

## PUBLICATIONS

2018

Elemental analysis of cultured pearls by PIXE

I. Sakakura, H. Tsuchida, Y. Sasaki, H. Hayashii  
Int. J. PIXE, Vol. 27, Nos. 3 & 4 (2017) 93-99.

Upgrades of a time-of-flight elastic recoil detection analysis measurement system for thin film analysis

K. Yasuda, Y. Kajitori, M. Oishi, H. Nakamura, Y. Haruyama, M. Saito, K. Suzuki, R. Ishigami, S. Hibi  
Nucl. Instrum. Methods Phys. Res., Sect. B: Beam Interact. Mater. Atoms, 442, 53-58 (2019).

The impact of solar radiation on polar mesospheric ice particle formation

M. Nachbar, H. Wilms, D. Duft, T. Aylett, K. Kitajima, T. Majima, J.M.C. Plane, M. Rapp, and T. Leisner  
Atmos. Chem. Phys., accepted.

Radiative lifetime measurements of metastable levels in  $Kr^{3+}$  using electrostatic ion beam trap

M. Saito, H. Kubota, T. Majima, M. Imai, H. Tsuchida, Y. Haruyama  
X-Ray Spectrom., accepted.

Secondary electron-induced biomolecular fragmentation in fast heavy-ion irradiation of microdroplets of glycine solution

K. Kitajima, H. Tsuchida, T. Majima, and M. Saito  
J. Chem. Phys., 150, 095102(1-9) (2019).

Two- and three-photon double ionization of helium by soft X-ray free-electron laser pulses

H. Shimada, K. Komatsu, W. Komatsubara, T. Mizuno, S. Miyake, S. Minemoto, H. Sakai, T. Majima, S. Owada, T. Togashi, M. Yabashi, and A. Yagishita  
J. Phys., B: At., Mol. Opt. Phys., 52, 065602(1-8) (2019).

A cryogenic linear ion trap beamline for providing keV ion bunches

S. Menk, P. Bertier, Y. Enomoto, T. Masunaga, T. Majima, Y. Nakano, and T. Azuma  
Rev. Sci. Instrum., 89, 113110(1-11) (2018).

Time-resolved photoelectron angular distributions from nonadiabatically aligned  $CO_2$  molecules with SX-FEL at SACLA

S. Minemoto, H. Shimada, K. Komatsu, W. Komatsubara, T. Majima, S. Miyake, T. Mizuno, S. Owada, H. Sakai, T. Togashi, M. Yabashi, P. Decleva, M. Stener, S. Tsuru, and A. Yagishita  
J. Phys. Commun., 2, 115015(1-8) (2018).

Photoelectron spectroscopy of Rydberg excited states in singly charged molecular ions  $CS_2^+$  by NIR laser pulses

H. Shimada, S. Minemoto, K. Komatsu, W.

Komatsubara, S. Yoshida, T. Majima, T. Mizuno, H. Sakai, S. Owada, T. Togashi, M. Yabashi, and A. Yagishita

J. Phys., B: At., Mol. Opt. Phys., 51, 225601(1-9) (2018).

Effects of electronic stopping power on fast-ion-induced secondary ion emission from methanol microdroplets

K. Kitajima, H. Tsuchida, T. Majima, and M. Saito  
Eur. Phys. J. D, 72, 169(1-7) (2018).

High resolution Li depth profiling of solid state Li ion battery by TERD technique with high energy light ions

K. Morita, B. Tsuchiya, J. Ohnishi, T. Yamamoto, Y. Iriyama, H. Tsuchida, T. Majima, and K. Suzuki  
Nucl. Instrum. Methods Phys. Res., Sect. B: Beam Interact. Mater. Atoms, 426, 30-33 (2018).

Mass spectrometric study of the negative and positive secondary ions emitted from ethanol microdroplets by MeV-energy heavy ion impact

K. Kitajima, T. Majima, T. Nishio, Y. Oonishi, S. Mizutani, J. Kohno, M. Saito, and H. Tsuchida  
Nucl. Instrum. Methods Phys. Res., Sect. B: Beam Interact. Mater. Atoms, 424, 10-16 (2018).

Ar 3p photoelectron sideband spectra in two-color XUV + NIR laser fields

S. Minemoto, H. Shimada, K. Komatsu, W. Komatsubara, T. Majima, T. Mizuno, S. Owada, H. Sakai, T. Togashi, S. Yoshida, M. Yabashi, and A. Yagishita  
J. Phys., B: At., Mol. Opt. Phys., 51, 075601(1-8) (2018).

Radiative lifetime measurements of  $^2P_{3/2}$  and  $^2P_{1/2}$  metastable levels in triply charged xenon using electrostatic ion beam trap

M. Saito, A. Chikaoka, T. Majima, M. Imai, H. Tsuchida, and Y. Haruyama  
Nucl. Instrum. Methods Phys. Res., Sect. B: Beam Interact. Mater. Atoms, 414, 68-73 (2018).

Molecular axis alignment of fast  $OH^+$  ions passing through nanocapillaries

R. Murase, H. Tsuchida, A. Chiba, T. Majima, M. Saito  
10th Int. Symp. on Swift Heavy Ions in Matter & 28th Int. Conf. on Atomic Collision in Solids Solid (SHIM-ICACS 2018) (Jul. 1-6, 2018, Caen, France).

Formation of nano-porous surface structures by fast  $C_{60}$  beam bombardments

H. Tsuchida, N. Nitta, S. Tomita, K. Sasa, K. Hirata, H. Shibata, Y. Saitoh, K. Narumi, A. Chiba, K. Yamada, Y. Hirano, and Y. Hoshino  
10th Int. Symp. on Swift Heavy Ions in Matter &

28th Int. Conf. on Atomic Collision in Solids Solid (SHIM-ICACS 2018) (Jul. 1-6, 2018, Caen, France).

AMOC measurements for polymers under ion irradiation

S. Konishi

3rd Kyoto Workshop on Positron Sciences "Positron Annihilation Spectroscopy: Fundamentals and Applications" (KWPS 2018) (Nov. 5-6, 2018, Kyoto, Japan) Oral.

Damage evolution in polystyrene during ion irradiation studied by AMOC measurement

H. Minagawa, S. Konishi, H. Tsuchida

3rd Kyoto Workshop on Positron Sciences "Positron Annihilation Spectroscopy: Fundamentals and Applications" (KWPS 2018) (Nov. 5-6, 2018, Kyoto, Japan) Poster.

Two-color above threshold ionization of atoms by using femtosecond XUV free electron laser and NIR laser pulses

S. Minemoto<sup>1</sup>, H. Shimada, K. Komatsu, W. Komatsubara, T. Majima, T. Mizuno, S. Owada, H. Sakai, T. Togashi, S. Yoshida, M. Yabashi, and A. Yagishita

21th Int. Conf. on Ultrafast Phenomena (Jul. 15-20, 2018, Hamburg, Germany).

Systematic study of kinetic energy distributions of fragment ions from multiply ionized  $C_2H_{2n}$  ( $n = 1-3$ ) as functions of the charge states

S. Yoshida, T. Majima, T. Asai, H. Tsuchida, and M. Saito

19th Int. Conf. on the Physics of Highly Charged Ions (HCI19) (Sept. 3-7, 2018, Lisbon, Portugal).

Radiative lifetime measurement of metastable levels in  $Kr^{3+}$  using electrostatic ion beam trap

H. Kubota, M. Saito, T. Majima, M. Imai, H. Tsuchida, and Y. Haruyama

19th Int. Conf. on the Physics of Highly Charged Ions (HCI19) (Sept. 3-7, 2018, Lisbon, Portugal).

Li Depth Profiles of Metal/Li-Electrolyte/Metal Capacitors under Biasing Studied by Means of MeV Ion Beam Analysis

K. Morita, B. Tsuchiya, Y. Iriyama, T. Kato, H. Tsuchida, T. Majima

22nd Int. Conf. on Solid State Ionics (SSI-22) (Jun. 16-21, 2019, PyeongChang, Korea).

Change in Li Depth Profiles of Au/LCO/LATP/Pt Battery under Charging and Discharging Studied by Ion Beam Analysis Techniques with 9 MeV  $O^{+4}$  Ions"

K. Morita, B. Tsuchiya, J. Oonishi, T. Kato, Y. Iriyama, H. Tsuchida, T. Majima

22nd Int. Conf. on Solid State Ionics (SSI-22) (Jun. 16-21, 2019, PyeongChang, Korea).

In-situ Total Li Profiling of Solid State Li Ion Batteries under Charging and Discharging by Means of Transmission Elastic Recoil Detection Analysis with 5MeV  $He^{+2}$  Ions

K. Morita, B. Tsuchiya, R. Yen, J. Oonishi, Y. Iriyama, T. Kato, H. Tsuchida, T. Majima

22nd Int. Conf. on Solid State Ionics (SSI-22) (Jun. 16-21, 2019, PyeongChang, Korea).

Fragmentation of multiply ionized polyatomic molecules in fast heavy ion collisions

T. Majima

TMU Symp. on Physics of Highly Charged Ions (Dec. 15-16, 2018, Hachioji, Japan).

Cationization and fragmentation of molecular ions sputtered from polyethylene glycol under gas cluster bombardment: An analysis by MS and MS/MS

T. Prutchayawoot, H. Gnaser, R. Oki, T. Aoki, T. Seki, J. Matsuo

Int. J. Mass Spectrom., Vol. 430, July 2018, Pages 149-157 (doi:10.1016/j.ijms.2018.05.012).

In situ cationization of molecular ions sputtered from organic specimens under cluster bombardment

H. Gnaser, W. Bock, J. Matsuo

J. Vac. Sci. Technol., B, 36(3), 2018, Pages 03F106- (doi:10.1116/1.5009781).

Liquid Adsorption and Desorption measured with Ambient-SIMS

J. Matsuo, T. Seki, T. Aoki

Symp. on Surface and Nano Science 2019 (SSNS'19) (Shizukuishi Prince Hotel, Iwate, Japan 2019/01/15) Oral.

Improvement in Detection Sensitivity of Secondary Ions by Na Absorption with Mist Deposition Method on a PEG Surface

T. Matsuda, T. Seki, T. Aoki, J. Matsuo

The 28th Annual Meeting of MRS-J (Kitakyushu Int. Conf. Center, Fukuoka, Japan 2018/12/19) Oral.

Ambient Secondary Ion Mass Analysis of Fatty Acids with MeV-energy Heavy Ion

T. Seki, T. Aoki, J. Matsuo

The 19th Workshop on Surface and Interface Analysis by Ion Beam (Kyoto Univ., Kyoto, Japan 2018/12/7) Oral.

Fabrication of multilayer layer structure by double-angled etching with reactive gas cluster injection

T. Seki, H. Yamamoto, T. Kozawa, T. Shojo, K. Koike, T. Aoki, J. Matsuo

40th Int. Symp. on Dry Process (DPS 2018) (Nagoya Univ., Aichi, Japan 2018/11/15) Postar.

Cluster Ion Beams: History and Technology

- Yamada, J. Matsuo  
22nd Int. Conf. on Ion Implantation Technology (IIT 2018 School) (Congress Centrum, Würzburg, Germany 2018/9/14) Oral.
- SIMS Analysis of Liquid Materials in Low Vacuum with Large Cluster Ion Beam  
T. Seki, K. Suzuki, T. Aoki, J. Matsuo  
25th Int. Conf. on Application of Accelerators in Research and Industry (CAARI 2018) (The Gaylord Texan Resort in Grapevine, Texas, USA 2018/8/15) Oral.
- Chemical Analysis under Ambient Conditions using MeV-Energy Heavy Ion  
T. Seki  
25th Int. Conf. on Application of Accelerators in Research and Industry (CAARI 2018) (The Gaylord Texan Resort in Grapevine, Texas, USA 2018/8/15) Oral.
- Low-energy Electron and Particle Microscopies in Liquid, Gaseous, and Frozen Conditions  
D. Muller, K. Molhave, S. Chikara, J. Matsuo, M. Willinger, A. Belianinov, H. Plank  
Microscopy & MicroAnalysis 2018 Meeting (M&M 2018) (the Baltimore Convention Center, Maryland, USA 2018/8/7-8) Invited.
- Adsorption of Liquids Measured with MeV-SIMS in Ambient  
J. Matsuo, T. Seki, T. Aoki  
16th Int. Conf. on Nuclear Microprobe Technology and Applications (ICNMTA2018) (the Surrey Ion Beam Centre at the Univ. of Surrey, Guildford, UK 2018/7/13) Oral.
- Improvement in the Detection Sensitivity of Secondary Ions by Na Absorption with the Mist Deposition Method on a PEG Surface  
T. Matsuda, T. Seki, T. Aoki, J. Matsuo  
The Scientific Int. Symp. on SIMS and Related Techniques Based on Ion-Solid Interactions (SISS-20) (Seikei Univ., Tokyo, Japan 2018/6/28) Poster.
- High-Speed SIMS Imaging Using a High Brightness Cluster Ion Source  
S. Yamada, T. Seki, T. Aoki, J. Matsuo  
The Scientific Int. Symp. on SIMS and Related Techniques Based on Ion-Solid Interactions (SISS-20) (Seikei Univ., Tokyo, Japan 2018/6/28) Poster.
- Secondary Molecular Ion Emission of Polymers with Various Molecular Weights under Large Cluster Ion Bombardment: Enhancement with the Cationization Technique  
J. Matsuo, L. Houssiau, H. Gnaser, T. Satoh, M. Fujii, T. Seki, T. Aoki  
The Scientific Int. Symp. on SIMS and Related Techniques Based on Ion-Solid Interactions (SISS-20) (Seikei Univ., Tokyo, Japan 2018/6/28) Oral.
- A Thermodynamic Model for ZrO<sub>2</sub>(am) Solubility at 25 °C in the Ca<sup>2+</sup>-Na<sup>+</sup>-H<sup>+</sup>-Cl<sup>-</sup>-OH<sup>-</sup>-H<sub>2</sub>O System: A Critical Review  
D. Rai, A. Kitamura, M. Altmaier, K. M. Rosso, T. Sasaki, T. Kobayashi  
J. Solution Chem., 47, 5 (2018) 855-891.
- Solubilities and solubility products of thorium hydroxide under moderate temperature conditions  
S. Nishikawa, T. Kobayashi, T. Sasaki, I. Takagi  
Radiochimica. Acta, 106 (2018) 655-667.
- Gamma-ray irradiation impact of humic substances on apparent formation constants with Cu(II)  
T. Sasaki, R. Goto, T. Saito, T. Kobayashi, I. Takagi and Y. Sugiyama  
J. Nucl. Sci. Technol., 55 (2018) 1299-1308.
- Study on the leaching behavior of actinides from nuclear fuel debris  
A. Kirishima, M. Hirano, D. Akiyama, T. Sasaki, N. Sato  
J. Nucl. Mater., 502 (2018) 169-176.
- High-resolution depth profiling of soda-lime silicate glass using high-resolution RBS and ERDA  
H. Sakata, Y. Yamamoto, K. Sato, K. Nakajima, and K. Kimura  
Nucl. Instrum. Methods, B 440 (2019) 60-63.
- Quantification of outermost OH group on silica glass surface by high-resolution elastic recoil detection analysis  
Y. Yamamoto, K. Sato, K. Nakajima, and K. Kimura  
J. Non-Cryst. Solids, 499 (2018) 408-411.
- Imaging of organic materials by transmission SIMS using MeV primary ions  
K. Nakajima, K. Yamamoto, S. Kitamura, and K. Kimura  
9th Int. Workshop on High-Resolution Depth Profiling (HRDP-9) (Uppsala, Sweden, Jun. 25-29, 2018) invited.
- Molecular imaging by transmission SIMS in combination with secondary electron microscope  
K. Nakajima, K. Yamamoto, S. Kitamura, H. Ishii, J. Sawada, and K. Kimura  
28th Int. Conf. on Atomic Collisions in Solids (ICACS-28) (Caen, France, Jul. 1-6, 2018) invited.
- Observation of dc field evaporated ion species from transition metal nitride deposited on tungsten tip

C. Nishimura, Y. Haneji, H. Tsuji, and Y. Gotoh  
Surf. Interface Anal., Vol. 51, No. 1 (2019) pp. 61-64.

Analysis of field evaporated ions from transition metal nitrides

C. Nishimura, Y. Haneji, H. Tsuji, and Y. Gotoh  
Atom Probe Tomography and Microscopy (Jun. 11-18, 2018, Gaithersburg, USA).

Operation of field emitter arrays under high dose rate gamma-ray irradiation

T. Morito, Y. Handa, Y. Gotoh, M. Nagao, M. Akiyoshi, I. Takagi, and T. Okamoto  
The 31<sup>st</sup> Int. Vacuum Nanoelectronics Conf. (Jul. 9-13, 2018, Kyoto) pp. 96-97.

Surface-Enhanced Infrared Absorption for the Periodic Array of Indium Tin Oxide and Gold Microdiscs: Effect of in-Plane Light Diffraction

R. Kamakura, T. Takeishi, S. Murai, K. Fujita, and K. Tanaka  
ACS Photonics, 5 (2018) 2602–2608.

Enhanced Photoluminescence from Organic Dyes Coupled to Periodic Array of Zirconium Nitride Nanoparticles

R. Kamakura, S. Murai, K. Fujita, and K. Tanaka  
ACS Photonics, 5 (2018) 3057-3063.

Demonstration of Temperature-Plateau Superheated Liquid by Photothermal Conversion of Plasmonic Titanium Nitride Nanostructures

S. Ishii, R. Kamakura, H. Sakamoto, T. D. Dao, S. L. Shinde, T. Nagao, K. Fujita, K. Namura, M. Suzuki, S. Murai, and K. Tanaka  
Nanoscale, 10 (2018) 18451-18456.

Enhanced Photoluminescence and Directional White-Light Generation by Plasmonic Array

R. Kamakura, S. Murai, Y. Yokobayashi, K. Takashima, M. Kuramoto, K. Fujita, and K. Tanaka  
J. Appl. Phys., 124 (2018) 213105/1-9.

Enhancement of Spontaneous Emission of Quantum Emitters near Metallic Thin films

S. Murai, K. Tanaka, S. I. Azzam, S. Ishii, A. V. Kildishev, and M. Saito  
Progress In Electromagnetics Research Symp. (PIERS 2018) (2018/8/1-4, Toyama Int. Conf. Center, Toyama).

Surface Lattice Resonances Excited in Al Nanocylinder Arrays in the UV, Visible and Near-Infrared Spectral Regions

S. Murai, Y. Kawachiya, M. Saito, K. Fujita, and K. Tanaka  
The 15th Int. Conf. on Near-Field Optics and Nanophotonics (NFO-15) (2018/8/26-31, Univ. of Technology of Troyes, France).

Surface Lattice Resonance Excited in Al Nanocylinder Array in the UV Spectral Region

S. Murai, U. Kawachiya, K. Fujita, and K. Tanaka  
Strong Coupling with Organic Molecules (SCOM 2018) (2018/4/16-18, Eindhoven Univ. of Technology, Netherlands).

Photoluminescence Enhancement by Plasmonic Nanoparticles and Arrays

Y. Gao, S. Murai, K. Fujita, and K. Tanaka  
3rd Global Congress & Expo on Materials Science & Engineering (2018/6/14-16, Holiday Inn Roma, Italy).

Conjugated Nanowire Sensors via High-Energy Single-Particle-Induced Linear Polymerization of 9,9'-Spiro[9H-fluorene] Derivatives

S. Sakaguchi, T. Sakurai, J. Ma, M. Sugimoto, T. Yamaki, A. Chiba, Y. Saito, and S. Seki  
J. Phys. Chem., B, 122 (2018) 8614.

Upgrades of a time-of-flight elastic recoil detection analysis measurement system for thin film analysis

K. Yasuda, Y. Kajitori, M. Oishi, H. Nakamura, Y. Haruyama, M. Saito, K. Suzuki, R. Ishigami and S. Hibi  
Nucl. Instrum. Methods, B, 442 (2019) 53-58.