

## 6. 研究成果リスト

### 原著論文

1. Twin-peaks absorption spectra of excess electron in ionic liquids, R. M. Musat, T. Kondoh, Y. Yoshida, Kenji Takahashi: *Radiat. Phys. Chem.* 100, 32-37 (2014).
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3. Effects of deprotonation efficiency of protected units on line edge roughness and stochastic defect generation in chemically amplified resist processes for 11 nm node of extreme ultraviolet lithography, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *Jpn. J. Appl. Phys.* 53 (2014) 116504
4. Application of natural linear polysaccharide to green resist polymers for electron beam and extreme-ultraviolet lithography, Satoshi Takei, Akihiro Oshima, Tomoko Oyama, Kenta Ito, Miki Kashiwakura, Takahiro Kozawa, Seiichi Tagawa, and Makoto Hanabata, *Jpn. J. Appl. Phys.* 53 (2014) 116505
5. Feasibility study of sub-10-nm half-pitch fabrication by chemically amplified resist processes of extreme ultraviolet lithography: I. Latent image quality predicted by probability density model, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *Jpn. J. Appl. Phys.* 53 (2014) 106501
6. Effect of molecular weight and protection ratio on line edge roughness and stochastic defect generation in chemically amplified resist processes of extreme ultraviolet lithography, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *Jpn. J. Appl. Phys.* 53 (2014) 084002
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8. Organic solvent-free water-developable sugar resist material derived from biomass in green lithography, Satoshi Takei, Akihiro Oshima, Takumi Ichikawa, Atsushi Sekiguchi, Miki Kashiwakura, Takahiro Kozawa, Seiichi Tagawa, Tomoko Oyama, Syoji Ito, and Hiroshi Miyasaka *Microelectron. Eng.* 122 (2014) 70-76.
9. Theoretical relationship between quencher diffusion constant and effective reaction radius for neutralization in contact hole imaging using chemically amplified extreme ultraviolet resists, Takahiro Kozawa and Taku Hirayama, *Jpn. J. Appl. Phys.* 53 (2014) 066502
10. Effect of photodecomposable quencher on latent image quality in extreme ultraviolet lithography, Takahiro Kozawa, *Jpn. J. Appl. Phys.* 53 (2014) 066508

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12. Effects of effective reaction radius for neutralization on performance of chemically amplified resists, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *Jpn. J. Appl. Phys.* 53 (2014) 06JC02
13. Relationship between stochasticity and wavelength of exposure source in lithography, Takahiro Kozawa, *Jpn. J. Appl. Phys.* 53 (2014) 066505
14. Stochastic effects in 11 nm imaging of extreme ultraviolet lithography with chemically amplified resists, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *Jpn. J. Appl. Phys.* 53 (2014) 036503
15. Relationships between Stochastic Phenomena and Optical Contrast in Chemically Amplified Resist Process of Extreme Ultraviolet Lithography, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *J. Photopolym. Sci. Technol.* 27 (2014) 11-19
16. Acid diffusion length in contact hole imaging of chemically amplified extreme ultraviolet resists, Takahiro Kozawa and Taku Hirayama, *Jpn. J. Appl. Phys.* 53 (2014) 016503
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22. Acid generation mechanism in anion-bound chemically amplified resists used for extreme ultraviolet lithography, Yoshitaka Komuro, Hiroki Yamamoto, Kazuo Kobayashi, Yoshiyuki Utsumi, Katsumi Ohmoro, Takahiro Kozawa, *Jpn. J. Appl. Phys.* 53 (2014) 116503-1-116503-8.
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24. Study on resist performance of chemically amplified molecular resists based on cyclic oligomers, H. Yamamoto, H. Kudo, and T. Kozawa, *Microelectron. Eng.* 133 (2015) 16-22
25. Feasibility study of sub-10-nm-half-pitch fabrication by chemically amplified resist processes of extreme ultraviolet lithography: II. Stochastic effects, Takahiro Kozawa, Julius J. Santillan, and Toshiro Itani, *Jpn. J. Appl. Phys.* 54 (2015) 036507
26. Effects of dose shift on line width, line edge roughness, and stochastic defect generation in chemically amplified extreme ultraviolet resist with photodecomposable quencher, Takahiro Kozawa *Jpn. J. Appl. Phys.* 54 (2015) 016504
27. Relationships between quencher diffusion constant and exposure dose dependences of line width, line edge roughness, and stochastic defect generation in extreme ultraviolet lithography, Takahiro Kozawa, *Jpn. J. Appl. Phys.* 54 (2015) 016502
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29. Mechanistic Studies on Formation of the Dinitrosyl Iron Complex of the [2Fe-2S] Cluster of SoxR Protein, Mayu Fujikawa, Kazuo Kobayashi, and Takahiro Kozawa, *J. Biochem.* 156 (2014) 163-172
30. Pulse Radiolysis Study of the Dynamics of Ascorbic Acid Free Radicals within a Liposomal Environment, Kazuo Kobayashi, Yumiko Seike, Akinori Saeki, Takahiro Kozawa, Fusako Takeuchi, and Motonari Tsubaki, *PhysChemPhys* 15 (2014) 2994-2997
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32. Single-Particle Study of Pt-Modified Au Nanorods for Plasmon-Enhanced Hydrogen Generation in Visible to Near Infrared Region, Z. Zheng, T. Tachikawa, and T. Majima, *J. Am. Chem. Soc.*, 136 (2014) 6870-6873.
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55. Excitation of giant monopole resonance in  $^{208}\text{Pb}$  and  $^{116}\text{Sn}$  using inelastic deuteron scattering, D. Patel, U. Garg, M. Itoh, H. Akimune, G.P.A. Berg, M. Fujiwara, M.N. Harakeh, C. Iwamoto, T. Kawabata, K. Kawase, J.T. Matta, T. Murakami, A. Okamoto, T. Sako, K.W. Schlx, F. Takahashi, M. White, M. Yosoi, Physics Letters B, Volume 735, 30 July 2014, Pages 387 – 390. (Available online 2 July 2014.)

#### 解説・総説・その他

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#### 国際会議の招待講演

1. J. Yang, "Femtosecond time-resolved electron diffraction and microscopy", FRI-E3-1, *Advanced Lasers and Their Applications (ALTA)* 2014, May 7-10, Jeju, Korea (2014). (invited talk)
2. Y. Yoshida, "Possibility of Attosecond Pulse Radiolysis", WG1-5, the 6th Asian Forum for Accelerators and Detectors (AFAD2015), Jan. 26-27, Taiwan, (2015). (invited talk)
3. J. Yang, "RF gun based Ultrafast Electron Microscopy", WG-1-9, the 6th Asian Forum for Accelerators and Detectors (AFAD2015), Jan. 26-27, Taiwan, (2015). (invited talk)
4. Tetsuro Majima, "Superstructure of TiO<sub>2</sub> crystalline nanoparticles with effective charge transfer pathways", *The International Symposium on Eco-materials Processing and Design (ISEPD)*, Hanoi University of Science and Technology, Hanoi, Vietnam, 2014. Jan. 13-15. (Keynote lecture)
5. Tetsuro Majima, "Charge Transfer in DNA", "KAERI-Osaka University Joint Workshop on Beam Science", KAERI, Daejeon, Korea. 2014.Feb.28. (Invited talk)

6. Tetsuro Majima : "Superstructure of TiO<sub>2</sub> crystalline nanoparticles with effective charge transfer pathways" in "Nanotechnology for Solar Fuels Production", "Single-molecule, single-particle approaches for exploring the structure and kinetics of nanocatalysts" in "Single Molecules at Interfaces: Experiments and Simulations" 247th ACS National Meeting at Dallas, 2014, March, 16-20. (invited talk)
7. Tetsuro Majima: " Superstructure of TiO<sub>2</sub> crystalline nanoparticles with effective charge transfer pathway" Urumqi Symposium on Recent Advances and Applications in Nanoengineering and Nanosystems, Urumqi, Xinjian Autonomous Region, China (Xinjian Technical Institute of Physics and Chemistry) 2014. Jun. 27-30. (invited talk)
8. Tetsuro Majima: "Charge Delocalization in Cyclophanes" International Symposium on Reactive Intermediates and Unusual Molecules (ISRIUM)2014, 広島アステールプラザ 2014. Apr. 1.(invited talk)
9. Tetsuro Majima, Superstructure of metal oxide crystalline nanoparticles with effective charge transfer pathways"  
Mamoru Fujitsuka, Hisashi Shimakoshi, Yoshio Hisaeda, and Tetsuro Majima, "Photoinduced Electron Transfer Processes in Supramolecular Donor Acceptor Dyads using Porphyrin Isomers" Korea Japan Frontier Symposium on Photoscience (KJFP2014) EwaWomensUniv. Seoul, 2014. Jun. 21-23. (invited talk)
10. Tetsuro Majima, "Nanoscale Visualization of TiO<sub>2</sub> Photocatalytic Reactions" 14th National Conference on Solar Energy Photochemistry and Photocatalysis (SEPP14), Harbin, Heilongjiang, China, 2014 July 27-31.(invited talk)
11. Tetsuro Majima, "Superstructure of TiO<sub>2</sub> crystalline nanoparticles with effective charge transfer pathways" UNIST (Ulsan National Institute of Science and Technology) Annual international conference on energy materials, 2014. Aug. 19-22. (invited talk)
12. Tetsuro Majima, "Recent Approach in Radiation Chemistry toward Material and Biological Science" 2014APSRC (Asian Pacific Symposium on Radiation Chemistry) /東大農学部弥生講堂, 2014.Sep.8-11. (invited talk)
13. Tetsuro Majima, "Metal oxide mesocrystals with efficient charge transport properties" (Sep 15), Inorganic nanoarchitectonics: from design and fabrication to sustainable solutions" in Fall E-MRS Conference, Warsaw University of Technology, 2014.Sep.14-25.(Keynote lecture)
14. Tetsuro Majima, "Metal oxide mesocrystals with effective charge transfer pathways", 4th TKU-ECUST-OPU-KIST Joint Symposium on Advanced Materials and their Applications, Taiwan, 2014. Sep. 24~26(Keynote lecture)
15. Tetsuro Majima, "Development of new photocatalysts", 2014 International Workshop on Resource Chemistry in Shanghai Normal University, 2014/Dec/23. (Keynote lecture)

## 国際会議関係

1. K. Kan, J. Yang, A. Ogata, T. Kondoh, M. Gohdo, I. Nozawa, T. Toigawa, K. Norizawa, H. Kobayashi, Y. Yoshida, “Pulse radiolysis using terahertz pulse”, Thu-E3-2, Advanced Lasers and Their Applications (ALTA) 2014, May 7-10, Jeju, Korea (2014).
2. K. Kan, J. Yang, A. Ogata, T. Kondoh, M. Gohdo, I. Nozawa, T. Toigawa, K. Norizawa, Y. Yoshida, “Pulse radiolysis using terahertz probe pulses”, MOPRI036, the 5th International Particle Accelerator Conference (IPAC'14), Jun. 15-20, Dresden, Germany (2014).
3. K. Kan, J. Yang, A. Ogata, T. Kondoh, M. Gohdo, I. Nozawa, T. Toigawa, K. Norizawa, Y. Yoshida, M. Hangyo, R. Kuroda, H. Toyokawa, “Simulation study on electron beam acceleration using coherent Cherenkov radiation”, TUPME036, the 5th International Particle Accelerator Conference (IPAC'14), Jun. 15-20, Dresden, Germany (2014).
4. J. Yang, M. Gohdo, K. Kan, T. Kondoh, K. Tanimura, Y. Yoshida, J. Urakawa, “Femtosecond time-resolved transmission electron microscopy using RF gun”, WEPRO103, the 5th International Particle Accelerator Conference (IPAC'14), Jun. 15-20, Dresden, Germany (2014).
5. I. Nozawa, K. Kan, J. Yang, A. Ogata, T. Kondoh, M. Gohdo, K. Norizawa, Y. Yoshida, H. Kobayashi, “Generation and diagnosis of ultrashort electron bunches from a photocathode RF gun linac”, THPME132, the 5th International Particle Accelerator Conference (IPAC'14), Jun. 15-20, Dresden, Germany (2014).
6. Y. Yoshida, “Possibility of Attosecond Pulse Radiolysis”, B-3, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).
7. M. Gohdo, K. Kan, T. Kondoh, J. Yang, Y. Yoshida, “Development and Perspective of the Atto-second Pulse Radiolysis”, B-4, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).
8. T. Toigawa, K. Norizawa, T. Kondoh, M. Gohdo, K. Kan, J. Yang, Y. Yoshida, “Femtosecond Pulse Radiolysis Study on Spectrum and Reactivity of Solvated/Pre-solvated Electrons in n-alcohols” Y1-2, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).
9. T. Igahara, M. Gohdo, T. Kondoh, S. Tagawa, J. Yang, K. Kan, A. Ogata, Y. Yoshida, “Formation of Dimer Radical Cation of Poly- $\alpha$ -methylstyrene by Direct Ionization in Solution”, Y2-3, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).
10. T. Kondoh, S. Nishii, K. Norizawa, K. Kan, J. Yang, M. Gohdo, S. Tagawa, Y. Yoshida, “Time



Dependent Behaviors of Electron in n-dodecane Studied by the Femtosecond Pulse Radiolysis”, E-3, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).

11. S. Nishii, T. Kondoh, M. Gohdo, K. Kan, J. Yang, S. Tagawa, Y. Yoshida, “Femtosecond Pulse Radiolysis Study of the Radiation Decomposition Process of n-dodecane”, Y4-4, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).
12. S. Yamaso, T. Toigawa, T. Kondoh, M. Gohdo, K. Kan, J. Yang, Y. Yoshida, “Formation Process Study of Hydrated Electron in Water by Femtosecond Pulse Radiolysis”, P06, The 5th Asia Pacific Symposium on Radiation Chemistry, The 57th Annual Meeting of The Japanese Society of Radiation Chemistry, Sep. 8-11, Tokyo, Japan (2014).
13. Y. Yoshida, “Radiation-Induced Decomposition Process of N-Dodecane Studied by Femtosecond Pulse Radiolysis” A-OS4, The 11th meeting of the ionizing radiation and polymers symposium (IRaP 2014), Oct. 5-9, Jeju, Korea (2014).
14. T. Kondoh, S. Nishii, M. Gohdo, K. Kan, J. Yang, K. Norizawa, S. Tagawa, Y. Yoshida “Initial Ionization G-Value of N-Dodecan Studies by a Femtosecond Pulse Radiolysis”, 1P-4, The 11th meeting of the ionizing radiation and polymers symposium (IRaP 2014), Oct. 5-9, Jeju, Korea (2014).
15. T. Igahara, T. Kondoh, M. Gohdo, K. Kan, J. Yang, S. Tagawa, Y. Yoshida “Formation of Dimer Radical Cation of Poly- $\alpha$ -Methylstyrene by Direct Ionization in Solution”, 1P-5, The 11th meeting of the ionizing radiation and polymers symposium (IRaP 2014), Oct. 5-9, Jeju, Korea (2014).
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