanna, U. Rau and H. W. Schock Universitat Stuttgart, Germany

[▲ Back to TOP](#)

■ Session 21-C-1 National Programs I Policies & Economics

21-C-1-1	<u>Current Status and Future Prospect of PV Program in the Netherlands</u> (invited) E. W. Horst Netherlands Agency for Energy and the Environment, The Netherlands
21-C-1-2	<u>Photovoltaic Technology and Renewable Energy Activities in the United Kingdom</u> (invited) A. Sayigh World Renewable Energy Network, UK
21-C-1-3	<u>Italian 10000 Roof-top PV Program</u> (invited) M. Garozzo ENEA, Italy
21-C-1-4	<u>The Current Situation and Future Trend of PV in China</u> (invited) L. Zuming Yunnamm Normal Univ., P.R.China
21-C-1-5	<u>Current Status and Future Prospect of PV in Korea</u> (invited) J. Song Korea Institute of Energy Research, Korea
21-C-1-6	<u>PV Promotion in Developing Countries by World Bank and Other International Organizations</u> (invited) M. R. L. N. Murthy Semicon Tech Consultants, India
21-C-1-7	<u>Resource Allocation Model for Planning R&D on Solar Cells</u> E. Endo and Y. Tamura Electrotechnical Laboratory, Japan
21-C-1-8	<u>Successful Financial Incentives for a Dissemination of PV Systems - Evidence from Western Europe</u> *R. Haas, **M. Heidenreich, *C. Huber *Institute of Energy Economics, Austria **Arsenal Research, Austria

[▲ Back to TOP](#)

■ Session 22-A-1 Crystalline Silicon Solar Cells I

22-A-1-1	<u>Development of NEDO Melt-Purification Process for Solar Grade Silicon</u>
----------	--

	(invited) *N. Yuge, *M. Abe, *K. Hanazawa, *H. Baba, *N. Nakamura, *Y. Kato, *Y. Sakaguchi, *S. Hiwasa, *M. Obashi and **F. Aratani *Kawasaki Steel Corp., Japan **Solar-Grade Silicon Technology Research Assoc., Japan
22-A-1-2	<u>New Electromagnetic Casting using Plasma Jet Melting</u> (invited) K. Kaneko, K. Sasatani, M. Ohnishi, N. Kimura Sumitomo Sitix of Amagasaki, Inc., Japan
22-A-1-3	<u>Production Technology of Large Area Multicrystalline Silicon Solar Cells</u> (invited) S. Fujii, Y. Fukawa, H. Takahashi, Y. Inomata, K. Okada, K. Fukui and K. Shirasawa Kyocera Corp., Japan
22-A-1-4	<u>Development of an Electromagnetic Pulling Process for Multi-c Silicon and Related High Throughput Solar Cell Process</u> *D.Sarti, **M. Gamier, **F. Durand, ***M. Blum, ****Y. Marfaing, ****S. Martinuzzi, *****R. Einhaus, *****I. Tobias and***** A. Luque *PHOTOWATT International S.A., France **EPM-Madylam, France, ***ALD, Germany ****ECOTECH, France, *****IMEC, Belgium *****IES, Spain
22-A-1-5	<u>Gettering in Photovoltaic Silicon: A Review of the Research Performed under the DOE/NREL Materials Research Program</u> B. Sopori National Renewable Energy Laboratory, USA
22-A-1-6	<u>Statistical Analysis of Local Shunts and Their Relationship with Minority-Carrier Lifetime in Multi-Crystalline Silicon Solar Cells</u> *D. Mulati, **T. Fuyuki and *H. Matsunami *Kyoto University, Japan **Nara Institute of Science and Technology, Japan
22-A-1-7	<u>A Novel High Throughput Texturization System for the Crystalline Silicon Solar Cell Industry</u> *P. Fath, **N. Ohimiya, **S. Bajyou, ***R. Busch, ****G. Willeke, ***K.H. Prieswasser, ***H. Shiomi and *E. Bucher *University of Konstanz, Germany **DISCO HI-TEC JAPAN, Japan ***DISCO HI-TEC EUROPE, Germany ****GP Solar, Germany
22-A-1-8	<u>Latest Results of Semitransparent POWER Silicon Solar Cells</u> A. Boueke, R. Kühn, P. Fath, G. Willeke and E. Bucher Univ. of Konstanz, Germany

[▲ Back to TOP](#)

■ Session 22-A-2-1 TPV & Concentrator Applications

22-A-2-1	<u>An Overview of Thermophotovoltaic Generation of Electricity</u> (invited) T. J. Coutts National Renewable Energy Laboratory, USA
22-A-2-2	<u>Analysis of Energy Valance of Electricity and Heat Generated by TPV Generators</u> T. Amano and M. Yamaguchi Toyota Technological Institute, Japan
22-A-2-3	<u>A New Approach to Thermophotovoltaic Systems</u> H. W. Brandhorst, Jr. and Z. Chen Auburn Univ., USA
22-A-2-4	<u>Characteristics of GaAs Based Concentrator Cells</u> *K. Araki, *M. Yamaguchi, **T. Takamoto, **E. Ikeda, **T. Agui, **H. Kurita, ***K. Takahashi and ***T. Unno *Toyota Technological Institute, Japan **Japan Energy Corp., Japan ***Hitachi Cable Ltd., Japan
22-A-2-5	<u>5800 Suns AlGaAs/GaAs Concentrator Solar Cells</u> *V. M. Andreev, *V. P. Khvostikov, *V. R. Larionov, *V. D. Rumyantsev, *E. V. Paleeva, *M. Z. Shvarts, **C. Algara *IOFFE Physico-Technical Institute, Russia **Ciudad Universitaria, Spain

[▲ Back to TOP](#)

■ Session 22-A-2-2 Symposium E-I Overview of Space Program

22-A-2-6	<u>Space Photovoltaic Technology -Current Status and Future Prospects-</u> (invited) D. J. Flood NASA Glenn Research Center, USA
----------	--

22-A-2-7	ESA's Space Solar Array Technology Programme: Current Status and Future Activities
	E. F. Lisboa and K. P. Bogus European Space Research and Technology Centre, The Netherlands

[▲ Back to TOP](#)

■ Session 22-A-3-1 Symposium E-II Flight Experiments

22-A-3-1	MDS-1 Program for New Type of Solar Cells
	(invited) S. Matsuda, K. Shinozaki, T. Aburaya, K. Aoyama and O. Anzawa National Space Development Agency of Japan, Japan
22-A-3-2	Radiation Degradation Mechanism of Space Silicon Solar Cells - A Model of Carrier-Removal and Type-Conversion -
	*T. Hisamatsu, **H. Okamoto, ***N. Shiono, ****T. Aburaya and ****S. Matsuda *Sharp Corp., Japan **Osaka Univ., Japan ***Reliability Center for Electronic Components of Japan, Japan ****National Space Development Agency of Japan, Japan

22-A-3-3	Good Radiation Resistance Observed for MBE Grown GaInP/GaAs Cascade Solar Cells Flown Onboard Equator-S Satellite
	*J. Haapamaa, *M. Pessa and **G. La Roche *Tampere Univ. of Technology, Finland **Domier Satellite Systems, Germany

[▲ Back to TOP](#)

■ Session 22-A-3-2 Symposium E-III Radiation Effects in Solar Cells & Materials

22-A-3-4	Radiation-Induced Defects in Solar Cell Materials invited
	(invited) J. C. Bourgoin and N. de Angelis Universite P. et M. Curie, France
22-A-3-5	Comparison of the Evolution of the Complex Defects in Type-Converted Si Space Solar Cells Irradiated with Heavy Fluence of 1 MeV Electrons and 10 MeV Protons
	*A. Khan, *M. Yamaguchi, **T. Aburaya and **S. Matsuda *Toyota Technological Institute, Japan **National Space Development Agency of Japan

22-A-3-6	Spatial Distribution of Proton Irradiation-Induced Defects in InP/Si Solar Cells
	*R. J. Waiters, *G. P. Summers, **M. J. Romero, **D. Araujo, **R. Garcia and ***S. R. Messenger *U.S. Naval Research Laboratory, USA ** Universidad de Cadiz, Spain ***SFA, Inc., USA

[▲ Back to TOP](#)

■ Session 22-A-s-1 Symposium E-IV Space Solar Cells

22-A-s-1-1	High-Efficiency GaInP/GaAs/Ge Dual and Triple Junction Solar Cells
	(invited) N. H. Karam HUGHES, Spectrolab, USA
22-A-s-1-2	Progress Toward High Efficiency(>24%) and Low Cost Multi-Junction Solar Cell Production
	P. K. Chiang, C. L. Chu, Y. C. M. Yeh, P. Iies and F. Ho TECSTARIASD, USA
22-A-s-1-3	Shadow Protection for Tandem Solar Cells in Space
	*S. J. Taylor, *C. M. Hardingham, *C. R. Huggins, *A. Kelt, *S. Wood, *J. Simpson, *J. Burrage, *A. Hayward, *R. Ginige, *T. Cross, **C. Clark and **V. Van del Zel *EEV Ltd., Solar Power Systems, UK **Univ., of Surrey, UK
22-A-s-1-4	Development of Both-side Junction Silicon Space Solar Cells
	*Y. Tonomura, *M. Hagino, *H. Washio, *M. Kaneiwa, *T. Saga, **O. Anzawa, **K. Aoyama, **K. Shinozaki, and **S. Matsuda *Sharp Corp., Japan **National Space Development Agency of Japan, Japan

[▲ Back to TOP](#)

■ Session 22-B-1 Advanced Materials & Processes

22-B-1-1	Formation of Stable Si-network at Low Ts by Controlling Chemical Reaction at Growing Surface
	(invited) I. Shimizu Tokyo Institute of Technology, Japan
22-B-1-2	Effects of Deposition Conditions of p-type μc-Si Layer on a-Si Based Solar Cells

	T. Sasaki, S. Fujikake, K. Tabuchi, T. Yoshida, T. Hama, H. Sakai and Y. Ichikawa Fuji Electric Corporate Research and Development, Ltd., Japan
22-B-1-3	High Quality p-type Wide Gap a-Si:H Films by Hydrogen Plasma Doping Method K. Kishimoto, T. Nakano, Y. Itoh, S. Mashima, H. Sannomiya and K. Nomoto Sharp Corp., Japan
22-B-1-4	Polycrystalline Si Thin-Film Solar Cell Formed on Highly-Crystallized-Seed Layer S. Taira, M. Tsukiji, T. Matsui, T. Toyama and H. Okamoto Osaka Univ., Japan
22-B-1-5	Microcrystalline Silicon Films Deposited by Hot-Wire CVD for Solar Cells on Low Temperature Substrate *C. Niikura, *J. Guillet, *R. Brenot, *J. E. Bouree, **J. P. Kleider, **R. Brüggemann and **C. Longeaud *Ecole Polytechnique, France **Ecole Supérieure d'Electricité, France
22-B-1-6	Effect of Plasma Parameters on the Stability of a-Si:H Prepared at a High Growth Rate M. Takai, T. Nishimoto, T. Takagi, M. Kondo and A. Matsuda Electrotechnical Laboratory, Japan
22-B-1-7	Influence of Hydrogen on the Structure of Various Doped μc-Si:H and poly-Si I. Kaiser, N. H. Nickel and W. Fuhs Hahn-Meitner-Institut Berlin, Germany
22-B-1-8	Effect of Halogen Additives on the Stability of a-Si:H Films Deposited at a High Growth Rate 197 T. Nishimoto, T. Takagi, M. Kondo and A. Matsuda Electrotechnical Laboratory, Japan

[▲ Back to TOP](#)

■ Session 22-B-2 Device Physics & Material Characterization

22-B-2-1	Photoinduced Structural Change in Hydrogenated Amorphous Silicon (invited) H. Okamoto Osaka Univ., Japan
22-B-2-2	The Hydrogen Collision Model of Light-Induced Metastability in Amorphous Silicon (invited) H. M. Branz National Renewable Energy Laboratory, USA
22-B-2-3	Charge Transport in Microcrystalline Si -the Specific Features (invited) J. Kocka and A. Fejfar Academy of Sciences of the Czech Republic, Czech Republic
22-B-2-4	Analysis of Free Carrier Optical Absorption Used for Characterization of Microcrystalline Silicon Films *T. Sameshima, *K. Saitoh, *N. Aoyama, **M. Tanda, **M. Kondo, **A. Matsuda and ***S. Higashi *Tokyo Univ. of A. & T., Japan **Electrotechnical Laboratory, Japan ***SEIKO Epson Corp., Japan
22-B-2-5	The Role of Front and Back Contact Roughness in the Performance Enhancement of Single Junction a-Si:H Solar Cells *M. Zeman, *R.A.C.M.M. Van Swaaij, *M. Zuiddam, *J.W. Metselaar and **R.E.I. Schropp *Delft Univ. of Technology, The Netherlands **Utrecht Univ., The Netherlands
22-B-2-6	Application of Real Time in situ Spectroscopic Ellipsometry and Infrared Spectroscopy for Characterizing Interface Structure of a-Si:H Layer H. Fujiwara, Y. Toyoshima, M. Kondo and A. Matsuda Electrotechnical Laboratory, Japan
22-B-2-7	Performance and Stability of Protocrystalline Si:H Solar Cells Role of the Evolutionary Phase Boundary *R. J. Koval, *J. Koh, *Z. Lu, *R. W. Collins, *C. R. Wronski and **G. Ganguly *The Pennsylvania State Univ., USA **BP Solarex, USA
22-B-2-8	Numerical Analysis on the Optical Confinement and Optical Loss in High-Efficiency a-Si Solar Cells with Textured Surfaces Y. Hishikawa, H. Tarui and S. Kiyama SANYO Electric Co., Ltd., Japan

■ Session 22-B-3 Advanced Technology of a-& μ -Si Solar Cells

22-B-3-1	<u>Microcrystalline Silicon Thin-Film Solar Cells by the VHF-GD Technique</u> (invited) J. Meier, E. Vallat-Sauvain, S. Dubail, U. Kroll, J. Dubail, S. Golay, L. Feitknecht, P. Torres, D. Fischer and A. Shah Universite de Neuchâtel, Switzerland
22-B-3-2	<u>Cost Effective and High Performance Thin Film Si Solar Cell Towards The 21st Century</u> (invited) K. Yamamoto, M. Yoshimi, Y. Tawada, Y. Okamoto and A. Nakajima Kaneka Corp., Japan
22-B-3-3	<u>High Efficiency Microcrystalline Silicon Solar Cells by the Low Temperature Plasma CVD Method</u> K. Saito, M. Sano, K. Matsuda, T. Kondo, M. Higashikawa and T. Kariya Canon, Japan
22-B-3-4	<u>Effects of Substrates with Different Properties on Microcrystalline Silicon Films</u> *H. Yamamoto, **M. Isomura, **M. Kondo and **A. Matsuda *Sharp Corp., Japan **Electrotechnical Laboratory, Japan
22-B-3-5	<u>Thickness Dependence of Microcrystalline Silicon Solar Cell Properties</u> O. Vetterl, A. Lambertz, F. Finger, B. Rech, O. Kluth and H. Wagner Forschungszentrum Jülich, Germany
22-B-3-6	<u>Improvement of a-SiGe Solar Cells and their Application to SCAF Structure Solar Cells with Plastic Film Substrate</u> K. Tabuchi, S. Fujikake, T. Sasaki, S. Hayashi, H. Sato, S. Saito, T. Yoshida, T. Hama, H. Sakai, Y. Ichikawa and M. Saga Fuji Electric Corporate Research and Development, Ltd., Japan
22-B-3-7	<u>Key Technology for μ-Si Thin-Film Solar Cells Prepared at a High Deposition Rate</u> *M. Tanda, *T. Wada, **H. Yamamoto, ***M. Isomura, ****M. Kondo and ****A. Matsuda *Fuji Electric Corporate R&D, Japan **Sharp Corp., Japan ***Sanyo Electric Co., Ltd., Japan ****Electrotechnical Laboratory, Japan
22-B-3-8	<u>Microcrystalline NIP Solar Cells Deposited at 10 Å/sec by VHF -GD</u> *L. Feitknecht, **O. Kluth, *Y. Ziegler, *X. Niquille, *P. Torres, *J. Meier, *N. Wyrsch and *A. Shah *IMT Neuchâtel, Switzerland **Forschungszentrum Jülich, Germany
22-B-3-9	<u>Amorphous and Microcrystalline Silicon Solar Cells Prepared at High Deposition Rates Using RF(13.56MHz) Plasma Excitation Frequencies</u> B. Rech, T. Roschek, J. Müller, S. Wieder and H. Wagner Forschungszentrum Jülich, Germany

■ Session 22-C-1 Stand-alone Systems and Others

22-C-1-1	<u>A Stand-alone Photovoltaic Power System Using Cylindrical Module</u> Y. Nozaki, N. Matsuzaki, K. Akiyama and T. Yamashita NTT Telecommunications Energy Laboratories, Japan
22-C-1-2	<u>Photovoltaic Display Module in a Mobile GPS</u> *T. Douseki, *T. Yamada, *J. Yamada, **K. Ito and **K. Nishi *NTT Telecommunications Energy Laboratories, Japan **TDK Corp., Japan
22-C-1-3	<u>Assessment of Photovoltaic Pumping Systems in Thailand-One Decade Experience</u> P. Kaunmuang, K. Kirtikara, R. Songprakorb, S. Thepa and T. Suwannakum King Mongkut's Univ. of Technology Thonburi, Thailand
22-C-1-4	<u>GIS Management of Solar Resource Data</u> B. Sørensen Roskilde Univ., Denmark
22-C-1-5	<u>Evaluation of Effective Shading Factor by Fitting a Clear-day Pattern Obtained from Hourly Maximum Irradiance Data</u> *D. Uchida, **K. Otani and *K. Kurokawa *Tokyo Univ. of A. & T., Japan **Electrotechnical Laboratory, Japan

22-C-1-6	Hourly Forecast of Global Irradiation Using GMS Satellite Images
	*H. Taniguchi, **K. Otani and *K. Kurokawa *Tokyo Univ. of A. & T., Japan **Electrotechnical Laboratory, Japan
22-C-1-7	Software tool for Simulation of Solar Hybrid Systems
	I. Knoblich and C. Schaffrin Konstanz Univ., Germany
22-C-1-8	Concept for an Optimum Energy Dispatch Strategy in Decentralised Photovoltaic Hybrid Systems
	M. Ibrahim and P. Zacharias Institute for solar energy supply Technology ISET, Germany
22-C-1-9	DSP Based Instantaneous Controller Design for Stand-Alone PV System
	*G. J. Yu, *J. Song, *Y. S. Jeong, **H. S. Kim and ***G. H. Choe *Korea Institute of Energy Research, Korea **Central Research of Institute of Electric Power Industry, Japan ***Konkuk Univ., Korea

[▲ Back to TOP](#)

■ Session 22-C-2 Symposium G PV Systems in Urban Environment

22-C-2-1	PV System in Urban Environment
	(invited) K. Kurokawa Tokyo Univ. of A. & T., Japan
22-C-2-2	The 1 Megawatt Solar City in Nieuwland, the Netherlands
	(invited) *T. J. N. Schoen, **F. Vlek and ***A. Illiceto *Ecofys Energy and Environment, The Netherlands **REMU, the Netherlands ***ENEL, Italy
22-C-2-3	The Megawatt Solar Roof at the New Munich Trade Fair Centre-An Advanced and Successful New Concept for PV Plants in the Megawatt Range
	(invited) E. Cunow and B. Giesler Siemens Solar, Germany
22-C-2-4	BIPV for the High-Temperature, High-Rise, High-Density Cities of S.China: The Related Projects of HKU PV Research Group to Facilitate BIPV Application
	(invited) J. Close Univ. of Hong Kong, Hong Kong
22-C-2-5	Fire-Proofing and Fire-Resistance Properties of PV Modules for Exterior Walls of Buildings
	*N. Ishikawa, **T. Ohuchi and ***Y. Kozawa *Daido Hoxan Inc., Japan **Kajima Corp., Japan ***Showa Shell Sekiyu K.K.
22-C-2-6	Organization of PV System with Dispersed PV Array
	S. Nishikawa Kandenko Co., Ltd., Japan
22-C-2-7	Enhancement of Minimum Power in Distributed PV Systems
	*K. Otani, *K. Sakuta and **K. Kurokawa *Electrotechnical Laboratory, Japan **Tokyo Univ. of A. & T., Japan

[▲ Back to TOP](#)

■ Session 22-C-3 Measurement & Simulation

22-C-3-1	Application of Scanning Mid-IR-laser Microscopy for Characterization of Semiconductor Materials for Photovoltaics
	*V. P. Kalinushkin, **O. V. Astafiev and **V. A. Yuryev *General Physics Institute of RAS, Russia **Natural Science Center of General Physics Institute of RAS, Russia
22-C-3-2	Shunts due to Laser Cutting of Solar Cells Characterized by Highly Sensitive Lock-in Thermography
	*O. Breitenstein, *M. Langenkamp, **O. Lang and ***A. Schirrmacher *Max-Planck-Institut für Mikrostrukturphysik, Germany **SOLARC, Germany ***LMTB, Germany

*W. Gross, **J. Zettner, ***J. Krinke, *H. Scheuerplug, **Th. Hierl, ****W. Riedl, *****H. v. Campe and *****M. Schulz
*Bavarian Center for Applied Energy Research, Germany **Thermosensorik GmbH, Germany ***Institut für

	Werkstoffwissenschaften, Germany ****Siemens AG, Germany *****Angewandte Solarenergie, Germany *****Universitat Erlangen-Nürnberg, Germany
22-C-3-4	<u>Numerical Simulation of Electron-Beam-Induced Current Near a Silicon Grain Boundary and Impact of a p-n Junction Space Charge Region</u> R. Corkish, P. P. Altermatt and G. Heiser Univ. of New South Wales, Australia
22-C-3-5	<u>Application of an improved Bandgap Narrowing Model to the Numerical Simulation of Recombination Properties of Phosphorus Doped Silicon Emitters</u> *J. O. Schumacher, **P. P. Altermatt, **G. Heiser and **A. G. Aberle *Fraunhofer Institute for Solar Energy Systems ISE, Germany **Univ. of New South Wales, Australia
22-C-3-6	<u>Improvements in Numerical Modelling of Highly Injected Crystalline Silicon Solar Cells</u> *P. P. Altermatt, **R. A. Sinton and *G. Heiser *Univ. of New South Wales, Australia **Sinton Consulting, USA
22-C-3-7	<u>Effects of Grain Boundaries in Polycrystalline Silicon Thin Film Solar Cells Based on 2-Dimensional Model</u> *K. Kurobe, **Y. Ishikawa, **Y. Yamamoto, **T. Fuyuki and *H. Matsunami *Kyoto Univ., Japan **Nara Institute of Science and Technology, Japan
22-C-3-8	<u>Lateral Resistance of Pyramidal Shaped Thin-Films</u> *D. Scholten, **R. Brendel and **M. Schulz *Universität Erlangen-Nürnberg, Germany **Bavarian Center for Applied Energy Research (ZAE Bayern), Germany

[▲ Back to TOP](#)

■ Poster Session I Fundamentals and New Approaches

P-I-1	<u>Electrodeposition of Pyrite(FeS2) Thin Films for Photovoltaic Cells</u> *S. Nakamura and** A. Yamamoto *Tsuyama National College of Technology, Japan ** Fukui Univ., Japan
P-I-2	<u>Deposition and Characterization of Amorphous Carbon by Molecular Beam Deposition(MBD)</u> O. Goetzberger, N. Kojima, A. Khan, M. Yamaguchi and K. Araki Toyota Technological Institute, Japan
P-I-3	<u>Infrared and Raman Spectroscopy Analysis of Silicon-hydrogen Bonds in Nano-crystalline Silicon Prepared by Electron Beam Excited Plasma Chemical Vapor Deposition</u> *K. Yamaguchi, *M. Imaizumi, *T. Ito, *K. Okitsu, *M. Yamaguchi, *T. Hara, **M. Ban, **M. Tokai and ***K. Kawamura *Toyota Technological Institute, Japan **Kawasaki Heavy Industry, Japan ***Chubu Electric Power Co., Inc. Japan
P-I-4	<u>Au/Poly(3-Methylthiophene)/10-(P-Nitorobenzyl)-2(10H)Phenazinone/Al Organic Hetero-Junction Photovoltaic Device</u> T. Mikayama, H. Matsuoka, K. Uehara, A. Sugimoto and K. Mizuno Osaka Prefecture Univ., Japan
P-I-5	<u>Physical and Photovoltaic Properties of Tin Selenide Thin Films</u> T. Yamazawa, N. Yamauchi, M. Yamaguchi and T. Nagatomo Shibaura Institute of Technology, Japan
P-I-6	<u>Solar Cells Based on Carbon Thin Films</u> K. M. Krishna, Y. Nukaya, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Technology, Japan
P-I-7	<u>Properties of Carbon Thin Films Deposited by Plasma-CVD for Solar Cell Application</u> K. Hagimoto, Y. Hayashi, K. M. Krishna, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Techonlogy, Japan
P-I-8	<u>Electrical Properties of ZnO Thin Film as a Function of Deposition Parameters</u> *W. J. Jeong, **G. C. Park, **H. D. Chung, ***S. K. Kim, ****H. B. Gu, **C. D. Kim, **H. R. Park *HanLyo Univ., Korea **Mokpo National Univ., Korea ***Korea Electronic Technology Institute, Korea ****Chonnam National Univ., Korea
P-I-9	<u>Zinc-Oxide Thin Films Prepared by Metalorganic Chemical Vapor Deposition Technique Using DMZ/H₂O and DEZ/H₂O Reactant Systems</u>

	<p>W. W. Wenás Institute of Technology Bandung, Indonesia</p>
P-I-10	<p><u>Investigation of the Effect of Sol Processing Parameters on the Photoelectrical Properties of Dye Sensitized TiO₂ Solar Cells</u></p> <p>*...K. Srikanth, *H. Tanaka, *Md. M. Rahman, *K. M. Krishna, *T. Soga, **M. K. Mishra, *T. Jimbo and *M. Umeno *Nagoya Institute of Technology, Japan **Indian Institute of Technology, India</p>
P-I-11	<p><u>Surface Modification of Electrodes in Nanocrystalline Dye-Sensitized TiO₂ Solar Cells</u></p> <p>S. Lee, Y. Jun, K. J. Kim and D. Kim Korea Univ., Korea</p>
▲ Back to TOP	
■ Crystalline Silicon	
P-I-12	<p><u>Selective Emitters in Buried Contact Silicon Solar Cells: some low cost solutions</u></p> <p>L. Pirozzi, G. Arabito, V. Barbarossa, U. Besi-Vetrella, S. Loretì, P. Mangiapane and E. Salza ENEA Casaccia, Italy</p>
P-I-13	<p><u>The Application of Co-diffusion of Phosphorus and Boron for Preparation of Silicon BSF Solar Cell</u></p> <p>G. P. Wei and W. T. Yu Shanghai Univ, China</p>
P-I-14	<p><u>UVCVD Silicon Nitride Passivation and ARC Layers for Multi crystalline Solar Cells</u></p> <p>*E. Fourmond, *G. Dennler, **R. Monna, *M. Lemiti, *A. Fave, *A. Laugier *INSA, France **PHOTOWATT International SA, France</p>
P-I-15	<p><u>Novel Process of Grain Boundary Metallisation on Multicrystalline Silicon Solar Cells</u></p> <p>M. Radike and J. Summhammer Atomic Institute of the Austrian Univ., Austria</p>
P-I-16	<p><u>Metallisation Patterns for Interconnection Through via Holes</u></p> <p>A. R. Burgers, J. H. Bultman, A. C. Tip and W. C. Sinke Netherlands Energy Research Foundation ECN, The Netherlands</p>
P-I-17	<p><u>MgF₂/CeO₂ AR Coating on p-type (100) Cz Silicon Solar Cells</u></p> <p>*S. E. Lee, *S. W. Choi, *D. G. Lim, *D. Y. Kim, *S. H. Park, **S. H. Kang, **J. C. Lee, ***S. H. Lee and *J. Yi *Sungkyunkwan Univ., Korea **Hi Solar Inc., Korea ***Samsung Display Device, Korea</p>
P-I-18	<p><u>Characterisation of Light Trapping in Silicon Films by Spectral Photoconductance Measurements</u></p> <p>P. Campbell and M. Keevers Univ. of New South Wales, Australia</p>
P-I-19	<p><u>Fine-Line Screen-Printing for Solar Cells</u></p> <p>*I. E. Reis, *D. Huljic, *P. Hahne, *R. Preu, *D. Zickermann, **B. Bucher and **P. V. Fleischer *Fraunhofer Institute for Solar Energy Systems, Germany **Micro Patterns+Layers, Germany</p>
P-I-20	<p><u>Progress in Thick-Film Pad Printing Technique for Solar Cells</u></p> <p>*P. Hahne, *E. Hirth, *I. E. Reis, **K. Schwichtenberg, ***W. Richtering, ***F. M. Horn and ***U. Eggenweiler *Fraunhofer Institute for Solar Energy Systems, Germany **Gebüder Märklin & Cie GmbH, Germany *** Albert-Ludwigs-University Freiburg, Germany</p>
P-I-21	<p><u>A MOS Capacitor Surface Passivation Structure for Peripheral Regions of High Efficiency Silicon Solar Cells</u></p> <p>J. Zhao, A. Wang and P. P. Altermatt Univ. of New South Wales, Australia</p>
P-I-22	<p><u>High Efficiency Solar Cells Enhanced with Diffraction Grating</u></p> <p>S. Mizuno, K. Yamauchi, H. Tayanaka and T. Matsushita Sony Corp., Japan</p>
P-I-23	<p><u>Optimized Rapid Thermal Process for High Efficiency Silicon Solar Cells</u></p> <p>*S. Noël, *A. Slaoui, **S. Peters, **H. Lautenschlager, **R. Schindler and *J.C. Muller *Laboratoire PHASE, France **FhG ISE, Germany</p>

P-I-24	<u>Single Diffusion Selective Emitter on Mechanically Textured Si Solar Cells with Plateaus and Screen Printed Metallisation</u> *C. Zechner, **B. Damiani and *B. Terheiden *Univ. of Konstanz, Germany **Georgia Institute of Technology, USA
P-I-25	<u>Efficiency Improvement of Silicon Solar Cells by Rear Al/Ag Electrode Treatment</u> C. J. Huang, C. T. Chen, C. S. Huang and L. C. Kuo Industrial Technology Research Institute, Republic of China
P-I-26	<u>Impact and Options for Boron Diffusions in Buried Contact Solar Cells</u> A. M. Slade, C. Honsberg and S. R. Wenham Univ. of New South Wales, Australia
P-I-27	<u>Dark I-V-T Measurements and Characteristics of (N)a-Si/(P) c-Si Heterojunction Solar Cells</u> R. Hussein, D. Borchert, G. Grabosch and W. R. Fahmer Univ. of Hagen, Germany
P-I-28	<u>In situ Monitoring of the Deposition of a-Si:H/c-Si Heterojunctions by Transient Photoconductivity Measurements</u> S. von. Aichberger, H. Feist, J. Löffler and M. Kunst Hahn-Meitner-Institut, Germany
P-I-29	<u>Structural Characterisation of Front Side Metallic Contacts on Silicon Solar Cells by Transmission Electron Microscopy</u> B. Thuillier, J. P. Boyeaux and A. Laugier Laboratoire de physique de la Matiere, France
P-I-30	<u>Effect of Thermal Annealing on Minority-Carrier Lifetimes for Multicrystalline Silicon Wafers</u> M. Mimura, S. Ishikawa and T. Saitoh Tokyo Univ. A. & T., Japan
P-I-31	<u>A High-Speed Reflectometer for Process Monitoring in Solar Cell Manufacturing</u> B. Sopori, Y. Zhang and W. Chen National Renewable Energy Laboratory, USA
P-I-32	<u>A Study of Carrier Trapping in Multicrystalline Silicon</u> D. Macdonald and A. Cuevas Australian National Univ., Australia
P-I-33	<u>Electrical Properties of Multicrystalline Silicon Produced by Electromagnetic Casting Process</u> *J. Boudaden, *A. Slaoui, ***D. Ballueaud, ****R. Ludemann, ***A. Riviere, **M. Loghmari and *J. C. Muller *Laboratoire PHASE, France **Laboratoire de Physique des Materiaux, France ***LPSB, CNRS, France ****FGh-ISE, Germany
P-I-34	<u>Effect of Substrate Temperature and Doping on ITO Properties for Using in Solar Cells</u> *S. A. Kandil, **H. H. Afifi, ***S. H. El-Hefnawi and ***A. Y. Eliwa *Ain Shams Univ., Egypt **National Research Center, Egypt ***Electronics Research Institute, Egypt
P-I-35	<u>Light Degradation of Minority Carrier Lifetimes in Low-Resistivity CZ-Si Crystalline Wafers</u> X. Wang, H. Hashigami and T. Saitoh Tokyo Univ. of A. & T., Japan
P-I-36	<u>Field Effect Surface Passivation of SiO₂/Si Interfaces by Heat Treatment with High-Pressure H₂O Vapor</u> K. Sakamoto, K. Asada and T. Sameshima Tokyo Univ. of A. & T., Japan
P-I-37	<u>High-Pressure H₂O Vapor Heating Used for Passivation of SiO₂/Si Interfaces</u> K. Sakamoto, K. Asada, T. Sameshima and T. Saitoh Tokyo Univ. of A. & T., Japan
P-I-38	<u>Screen Printed Grid Contact Resistance Measurements on Cz Silicon Solar Cells</u> P. N. Vinod, M. Lal and S. N. Singh National Physical Laboratory, India

P-I-39	<u>Effect of High Temperature Steam Annealing for SiO₂ Passivation</u> *Y. Abe, **H. Nagayoshi, T. Kawaba, *N. Arai, *T. Saitoh and *K. Kamisako *Tokyo Univ. of A. & T., Japan **Shonan Institute of Technology, Japan
P-I-40	<u>In-Situ Characterization of Si Surfaces using Contactless UHV C-V Method for Optimization of Solar Cell Fabrication Process</u> T. Shiozawa, T. Yoshida, T. Hashizume and H. Hasegawa Hokkaido Univ., Japan
▲ Back to TOP	
■ Amorphous and Microcrystalline Silicon	
P-I-41	<u>Modelling Charge-Carrier Transport and Generation-Recombination Mechanisms in p⁺n⁻ a-Si:H Tunnel Junctions</u> J. Furlan, Z. Gorup, F. Smole and M. Topic Univ. of Ljubljana, Slovenia
P-I-42	<u>Wide Optical Bandgap Window Layers for Solar Cells</u> *Z. Yu, **I. Pereyra and **M. P. Marcelo *Nankai Univ., P.R.China **Sao Paulo Univ., Brasil
P-I-43	<u>Performance of p-type Silicon-Oxide Windows in Amorphous Silicon Solar Cell</u> Y. Matsumoto, F. Melendez and R. Asomoza CINVESTAV-IPN, Mexico
P-I-44	<u>Kelvin Probe Measurements of Microcrystalline Silicon on a Nanometer Scale using SFM</u> *A. Breymesser, *V. Schlosser, **D. Peiro, **C. Voz, **J. Bertomeu, **J. Andreu and ***J. Summhammer *Univ. of Vienna, Austria **Universitat de Barcelona, Spain ***Atom Institute of the Austrian Univ., Austria
P-I-45	<u>The Influence of Doping on Charge Carrier Transport in a-Si:H</u> D. Herm, S. von Aichberger and M. Kunst Hahn-Meitner-Institut, Germany
P-I-46	<u>A Large Discrepancy between CPM and ESR Defect Densities in Light-Soaked a-Si:H</u> T. Shimizu, H. Sugiyama and M. Kumeda Kanazawa Univ., Japan
P-I-47	<u>An Accelerated Test Method of Stacked a-Si Solar Cells</u> K. Takahisa, T. Kojima, K. Nakamura, T. Koyanagi and T. Yanagisawa Electrotechnical Laboratory, Japan
P-I-48	<u>A New Perspective on the Characterization of Materials for a-Si:H Solar Cells</u> *L. Jiao, *Z. Lu, *X. Niu, *R. W. Collins, *C. R. Wronski, **A. Matsuda, **T. Kamei and ***G. Ganguly *The Pennsylvania State Univ., USA **Electrotechnical Laboratory, Japan ***BP Solarex, USA
P-I-49	<u>Comprehensive Inputs for Optical Modeling of a-Si:H-Based Multijunction Solar Cells</u> *A. S. Ferlauto, *J. Koh, *P. I. Rovira, *L. Jiao, *C. R. Wronski, *R. W. Collins and **G. Ganguly *The Pennsylvania State Univ., USA **BP Solarex, USA
P-I-50	<u>Absorption Coefficient Spectra of μc-Si in the Low Energy Region 0.4~1.2 eV</u> J. Kitao, H. Harada, N. Yoshida, M. Nishio, T. Sakamoto, T. Itoh, S. Nonomura and S. Nitta Gifu Univ., Japan
P-I-51	<u>Dominant Parameter Determining Dangling-Bond Density in a-Si:H Films Prepared by Catalytic CVD</u> A. Masuda, C. Niikura, Y. Ishibashi and H. Matsumura Japan Advanced Institute of Science and Technology, Japan
P-I-52	<u>Properties of Amorphous Silicon Solar Cells Fabricated from SiH₂Cl₂</u> S. Shimizu, T. Komaru, K. Ohkawa, M. Azuma, T. Kamiya, C. M. Fortmann and I. Shimizu Tokyo Institute of Technology, Japan
P-I-53	<u>Stability of a-Si:H Solar Cells Deposited by Ar-Treatment or by ECR Techniques</u>

	K. Ohkawa, S. Shimizu, H. Sato, T. Komaru, W. Futako, T. Kamiya, C. M. Fortmann and I. Shimizu Tokyo Institute of Technology, Japan
P-I-54	Numerical Modelling of Trap-Assisted Tunnelling Mechanism in a-Si:H and μc-Si n/p Structures and Tandem Solar Cells M. Vukadinovic, F. Smole, M. Topič J. Krč and J. Furlan Univ. of Ljubljana, Slovenia
P-I-55	Use of Thin n-type Microcrystalline Layer in Improving the Performance of Double Junction a-Si/a-Si Structure Solar Cells A. K. Barua, A. D. Gupta, S. Mondal, D. Roy and S. Ray Indian Association for the Cultivation of Science, India
P-I-56	Development of Undoped and Boron Doped Hydrogenated Microcrystalline Silicon Oxide Thin Films D. Das, M. Jana and A. K. Barua Indian Association for the Cultivation of Science, India
P-I-57	Properties of a-SiGe:H Thin Film and Performances of Related Solar Cells Realized in a Single Chamber, Large Area PECVD Reactor *C. Privato, *E. Terzini, **L. Nedialkova and *G. Nobile *ENEA Research Center-Via Vecchio Macello, Italy **Higher Institute for Transport Engineering, Bulgaria
P-I-58	Effect of Hydrogen on Stability of Amorphous Silicon Thin Films *S. M. Pietruszko and **J. Jang *Warsaw Univ. of Technology, Poland **Kyunghée Univ., Korea
P-I-59	Evaluation of Microcrystalline Silicon Films with Double Layered Structure T. Ishitani, M. Hatta, Y. Kimura, T. Komuro, N. Andoh and K. Kamisako Tokyo Univ. of A. & T., Japan Super-high Efficiency Compound Semiconductors
P-I-60	Deep Levels and Electronic Properties of 1eV Bandgap InGaAsN Layers for Multi-Junction III-V Cells *S. A. Ringel, *D. Kwon, *R. J. Kaplar, **A. A. Allerman, **S. R. Kurtz and **E. D. Jones *The Ohio State Univ., USA **Sandia National Laboratories, USA
P-I-61	Characteristics of InGaP Solar Cells Grown on GaAs/Si Substrates with A-Step Surface Formed by Thermal Cleaning in Si₂H₆ Ambient S. Goto, T. Ueda and C. Yamagishi Oki Electric Industry Co., Ltd., Japan
P-I-62	TBP-Based GSMBE Growth of High Quality InGaP/GaAs Heterointerfaces for High Efficiency Solar Cells A. Hirama, H. Fujikura and H. Hasegawa Hokkaido Univ., Japan
P-I-63	Temperature-Dependent Study of the Radiative Losses in Double Quantum Well 1_1 Solar Cells *B. G Kluftinger, *J. Nelson, *K. WJ. Barnham, **T. Foxon and **T. Cheng *Imperial College, UK **Univ. of Nottingham, UK
P-I-64	Critical Built-in Electric Field for Enhanced Open Circuit Voltage in Multiquantum Well Solar Cells I. Serdiukova, C. Monier, M. F. Vilela and A. Freundlich Univ. of Houston, USA
P-I-65	Improved Efficiency of Al_{0.36}Ga_{0.64}As Solar Cells with a ppn Structure K. Takahashi, Y. Minagawa, S. Yamada and T. Unno Hitachi Cable, Ltd., Japan
P-I-66	Selection of Thermal Annealing Methods in the MBE Growth of High Quality GaAs on Si for Solar Cell Applications *K. Baskar, **H. Kawanami, **I. Sakata and **T. Sekigawa *Anna Univ., India **Electrotechnical Laboratory, Japan
P-I-67	Study of Hydrogen Plasma Passivation Effects on Al_xGa_{1-x}As-on-Si Solar Cells T. Ogawa, G. Wang, K. Ohtsuka, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Technology, Japan
P-I-68	Improvement of the MOCVD-Grown InGaP/Si Substrate Towards High Efficiency Solar Cell Application

	K. Akahori, G. Wang, K. Okumura, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Techonlogy, Japan
P-I-69	<u>Growth of GainP with an Intermediate GaP Layer on Si by Chemical Beam Epitaxy</u> N. Satoh, M. Adachi, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Techonlogy, Japan
P-I-70	<u>Improvement of GaAs Solar Cells on Si Substrates by Thermal Cycle Annealing</u> C. Yamagishi, T. Ueda and S. Gotoh Oki Electric Industry Co., Ltd., Japan
P-I-71	<u>Surface and Interface Characterization of GaAs/Ge Heterostructures</u> *S. B. Krupanidhi, **M. K. Hudait and **S. Shah *Indian Institute of Science, India **Bharat Electronics, India
P-I-72	<u>Fabrication and Simulation of GaSb Thermophotovoltaic Cells</u> O. V. Sulima and A. W. Bett Fraunhofer Institute for Solar Energy Systems, Germany
P-I-73	<u>GaSb/InGaAsSb Cells for Use in TPV Generators</u> V. M. Andreev, V. P. Khvostikov, V. D. Rumyantsev, S. V. Sorokina, M. Z. Shvarts and V. I. Vasil'ev Ioffe-Physico-Technical Institute, Russia
P-I-74	<u>X-ray Diffraction Analysis of CdTe Films with Different Compositions Fabricated by CMBD in Hydrogen Flow</u> *T. M. Razykov, **K. Sato, **T. Shimizu, *N. F. Khusainova, *K. M. Kouchkarov and *A. F. Troushin *Physical-Technical Institute, Uzbekistan **Tokyo Univ. of A. & T., Japan
P-I-75	<u>CuGaSe₂/ZnSe Solar Cells Prepared by MOVPE</u> S. Siebentritt, U. Fiedeler, A. Bauknecht, A. Gerhard, T. Kampschulte, J. Albert, W. Harneit, S. Brehme and M. Ch. Lux-Steiner Hahn-Meitner-Institut, Germany
P-I-76	<u>Optical Properties of High Quality CuGaSe₂ Epitaxial Layers Examined by Piezoelectric Photoacoustic Spectroscopy</u> *K. Yoshino, *N. Mitani, *A. Fukuyama, *K. Maeda, *T. Ikari, **P. J. Fons, **S. Niki and **A. Yamada *Miyazaki Univ., Japan **Electrotechnical Laboratory, Japan
P-I-77	<u>ESR and PL Characterization of CuGaSe₂ Single Crystals</u> *T. Nishi, *Y. Katsumata, *K. Sato and **H. Miyake *Tokyo Univ. of A. & T., Japan **Mie Univ., Japan
P-I-78	<u>Structural, Electrical and Optical Properties of CuInSe₂ Thin Films Prepared by E-B Evaporation from Binary Compounds</u> A. Setiyadi, H. Sugiyama, H. Ito, M. Yamaguchi and T. Nagatomo Shibaura Institute of Technology, Japan
P-I-79	<u>Photoluminescence Properties of Sodium Incorporation in CuInSe₂ and CuIn_{1-x}Se_x Thin Films</u> *R. Kimura, **T. Nakada, ***P. Fons, ***A. Yamada, ***S. Niki, *T. Matsuzawa, *K. Takahashi and **A. Kunioka *Teikyo Univ. Science & Technology, Japan **Aoyama Gakuin Univ., Japan ***Electrotechnical Laboratory, Japan
P-I-80	<u>Influence of Na Doping on Opto-Electrical Properties of CdTe:Cl</u> M. Altosaar, P. -E. Kukk, J. Raudoja, J. Krustok, M. Krunks and E. Mellikov Tallinn Technical Univ., Estonia
P-I-81	<u>Influence of Cu Doping and Heat Treatments on the Physical Properties of ZnTe Films</u> *D. I. Choi, ***S. Yoon, **J. Song and *D. Kini *Korea Univ., Korea **Korea Institute of Energy Research, Korea ***TS Co., Korea
P-I-82	<u>Characterization of Cu(In,Ga)Se₂ Thin Films Prepared by Thermal Crystallization on Mo/Glass Substrate</u> *T. Yamaguchi, **Y. Yamamoto and ***A. Yoshida *Wakayama College of Technology, Japan **Fukui College of Technology, Japan ***Toyohashi Univ. of Technology, Japan
P-I-83	<u>Theoretical Analysis of the Effect of Conduction Band Offset of Window/CIS Layers on Performance of CIS Solar Cells using Device Simulation</u>

	<p>*T. Minemoto, *T. Matsui, *H. Takakura, *Y. Hamakawa, **T. Negami, **Y. Hashimoto, **T. Uenoyama and **M. Kitagawa *Ritsumeikan Univ., Japan **Matsushita Electric Industrial Co., Ltd., Japan</p>
P-I-84	<p><u>Material Properties of CuInSe₂, CuInS₂ and CuIn(S,Se)₂ Films Produced by High Vapor Treatment of Co-sputtered Cu-In Alloy</u></p> <p>*F. O. Adurodija, **J. Song and ***I. O Asia *Hyogo Pref. Institute of Industrial Research, Japan **Korea Institute of Energy Research, Korea ***Edo State Univ., Nigeria</p>
P-I-85	<p><u>Structural and Optical Characterizations of CdTe on CdS Grown by Hot-Wall Vacuum Evaporation</u></p> <p>*S. Seto, *S. Yamada and **K. Suzuki *Ishikawa National College of Technology, Japan **Hokkaido Institute of Technology, Japan</p>
P-I-86	<p><u>A Pyrosol Process to Deposit Large Area SnO₂:F Films as a Transparent Conducting Substrate for CdTe Solar Cells</u></p> <p>P. Veluchamy, M. Tsuji, T. Nishio, T. Aramoto, H. Higuchi, S. Kumazawa, S. Shibutani, J. Nakajima, T. Arita, H. Ohyama, A. Hanafusa, T. Hibino and K. Omura Matsushita Battery Industrial Co. Ltd., Japan</p>
P-I-87	<p><u>Electrical Properties of the Cu(In,Ga)Se₂/MoSe₂/Mo Structure</u></p> <p>*N. Kohara, *S. Nishiwaki, *Y. Hashimoto, *T. Negami and **T. Wada *Matsushita Electric Industrial Co., Ltd., Japan **Ryukoku Univ., Japan</p>
P-I-88	<p><u>ZnO:Ga Conducting-Films Grown by DC Arc Discharge Ionplating</u></p> <p>H. Hirasawa, M. Yoshida, S. Nakamura, Y. Suzuki, S. Okada and K. Kondo Stanley Electric Co., Ltd., Japan</p>
P-I-89	<p><u>Mg Ion Implantation in CuInSe₂ Thin Films</u></p> <p>*T. Tanaka, **T. Ohshima, **H. Itoh, **S. Okada, *A. Wakahara and *A. Yoshida *Toyohashi Univ. of Technology, Japan **Japan Atomic Energy Research Institute, Japan</p>
P-I-90	<p><u>Influence of CdS Heat Treatment on the Microstructure of CdS and the Performance of CdS/CdTe Solar Cells</u></p> <p>H. Kim and D. Kim Korea Univ., Korea Modules and System Components</p>
P-I-91	<p><u>Cost Analysis of Concentrator Systems</u></p> <p>M. Hein and A. W. Bett Fraunhofer Institute for Solar Energy Systems, Germany</p>
P-I-92	<p><u>A Novel Photovoltaic Generation System for Solid Polymer Electrolyte Water Electrolysis using Standard Voltage Control</u></p> <p>*R. Muhida, *M. Park, *K. Matsuura, **M. Michihira and **A. Tsuyoshi *Osaka Univ., Japan **Kobe College of Technology, Japan</p>
P-I-93	<p><u>Evaluation of Thermal Characteristics of a Static Concentrator Module</u></p> <p>K. Suzuki, K. Yoshioka and T. Saitoh Tokyo Univ. of A. & T., Japan</p>
P-I-94	<p><u>Performance Improvement of a Photovoltaic Static Concentrator Module with a Co-Molded Two-Dimensional Lens</u></p> <p>S. Mizuno, T. Nikaido, K. Yoshioka and T. Saitoh Tokyo Univ. of A. & T., Japan</p>
P-I-95	<p><u>Performance Simulation of Light Trapping Type Concentrator PV Modules</u></p> <p>G. Tsuchiya, K. Yoshioka and T. Saitoh Tokyo Univ. of A. & T., Japan</p>
P-I-96	<p><u>Flat-Plate Static-Concentrator Photovoltaic Module</u></p> <p>T. Uematsu, Y. Yazawa, T. Joge and S. Kokunai Hitachi, Ltd., Japan</p>
P-I-97	<p><u>Point-and Line-Focus Concentrator Photovoltaic Modules</u></p> <p>V. M. Andreev, V. D. Rumyantsev and M. Z. Shvarts Ioffe Physico-Technical Institute, Russia</p>
P-I-98	<p><u>Design Analysis and Fabrication of Holographic Solar Concentrators for Photovoltaic Solar Cells</u></p>

	*H. L. Yadav, **A. K. Chatterjee, ***C. Shakher and ****B. N. Gupta *R.I.T., India **Jadavpur Univ., India ***I.D.D. Center I.I.T., India ****Netaji Subhas Institute of Technology, India
P-I-99	<u>Monitoring and Data Analysis of PV Connected to Grid System for Home Applications</u> S. Sopitpan, P. Changmoang and S. Panyakeow Chulalongkorn Univ., Thailand
P-I-100	<u>Direct Comparison of the Emerging Photovoltaic Technologies in Multi-Technology Retrofit Building Arrays in Oxford and Mallorca</u> *G. Conibeer and **A. Wilshaw *Oxford Univ., UK **IT Power Ltd., UK
P-I-101	<u>Islanding Prevention Performance Test of Japanese Manufacturers Inverters</u> A. Mizorogi and K. Takigawa Central Research Institute of Electric Power Industry, Japan
P-I-102	<u>The Studies on the Application of Grid-Connected Photovoltaic System in Taiwan</u> M. C. Peng, G. C. Hsu, Y. F. Lee, C. T. Chen and L. C. Kuo Industrial Technology Research Institute, Republic of China
P-I-103	<u>Comparison of Three Low-Power Photovoltaic On-Grid Systems</u> *W. Durisch, **R. Lavric, ***O. Struss and ****S. Leutenegger *Paul Scherrer Institute, Switzerland **Technical College Zurich, Switzerland ***Fresenius Academy, Germany ****Leutenegger Energy & Control, Switzerland
P-I-104	<u>How PV Inverter Voltage Increase Prevention Functions Affect Operation Characteristics</u> F. Yamamoto, T. Matsuoka, K. Miyajima, T. Hongo, H. Matsuda and A. Kitamura The Kansai Electric Power Co., Inc., Japan
P-I-105	<u>Study on PV Output Fluctuation Suppression by Electric Double-Layered Condenser</u> *T. Matsuoka, *K. Miyajima, *A. Kitamura, **T. Hirano, **Y. Kubo and **K. Okuda *The Kansai Electric Power Co., Inc., Japan **DAIHEN Corp., Japan
P-I-106	<u>Matching of DC Pumping Systems with PV System Through Modified Maximum Power Points Tracker</u> *H. E. S. A. Ibrahim, *F. F. Houssiny, **H. M. Z. El-Din and **M. A. El-Shibini *Electronics Research Institute, Egypt **Cairo Univ., Egypt
P-I-107	<u>Economic Analysis of using Photovoltaic Generators for Water Pumping in Libya</u> A. S. Kagilik Center for Solar Studies, Libya
P-I-108	<u>Experimental Evolution of the Solar Coefficient of a Freezing System Has Compression Feeds by Photovoltaic Energy in Desert Area</u> *R. Khelfaoui and **M. Belhamel *Station d'Expérimentation des équipements solaire en milieu Saharien, Algerie **Centre de développement des énergies renouvelables en milieu Saharien, Algérie
P-I-109	<u>Simple Photovoltaic System: Energy Distribution and Optimization</u> I. Zulim and Z. Matic Univ. of Split, Croatia
P-I-110	<u>Reliability and Sensitivity Analysis for Different Photovoltaic Remote Area Systems</u> *M. Zahran, **A. Hanafy, **O. Mahgoub and *S. El-Hefnawi *Electronics Research Institute, Egypt **Cairo Univ., Egypt National Programs, Policies and Economics
P-I-111	<u>Photovoltaics for Rural Electrification in Xinjiang</u> S. H. Yang Xingjiang New Energy Research Institute, USA
P-I-112	<u>The Development of Photovoltaic Energy in Russia</u> S. Karabavov Ryazan Metal Ceramics Instrumentation Plant, Russia
P-I-113	<u>Naresuan Solar Energy Park: A New Concept of Photovoltaic System Commercialization in Thailand</u>

	*R. Saeng-udom, *W. Rakwichian and **S. Boonyathikam *Naresuan Univ., Thailand **DCM 2000 Co. Ltd., Thailand
P-I-114	Opportunities Arising Through Rapid Growth of the Photovoltaic Industry S. R. Wenham, C. B. Honsberg, J. Cotter, R. Largent, A. Aberle, T. Spooner and M. A. Green Univ. of New South Wales, Australia
P-I-115	Solar Cell R&D in The Netherlands F. M. Witte and E. W. Horst Netherlands Agency for Energy and the Environment, The Netherlands

[▲ Back to TOP](#)

■ Session 23-A-1 Thin Poly-silicon Solar Cells I

23-A-1-1	Development of High Efficiency Thin Film Si invited Solar Cells using Zone Melting Recrystallization H. Morikawa, Y. Kawama, Y. Matsuno, S. Hamamoto, K. Imada, T. Ishihara, K. Kojima and T. Ogama Mitsubishi Electric Corp., Japan
23-A-1-2	An Overview of Si Ribbon-Growth Technology invited J.I. Hanoka Evergreen Solar, USA
23-A-1-3	Si Film Growth Using Liquid Phase Epitaxy Method and Its Application to Thin-Film Crystalline Si Solar Cell S. Nishida, K. Nakagawa, M. Iwane, Y. Iwasaki, N. Ukiyo, M. Mizutani and T. Shoji CANON, Japan
23-A-1-4	Direct-Grown Polycrystalline Si Film on Carbon Substrate by LPE S. Ito, Y. Kitagawa, T. Mishima and T. Yokoyama Daido Hoxan Inc., Japan
23-A-1-5	Thin Film Solar Cells on Glass by Transfer of Quasi-Monocrystalline Si Films R. B. Bergmann, T. J. Rinke, T. A. Wagner and J. H. Wemer Univ. of Stuttgart, Germany
23-A-1-6	High Minority-Carrier Lifetime in Single-Crystal Silicon Thin Films on a Porous Silicon Sacrificial Layer H. Tayanaka, K. Yamauchi and T. Matsushita Sony Corp., Japan
23-A-1-7	A Novel Process for the Integrated Series Connection of Crystalline Thin-Film Silicon Solar Cells *R. Brendel and **S. Oelting *Bavarian Center for Applied Energy Research (ZAE Bayen), Germany **Antec GmbH, Germany
23-A-1-8	'Through-the-Glass', Double-Sided Laser Crystallisation using Copper Vapour Lasers for the Production of Thin Film Silicon Material *M. Boreland and **E. Iily *Univ. of New South Wales, Australia **Macquarie Univ., Australia

[▲ Back to TOP](#)

■ Session 23-A-2 Crystalline Silicon Solar Cells II

23-A-2-1	Degradation of Carrier Lifetime in Cz-Si Solar invited Cells S. W. Glunz, S. Rein, W. Warta, J. Knobloch and W. Wetling Fraunhofer Institute for Solar Energy Systems, Germany
23-A-2-2	Light Degradation and Control of Low-Resistivity CZ-Si Solar Cells -An International Joint Research - (invited) *T. Saitoh, *X. Wang, *H. Hashigami, **T. Abe, **T. Igarashi, ***S. Glunz, ***W. Wetling, ****A. Ebong, ****B. M. Damiani, ****A. Rohatgi, *****I. Yamasaki, *****T. Numoi, *****H. Sawai, *****H. Ohtuka, *****Y. Yazawa, *****T. Warabisako, *****J. Zhao and *****M. A. Green *Tokyo Univ. of A. & T., Japan **Shin-Etsu Handotai, Japan ***Fraunhofer-Institute for Solar Energy System, Germany ****Georgia Institute of Technology, USA *****Sharp Corp., Japan *****Hitachi Ltd., Japan *****Univ. of New South Wales, Australia
23-A-2-3	High Efficiency PERL Silicon Solar Cells on FZ, MCZ and CZ Substrates J. Zhao, A. Wang and M. A. Green Univ. of New South Wales, Australia

23-A-2-4	Relationship between Thermal Treatment Conditions and Minority Carrier Lifetimes in p-type, FZ Si Wafers K. Yoshioka, S. Ishikawa, M. Mimura and T. Saitoh Tokyo Univ. of A. & T., Japan
23-A-2-5	High Performance Light Trapping Textures for Monocrystalline Silicon Solar Cells P. Campbell and M. A. Green Univ. of New South Wales, Australia
23-A-2-6	Experimental Evidence of Very High Open-Circuit Voltages of Inversion-Layer Silicon Solar Cells C. Hampe, A. Metz and R. Hezel Institut für Solarenergieforschung Hameln/Emmerthal, Germany
23-A-2-7	Optimization of Front Metal Contact Firing Scheme to Achieve High Fill Factors on Screen Printed Silicon Solar Cells *A. Ebong, *J. Brody, *A. Rohatgi and **T. Williams *Georgia Institute of Technology, USA **Ferro Corp., USA
23-A-2-8	A Detailed Analysis of the Thick Film Contact for Solar Cell Metallization *R. Tolle, **C. Gerhards, **C. Marekemann, **P. Fath, **G. Willeke and **E. Bucher *BP Solar, UK **Univ. of Konstanz, Germany

[▲ Back to TOP](#)

■ Session 23-A-3 Crystalline Silicon Solar Cells III

23-A-3-1	Overview on SiN Surface Passivation of Crystalline Silicon Solar Cells (invited) A. G. Aberle Univ. of New South Wales, Australia
23-A-3-2	Advanced Cost-effective Silicon Solar Cell Technologies (invited) J. F. Nijs, J. Szlufcik, J. Poortmans, S. Sivoththaman and R. P. Mertens IMEC, Belgium
23-A-3-3	Surface Passivation in High Efficiency Silicon Solar Cells S. R. Wenham, J. Zhao, X. Dai, A. Wang, Y. H. Tang and M. A. Green Univ. of New South Wales, Australia
23-A-3-4	Excellent Thermal Stability of Remote Plasma-Enhanced Chemical Vapour Deposited Silicon Nitride Films for Screen-Printed Bifacial Silicon Solar Cells *B. Lenkeit, *S. Steckemetz, **F. Artuso and *R. Hezel *Institut für Solarenergieforschung Hameln/Emmerthal, Germany **ENEA C.R. Casaccia, Italy
23-A-3-5	Highest-Quality Surface Passivation of Low-Resistivity p-type Silicon using Stoichiometric PECVD Silicon Nitride J. Schmidt and M. Kerr Australian National Univ., Australia
23-A-3-6	Effect of Hydrogen Radical Annealing for SiN Passivation of c-Si Solar Cells *S. Muramatsu, **T. Uematsu, **H. Ohtsuka, **Y. Yazawa, **T. Warabisako, ***H. Nagayoshi and ****K. Kamisako *Hitachi Cable, Ltd., Japan **Hitachi, Ltd., Japan ***Shonan Inst. Tech., Japan ****Tokyo Univ. of A&T, Japan
23-A-3-7	The Use of Silicon Nitride in Buried Contact Silicon Solar Cells B. Yogi, A. M. Slade, S. C. Pritchard, M. Gross and C. B. Honsberg Univ. of New South Wales, Australia
23-A-3-8	Easy-to-Fabricate 20% Efficient Large-Area Silicon Solar Cells A. Metz and R. Hezel Institut für Solarenergieforschung Hameln/Emmerthal, Germany

[▲ Back to TOP](#)

■ Session 23-B-1-1 III-V Tandem Solar Cells

23-B-1-1	R&D of III-V Compound Solar Cells in Russia (invited) V. M. Andreev Ioffe Physico-Technical Institute, Russia

23-B-1-2	<u>High Efficiency InGaP/In_{0.01}Ga_{0.99}As Tandem Solar Cells Lattice-matched to Ge Substrates</u> T. Takamoto, T. Agui, E. Ikeda and H. Kurita Japan Energy Corp., Japan
23-B-1-3	<u>Advanced III-V Solar Cell Structures Grown by MOVPE</u> A. W. Bett, R. Adelhelm, C. Agert, R. Beckert, F. Dimroth and U. Schubert Fraunhofer Institute for Solar Energy Systems, Germany
23-B-1-4	<u>Characteristics of Al_{0.36}Ga_{0.64}As/GaAs Tandem Solar Cells with pp'n'n Structural AlGaAs Solar Cells</u> K. Takahashi, S. Yamada, Y. Minagawa and T. Unno Hitachi Cable, Ltd., Japan
23-B-1-5	<u>GaInP/GaAs and GaInAs Mechanically-Stacked Triple-Junction Solar Cells Grown by MOCVD using TBAs and TBP as V-Precursors</u> A. Moto, S. Tanaka, T. Tanabe and S. Takagishi Sumitomo Electric Industries Ltd., Japan

[▲ Back to TOP](#)

■ Session 23-B-1-2 Heteroepitaxial Technologies on Si

23-B-1-6	<u>Heteroepitaxial Technologies of III-V on Si</u> (invited) H. Kawanami Electrotechnical Laboratory, Japan
23-B-1-7	<u>High Lifetime GaAs on Si using GeSi Buffers and its Potential for Space Photovoltaics</u> *S. A. Ringel, *J. A. Carlin, **R. J. Kaplar, **B. M. Keyes, ***E. A. Fitzgerald and ****M. Bulsara *The Ohio State Univ., USA **National Renewable Energy Labs, USA ***MIT, USA ****Amberwave LLC, USA
23-B-1-8	<u>A Detailed Study of H Plasma Passivation Effects on GaAs-on-Si Solar Cell</u> G. Wang, K. Ohtsuka, T. Ogawa, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Technology, Japan

[▲ Back to TOP](#)

■ Session 23-B-2 Symposium F-I Low-cost & Large-area Fabrication of CIS & CdTe Cells

23-B-2-1	<u>Highly Efficient Large Area (10.5%, 1376cm²) Thin Film CdS/CdTe Solar Cell</u> (invited) A. Hanafusa, T. Aramoto, M. Tsuji, T. Yamamoto, T. Nishio, P. Veluchamy, H. Higuchi, S. Kumazawa, S. Shibusaki, J. Nakajima, T. Arita, H. Ohyama, T. Hibino and K. Omura
23-B-2-2	<u>An Life-Cycle Analysis on Thin Film CdS/CdTe PV Modules</u> *K. Kato, **T. Hibino, ***K. Komoto, ****S. Ihara, *****S. Yamamoto and *****H. Fujiwara *Electrotechnical Laboratory, Japan **Matsushita Battery Industrial Co. Ltd, Japan ***Fuji Research Institute Corp., Japan ****Nippon Institute of Technology, Japan *****Photovoltaic Power Generation Technology Research Association, Japan *****New Energy and Industrial Technology Development Organization, Japan
23-B-2-3	<u>Toward 20% Efficient CIGS-Based Solar Cells</u> (invited) B. Egaas, M. Contreras, K. Ramanathan, J. Keane, J. Alleman, F. Hasoon, R. Bhattacharya and R. Noufi National Renewable Energy Laboratory, USA
23-B-2-4	<u>Characterization of Cu-In-S Absorber Structure Obtained by CISCuT</u> *I. Konovalov, **O. Tober, **M. Winkler, *S. Senz and ***K. Otte *Max Plank Institute of Microstructure Physics, Germany, **Institut f ür Solar Technologien GmbH, Germany ***Institut f ür Oberflachenmodifizierung, Germany
23-B-2-5	<u>Preparation of Cu(In,Ga)Se₂ Thin Films from Cu-Se/In-Ga-Se Precursors for High Efficiency Solar Cells</u> *S. Nishiwaki, *T. Satoh, *S. Hayashi, *Y. Hashimoto, *S. Shimakawa, *T. Negami, **T. Wada and *T. Uenoyama *Matsushita Electric Industrial Co., Ltd., Japan **Ryukoku Univ., Japan
23-B-2-6	<u>Efficient CuInS₂ Solar Cells from a Rapid Thermal Process (RTP)</u> K. Siemer, J. Klaer, I. Luck, J. Bruns, R. Klenk and D. Br äunig Hahn-Meitner Institut, Germany
23-B-2-7	<u>Performance Improvement of CIGS-Based Modules by Depositing High-Quality Ga-Doped ZnO Windows with Magnetron Sputtering</u>

■ Session 23-B-3 Symposium F-II Low-cost & Large-area Fabrication of CIS & CdTe Cells

23-B-3-1	Development and Manufacturing of CIS Thin Film invited Solar Modules F. H. Karg Siemens Solar, Germany
23-B-3-2	Baseline Cu(In,Ga)Se₂ Device Production: Control and Statistical Significance J. Kessler, M. Bodegård, J. Hedstrom and L. Stolt Uppsala Univ., Sweden
23-B-3-3	Large Area CIGS Absorbers Prepared by Physical invited Vapor Deposition T. Negami, T. Satoh, Y. Hashimoto, S. Nishiaki, S. Shimakawa and S. Hayashi Matsushita Electric Industrial Co., Ltd., Japan
23-B-3-4	Progress in Large-Area Cu(In,Ga)Se₂-Based invited Thin-Film Modules with a Zn(O,S,OH)_x Buffer K. Kushiya, M. Tachiyuki, Y. Nagoya and A. Fujimaki Showa Shell Sekiyu K. K., Japan

■ Session 23-C-1 New Material, Structure & TCO

23-C-1-1	Boron Ion Implantation Effects in C₆₀ Films for Homo-Junction Solar Cells K. L. Narayanan, A. Kahn, O. Goetzberger, N. Kojima and M. Yamaguchi Toyota Technological Institute, Japan
23-C-1-2	Porous SiO_x Films Prepared by Remote Plasma-Enhanced Chemical Vapour Deposition A Novel Antireflection Coating Technology for Photovoltaic Modules H. Nagel, A. Metz and R. Hezel Institut für Solarenergieforschung Hameln/Emmerthal, Germany
23-C-1-3	Determination of the Density of States in Heavily Doped Regions of Silicon Solar Cells D. H. Neuhaus, P. P. Altermatt and A. G. Aberle Univ. of New South Wales, Australia
23-C-1-4	Development of Thin Film Solar Cell Based on Cu₂ZnSnS₄ Thin Films H. Katagiri, K. Saitoh, T. Washio, H. Shinohara, T. Kurumadani and S. Miyajima Nagaoka National College of Technology, Japan
23-C-1-5	Reduction of Plasma-Induced Damage by Electron Beam Excited Plasma CVD *K. Okitsu, *M. Imaizumi, *K. Yamaguchi, *A. Khan, *M. Yamaguchi, **M. Ban, **M. Tokai and ***K. Kawamura *Toyota Technological Institute, Japan **Kawasaki Heavy Industries, Japan **Chubu Electric Power Co. Inc., Japan
23-C-1-6	Progress in Monolithic Series Connection of Wafer Based Crystalline Silicon Solar Cells by the Novel 'High Vo'(High Voltage) Cell Concept S. Keller, S. Scheibenstock, P. Path, G. Willeke and E. Bucher Univ. of Konstanz, Germany
23-C-1-7	Growth and Characterization of ITO Thin Films by Pulsed Laser Ablation at Room Temperature F. O. Adurodiwa, H. Izumi, T. Ishihara, H. Yoshioka, H. Matsui and M. Motoyama Hyogo Pref. Institute of Industrial Research, Japan
23-C-1-8	Preparation of Boron-Doped ZnO Thin Films by Photo-Atomic Layer Deposition *Y. Yamamoto, *K. Saito, *K. Takahashi and **M. Konagai *Teikyo Univ. of Science and Technology, Japan **Tokyo Institute of Technology, Japan

■ Session 23-C-2 Modules I

23-C-2-1	Current Status and Future Prospect of PVMaT Project
----------	---

	*C. E. Witt, *R. L. Mitchell, *M. S. Davies, *H. P. Thomas, **R. King and ***D. S. Ruby *NREL, USA **U.S. Dep. of Energy, USA ***Sandia National Lab., USA
23-C-2-2	<u>Building-integrated PV Modules</u> J. Benemann Pilkington Solar International, Germany
23-C-2-3	<u>New Stage of Building-Integrated Photovoltaic Systems</u> *T. Ohba, *K. Shimabukuro, **K. Kurokawa, ***S. Wakamatsu and ***M. Takehara *New Energy and Industrial Technology Development Organization, Japan **Tokyo Univ. of A. & T., Japan ***Photovoltaic Power Generation Technology Research Association, Japan
23-C-2-4	<u>Photovoltaic Modules Integrated with Construction Materials</u> *K. Shimabukuro, **K. Sakuta and ***S. Wakamatsu *New Energy and Industrial Technology Development Organization, Japan **Electrotechnical Laboratory, Japan ***Photovoltaic Power Generation Technology Research Association, Japan
23-C-2-5	<u>Flexible Thin Membrane PV Module for Membrane Structures</u> *H. Tsubota, *S. Yoshinaka, **Y. Watanuki, **S. Mayuyama and **H. Fujii *Kajima Technical Research Institute, Japan **Fuji Electric Corp. Research & Development, Ltd., Japan
23-C-2-6	<u>Field Applied PV Membrane</u> P. Nath, C. Vogeli, K. Jones, A. Singh and S. Guha United Solar Systems Corp., USA
23-C-2-7	<u>Adhesional Strength and Surface Analysis of a PV Module Deployed in Harsh Coastal Climate</u> N. G. Dhere and N. R. Raravikar Florida Solar Energy Center, USA
23-C-2-8	<u>Performance of Selected Photovoltaic Modules Under Varying Climatic Conditions</u> *W. Durisch, **O. Struss and ***K. Robert *Paul Scherrer Institute, Switzerland **Fresenius Academy, Germany ***Technical College Lubeck, Germany

[▲ Back to TOP](#)

■ Session 23-C-3 National Programs II

23-C-3-1	<u>Overview of Photovoltaic Technologies in India</u> B. Bhargava Ministry of Non-Conventional Energy Sources, India
23-C-3-2	<u>National Photovoltaic Project in Thailand on the Occasion of the Royal Commemorating the Sixth-Cycle(72nd) Birthday Anniversary of His Majesty King Bhumibol Adulyadej on 5 December 1999</u> *P. Chandrasurin and **D. Kruangam *Standing Committee on Energy, Parliament, Thailand **Chulalongkorn Univ., Thailand
23-C-3-3	<u>A Regional Overview and Opportunities for Using Solar Photovoltaics in the Pacific</u> P. L. Fairbairn South Pacific Applied Geoscience Commission, Fiji
23-C-3-4	<u>Overview of PV in Laos and Mekong Countries</u> P. Muangnaland Science Technology and Environment Organization, Laos
23-C-3-5	<u>Overview of PV in Viet Nam</u> L. H. To Vietnam National Center for National Science & Technology, Vietnam
23-C-3-6	<u>The Present Status and Future Potential of PV Development in China</u> Y. Zhao Beijing Solar Energy Research Institute, China
23-C-3-7	<u>Thailand's First Cost-Share PV Roof-Top Grid Connected Pilot Project</u>

■ **Poster SessionII Fundamentals and New Approaches**

P-II-1	Deep Level Transient Spectroscopy of C₆₀/p-Si Heterojunction Solar Cell Interface States A. Khan, M. Yamaguchi and N. Kojima Toyota Technological Institute, Japan
P-II-2	Study and Characterization of Semiconductor Junctions for Photovoltaic Applications by Contactless Methods S. von Aichberger, R. Schieck and M. Kunst Hahn-Meitner-Institut, Germany
P-II-3	The Influence of the Surface on Charge Carrier Transport in GaAs Films A. Sanders, O. Hahneiser, S. von Aichberger and M. Kunst Hahn-Meitner-Institut, Germany
P-II-4	Conceptual Design on Solar Simulator for Large Area Multi-Junction PV Devices *S. Igari, *Y. Imura, **S. Shimada and **N. Watanabe *Japan Quality Assurance Organization, Japan **Wacom Electric Co., Ltd., Japan
P-II-5	Mathematical and Numerical Model for PV Cell Steady State Temperature Distribution F. H. Fahmy and F. M. El-Hefnawi Electronics Research Institute, Egypt
P-II-6	2D-Numerical Analysis and Optimum Design of Thin Film Silicon Solar Cells T. Matsui, H. Takakura and Y. Hamakawa Ritsumeikan Univ., Japan
P-II-7	Performance Simulations for Designing Recent Advanced Bifacial Silicon Solar Cells using a Two Dimensional Device Simulator *K. Matsukuma, *K. Oshikata, *K. Morita, **S. Kokunai and **T. Johge *Kumamoto Institute of Technology, Japan **Hitachi Ltd, Japan
P-II-8	Unified Model of Ballistic and Diffusive Carrier Transport : Application to Photovoltaic Materials R. Lipperheide, T. Weis and U. Wille Hahn-Meitner-Institut Berlin, Germany
P-II-9	Apparent Band-Gap Narrowing Doping Functions for Silicon in the Dhariwal and Ojha's Form Facilitating Solar Cell Modeling L. Abenante and L. Pirozzi E.N.E.A. ERG FORI SICRI, Italy
P-II-10	The Influence of a New Band Gap Narrowing Model on Measurements of the Intrinsic Carrier Density in Crystalline Silicon *P. P. Altennatt, **A. Schenk, *G. Heiser and *M. A. Green *Univ. of New South Wales, Australia **ETH Zurich, Switzerland
P-II-11	Solar Cells Radiospectroscopy Measurements in the Outdoor Conditions at Helwan, Egypt *M. A. M. Shatout, **M. S. Gohnum and *A. H. Hassan *National Research Institute of Astronomy and Geophysics, Egypt **Menofia Univ., Egypt
P-II-12	Comparison Between the Behaviour of the Electrical Output Performance of Solar Cells under Hot and Cold Climate A. E. S. Ghitas SUT, Slovak Republic

■ **Crystalline Silicon**

P-II-13	Short-time Thermal Polycrystallization of Amorphous Silicon Films on Quartz Substrates Y. Matsumoto CINVESTAV-IPN, Mexico
P-II-14	Aluminium Induced Crystallisation of Silicon on Glass for Thin-Film Solar Cells

	<p>*O. Nast, **S. Brehme, *S. Pritchard, *A. G. Aberle and *S. R. Wenham *Univ. of New South Wales, Australia **Hahn-Meitner-Institut, Germany</p>
P-II-15	<p><u>Zone Melting Recrystallization of Silicon Films for Crystalline-Silicon Thin-Film Solar Cells</u></p> <p>S. Reber, W. Zimmennann, T. Kieliba and S. W. Glunz Fraunhofer Institute for Solar Energy Systems, Germany</p>
P-II-16	<p><u>Suppression of Substrate Distortion During Zone-Melting Recrystallization Process for Thin Film Silicon Solar Cells</u></p> <p>K. Imada, Y. Matsuno, S. Hamamoto, Y. Kawama, H. Morikawa, T. Ishihara, K. Kojima and T. Ogama Mitsubishi Electric Corp., Japan</p>
P-II-17	<p><u>Silicon Thin Film Formation by Liquid Phase Epitaxy on Mullite Substrates with RT-CVD Polysilicon Seed Layer</u></p> <p>*A. Fave, *B. Semmache, ***J. M. Olchowik, *A. Laugier, **F. Mazel, **G. Fantozzi, ****S. Bourdais and ****A. Slaoui *LPM-CNRS, France **GEMPPM, France ***Technical Univ. of Lublin, Poland ****PHASE-CNRS, France</p>
P-II-18	<p><u>Thin Film Solar Cells on a Ceramic Substrate by Adhesive Bonding</u></p> <p>H. Takato and R. Shimokawa Electrotechnical Laboratory, Japan</p>
P-II-19	<p><u>Optical Surface Roughness of Alumina Ceramics Substrate and its Effect on Light Absorption in Thin Film Poly crystalline Si Solar Cells</u></p> <p>M. Tazawa, T. Miki, P. Jin, K. Yoshimura, K. Igarashi and S. Tanemura National Industrial Research Institute of Nagoya, Japan</p>
P-II-20	<p><u>Deposition of Poly-crystalline Silicon with Large Grain Size from Al-Si Melt</u></p> <p>T. Yamada, T. Nishioka, M. Tachikawa and T. Yamada NTT Telecommunication Energy Labs., Japan</p>
P-II-21	<p><u>Polycrystalline Absorber Films for Thin Film Solar Cells Prepared by Laser Crystallization</u></p> <p>G. Andra, J. Bergmann, F. Falk, E. Ose and N. D. Sinh Institut für Physikalische Hochtechnologie, Germany</p>
P-II-22	<p><u>Zone-Defined Growth of Multicrystalline Silicon Film from Metal-Silicon Solution</u></p> <p>K. Kita, H. Yamatsugu, C. Wen, H. Komiyama and K. Yamada The Univ. of Tokyo, Japan</p>
P-II-23	<p><u>Flexible Single-Crystal Si Solar Cells on Plastic Films</u></p> <p>S. Mizuno, K. Yamauchi, H. Tayanaka and T. Matsushita Sony Corp., Japan</p>
P-II-24	<p><u>Monolithic Series-Interconnection for a Thin Film Silicon Solar Cell</u></p> <p>U. Kerst, B. Muller, M. E. Nell and H. -G. Wagemann Technische Universität Berlin, IMF, Germany</p>
P-II-25	<p><u>Solar Cells from Thin Silicon Layers on Al_2O_3</u></p> <p>*M. E. Nell, *A. Braun, *B. von Ehrenwall, *C. Schmidt and **L. Elstner *Technische Universität Berlin, IMF, Germany **Hahn-Meitner-Institut, Germany</p>
P-II-26	<p><u>Thin Film Poly-Si Formation for Solar Cells by Flux Method and Cat-CVD Method</u></p> <p>K. Niira, H. Hakuma, M. Komoda, K. Fukui and K. Shirasawa Kyocera Corp., Japan</p>
P-II-27	<p><u>Porous Silicon as an Intermediate Layer for Thin Film Solar Cell</u></p> <p>R. Bilyalov, L. Stalmans, G. Beaucarne, R. Loo, M. Caymax, J. Poortmans and J. Nijs IMEC, Belgium</p>
P-II-28	<p><u>Comparative Study of Classical and Rapid Thermal Phosphorus Diffusion on Polycrystalline-Silicon Thin Films</u></p> <p>*S. Bourdais, **G. Beaucarne, *A. Slaoui, **J. Poortmans, ***B. Semmache and ***C. Dubois *CNRS PHASE, France **IMEC, Belgium ***LPM INSA, France</p>
P-II-29	<p><u>Microstructure and Electrical Properties of Epitaxial Layers Deposited on Silicon by Ion Assisted Deposition</u></p>

	<p>*J. Krinke, **G. Kuchler, **R. Brendel, ***H. Artmann, ***W. Frey, ****S. Oelting, **M. Schulz and *H. P. Strunk *Universitat Erlangen-Nurnberg, Germany **Bavarian Center for Applied Energy Research (ZAE Bayern), Germany ***Robert Bosch GmbH, Germany ****ANTEC GmbH, Germany</p>
P-II-30	<p><u>Performance of 6µm Thick Crystalline Silicon Solar Cells on Glass Substrate</u></p> <p>H. Kasai, H. Wada and H. Matsumura Japan Advanced Institute of Science and Technology, Japan</p>
P-II-31	<p><u>A Simple and Efficient Process for Fabricating High Efficiency Polycrystalline Silicon Ribbon Solar Cells</u></p> <p>H. E. A. Elgamel and J. Gobrecht Paul Scherrer Institute, Switzerland</p>
P-II-32	<p><u>2µm Thin Film c-Si Cells on near-Lambertian Al₂O₃ Substrates</u></p> <p>*R. Shimokawa, *T. Takahashi, *H. Takato, **A. Ozaki and **Y. Takano *Electrotechnical Laboratory, Japan **Science Univ. of Tokyo, Japan</p>
P-II-33	<p><u>Aluminum Alloy Back p-n Junction Dendritic Web Silicon Solar Cell</u></p> <p>*D. L. Meier, *H. P. Davis, *R. A. Garcia, *J. Salami, **A. Rohatgi, **A. Ebong, **P. Doshi and **M. Finnegan *EBARA Solar Inc., USA **Georgia Institute of Technology, USA</p>
P-II-34	<p><u>Polycrystalline Silicon Film deposited by ICP-CVD</u></p> <p>B. Y. Moon, J. H. Youn, S. H. Won and J. Jang Kyung Hee Univ., Korea</p>
▲Back to TOP	
■ Amorphous and Microcrystalline Silicon	
P-II-35	<p><u>Thin Film Silicon Solar Cells Fabricated by Electron Beam Excited Plasma CVD</u></p> <p>*T. Ito, *H. Azuma, **K. Yamaguchi, **M. Imaizumi, *H. Fukushima, **M. Yamaguchi, **T. Hara, ***M. Ban, ***M. Tokai and ****K. Kawamura *Toyota Central R&D Labs. Inc., Japan **Toyota Technological Institute, Japan ***Kawasaki Heavy Industries Ltd., Japan ****Chubu Electric Power Co., Inc., Japan</p>
P-II-36	<p><u>Low Temperature µc-Si Film Growth using a CaF₂ Film</u></p> <p>D. Y. Kim, B. J. Ahn, S. I. Moon and J. Yi SungKyunKwan Univ., Korea</p>
P-II-37	<p><u>Enhancement of Growth Rate of Microcrystalline Silicon Thin Films by Hydrogen Introduction into Electron Beam Excited Plasma CVD</u></p> <p>*M. Imaizumi, *T. Ito, *K. Yamaguchi, *K. Okitsu, *M. Yamaguchi, *T. Hara, **M. Al-Jassim, ***M. Ban, ***M. Tokai and ****K. Kawamura *Toyota Technological Institute, Japan **National Renewable Energy Laboratory., USA ***Kawasaki Heavy Industries Ltd., Japan ****Chubu Electric Power Co., Inc., Japan</p>
P-II-38	<p><u>Fabrication of Polycrystalline Silicon Thin Film Solar Cells by Hot Wire Cell Method</u></p> <p>Y. Ide, Y. Wakita, A. Yamada and M. Konagai Tokyo Institute of Technology, Japan</p>
P-II-39	<p><u>Role of Hydrogen in Hydrogenated Microcrystalline Silicon</u></p> <p>T. Itoh, K. Yamamoto, H. Harada, N. Yamana, N. Yoshida, K. Inagaki, H. Inouchi, S. Nonomura and S. Nitta Gifu Univ., Japan</p>
P-II-40	<p><u>The Creation of Hydrogen Radicals by the Hot-Wire Technique and It's Application for µc-Si:H</u></p> <p>H. Harada, N. Yoshida, K. Yamamoto, T. Itoh, K. Inagaki, H. Inouchi, N. Yamada, T. Aoki, S. Nonomura and S. Nitta Gifu Univ., Japan</p>
P-II-41	<p><u>Structural Control of Cat-CVD Poly-Si Films by Gas Phase Reaction using Pure SiH₄ Gas</u></p> <p>A. Heya, A. Masuda and H. Matsumura Japan Advanced Institute of Science and Technology, Japan</p>
P-II-42	<p><u>High Growth-Rate Fabrication of Microcrystalline Silicon by Helicon Wave Plasma CVD</u></p> <p>K. Endo, M. Isomura, M. Taguchi, H. Tarui and S. Kiyama SANYO Electric Co., Ltd., Japan</p>

P-II-43	<u>Microstructure Control of Very Thin Polycrystalline Silicon Layers on Glass Substrate by Plasma Enhanced CVD</u> D. Matsuura, T. Kamiya, C. M. Fortmann and I. Shimizu Tokyo Institute of Technology, Japan
P-II-44	<u>In-Situ Hydrogen Plasma Treatment for Improved Transport of (400) Oriented Polycrystalline Silicon Films</u> A. Suemasu, K. Nakahata, K. Ro, T. Kamiya, C. M. Fortmann and I. Shimizu Tokyo Institute of Technology, Japan
P-II-45	<u>High Quality Narrow Gap (1.52eV) a-Si:H with Improved Stability Fabricated by Excited Inert Gas Treatment</u> H. Sato, K. Fukutani, W. Futako, T. Kamiya, C. M. Fortmann and I. Shimizu Tokyo Institute of Technology, Japan
P-II-46	<u>Improved TCO Coated Glass Substrates for High Deposition Temperature, Narrow Gap a-Si:H Solar Cells</u> K. Komaru, H. Sato, W. Futako, T. Kamiya, C. M. Fortmann and I. Shimizu Tokyo Institute of Technology, Japan
P-II-47	<u>High Rate Deposition of Hydrogenated Amorphous Silicon Films using Inductively Coupled Silane Plasma</u> N. Sakikawa, Y. Shishida, S. Miyazaki and M. Hirose Hiroshima Univ., Japan
P-II-48	<u>Dependence of the Boron-Doped Microcrystalline SiC:H Film Characteristics on Mercury Bath and Substrate Temperatures in Photo-CVD System</u> S. Y. Myong, H. K. Lee, E. Yoon, and K. S. Lim Korea Advanced Institute of Science and Technology, Korea
P-II-49	<u>Low Degradation and High Annealing Effects of Amorphous Silicon Multilayer Processed Through Alternate Hydrogen Dilution</u> K. H. Jun and K. S. Lim Korea Advanced Institute of Science and Technology, Korea
P-II-50	<u>Al-Seeded Growth of p-type Microcrystalline Si Thin Film and Its Application to Window Layer of a-Si Solar Cells</u> C. H. Lee, J. Y. Ahn and K. S. Lim Korea Advanced Institute of Science and Technology, Korea
P-II-51	<u>FZ Growth of 8-Ga₂O₃: a Candidate Window Material</u> Y. Tomm, J. M. Ko, A. Yoshikawa and T. Fukuda Tohoku Univ., Japan
P-II-52	<u>Characterization of Pulsed Laser Crystallization of Silicon Thin Film</u> *S. Ishigame, *K. Ozaki, *T. Sameshima and **S. Higashi *Tokyo Univ. of A. & T., Japan ** SEIKO Epson Corp., Japan
P-II-53	<u>Microcrystalline Si Films Deposited from Dichlorosilane using RF PECVD</u> L. Guo, M. Kondo and A. Matsuda Electro technical Laboratory, Japan
P-II-54	<u>More Stable Low Gap a-Si:H Layers Deposited by PE-CVD at Moderately High Temperatures with Hydrogen Dilution</u> Y. Ziegler, V. Daudrix, C. Droz, R. Platz and A. Shah LMT, Uni-Ne/EPFL, Switzerland

[▲ Back to TOP](#)

■ Space Cells and Radiation Effects

P-II-55	<u>Solar Cell Degradation by Electron Irradiation. Comparison Between Si, GaAs and GaInP Cells</u> J. C. Bourgoin and N. de Angelis Universite P. et M. Curie, France
P-II-56	<u>Radiation Response of 1.1 eV InGaAs/GaAs Solar Cells</u> *R. J. Waiters, *G. P. Summers, **S. R. Messenger, ***R. W. Hoffman, Jr. and ***M. A. Stan *U.S. Naval Research Laboratory, USA **SFA, Inc., USA ***Essential Research Inc., USA
P-II-57	<u>Correlation of Solar Cell Radiation Data in Terms of Displacement Damage Dose</u>

	*R. J. Waiters, *G. P. Summers, **S. R. Messenger, ***T. Aburaya and ***S. Matsuda *U.S. Naval Research Laboratory, USA **SFA, Inc., USA ***National Space Development Agency of Japan, Japan
P-II-58	Use of Displacement Damage Dose in an Engineering Model of GaAs Solar Cell Radiation Damage *T. L. Morton, **R. Chock, **K. Long, **S. Bailey, ***S. R. Messenger, ****R. J. Waiters and *****G. P. Summers *Ohio Aerospace Institute, USA **NASA Glenn Research Center, USA ***SFA, Inc., USA ****U.S. NRL, USA *****Univ. of Maryland Baltimore County, USA
P-II-59	Betavoltaic Cells Based on Tritium and AlGaAs/GaAs Heterostructure V. M. Andreev, A. S. Vlasov, V. S. Kalinovsky, V. P. Khvostikov, V. R. Larionov, V. D. Rumyantsev, M. Z. Shvarts and E. V. Yakimova IOFFE Physico-Technical Institute, Russia
P-II-60	Over 20% AMO Efficient InP Solar Cell under LiLT Conditions C. Monier, A. Freundlich and M. F. Vilela Univ. of Houston, USA
P-II-61	GaAs Space Solar Cells and Tunnel Diodes Fabricated by High Growth Rate Metal-Organic MBE A. Freundlich, F. Newman, M. F. Vilela, C. Monier, L. Aguilar and S. Street Univ. of Houston, USA
P-II-62	Optical and Electrical Properties of GaAs Solar Cell by Bonding of GaAs on Si -A Futuristic Approach *H. Okui, *J. Arokiaraj, **H. Taguchi, *T. Soga, *T. Jimbo and *M. Umeno *Nagoya Institute of Techonlogy, Japan **Sanyo Electric Works Ltd., Japan
P-II-63	High Quality Thin Film GaAs Bonded to Si using SeS₂ -A New Approach for High Efficiency Tandem Solar Cells J. Arokiaraj, H. Okui, T. Soga, T. Jimbo and M. Umeno Nagoya Institute of Techonlogy, Japan
▲ Back to TOP	
■ CIS and CdTe Thin Film Cells	
P-II-64	Design of Gridded Cu(In,Ga)Se₂ Thin Film PV Modules J. Wennerberg, J. Kessler and L. Stolt Uppsala Univ., Sweden
P-II-65	Electrical and Optical Properties of CdS Films Grown by Photochemical Deposition from Aqueous Solutions R. Kumaresan, M. Ichimura, K. Takahashi, K. Takeuchi, F. Goto and E. Arai Nagoya Institute of Technology, Japan
P-II-66	Characterization of Large Grain Size CuInS₂ Solar Cells K. Takeuchi, S. Ichikawa, A. Koizumi, M. Harada, H. Tanaka, K. Arai and Y. Onuma Shinko Electric Industry Co., Ltd., Japan
P-II-67	CVD of CuGaSe₂ for Thin Film Solar Cells with Various Transport Agents D. Fischer, N. Meyer, M. Beck, A. Jager-Waldau and M. Ch. Lux-Steiner Hahn Meitner Institute, Germany
P-II-68	Influence of Na on the Propaties of Cu-rich Prepared CuInS₂ Thin Films and the Performance of Corresponding CuInS₂/CdS/ZnO Solar Cells *I. Luck, *J. Kneisel, *K. Siemer, *J. Bruns, *R. Scheer, *R. Klenk, **N. Janke and *D. Braunig *Hahn Meitner Institute, Germany **Vereinigte Glaswerke GmbH, Germany
P-II-69	Highly Efficient 1μm Thick CdTe Solar Cells with Textured TCOs N. Amin, T. Isaka, A. Yamada and M. Konagai Tokyo Institute of Technology, Japan
P-II-70	Improved CIGS Thin Film Solar Cells by Surface Sulfurization using In₂S₃ and Sulfur Vapor T. Nakada, D. Ohashi and A. Kunioka Aoyama Gakuin Univ., Japan
P-II-71	Characteristics of CuInSe₂ Films Prepared by Evaporating Selenide Compounds and Annealing in a Se Atmosphere

	*S. C. Park, *D. Y. Lee, *B. T. Ahn, **K. H. Yoon and **J. Song *Korea Advanced Institute of Science and Technology, Korea **Korea Institute of Energy Research, Korea
P-II-72	<u>Characterization of CdS/CdTe Junctions using C-V Measurements with Monochromatic Light Illumination</u> S. W. Kim, J. H. Yun, D. Y. Lee and B. T. Ahn Korea Advanced Institute of Science and Technology, Korea
P-II-73	<u>Sprayed CuInS₂ Thin Films for Solar Cells : The Effect of Solution Composition and Post-Deposition Treatments</u> M. Krunks, O. Bijakina, V. Mikli, H. Rebane, T. Varema, M. Altosaar and E. Mellikov Tallinn Technical Univ., Estonia
P-II-74	<u>Cu(In,Ga)Se₂ Superstrate Solar Cells on Transparent Conducting Zinc oxide Layers</u> F. J. Haug, M. Krejci, H. Zogg and A. N. Tiwari Institute of Quantum Electronics, ETH, Switzerland
P-II-75	<u>ETA-Solar Cell: A Photovoltaic Cell Concept using CIS as the Extremely Thin Absorber</u> I. Kaiser, K. Ernst, C. H. Fischer, R. Konenkamp, J. Moller, C. Rost and M. C. Lux-Steiner Hahn-Meitner-Institute, Germany
P-II-76	<u>CIS by ILGAR-A Novel Low-Cost Deposition Technique for Chalcogenides on Flat and Porous Substrates</u> C. H. Fischer, J. Moeller, H. J. Muffler, R. Koenenkamp, I. Kaiser and M. C. Lux-Steiner Hahn-Meitner-Institute, Germany
P-II-77	<u>ILGAR-A Novel Chemical Deposition Technique for Sulfidic Thin Buffer Layers of Chalcopyrites Solar Cells</u> H. J. Muffler, C. H. Fischer, M. Giersig and M. C. Lux-Steiner Hahn-Meitner-Institute, Germany
P-II-78	<u>Study of Cd-free Buffer Layers Using Inx(OH,S)y on CIGS Solar Cells</u> *C. H. Huang, *S. S. Li, **W. N. Shafarman, *C.-H. Chang, *J. W. Johnson, *L. Reith, *S. Kim, *B. J. Stanbery and *T. J. Anderson *Univ. of Florida, USA **Univ. of Delaware, USA
P-II-79	<u>Preparation and Properties of All Thin Film CuGa_{0.2}In_{0.8}Se₂/CdO Heterojunction Solar Cell</u> R. B. V. Chalapathy, T. K. Subramanyan, K. T. R. Reddy and S. Uthanna Sri Venkateswara Univ., India
P-II-80	<u>Fabrication of Cu(In,Ga)Se₂ by In-Line Evaporation</u> T. Satoh, S. Hayashi, S. Nishiwaki, S. Shimakawa, Y. Hashimoto, T. Negami, H. Inoue, K. Tanaka, M. Muro, M. Kitagawa and T. Uenoyma Matsushita Electric Industrial Co., Ltd., Japan
P-II-81	<u>Structure Analysis of CIGS Solar Cells by CV, CF Characteristics under Monochromatic Light at Low Temperature Levels</u> *T. Koyanagi, *T. Kojima, *K. Nakamura, *T. Yanagisawa, *K. Takahisa and ** T. Negami *Electrotechnical Laboratory, Japan **Matsushita Electric Industrial Co. Ltd., Japan

[▲ Back to TOP](#)

■ Modules and System Components

P-II-82	<u>Experimental Investigation on Generated Power of Amorphous PV Module for Roof Azimuth</u> *T. Yamawaki, *S. Mizukami, **T. Masui and **H. Takahashi *Kaneka Corp., Japan **Nara National College of Technology, Japan
P-II-83	<u>Study Field Performance and Shadowing Effect for Series and Parallel Connected Multiple Solar Cells in Flat Plate Photovoltaic Modules</u> J. C. Joshi Centre for Energy Studies, India
P-II-84	<u>Outdoor Exposure Test of Amorphous Silicon Modules in Australia</u> M. Ikisawa, A. Nakano and T. Ohshiro Japan Quality Assurance Organization, Japan
P-II-85	<u>Dye Sensitised Solar Cells: Large Scale Batch Processing of Mini Modules for Applications in Consumer Electronics</u>

	<p>*A. Hinsch, *R. Kinderman, **M. Wolf, ***C. Bradbury, ***A. Hagfeldt, ****S. Winkel, ****S. Burnside, ****M. Gratzel, *****H. Pettersson and *****P. Johander *ECN Solar and Wind Energy, The Netherlands **Leclanche S.A., Switzerland ***Uppsala Univ., Sweden ****Ecole Polytechnique de Lausanne, Switzerland *****Institute for Production Engineering Reserch, Sweden</p>
P-II-86	<p>Reflection Loss Analysis by Optical Modeling of PV Module</p> <p>*T. Yamada, *H. Nakamura, *T. Sugiura, **K. Sakuta and ***K. Kurokawa *Japan Quality Assurance Organization, Japan **Electrotechnical Laboratory, Japan ***Tokyo Univ. of A. & T., Japan</p>
P-II-87	<p>Generalized Models Representing Efficiency and Electrical Behavior of Solar Cells</p> <p>*J. C. Mayor, *W. Durisch, **P. Kleinert and **M. Kost *Paul Scherrer Institute, Switzerland **Swiss Federal Institute of Technology, Switzerland</p>
P-II-88	<p>Application of Equivalent Circuit of PV Module to Evaluation and Improvement of MPPT Control Algorithm</p> <p>*T. Maezono, *T. Ikegami, **Y. Shiota and *K. Ebihara *Kumamoto Univ., Japan **Kyushu Electric Power Co., Inc., Japan</p>
P-II-89	<p>Estimation of Equivalent Circuit Parameters of PV Module and Its Application to Diagnostics of PV Array</p> <p>*T. Ikegami, *Y. Mori, *F. Nakanishi, **Y. Shiota and *K. Ebihara *Kumamoto Univ., Japan **Kyushu Electric Power Co., Inc., Japan</p>
P-II-90	<p>Long Term Reliability Evaluation of Powerconditioner for the Photovoltaic Power Generation Systems</p> <p>S. Suenaga Japan Electrical Safety&Environment Technology Laboratories, Japan</p>
P-II-91	<p>Outline of Certification System Interconnection Protection Devices, Inverters for System Interconnection, etc. for Small Photovoltaic Power Generation Systems and the Practical Operation</p> <p>S. Suenaga Japan Electrical Safety&Environment Technology Laboratories, Japan Terrestrial Systems</p>

[▲ Back to TOP](#)

■ Terrestrial Systems

	<p>Eastern Indonesia Hybrid Energy Project: Design and Implementation</p> <p>P-II-92 S. Trihadi and R. Mulyadi Agency for the Assessment and Application of Technology, Indonesia</p>
P-II-93	<p>Computer Simulation of a Power System Consisting of Load, PV Modules and Battery Bank for the Purpose of Accurate Sizing of the System Components and Performance Prediction</p> <p>A. Zahedi and I. Budiada Monash Univ., Australia</p>
P-II-94	<p>Investigation of PV System Parameters by Computational Simulation</p> <p>P-II-94 S. Wakao, T. Onuki, R. Hirakawa, T. Kusakabe, H. Fukutomi and A. Ishida Waseda Univ., Japan</p>
P-II-95	<p>Novel Control Method for Battery Charging-Discharging in PV System</p> <p>P-II-95 T. Onuki, S. Wakao, R. Hirakawa, T. Kusakabe', H. Fukutomi and A. Ishida Waseda Univ., Japan</p>
P-II-96	<p>Operation Control of Photovoltaic/Diesel Hybrid Generating System Considering Fluctuation of Solar Radiation</p> <p>P-II-96 J. S. Park, T. Katagi, S. Yamamoto and T. Hashimoto Kobe Univ. of Mercantile Marine, Japan</p>
P-II-97	<p>An Optical Powering System Consisting of a Laser Diode, Optical Fiber, Photovoltaic Cell and Electric Double-Layer Capacitor</p> <p>P-II-97 T. Yasui and J. Ohwaki NTT Telecommunications Energy Laboratories, Japan</p>
P-II-98	<p>Direct Torque Control of Photovoltaic Pumping System</p> <p>P-II-98 *Y. Atia, ***O. Mahgoub, **M. Kamel, *S. El-Hefnawi and ***E. Aboul-Zahab *Electronics Research Institute, Egypt **Benha Higher Institute of Technology, Egypt ***Cairo Univ., Egypt</p>
P-II-99	<p>Research for a Drive of Ozonizer by using a Photovoltaic Generation System</p>

	<p>*M. Umeno, *Y. Inamori, *T. Soga, *T. Jimbo, *Y. Tsujita, *K. Ohe, **S. Suzuki and **T. Sato *Nagoya Institute of Technology, Japan **Taisei-kiko Co. Ltd., Japan</p>
P-II-100	<p>Automatic Control of PV Hybrid Systems</p> <p>*D. Konstantakos, *C. Avgerinou, *G. Toros, *A. Karafyllis, **P. Romanos, **S. Tselepis, **G. Goulas and **G. Tsimitrea *Technological Educational Institute of Peiraeus, Greece **Centre for Renewable Energy Sources, Greece</p>
P-II-101	<p>A Comparison on Modelling and Simulation of PV Systems using Matlab and SPICE</p> <p>*S. Silvestre, *D. Guasch, **A. Moreno, *J. Julve and *L. Castafier *Polytechnic Univ. of Catalonia, Spain **Escola Univ. Salesiana de Sarria, Spain</p>
P-II-102	<p>Data Analysis on Solar Irradiance and Performance Characteristics of Solar Modules with a Test Facility of Various Tilt Angles and Directions</p> <p>*H. Nakamura, *T. Yamada, *T. Sugiura, **K. Sakuta and ***K. Kurokawa *Japan Quality Assurance Organization, Japan **Electrotechnical Laboratory, Japan ***Tokyo Univ. of A. & T., Japan</p>
P-II-103	<p>A Simplified Estimating Model for In-Plane Irradiation using Minute Horizontal Irradiation</p> <p>*H. Unoza, **K. Otani and *K. Kurokawa *Tokyo Univ. of A. & T., Japan **Electrotechnical Laboratory, Japan</p>
P-II-104	<p>Advanced Simulation - Based PV-Arrays Used in Hybrid System Design</p> <p>F. M. A. Ghali Electronics Research Institute, Egypt National Programs, Policies and Economics</p>

[▲ Back to TOP](#)

■ National Programs, Policies and Economics

	<p>Photovoltaic Energy for Northwestern China Development</p> <p>*L. Zhang and **W. Xi *Renewable Energy Unit, Italy **Gansu Natural Energy Research Institute, P.R. China</p>
P-II-105	<p>Economics of Photovoltaic Electricity Supply in a Small Remote Village in Southern Jordan</p> <p>*P. Aebl and **W. Durisch *Swiss Federal Institute of Technology, Switzerland **Paul Scherrer Institute, Switzerland</p>

[▲ Back to TOP](#)

■ Session 24-A-1 Crystalline Silicon Solar Cells IV

24-A-1-1	<p>A New Generation of Crystalline Silicon Solar Cells: Simple Processing and Record Efficiencies for Industrial-Size Devices</p> <p>R. Hezel, R. Meyer and A. Metz Institut fur Solarenergieforschung Hameln/Emmerthal, Germany</p>
24-A-1-2	<p>A Si Concentrator Cell by Single Photolithography Process</p> <p>K. Araki and M. Yamaguchi Toyota Technological Institute, Japan</p>
24-A-1-3	<p>Characteristics of Si Bifacial Solar Cells under Front-, Rear-, and Double-side Concentrated Sunlight</p> <p>*H. Ohtsuka, **M. Sakamoto, **M. Koyama, *K. Tsutsui, *T. Uematsu, ***S. Muramatsu, *Y. Yazawa and *T. Warabisako *Hitachi, Ltd., Japan **Hitachi ULSI Systems, Ltd., Japan ***Hitachi Cable, Ltd., Japan</p>
24-A-1-4	<p>Low Cost Back Contact Silicon Solar Cells</p> <p>A. Kress, P. Fath, G. Willeke and E. Bucher Univ. of Konstanz, Germany</p>
24-A-1-5	<p>Interconnection through Vias for Improved Efficiency and Easy Module Manufacturing of Crystalline Silicon Solar Cells</p> <p>J. H. Bultman, M. W. Brieko, A. R. Burgers, J. Hoornstra, A. C. Tip and A. W. Weeber Netherlands Energy Research Foundation ECN, The Netherlands</p>

[▲ Back to TOP](#)

■ Session 24-A-2 Thin Poly-silicon Solar Cells II

24-A-2-1	<p>invited Perspectives of Crystalline Silicon Thin Film Solar Cells</p> <p>J. H. Werner and R. B. Bergmann Univ. of Stuttgart, Germany</p>
----------	--

24-A-2-2	<u>Characterization of Crystalline Silicon Grown by Plasma-Enhanced CVD for Thin Film Solar Cells</u> *K. Kurobe, **T. Fuyuki and *H. Matsunami *Kyoto Univ., Japan **Nara Institute of Science and Technology, Japan
24-A-2-3	<u>Thin Film Poly-Silicon Solar Cells with Low Impurity Concentration Made by Hot Wire Chemical Vapor Deposition</u> *R.E.I. Schropp, **P.F.A. Alkemade and *J.K. Rath *Utrecht Univ., The Netherlands **Delft Univ. of Technology, The Netherlands
24-A-2-4	<u>Reduction of Defects of Polycrystalline Silicon Thin Films by Heat Treatment with High Pressure H₂O Vapor</u> *T. Sameshima, *K. Sakamoto, *K. Asada and **S. Higashi *Tokyo Univ. of A. & T., Japan **SEIKO Epson Corp., Japan
24-A-2-5	<u>Fabrication and Characterisation of Parallel Multijunction Thin Film Silicon Solar Cells</u> M. J. Keevers Univ. of New South Wales, Australia

[▲ Back to TOP](#)

■ Session 24-B-1 Symposium D High-throughput Process for a-& μC- Si Thin Films

24-B-1-1	<u>a-Si:H Material and Devices Deposited at High invited Deposition Rates Using the Catalytic CVD Deposition Technique</u> A. H. Mahan NREL, USA
24-B-1-2	<u>High-Pressure Plasma CVD for High-Quality Amorphous Silicon</u> M. Isomura, M. Kondo and A. Matsuda Electrotechnical Laboratory, Japan
24-B-1-3	<u>Fast and Uniform Deposition of Microcrystalline Silicon Film using High Density Microwave Plasma Utilizing a Spokewise Antenna</u> *H. Shirai, *Y. Sakuma *L. Haiping, *Y. Fukuda and **H. Ueyama *Saitama Univ., Japan **Nihon Koshuha Co.Ltd, Japan
24-B-1-4	<u>High Rate Deposition of Polycrystalline Silicon Thin Films by Hot Wire Cell Method using Disilane</u> M. Ichikawa, J. Takeshita, T. Tsushima, A. Yamada and M. Konagai Tokyo Institute of Technology, Japan
24-B-1-5	<u>High Rate Growth of Microcrystalline Silicon using High Pressure Depletion Method with VHF Plasma</u> *M. Fukawa, **S. Suzuki, **L. Guo, **M. Kondo and **A. Matsuda *Asahi Glass Co., Ltd., Japan **Electrotechnical Laboratory, Japan

[▲ Back to TOP](#)

■ Session 24-B-2 CdTe & CuInS₂ Solar Cells

24-B-2-1	<u>Improved Performance of CdTe Thin Film Solar Cells Through Controlling the Initial Stage of the CdTe Layer Deposition by Close-Spaced Sublimation</u> T. Okamoto, Y. Harada, A. Yamada and M. Konagai Tokyo Institute of Technology, Japan
24-B-2-2	<u>Influence of CdS Growth Process on the Structural and Photovoltaic Properties of CdTe/CdS Solar Cells</u> A. Romeo, D. Baetzner, H. Zogg and A. N. Tiwari Institute of Quantum Electronics, ETH Zurich, Switzerland
24-B-2-3	<u>Reduction of Infrared Response of CdS/CdTe Thin-Film Solar Cell with Decreased Thickness of Photovoltaic Active Layer</u> T. Toyama, T. Suzuki, M. Gotoh, K. Nakamura and H. Okamoto Osaka Univ., Japan
24-B-2-4	<u>Solar Cells with Cu(In_{1-x}Ga_x)S₂ Thin Films Prepared by Sulfurization</u> T. Ohashi, Y. Hashimoto and K. Ito Shinshu Univ., Japan
24-B-2-5	<u>Effect of Ga Incorporation in Sequentially Prepared CuInS₂ Thin Film Absorbers</u> *A. Neisser, *I. Hengel, *R. Klenk, *Th. W. Matthes, **J. Alvarez-Garcia, **A. Perez-Rodriguez, **A. Romano-Rodriguez and *M.-Ch. Lux-Steiner *Hahn-Meitner-Institut, Germany **Unitat Associada CNM-CSIC, Spain

24-C-1-1	<u>Static Concentrator Photovoltaic Module with Prism Array</u> *T. Uematsu, *Y. Yazawa, *Y. Miyamura, **S. Muramatsu, *H. Ohtsuka, *K. Tsutsui and *J. Minemura *Hitachi, Ltd., Japan **Hitachi Cable, Ltd., Japan
24-C-1-2	<u>Building Integrated Multi Solar System</u> A. E. MBA Solar PV Systems Chromagen, Israel
24-C-1-3	<u>Experimental Study on PV Module Recycling with Organic Solvent Method</u> *T. Doi, *I. Tsuda, *H. Unagida, *A. Murata, *K. Sakuta and **K. Kurokawa *Electrotechnical Laboratory, Japan **Tokyo Univ. of A. & T., Japan
24-C-1-4	<u>Further Improvement of a Transformer Less, Voltage-Boosting Inverter for AC Modules</u> *M. Kusakawa, **H. Nagayoshi, *K. Kamisako and *K. Kurokawa *Tokyo Univ. of A. & T., Japan **Shonan Institute of Technology, Japan

[▲ Back to TOP](#)

■ Session 24-C-2 Grid Connected Systems

24-C-2-1	<u>General Characteristics of Grid-Connected PV System Group Islandings</u> A. Kitamura, T. Matsuoka, F. Yamamoto, T. Hongo, K. Miyajima and H. Matsuda The Kansai Electric Power Co., Inc., Japan
24-C-2-2	<u>Advanced Grid Connected PV System with Functions to Suppress Disturbances by PV Output Variation and Customer Load Change</u> H. -S. Kim, N. Okada and K. Takigawa Central Research Institute of Electric Power Industry, Japan
24-C-2-3	<u>Advanced Concept for Dispersed Power Supply System using AC Modules</u> N. Okada and K. Takigawa Central Research Institute of Electric Power Industry, Japan
24-C-2-4	<u>Peak-Power Reduction with 100kW PV and Battery Hybrid System at Shonan Institute of Technology</u> *H. Nagayoshi, **K. Kurokawa, ***T. Ohashi, ***H. Nishita and ***T. Deguchi *Shonan Institute of Technology, Japan **Tokyo Univ. of A. & T., Japan ***Nippon Denchi Co., Ltd., Japan
24-C-2-5	<u>Estimation of the Output Fluctuation of Multi Grid Connected PV Systems in a Certain Area</u> T. Hayase, M. Hirose, K. Harada, Y. Ishihara and T. Todaka Doshisha Univ., Japan

[▲ Back to TOP](#)

■ Session LN-I Late News I Poster Room

LN-1	<u>Tin-doped Indium Oxide (ITO) Films by Ion-Beam Sputtering</u> Younggun Han, Donghwan Kim, Jun-Sik Cho*, Seok-Keun Koh* and Soo Hong Lee** Division of Materials science and Metallurgical Engineering, Korea University, KOREA, *Thin Film Technology Research Center, Korea Institute of Science and Technology, **Samsung Display Devices, Suwon, Korea
LN-2	<u>Zn₃P₂ Thin Film Growth by MOCVD for Mg/Zn₃P₂ and Zn₃P₂/ZnSe Solar Cells</u> Kazuhiko KAKISHITA, Toshio BABA, Takamasa MIKAMI and Toshikazu SUDA Department of Electronic Engineering, Polytechnic University, Japan
LN-3	<u>Liquid Phase Epitaxial Silicon Layer with Pyramidal Structure Obtained on an Etched Silicon Grid</u> A.Fave, B. Semmachc, J.M. Olchowik, P. Kleiman, A. Laugier. LPM-CNRS, France
LN-4	<u>Effect of Dopant Species on Light Degradation of Carrier Lifetimes for Cz-Si Wafers</u> H. Hashigami, X Wangxiao, T. Abe*, and T. Saitoh Tokyo A&T University Koganei, Japan, *Shin-Etsu Handotai, Japan
LN-5	<u>24.5% EFFICIENCY PERT SILICON SOLAR CELLS ON MCZ SUBSTRATES</u> Jianhua Zhao, Aihua Wang and Martin A. Green Photovoltaic Special Research Centre University of New South Wales, Australia

LN-6	<u>Large area plasma source for high rate etching of silicon</u>
	A. Steiner, J. Mai, L. Eismann, and D. Roth, R. Auer*, V. Gazuz*, R. Brendel*, and M. Schulz* Roth & Rau Oberflächentechnik GmbH, Plasma-and Surface Technology, Germany, *Bavarian Center for Applied Energy Research (ZAE Bayern), Germany
LN-7	<u>Experiments on anisotropic etching of Si in TMAH</u>
	JaeSung You*, Donghwan Kim**, HoJoon Park***, James Jungho Pak***, ChoonSik Kang* *School of Materials Science and Engineering, Seoul National University, Korea, **Division of Materials Science and Engineering, Korea University, Korea, *** School of Electrical Engineering, Korea University, Korea
LN-8	<u>High Current, Thin Silicon-on-Ceramic Solar Cell</u>
	AM. Barnett, J.A. Rand, R.B. Hall, D.H. Ford, E.J. DelleDonne, A.E. Ingram, J.C. Bisailon, B.W. Feyock, M.G. Mauk, and P.E. Sims AstroPower, Inc., USA
LN-9	<u>A simple (n) a-Si/(p) c-Si heterojunction cell process yielding conversion efficiencies up to 15.3%</u>
	D. Borchert, R. Hussein, W. R. Fahmer University of Hagen, Chair of Electronic Devices, Germany
LN-10	<u>Effect of Light Degradation on Bifacial Si Solar Cells</u>
	H. Ohtsuka ¹ , M. Sakamoto ² , M. Koyama ² , S. Muramatsu ³ Y. Yazawa ¹ , T. Warabisako ¹ , T. Abe ⁴ and T. Saitoh ⁵ 1Central Research Laboratory, Hitachi, Ltd., Japan, 2Hitachi ULSI Systems, Ltd., Japan, 3Hitachi Cable, Ltd., Japan, 4Shin-Etsu Holdoutai, Japan, 5Tokyo Univ. of Agriculture and Technology, Japan

[▲ Back to TOP](#)

■ Session LN-II Late News II Poster Room

LN-11	<u>Surface Coverage of the Microcrystalline Phase Grown under H₂-diluted SiH₄ and/or SiH₂Cl₂ Plasmas Detected by Infrared Reflection Absorption Spectroscopy</u>
	Yasutake TOYOSHIMA, Michio KONDO and Akihisa MATSUDA Electrotechnical Laboratory, JAPAN
LN-12	<u>Epitaxial Growth of Polycrystalline Films Formed by Microwave Plasma Chemical Vapor Deposition at Low Temperatures</u>
	N. Andoh, K. Kamisako, T. Sameshima and T. Saitoh Faculty of Technology, Tokyo University of Agriculture and Technology, Japan
LN-13	<u>Effect of Film Thickness on Electrical Property of nc-Si:H</u>
	N. Andoh, K. Hayashi, T. Shirasawa, T. Sameshima and K. Kamisako Faculty of Technology, Tokyo University of Agriculture and Technology, Japan
LN-14	<u>CALIBRATION CAMPAIGNS IN TENERIFE. SUMMARY (Terrestrial Global Method)</u>
	T. Goómez Rodriguez, L. García Cervantes SPASOLAB-INTA, Spain
LN-15	<u>Low-Bandgap Thermophotovoltaics Based on InAsSbP Alloys</u>
	Michael G. Mauk, Zane Shellenbarger, Paul J. Sims, Jeffrey A. Cox, Anthony Tata, Tammie Warden, James B. McNeely, and Louis C. DiNetta AstroPower, Inc., USA
LN-16	<u>High-efficiency (AlGa)As/GaAs solar cells grown by MOVPE using TBAs at low temperatures and low V/III-ratios</u>
	C. Agert, F. Dimroth, U. Schubert, A.W. Bett, S. Leu*, W. Stolz* Fraunhofer Institute for Solar Energy Systems, Germany, *Materials Science Center and Department of Physics, Philipps-University, Germany
LN-17	<u>Photoelectrochemical Storage Cell Using AlGaAs on Si Substrate -A New Application of III-V/Si Tandem Solar Cell-</u>
	T. Soga, S. Licht*, B. Wang*, T. Iimbo and M. Umeno Nagoya Institute of Technology, Japan, *Technion-Israel Institute of Technology, Israel
LN-18	<u>Development of Cu(In,Ga)Se₂ solar cells on polymer with a record efficiency of 12.8%</u>
	A.N. Tiwari, M. Krejci, F.-J. Haug, H.Zogg Thin Film Physics Group, Institute of Quantum Electronics, ETH (Swiss Federal Institute of Technology), Switzerland
LN-19	<u>Cu(In,Ga)Se₂ Thin Film Solar Cells with an Efficiency of 18%</u>

	Takayuki NEGAMI, Yasuhiro HASHIMOTO, Shiro NISHIWAKI Advanced Technology Research Laboratories, Matsushita Electric Industrial Co., Ltd., JAPAN
LN-20	<u>Evaluation of Electric Energy from Different PV Arrays by Democratic Module PV Field Test</u> Masaya Itoh, Hideki Takahashi, Takeshi Fujii, Hideyuki Takakura and Yoshihiro Hamakawa Department of Photonics, Faculty of Science and Engineering, Ritsumeikan University, Japan
LN-21	<u>Characterization of a Flat-Plate Static-Concentrator Photovoltaic Module</u> T. Uematsu ¹ , Y. Yazawa ¹ , K. Tsutsui ¹ , Y. Miyamura ¹ , H. Ohtsuka ¹ , and T. Joge ² 1: Central Research Laboratory, Hitachi, Ltd., Japan, 2: Hitachi works, Hitachi, Ltd., Japan
LN-22	<u>Ten Years Operation of A PV-Microhydro Hybrid System in Taratak, Indonesia</u> Aman Mostavan, Wahyu Sujatmiko*, Riza Muhida** Dept. of Engineering Physics, Bandung Institute of Technology, Indonesia, *Regional Centre for Research on human Settlements, Indonesia, **Dept. of Electrical Engineering, Osaka University, Japan
LN-23	<u>Solar Energy in Yemen - an Economically Viable Alternative</u> John S. Ijichi, Towfick Sufian*, Christer Nyman**, Peter Ahm*** Principal Cofinancing Advisor, The World Bank, Washington USA, *Head of Coordination Unit, Ministry of Education, Yemen, **Soleco Ltd., Finland, ***PA Energy Ltd., Denmark
LN-24	<u>The Scolar Programme for Photovoltaics in the UK</u> Gavin Conibeer Environmental Change Unit, Oxford University, UK

[◀Back to Previous Page](#)

[▲ Back to TOP](#)