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<b>3DV.4.18</b>	Static and Dynamic VHF-Deposition of Microcrystalline Silicon at 140 MHz with Rates Up to 2.5 Nm/s <i>C. Strobel, B. Leszczynska, S. Leszczynski, U. Merkel, J. Kuske, D.D. Fischer, M. Albert, J. Holovsky, J.W. Bartha</i>	1917
<b>3DV.4.19</b>	Pulsed-Lamp Crystallization of Nanocrystalline Silicon Thin Films for Solar Cell Application <i>B. Yan, M. Dubey, M. Shrestha, Q. Fan, D. Stevenson</i>	1921
<b>3DV.4.20</b>	High Haze Textured Surface B-Doped ZnO-TCO Films on Chemically Etched Glass Substrates for Si-Based Thin Film Solar Cells <i>X.-L. Chen, X.-D. Zhang, J.-M. Liu, Z. Chen, J. Fang, J. Ni, D.-K. Zhang, C.-C. Wei, H.-Z. Ren, Y. Zhao</i>	1926
<b>3DV.4.24</b>	Development and Investigation of Thin Film Solar Cells on Flexible Substrates Using Very High Frequency Plasma Enhanced Chemical Vapor Deposition (VHF-PECVD) Technique <i>D.D. Fischer, B. Leszczynska, M. Albert, J.W. Bartha, U. Stephan, J. Kuske, N. Prager, M. Fahland</i>	1929

<b>3DV.4.29</b>	Electrochemically Grown ZnO Nanorods as Antireflective Layer for Silicon Thin-Film Solar Cells in n-i-p Configuration <i>R.-E. Nowak, M. Juilfs, S. Geißendörfer, M. Vehse, K. von Maydell, C. Agert</i>	1933
<b>3DV.4.30</b>	Integrated Solar Cell Based on Monocrystalline Si Thin Film Transferred to Low Cost Sintered Si Wafers <i>F. Chancelerel, Y. Boye, G. Sun, A Sow, J.-B. Brette, B. Sionneau, A. Malinge, A. Straboni</i>	1937
<b>3DV.4.32</b>	Graded Index at the TCO/p Interface for Silicon Thin Film Solar Cells Using Nb Doped TiO <sub>2</sub> <i>A. Antony, M. Llusçà, F. Rojas Tarazona, L. Morrone, A. Caballero, J.M. Asensi, J. Andreu, J. Bertomeu</i>	1941
<b>3DV.4.33</b>	2D Photonic Crystals with Random Surface Roughness for Light Trapping in Thin Film Crystalline Silicon Photovoltaic Cells <i>X. Meng, E. Drouard, G. Gomard, D. Frisina, R. Kleiman, C. Seassal</i>	1944
<b>3DV.4.35</b>	Applying Design of Experiment to the Modeling and Optimization of a-Si:H/ $\mu$ c-Si:H Tandem Solar Cells <i>J. Xin, Y. Lee, L. Zhao, C. Liu, J. Peng, P. Ho, A.Y.-S. Lee, B. Leung</i>	1948
<b>3DV.4.37</b>	2D Periodic Photonic Nanostructures Integrated in 40 $\mu$ m Thin Crystalline Silicon Solar Cells <i>C. Trompoukis, O. El Daif, V. Depauw, T. Bearda, K. Van Nieuwenhuysen, J. Govaerts, H. Sivaramakrishnan Radhakrishnan, R. Martini, S. Granata, I. Gordon, R. Mertens, J. Poortmans</i>	1952
<b>3DV.4.39</b>	Synergy Effect of XRD, Raman, FTIR, UVVIS and Tem Analyses in $\mu$ c-Si:H and nc-Si Microstructure Determination <i>P. Sutta, J. Müllerová, P. Caltà, S.N. Agbo, R. Medlin, M. Netrvalová, V. Vavrunková, L. Prušáková</i>	1955
<b>3DV.4.41</b>	Epitaxial Growth of Silicon Thin Films by Low Temperature RF-PECVD from SiF <sub>4</sub> /H <sub>2</sub> /Ar <i>R. Leal, J.-C. Dornstetter, F. Haddad, B. Bruneau, R. Cariou, W. Chen, I. Cosme Bolanos, G. Poulain, J.-L. Maurice, P. Roca i Cabarrocas</i>	1959
<b>3DV.4.42</b>	Control of Glass Texture by NaOH and HF Etching in Aluminium Induced Texturing Process for Enhanced Light Scattering in Silicon Thin Film Solar Cells <i>A. Soman, A. Antony</i>	1963
<b>3DV.4.45</b>	Towards Integration of High Quality Epitaxial Si Foils into Low-Temperature Back-Contacted Solar Devices <i>K. Van Nieuwenhuysen, V. Depauw, T. Bearda, E. Carnemolla, H. Sivaramakrishnan Radhakrishnan, J. Govaerts, S.N. Granata, R. Martini, C. Trompoukis, Y. Abdulraheem, I. Gordon, J. Poortmans</i>	1967
<b>3DV.4.46</b>	FTIR Analysis of Post-Oxidation in Microcrystalline Silicon Thin Films <i>E. Farsari, A. Kalampounias, E. Amanatides, D. Mataras</i>	1971

## **Solar Cells / Assemblies / Modules for Terrestrial Concentrator Systems and for Space Solar Generators**

### **Plenary SESSION 4CP.2 THIN FILM SOLAR CELLS // SOLAR CELLS / ASSEMBLIES / MODULES FOR TERRESTRIAL CONCENTRATOR SYSTEMS AND FOR SPACE SOLAR GENERATORS**

<b>4CP.2.1</b>	New Efficiency Frontiers with Wafer-Bonded Multi-Junction Solar Cells. <i>T.N.D. Tibbits, P. Beutel, M. Grave, C. Karcher, E. Oliva, G. Siefer, A. Wekkeli, M. Schachtner, F. Dimroth, A.W. Bett, R. Krause, M. Piccin, N. Blanc, M. Muñoz-Rico, C. Arena, E. Guiot, C. Charles-Alfred, C. Drazek, F. Janin, L. Farrugia, B. Hoarau, J. Wasselin, A. Tauzin, T. Signamarcheix, T. Hannappel, K. Schwarzburg, A. Dobrich</i>	1975
<b>4CP.2.2</b>	Solar Generators for ESA Missions: in Orbit Performance and Future Challenges <i>A. Caon, C. Baur, G. D'Accolti, L. Icardi, O. Mourra, C. Signorini, S. Taylor</i>	1979

**Oral PRESENTATIONS 4BO.10 III-IV MultiJunction Cells and CPV Modules**

- 4BO.10.1** InGaAs/GaAsP Superlattice Solar Cells on Vicinal Substrates for Current-Matched Triple Junction Cells on Ge 1986  
*H. Fujii, K. Toprasertpong, H. Sodabanlu, Y. Wang, K. Watanabe, M. Sugiyama, Y. Nakano*
- 4BO.10.2** Next Generation of Wafer-Bonded Multi-Junction Solar Cells 1991  
*M. Niemeyer, V. Klinger, F. Dimroth, F. Predan, P. Fuss-Kailuweit, D. Reinwand, D. Lackner, A. Wekkeli, E. Oliva, M. Schachtner, G. Siefer, A.W. Bett*
- 4BO.10.3** Lattice Matched III-V/SiGe on Silicon Tandem Solar Cells 1996  
*M. Diaz, L. Wang, D. Li, B. Conrad, X. Zhao, A. Soeriyadi, A. Gerger, A. Lochtefeld, C. Ebert, R. Opila, I. Perez-Wurfl, A. Barnett*
- 4BO.10.4** 4-Junction Solar Cells with Dilute Nitrides: Optimization with Luminescent Coupling 1999  
*M.M. Wilkins, A. Gabr, P. Sharma, H. Schriemer, S. Fafard, K. Hinzer*
- 4BO.10.5** High Quality Measurements of the Solar Spectrum for Simulation of Multi-Junction Photovoltaic Cell Yields 2002  
*M. Norton, V. Paraskeva, R. Galleano, G. Makrides, R.P. Kenny, G.E. Georgiou*
- 4BO.10.6** In-Field Temperature Evaluation of Solar Modules by Time Dependent Open Circuit Voltage Measurements 2008  
*V.D. Rumyantsev, A.V. Chekalin, N.Yu. Davidyuk, N.A. Sadchikov, A. Luque*

**Oral PRESENTATIONS 4CO.13 Terrestrial Concentrator Modules and Systems**

- 4CO.13.2** SOPHIA CPV Module Round Robin: Power Rating at CSOC 2012  
*M. Steiner, M. Baudrit, C. Dominguez, I. Anton, F. Roca, R. Fucci, P.M. Pugliatti, A. Di Stefano, R. Kenny, P. Morabito, M. Muller, G. Siefer*
- 4CO.13.3** Return of Experience from 5 Years of Field Data: Long Term Performance Reliability of Soitec's CPV Technology 2017  
*T. Zech, T. Gerstmaier, M. Röttger, R. Moretta, C. Braun, A. Gombert, M. Steiner, G. Siefer, D. Sánchez, O. de la Rubia, M. Martínez*
- 4CO.13.4** Comparative Analysis of Nonuniform Illumination and Chromatic Aberration in Triple and Quadruple Junction Solar Cells under Concentration Using SPICE 2020  
*P. Sharma, A.H. Trojnar, M. Wilkins, A.W. Walker, H. Schriemer, K. Hinzer*

**Oral PRESENTATIONS 4DO.13 Solar Generators for Space Missions**

- 4DO.13.2** Design of a Flexible Solar Generator for on-Orbit Verification on a Small Satellite Mission 2025  
*K. Zajac, S. Brunner, S. Langendorf*
- 4DO.13.3** High Efficiency Four Junction Lattice Matched Solar Cells for Space Applications: Analysis of Radiation Hardness Against 1 MeV Electrons 2031  
*R. Campesato, G. Gori, M. Casale, G. Gabetta*

**Visual PRESENTATIONS 4CV.3 III-V-based Multi-junction Solar Cells, Concentrator Solar Cells and Space Solar Cells / Electrical Characterisation and Modeling of Cells and Modules / Terrestrial Concentrator Modules and Systems / Solar Generators for Space Missions**

- 4CV.3.1** Design, Fabrication and Analysis of SiGe Solar Cell in a Gallium Arsenide Phosphide - Silicon Germanium Dual Junction Solar Cell on Si Substrate 2036  
*X. Zhao, D. Li, B. Conrad, L. Wang, A.H. Soeriyadi, M. Diaz, A. Lochtefeld, A. Gerger, I. Perez-Wurfl, A. Barnett*
- 4CV.3.3** Study of GaPN(As)/Si Multijunction Solar Cells Grown by MBE 2040  
*A.S. Gudovskikh, A.I. Baranov, A.Y. Egorov, K.S. Zelentsov, D.A. Kudryashov, I.A. Morozov, E.V. Nikitina, E.V. Pirogov, M.S. Sobolev*
- 4CV.3.4** GaAsP Top Solar Cell of Three-Terminal GaAsP/SiGe on Si Tandem Solar Cells 2043  
*L. Wang, M. Diaz, B. Conrad, A. Lochtefeld, A. Gerger, C. Ebert, X. Zhao, D. Li, A. Soeriyadi, I. Perez-Wurfl, A. Barnett*

<b>4CV.3.6</b>	Optical and Electrical Characterization of High-Efficiency InGaP/InGaAs/Ge Triple-Junction Solar Cell Incorporated with InGaAs/GaAs QDs Layers in Middle Cell <i>W.-J. Ho, G.-C. Yang, C.-M. Chan, J.-J. Liu, Y.-Y. Lee, H.-P. Shiao</i>	2046
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<b>4CV.3.8</b>	Influence of Surfactants on the Recombination and Diffusion Processes in GaAs Solar Cells <i>A.S. Vlasov, L.B. Karlina, M.Z. Shvarts, N.K. Timoshina, B.Y. Ber, D.Y. Kazantsev</i>	2054
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<b>4CV.3.11</b>	Cadmium Telluride Thin Film Photovoltaics for Space Application <i>R. Kimber, D.A. Lamb, S.J.C. Irvine, M.A. Baker, R. Grilli, C.I. Underwood, J. Hall</i>	2066
<b>4CV.3.14</b>	Further Development of a Pulsed Solar Simulator for CPV Modules and Acceptance Angle Measurement <i>G. Mathiak, A. Bork, C. Schaefer, F. Bous, L. Rimmelspacher, W. Herrmann, W. Shisler</i>	2072
<b>4CV.3.16</b>	Modeling Realistically Attainable Efficiency of Multijunction Solar Cells <i>A.V. Sachenko, V.P. Kostlyov, M.R. Kulish, I.O. Sokolovskiy, A.I. Shkrebtii, F. Gaspari, S. Quaranta</i>	2076
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<b>4CV.3.18</b>	LBIC Measurements as a Defect Mapping Tool for Multi-Junction Solar Cells <i>N. Kwarikunda, E.E. van Dyk, F.J. Vorster, W. Okullo</i>	2084
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## **Operations, Performance and Reliability of Photovoltaics (from Cells to Systems)**

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