



**International Workshop on the
Sustainable Actions for “Year by Year Aging” under Reliability
Investigations in Photovoltaic Modules, 2016**

SAYURI-PV 2016

[Tentative] Agenda 20160912 version

Date: October 4th – 5th, 2016
Venue: Auditorium in AIST Tsukuba Central Campus
Central 1, 1-1-1 Higashi, Tsukuba, Ibaraki 305-8561, JAPAN

Organizing Committee

Chair: Koji Matsubara
Atsushi Masuda
Tadanori Tanahashi
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Tsuyoshi Shioda
Miki Terada
Norihiro Umeda

Host

Research Center for Photovoltaics (RCPV)
in National Institute of Advanced Industrial Science and Technology (AIST)

This workshop is held under the auspices of The Japan Electrical Manufacturers' Association.

International Workshop on the Sustainable Actions for “Year by Year Aging” under Reliability Investigations in Photovoltaic Modules, 2016 (SAYURI-PV 2016)

[Day 1] October 4th

9:30- Registration

10:00- Opening Tadanori Tanahashi (AIST)

10:05- Welcome Koji Matsubara (AIST)

Session I: Keynote Chair: Masaaki Yamamichi (AIST)

10:15- PV challenge in JP Takamizu Sasaki (NEDO)

Session II: Field Experiences for PV Reliability Research

Chair: Keiichiro Sakurai (AIST)
Hui Shen (Changzhou Trina Solar)

10:45- Correlation between visual defects and environmental conditions in 68 photovoltaic systems in Japan
Kohji Masuda (JET)

11:15- PV reliability as addressed in IEA PVPS Task 13
IEA PVPS Task13 Team

11:45- Investigation of the quality of recent photovoltaic modules under actual operating conditions
Tetsuyuki Ishii¹, Ritsuko Sato², Sungwoo Choi², Yasuo Chiba², and Atsushi Masuda² (¹CRIEPI, ²AIST)

12:15- Lunch & Poster Session (90 min)

Session III: Novel Test Protocols-1 Chair: Atsushi Masuda (AIST) Tadashi Obayashi (JET)

13:45- Proposed new damp heat test standards for thin film PV modules
Keiichiro Sakurai¹, Akihiro Takano², Hiroshi Tomita³, Kinichi Ogawa¹, Darshan Schmitz³, Hajime Shibata¹,
Shuuji Tokuda³, and Atsushi Masuda¹ (¹AIST, ²FWAVE Co., LTD., ³Solar Frontier K.K.)

14:15- Permanent damage from partial shade in monolithic thin-film modules
Timothy Silverman (NREL)

14:45- Acceleration of degradation by HAST and air-HAST in c-Si PV modules
Tadanori Tanahashi², Soh Suzuki¹, Takuya Doi², and Atsushi Masuda² (¹ESPEC CORP., ²AIST)

15:15- The influence of different climate on module's performance
Hui Shen, Qiangzhong Zhu, Zhichao Ji, Jianmei Xu, Pierre J. Verlinden, Wei Zhou, Zhiqiang Feng
(Changzhou Trina Solar Energy Co., Ltd.)

15:45- Coffee Break (30 min)

Session IV: Novel Test Protocols-2 Chair: Hidenari Nakahama (Nisshinbo Mechatronics) Christos Monokroussos (TÜV Rheinland, Shanghai)

16:15- A characterization by using laser-based technique for failure Si PV modules
Y. Ishikawa¹, M. A. Islam¹, K. Noguchi¹, H. Iida², Y. Takagi², and
H. Nakahama² (¹NAIST, ²Nisshinbo Mechatronics)

16:45- Potential-induced degradation of n-type crystalline silicon photovoltaic modules
Keisuke Ohdaira¹, Seira Yamaguchi¹, Chizuko Yamamoto², Kohjiro Hara², and
Atsushi Masuda² (¹JAIST, ²AIST)

17:15- PID in thin-film PV modules and PID standards development
Peter Hacke (NREL)

17:45 End of 1st Day

18:00- Banquet

International Workshop on the Sustainable Actions for “Year by Year Aging” under Reliability Investigations in Photovoltaic Modules, 2016 (SAYURI-PV 2016)

[Day 2] October 5th

9:00- Registration

Session V: Cells, Materials, and Components Chair: Timothy Silverman (NREL) Michio Shibata (DuPont K. K.)

9:30- Degradation mechanisms of c-Si PV cells exposed to acetic acid vapor

Tadanori Tanahashi, Norihiko Sakamoto, Hajime Shibata, Yukiko Hara, and Atsushi Masuda (AIST)

10:00- PV modules' reliability deployed in Japanese PV power plant from viewpoint of encapsulant

Tsuyoshi Shioda (Mitsui Chemicals)

10:30- IEC standardization of BD thermal runaway test

Yasunori Uchida (JET)

11:00- Coffee Break (30 min)

Session VI: Novel Test Protocols-3 Chair: Peter Hacke (NREL) Kohji Masuda (JET)

11:30- Sequential and combined acceleration tests for physical and mechanical stresses in crystalline Si photovoltaic modules

Atsushi Masuda¹, Chizuko Yamamoto¹, Naomi Uchiyama¹, Kiyoshi Ueno², Toshiharu Yamazaki², Kazunari Mitsuhashi³, Akihiro Tsutsumida³, Jyunichi Watanabe³, Jyunko Shirataki³, and Keiko Matsuda³

(¹AIST, ²Choshu Industry Co., Ltd., ³Toray Research Center, Inc.)

12:00- Effects of hygrothermal environment on PID acceleration for crystalline Si photovoltaic modules

Yasushi Tachibana¹, Takeshi Toyoda¹, Toshiharu Minamikawa¹, Yukiko Hara², and Atsushi Masuda² (¹IRIL, ²AIST)

12:15- <PID-Na >

Fumitaka Ohashi (Gifu University)

12:30- <TBD>

<TBD> <(TBD)>

12:45- Lunch & Poster Session (105 min)

Session VII: Practical Issues in PV Reliability Chair: George Kelly (IEC TC82) Isao Yoshida (JEMA)

14:30- <Performance & Degradation in fields>

Yuzuru Ueda (Tokyo University of Science)

15:00- Reliability of power rating and labeling

Christos Monokroussos, Kengo Morita and Werner Herrmann (TÜV Rheinland Group)

15:30- Challenges to overcome before spreading BIPV system

Akihiko Nakajima (KANEKA)

Session VIII: Standardization Chair: Masaaki Yamamichi (AIST)

16:00- Coordination of international standards with implementation of the IEC RE conformity assessment system

George Kelly (IEC TC82 Secretariat)

16:30- General Discussion & Closing Remarks

Tadanori Tanahashi (AIST)

17:00- Wrap up

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Poster Session : [Day 1] October 4th

- P-01 **Influence of volcanic ash fall on generated energy from photovoltaic modules**
Tadashi Hirayama¹, Takumi Tashima¹, Shuma Kawabata¹, Akihito Hirai², Yukio Yoshimura³, and Atsushi Masuda⁴
(¹Kagoshima Univ., ²Central Automotive Products, ³Kagoshima Prefectural Institute of Industrial Technology, ⁴AIST)
- P-02 **The measurement technology of PV module temperature in PV system field**
Hiromi Tobita, Hirofumi Shinohara, Hisayuki Miura, and Takeshi Furutani (JET)
- P-03 **Study of carrier lifetime measurement methods for PID tested module**
Kazuki Noguchi¹, Mohammad Aminul Islam¹, Takuya Oshima¹, Yasuaki Ishikawa¹, Hidenari Nakahama², and Yukiharu Uraoka¹
(¹NAIST, ²Nisshinbo Mechatronics)
- P-04 **The influence of the temperature on EL intensity of the PID tested Si PV modules**
Takuya Oshima, Mohammad Aminul Islam, Kazuki Noguchi, Yasuaki Ishikawa, and Yukiharu Uraoka (NAIST)
- P-05 **Potential-induced degradation and recovery process for thin-film Si photovoltaic modules**
Yukiko Hara and Atsushi Masuda (AIST)
- P-06 **Progression behavior of the potential-induced degradation of n-type c-Si-wafer-based photovoltaic modules with a front-side p⁺ emitter**
Seira Yamaguchi¹, Atsushi Masuda², and Keisuke Ohdaira¹ (¹JAIST, ²AIST)
- P-07 **Analysis of cross-section between cell and interconnector in field-aged photovoltaic modules**
Tomoyuki Hirooka¹, Kohji Masuda², Yasunori Uchida², and Tadashi Obayashi² (¹Kusumoto Chemicals, ²JET)
- P-08 **Combined test of UV irradiation and highly accelerated hygrothermal treatment for photovoltaic modules using light source with high intensity**
H. Morita¹, M. Terada¹, Y. Oka¹, K. Mori¹, and A. Masuda² (¹Toray Industries, ²AIST)
- P-09 **Developing an acetic acid detection sensor for photovoltaic modules using a pH-sensitive fluorescent dye**
H. Nagasaki¹, T. Itayama¹, K. Iwami¹, C. Yamamoto², Y. Hara², A. Masuda², and N. Umeda¹ (¹TUAT, ²AIST)

Poster Session : [Day 2] October 5th

- P-10 **Unexplained causes of the most frequent degradation mode of crystalline silicon photovoltaic modules**
Sadao Sakamoto and Atsushi Masuda (AIST)
- P-11 **Fast measurement system for operating strings in Yoshinogari mega solar power plant**
Shigeomi Hara and Makoto Kasu (Saga Univ.)
- P-12 **Analysis of long term operational data in residential photovoltaic systems**
Hajime Wakabayashi and Kohji Masuda (JET)
- P-13 **Study of potential induced degradation and recovery of c-Si module**
Mohammad Aminul Islam¹, Kazuki Noguchi¹, Takuya Oshima¹, Hiroataka Iida², Yasushi Takagi², Yasuaki Ishikawa¹, and Hidenari Nakahama²
(¹NAIST, ²Nisshinbo Mechatronics)
- P-14 **Activation of surface recombination at a SiN_x/n-type c-Si interface after potential-induced degradation**
Naoyuki Nishikawa, Seira Yamaguchi, and Keisuke Ohdaira (JAIST)
- P-15 **Potential-induced degradation for silicon heterojunction photovoltaic modules**
Chizuko Yamamoto¹, Seira Yamaguchi², Keisuke Ohdaira², and Atsushi Masuda¹ (¹AIST, ²JAIST)
- P-16 **Mechanism of potential-induced degradation for p-type crystalline silicon photovoltaic modules**
Sachiko Jonai, Hideaki Hagihara, Hiroaki Sato, and Atsushi Masuda (AIST)
- P-17 **Testing procedures including damp heat and thermal cycle processes for highly reliable photovoltaic modules**
Kohji Masuda, Yasunori Uchida, and Tadashi Obayashi (JET)
- P-18 **Detecting acetic acid in photovoltaic modules through changes in the relative reflectance of tin films**
T. Itayama¹, H. Nagasaki¹, K. Iwami¹, C. Yamamoto², Y. Hara², A. Masuda², and N. Umeda¹ (¹TUAT, ²AIST)
- P-19 **The study of IV characteristic, EL image, internal wiring and cell cross section of PV modules, which were exposed to outside for over 20 years**
Tadashi Obayashi (JET)
- P-20 **Introduction of JET O&M certification**
Tadashi Obayashi (JET)