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Curriculum Vitae

Name: Takeaki Sakurai

Citizenship: Japan

Job Status: Associate Professor,

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Education:

B. Sc., Department of Chemistry, Faculty of Science, Osaka University, Japan 1996.

M. Sc., Department of Chemistry, Graduate School of Science, Osaka University, Japan 1998.

Ph. D., Department of Chemistry, Graduate School of Science, Osaka University, Japan 2001.

(Doctor thesis; Low-temperature fabrication and physical properties of SiC/SiO₂ structure).

Academic Positions:

Assistant Professor, Institute of Applied Physics, University of Tsukuba, Japan, 2001-2005.

Lecturer, Institute of Applied Physics, University of Tsukuba, Japan, 2005-2013.

Associate Professor, Division of Applied Physics, University of Tsukuba, Japan, 2013-present.

PRESTO researcher, Japan Science and Technology Agency, Japan, 2011-2015.

Visiting Fellow, Department of Electrical Engineering, Princeton University, USA, 2015-2016.

Research areas

- Investigation of energy loss in both photovoltaic and photocatalyst materials
- Characterization of defects in wide-gap semiconductors (SiC, diamond, etc.)

Society Memberships:

Japan Society of Applied Physics

Materials Research Society

European Materials Research Society

Professional Activities:

Regional Editor, Journal of the Vacuum Society of Japan, 2009-2011.

Committee Member in Research Division, The Vacuum Society of Japan, 2011-2014.

Committee Member in Professional Group of Multinary Compounds and Solar Cells, The Japan Society of Applied Physics, 2014-present.

Sub-area co-chair, 39th IEEE Photovoltaic Specialists Conference, Tampa, USA, 2013.

Area co-chair, 40th IEEE Photovoltaic Specialists Conference, Denver, USA, 2014.

Organizing Committee member, 19th International Conference on Ternary and Multinary Compounds (ICTMC-19), Japan, 2014.

Symposium Organizer, 2016 European Materials Research Society (E-MRS) Spring Meeting, Lille, France, 2016.

Guest Editor, Thin Solid Films, Elsevier, 2016-2017.

Area co-chair, 44th IEEE Photovoltaic Specialists Conference, Washington DC, USA, 2017.

Technical Program Committee member, 27th International Photovoltaic Science and Engineering Conference (PVSEC-27), Japan, 2017.

Area co-chair, 7th World Conference on Photovoltaic Energy Conversion, Hawaii, USA, 2018.

Area co-chair, 46th IEEE Photovoltaic Specialists Conference, Chicago, USA, 2019.

Vice-Director, Professional Group of Multinary Compounds and Solar Cells, The Japan Society of Applied Physics, 2019-2021.

Honors and Awards:

Best poster award, 2008 E-MRS Spring meeting, Strasbourg (France), May 2008.

Best paper award, PVSEC-19, Jeju (Korea), November 2009.

Best poster nominee, 2012 MRS Fall Meeting, Boston (USA), November 2012.

Soukatsu Award, JST PRESTO (Japan), May 2014.

Best Poster Award, Annual workshop of professional group of Multinary Compounds and Solar cells, Japan Society of Applied Physics (JSAP), Shiga, Japan), 2017.

Grants and Fellowship:

Grants-in-Aid for Young Scientists (B) No.15760018, JSPS, FY2003-2004.

Grants-in-Aid for Young Scientists (B) No.17760246, JSPS, FY2005-2006.

Grant for Environmental Research, Nissan Science Foundation, FY2006-2008.

Financial Assistance for International Exchange, Marubun Research Promotion Foundation, FY2007

International Travel Grant, Inoue Foundation for Sciences, FY2008.

Grants-in-Aid for Young Scientists (B) No.21760229, JSPS, FY2009-2010.

Financial Assistance for International Exchange, Yazaki Memorial Foundation for Science and Technology, FY2010

Grants-in-Aid for Young Scientists (B) No.23760276, JSPS, FY2011-2012.

Grants-in-Aid for Scientific Research (C) No.25390063, JSPS, FY2013-2015.

JST-PRESTO "Photoenergy conversion systems and materials for the next generation solar cells" FY2011-2014.

Grants-in-Aid for Scientific Research (C) No.16K04943, JSPS, FY2016-2018.

Grants-in-Aid for JSPS Research Fellow, JSPS, FY2017-2019.

NEDO, "Development of high performance CIGS PV module technology", FY2015-2019.

Grants-in-Aid for Scientific Research (B) No.19H02656, JSPS, FY2019-2021.

Invited Talks (selected 5 titles):

T. Sakurai, "Study of Defects in Cu(In,Ga)(S,Se)₂-based Solar Cells", The International Union of Materials Research Societies-International Conference on Electronic Materials (IUMRS-ICEM), Daejeon, Korea, August, 2018.

T. Sakurai, “Impact of deep defects in Cu(In,Ga)Se₂ based solar cells”, DPG (Deutsche Physikalische Gesellschaft) Conferences 2017, Technical University of Dresden, Germany, March, 2017.

T. Sakurai, “Study of Defects in Widegap CIGS Solar Cells”, The International Union of Materials Research Societies-International Conference on Electronic Materials (IUMRS-ICEM), Suntec, Singapore, July, 2016.

T. Sakurai, “Influence of buffer layers on energy-level alignment in organic thin-film solar cells” 2014 SPIE Photonics Europe, Brussels, Belgium, April 2014.

T. Sakurai et al., “Characterization of Deep Defect States in Cu(In,Ga)Se₂” 2013 MRS Spring Meeting, San Francisco, USA, April 2013.

Publication List (peer reviewed papers):

- 1) “Wavelength dependent J-V characteristics of CuIn_{1-x}Ga_x(S,Se)₂ solar cells and carrier recombination” A.Lafuente-Sampietro, J.Chen, S.Wang, X.Hao, MM.Islam, T.Kato, H.Sugimoto, K.Akimoto, **T.Sakurai** Applied Physics Express **12**, 061001 (2019).
- 2) “Dependence of substrate work function on the energy-level alignment at organic–organic heterojunction interface” AL.Foggiatto, H.Suga, Y.Takeichi, K.Ono, Y.Takahashi, K.Kutsukake, T.Ueba, S.Kera. **T.Sakurai**, Japanese Journal of Applied Physics, **58**, SBBG06 (2019).
- 3) “Investigation of stress at SiO₂/4H-SiC interface induced by thermal oxidation by confocal Raman microscopy” Wei Fu, Ai Kobayashi, Hiroshi Yano, Akiko Ueda, Shinsuke Harada, **Takeaki Sakurai** Japanese Journal of Applied Physics, **58**, SBBD03 (2019).
- 4) Energy Level Alignment at Interfaces in Metal Halide Perovskite Solar Cells S Wang, **T Sakurai**, W Wen, Y Qi Advanced Materials Interfaces **5**, 1800260 (2018)
- 5) Influence of potassium treatment on electronic properties of Cu (In_{1-x} Ga_x)(Se_{1-y} S_y)₂ solar cells studied by steady state photo-capacitance and admittance spectroscopy S Wang, X Hao, MM Islam, T Kato, H Sugimoto, K Akimoto, **T Sakurai** Japanese Journal of Applied Physics **57**, 08RC13 (2018)
- 6) Relationship between bandgap grading and carrier recombination for Cu (In, Ga) Se₂-based solar cells, Y Ando, S Ishizuka, S Wang, J Chen, MM Islam, H Shibata, K Akimoto, **T Sakurai** Japanese Journal of Applied Physics **57**, 08RC08 (2018)
- 7) Impurities removal process for high-purity silica production from diatomite I Abdellaoui, MM Islam, **T Sakurai**, S Hamzaoui, K Akimoto Hydrometallurgy (2018)
- 8) Deep level emission in polycrystalline CuGaSe₂ thin-films observed by micro-photoluminescence MM Islam, S Wang, S Ishizuka, H Shibata, S Niki, K Akimoto, **T Sakurai** Japanese Journal of Applied Physics **57**, 08RC02 (2018)
- 9) Electrodeposition and characterization of silicon films obtained through electrochemical reduction of SiO₂ nanoparticles MM Islam, I Abdellaoui, C Moslah, **T Sakurai**, M Ksibi, S Hamzaoui, K.Akimoto, Thin Solid Films **654**, 1-10 (2018)
- 10) Characterization of Defect Properties in Wide-Gap CuGaSe₂ Thin-Film Solar-Cells MM Islam, S Ishizuka, H Shibata, S Niki, K Akimoto, **T Sakurai** Nanoscience and Nanotechnology Letters **10**, 559-564 (2018)
- 11) Depth Profile of Impurity Phase in Wide-Bandgap Cu(In_{1-x}Ga_x)Se₂ Film Fabricated by Three-Stage Process S Wang, T Nazuka, H Hagiya, Y Takabayashi, S Ishizuka, H Shibata, K.Akimoto, **T Sakurai** Journal of Electronic Materials, **47**,4944-4949 (2018)
- 12) Effects of Zirconium Doping Into a Monoclinic Scheelite BiVO₄ Crystal on Its Structural, Photocatalytic, and Photoelectrochemical Properties S Ikeda, T Kawaguchi, Y Highchi, N Kawasaki, T Harada, M Remeika, **T Sakurai**. Frontiers in chemistry **6**, 266 (2018)
- 13) “Charge transfer induced by MoO₃ at boron subphthalocyanine chloride/ α -sexithiophene heterojunction interface”. A. L. Foggiatto and T. Sakurai. Japanese Journal of Applied Physics, **57**, 03EE01 (2018).
- 14) “Impact of carrier doping on electrical properties of laser-induced liquid-phase-crystallized silicon thin films for solar cell application”, H.Umishio, T.Matsui, H.Sai, T.Sakurai, K.Matsubara, Japanese Journal of Applied Physics **57**, 021302 (2018)

- 15) “An optimized photolithography recipe for $\text{Cu}(\text{In}_{1-x}\text{Ga}_x)(\text{S}_y\text{Se}_{1-y})_2$ (CIGSSe) solar cells”. X. Hao, S. Wang, K. Akimoto, T. Kato, H. Sugimoto, and T. Sakurai. Proceeding of IEEE 44th Photovoltaic Specialists Conference (PVSC), 2017, in Press.
- 16) “Study of defect properties in CuGaSe_2 thin-film solar-cells using Admittance Spectroscopy”. M. M. Islam, S. Ishizuka, H. Shibata, S. Niki, K. Akimoto, and T. Sakurai. Proceeding of the IEEE 44th Photovoltaic Specialists Conference (PVSC-44), 2017, in Press.
- 17) “Electrodeposition of Si-layer through reduction of diatomaceous earth for the application of solar-cells”. M. M. Islam, I. Abdellaoui, T. Sakurai, S. Hamzaoui, and K. Akimoto. Proceeding of the IEEE 44th Photovoltaic Specialists Conference (PVSC-44), 2017, in Press.
- 18) Akira Uedono, Muhammad M. Islam, **Takeaki Sakurai**, Christoph Hugenschmidt, Werner Egger, Roland Scheer, Reinhard Krause-Rehberg, Katsuhiro Akimoto, “Vacancy behavior in $\text{Cu}(\text{In}_{1-x}\text{Ga}_x)\text{Se}_2$ layers grown by a three-stage coevaporation process probed by monoenergetic positron beams”, *Thin Solid Films* 603, (2016) 418-423.
- 19) Mohammad Abdul Halim, Muhammad Monirul Islam, Xianjia Luo, **Takeaki Sakurai**, Noriyuki Sakai, Takuya Kato, Hiroki Sugimoto, Hitoshi Tampo, Hajime Shibata, Shigeru Niki, and Katsuhiro Akimoto, “A comparative study on charge carrier recombination across the junction region of $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ and $\text{Cu}(\text{In},\text{Ga})\text{Se}_2$ thin film solar cells”, *AIP Advances* 6, (2016), 035216.
- 20) M. Kubota, **T. Sakurai**, T. Miyadera, H. Nakao, T. Sugita, and Y. Yoshida, "Domain structure and electronic state in P3HT:PCBM blend thin films by soft X-ray resonant scattering", *J. Appl. Phys.* 120 (2016) 165501.
- 21) X. Hao, K.T. Chowdhury, **T. Sakurai**, Y. Kamikawa-Shimizu, S. Ishizuka, A. Yamada, H. Shibata, K. Akimoto, “The Influence of Sodium in High Ga-Content $\text{Cu}(\text{In}_{1-x}\text{Ga}_x)\text{Se}_2$ (CIGS) Solar Cells”, *Proceedings of the 32nd European Photovoltaic Solar Energy Conference and Exhibition*, 2016, 3CV.4.17, 1213-1215.
- 22) X. B. Hu, **T. Sakurai**, A. Yamada, S. Ishizuka, S. Niki, and K. Akimoto, Investigation of the properties of deep-level defect in $\text{Cu}(\text{In},\text{Ga})\text{Se}_2$ thin films by steady-state photocapacitance and time-resolved photoluminescence measurements. *Japanese Journal of Applied Physics*, **54** (2015) 04DR02.
- 23) X. Hao, S. Wang, **T. Sakurai** and K. Akimoto. Effect of bathocuproine buffer layer in small molecule organic solar cells with inverted structure. *Japanese Journal of Applied Physics*, **54** (2015), 04DK06.
- 24) X. Hao, S. Wang, **T. Sakurai**, S. Masuda and K. Akimoto. Improvement of stability for small molecule organic solar cells by suppressing the trap mediated recombination. *ACS Applied Materials & Interfaces*, **7** (2015), 18379.
- 25) M. A. Halim, M. M. Islam, X. Luo, **T. Sakurai**, N. Sakai, T. Kato, H. Sugimoto, H. Tampo, H. Shibata, S. Niki, and K. Akimoto, Study of time-resolved photoluminescence in $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ thin films with different Cu/Sn ratio. *Japan Journal of Applied Physics*, **54** (2015) 08KC15.
- 26) M. M. Islam, M. A. Halim, **T. Sakurai**, N. Sakai, T. Kato, H. Sugimoto, H. Tampo, H. Shibata, S. Niki, and K. Akimoto. Determination of deep-level defects in $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ thin-films using photocapacitance method. *Applied Physics Letters*, **06** (2015) 243905.
- 27) M. M. Islam, M. A. Halim, C. Joy, X. Luo, **T. Sakurai**, N. Sakai, T. Kato, H. Sugimoto, H. Tampo, H. Shibata, S. Niki, K. Akimoto. Study of $\text{Cu}_2\text{ZnSn}(\text{S},\text{Se})_4$ thin films for solar cell application. *Journal of Physics: Conference Series* **596** (2015) 012019.
- 28) C. Lin, S. Liu, C. Lee, T. Sakurai, M. Kubota, W. Su, J. Huang, T. Chiu, H. Han, L. Chen, C. Chen and J. Lee. A new anodic buffer layer material for non-mixed planar heterojunction chloroboron subphthalocyanine organic photovoltaic achieving 96% internal quantum efficiency. *Solar Energy Materials & Solar Cells*, **137** (2015) 138.
- 29) Y. Moritomo, K. Yonezawa, T. Sakurai, T. Yasuda, Y. Takeichi, H. Kamioka, H. Suga, Y. Takahashi, Y. Yoshida, N. Inami, K. Mase and K. Ono. Morphology of $\text{F}_8\text{T}_2/\text{PC}_{71}\text{BM}$ Blend Film as Investigated by Scanning Transmission X-ray Microscope (STXM). *Molecular Crystals and Liquid Crystals*, **620** (2015) 32.
- 30) M. Okano, H. Hagiya, T. Sakurai, K. Akimoto, H. Shibata, S. Niki, and Y. Kanemitsu. Individual identification of free hole and electron dynamics in $\text{CuIn}_{1-x}\text{Ga}_x\text{Se}_2$ thin films by simultaneous monitoring of two optical transitions. *Applied Physics Letters*, **106** (2015) 181903.
- 31) Y. Moritomo, T. Yasuda, K. Yonezawa, T. Sakurai, Y. Takeichi, H. Suga, Y. Takahashi, N. Inami, K. Mase and K. Ono, Fullerene mixing effect on carrier formation in bulk-hetero organic solar cell. *Scientific report*, **5** (2015) 9483.
- 32) “Novel cathode buffer layer of Ag-doped bathocuproine for small molecule organic solar cell with inverted structure” X. Hao, S. Wang, W. Fu, **T. Sakurai**, S. Masuda, K. Akimoto, *Organic Electronics*, **15**, pp.1773-1779 (2014).
- 33) “Slow intraband relaxation and localization of photogenerated carriers in $\text{Cu}(\text{In}_{1-x}\text{Ga}_x)\text{Se}_2$ thin films: Evidence

- for the existence of long-lived high-energy carriers” M. Okano, Y. Takabayashi, **T. Sakurai**, K. Akimoto, H. Shibata, S. Niki, Y. Kanemitsu, *Physical Review B* **89**, Art.195203 (2014).
- 34) “Molecular mixing in donor and acceptor domains as investigated by scanning transmission X-ray microscopy” Y. Moritomo, **T. Sakurai**, T. Yasuda, Y. Takeichi, K. Yonezawa, H. Kamioka, H. Suga, Y. Takahashi, Y. Yoshida, N. Inami, K. Mase, K. Ono, *Applied Physics Express*, **7**, Art.052302 (2014).
- 35) “Investigation of deep-level defects in Cu(In,Ga)Se₂ thin films by a steady-state photocapacitance method”, X. Hu, **T. Sakurai**, A. Yamada, S. Ishizuka, S. Niki and K. Akimoto, *Journal of Applied Physics*, **116**, Art.163703 (2014).
- 36) “Investigation of the relative density of deep defects in Cu(In,Ga)Se₂ thin films dependent on Ga content by transient photo-capacitance method” X. Hu, **T. Sakurai**, A. Yamada, S. Ishizuka, S. Niki and K. Akimoto, *Japanese Journal of Applied Physics*, **53**, 068008 (2014).
- 37) “Favorable electronic structure for organic solar cells induced by strong interaction at interface” S. Wang, **T. Sakurai**, X. Hao, W. Fu, S. Masuda, and K. Akimoto, *Journal of Applied Physics*, **114**, Art.183707 (2013).
- 38) “Investigation of deep-level defects in Cu(In,Ga)Se₂ thin films by two-wavelength excitation photo-capacitance spectroscopy” X. Hu, A. Gupta, **T. Sakurai**, A. Yamada, S. Ishizuka, S. Niki and K. Akimoto, *Applied Physics Letters*, **103**, Art.163905 (2013).
- 39) “Characterization of Cu(In,Ga)Se₂ grown by MBE by two-wavelength excited photoluminescence spectroscopy” A. Gupta, N. Hiraoka, **T. Sakurai**, A. Yamada, S. Ishizuka, S. Niki, and K. Akimoto, *Journal of Crystal Growth*, **378**, pp. 162-164 (2013).
- 40) “Effect of Ag-doped bathocuproine on the recombination properties of exciton in fullerene” S. Wang, **T. Sakurai**, K. Komatsu, K. Akimoto, *Journal of Crystal Growth*, **378**, pp. 415-417 (2013).
- 41) “Impact of Se flux on the defect formation in polycrystalline Cu(In,Ga)Se₂ thin films grown by three stage evaporation process”, M. M. Islam, A. Uedono, **T. Sakurai**, A. Yamada, S. Ishizuka, K. Matsubara, S. Niki, and K. Akimoto, *Journal of Applied Physics*, **113**, Art.064907 (2013).
- 42) “Photocapacitance study of MBE grown GaInNAsSb thin film solar cells” M.M. Islam, N. Miyashita, N. Ahsan, **T. Sakurai**, K. Akimoto, and Y. Okada, *Journal of Crystal Growth*, **378**, pp. 57-60 (2013).
- 43) “A novel synthesis method and up-conversion properties of hexagonal-phase NaYF₄:Er nano-crystals”, X. Luo, R. Yuminami, **T. Sakurai**, K. Akimoto, *Journal of Rare Earths*, **31**, pp. 267-270 (2013).
- 44) “Effect of Er³⁺ Concentration on Upconversion in Hexagonal-Phase NaYF₄:Er³⁺ Nanocrystals” X.J Luo, R. Yuminami, **T. Sakurai** and K. Akimoto, *Journal of Physics: Conference Series*, **417**, Art.012054 (2013).
- 45) “Identification of defect types in moderately Si-doped GaInNAsSb layer in p-GaAs/n- GaInNAsSb/n-GaAs solar cell structure using admittance spectroscopy”, M.M. Islam, N. Miyashita, N. Ahsan, **T. Sakurai**, K. Akimoto, and Y. Okada, *Journal of Applied Physics*, **112**, Art.114910 (2012).
- 46) “Energy band bending induced charge accumulation at fullerene/bathocuproine heterojunction interface”, S. Wang, **T. Sakurai**, R. Kuroda, K. Akimoto, *Applied Physics Letters*, **100**, Art.243302 (2012).
- 47) “Energy level alignment at interfaces between 3-(4-biphenyl)-4-phenyl-5-(4-tert-butyl phenyl)-1, 2, 4-triazole (TAZ) and metals (Ca, Mg, Ag, and Au): experiment and theory”, B.M. Datt, A. Baba, **T. Sakurai**, K. Akimoto, *Journal of Solid State Electrochemistry*, **3**, pp.1141-1149 (2012).
- 48) “Hydrogen isotope tracer experiment in a-C:H film deposition: Reactive RF magnetron sputtering with CH₄ and D₂”, D. Sekiba, N. Takemoto, M. Okada, S. Ishii, **T. Sakurai**, K. Akimoto, *Diamond and Related Materials*, **27-28**, pp.60-63 (2012).
- 49) “Energy level alignment of C₆₀/Ca interface with bathocuproine as a interlayer studied by ultraviolet photoelectron spectroscopy”, S. Wang, **T. Sakurai**, R. Kuroda, H. Kato, K. Akimoto, *Japanese Journal of Applied Physics*, **51**, Art.10NE32 (2012).
- 50) “Structural control of organic solar cells based on nonplanar metallophthalocyanine/C₆₀ heterojunctions using organic buffer layers”, **T. Sakurai**, T. Ohashi, H. Kitazume, M. Kubota, T. Suemasu, K. Akimoto, *Organic*

Electronics, **12**, pp.966-973 (2011).

- 51) "Dependence of Se beam pressure on defect states in CIGS solar cells" **T. Sakurai**, M.M. Islam, H. Uehigashi, A. Yamada, S. Ishizuka, K. Matsubara, S. Niki, K. Akimoto, *Solar Energy Materials and Solar Cells*, **95**, pp.227-230 (2011).
- 52) "Determination of Cu(In,Ga)₃Se₅ defect phase in CIGS material by Rietveld analysis" M.M. Islam, **T. Sakurai**, S. Otagiri, S. Ishizuka, A. Yamada, K. Sakurai, K. Matsubara, S. Niki, K. Akimoto, *Solar Energy Materials and Solar Cells*, **95**, pp.231-234 (2011).
- 53) "Effect of doping on metal doped semiconductor" B.M. Datt, S. Suzuki, **T. Sakurai**, K. Akimoto, *Current Applied Physics*, **11**, pp.188-190 (2011).
- 54) "Electronic states at 4,4'-N,N'-dicarbazol-biphenyl (CBP)-metal (Mg, Ag, and Au) interfaces: A joint experimental and theoretical study" B.M. Datt, S. Suzuki, **T. Sakurai**, K. Akimoto, *Current Applied Physics*, **11**, pp.346-352 (2011).
- 55) "Barrier formation at organic-metal interfaces studied by density functional theory" B.M. Datt, S. Suzuki, **T. Sakurai**, K. Akimoto, *Current Applied Physics*, **11**, pp.447-450 (2011).
- 56) "Impact of Cu/III ratio on the near-surface defects in polycrystalline CuGaSe₂ thin films" Muhammad Monirul Islam, Akira Uedono, Shoji Ishibashi, Kazuki Tenjinbayashi, **T. Sakurai**, A. Yamada, S. Ishizuka, K. Matsubara, S. Niki, K. Akimoto, *Applied Physics Letters*, **98**, Art.112105 (2011).
- 57) "Time-Resolved Microphotoluminescence Study of Cu(In,Ga)Se₂" Japanese Journal of Applied Physics, **T. Sakurai**, K. Taguchi, M.M. Islam, S. Ishizuka, A. Yamada, K. Matsubara, S. Niki, K. Akimoto, *Japanese Journal of Applied Physics*, **50**, Art.05FC01 (2011).
- 58) "Cu-dependent phase transition in polycrystalline CuGaSe₂ thin films grown by three-stage process" M. M. Islam, A. Yamada, **T. Sakurai**, M. Kubota, S. Ishizuka, K. Matsubara, S. Niki, and K. Akimoto, *Journal of Applied Physics*, **110**, Art.014903 (2011).
- 59) "Effect of Ga/Cu Ratio on Polycrystalline CuGaSe₂ Thin Film Solar Cell" M.M. Islam, A. Yamada, **T. Sakurai**, S. Ishizuka, K. Matsubara, S. Niki, and K. Akimoto, *Applied in OptoElectronics*, **2011**, Art.573094, (2011).
- 60) "Thickness study of Al:ZnO film for application as a window layer in Cu(In_{1-x}Ga_x)Se₂ thin film solar cell" M.M. Islam, S. Ishizuka, A. Yamada, K. Matsubara, S. Niki, **T. Sakurai**, K. Akimoto, *Applied Surface Science*, **257**, pp.4026-4030 (2011).
- 61) "Influence of gap states on electrical properties at interface between bathocuproine and various types of metals", **T. Sakurai**, S. Toyoshima, H. Kitazume, S. Masuda, H. Kato, K. Akimoto, *Journal of Applied Physics*, **107**, Art.043707 (2010).
- 62) "Comparative study on structural properties of P3HT and P3HT:PCBM thin films by using synchrotron x-ray diffraction" **T. Sakurai**, T. Yamanari, M. Kubota, S. Toyoshima, T. Taima, Y. Yoshida, and K. Akimoto, *Japanese Journal of Applied Physics*, **49**, Art.01AC01 (2010).
- 63) "Interaction of bathocuproine with metals (Ca, Mg, Al, Ag, and Au) studied by density functional theory", M.D. Bhatt, S. Suzuki, **T. Sakurai**, K. Akimoto, *Applied Surface Science*, **256**, pp.2661-2667 (2010).
- 64) "Orientation-controlled phthalocyanine-based photovoltaic cell formed on pentacene buffer layer", **T. Sakurai**, R. Naito, S. Toyoshima, T. Ohashi, and K. Akimoto, *Nanoscience and Nanotechnology Letters*, **1**, pp.23-27 (2009).
- 65) "Temperature dependence of phot capacitance spectrum for CIGS solar cell" **T. Sakurai**, H. Uehigashi, M.M. Islam, T. Miyazaki, S. Ishizuka, K. Sakurai, A. Yamada, K. Matsubara, S. Niki and K. Akimoto, *Thin Solid Films*, **517**, pp.2403-2406 (2009).
- 66) "Interaction of Bathocuproine with Ca and Au Studied by Density Functional Theory", M.D. Bhatt, S. Suzuki, **T. Sakurai**, K. Akimoto, *Japanese Journal of Applied Physics*, **48**, Art.125504 (2009).
- 67) "Effect of Se/(Ga+In) ratio on MBE grown Cu(In,Ga)Se₂ thin film solar cell" M.M. Islam, **T. Sakurai**, S. Ishizuka, A. Yamada, H. Shibata, K. Sakurai, K. Matsubara, S. Niki, K. Akimoto, *Journal of Crystal Growth*, **311**, pp.2212-2214 (2009).

- 68) "CIGS solar cell with MBE-grown ZnS buffer layer" M.M. Islam, S. Ishizuka, A. Yamada, K. Sakurai, S. Niki, **T. Sakurai**, K. Akimoto, *Solar Energy Materials and Solar Cells*, **93**, pp.970-972 (2009).
- 69) "Na-induced variations in the structural, optical, and electrical properties of Cu(In,Ga)Se₂ thin films" S. Ishizuka, A. Yamada, M.M. Islam, H. Shibata, P. Fons, **T. Sakurai**, K. Akimoto, and S. Niki, *Journal of Applied Physics*, **106**, Art.034908 (2009).
- 70) "Level alignment of gap state at organic-metal interface" M. Aoki, S. Toyoshima, T. Kamada, M. Sogo, S. Masuda, **T. Sakurai**, and K. Akimoto, *Journal of Applied Physics*, **106**, Art.043715 (2009).
- 71) "Effects of annealing under various atmospheres on electrical properties of Cu(In,Ga)Se₂ films and CdS/Cu(In,Ga)Se₂ heterostructures", **T. Sakurai**, N. Ishida, S. Ishizuka, M.D. Islam, A. Kasai, K. Matsubara, K. Sakurai, A. Yamada, K. Akimoto and S. Niki, *Thin Solid Films*, **516**, pp.7036-7040 (2008).
- 72) "Ultraviolet Photoemission Study of Calcium Doped Bathocuproine", S. Toyoshima, **T. Sakurai**, T. Taima, K. Saito, H. Kato and K. Akimoto, *Japanese Journal of Applied Physics*, **47**, pp.1397-1399 (2008).
- 73) "Molecular Orientation Control of Phthalocyanine Thin Film by Inserting Pentacene Buffer Layer" R. Naito, S. Toyoshima, T. Ohashi, **T. Sakurai**, K. Akimoto, *Japanese Journal of Applied Physics*, **47**, pp.1416-1418 (2008).
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