# CURRICULUM VITAE


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Date of birth: Sep. 8, 1977

Nationality: Japan

* All years shown below follow the Japanese fiscal year, starting in April and ending in March of the following year.

Education

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|---|---|
| 1996 - 1999 | Undergraduate course at the Department of Quantum Engineering and Systems Science, The University of Tokyo.<br>Thesis: “Development of the Radiation Measurement by Optical Fiber”<br>Bachelor of Engineering |
| 2000 - 2001 | Master course at the Department of Quantum Engineering and Systems Science, The University of Tokyo.<br>Thesis: “Complexation of Uranyl with Humic Substances Studied by Fluorescence Spectroscopy”<br>Master of Engineering |
| 2002 - 2004 | Doctoral course at the Department of Quantum Engineering and Systems Science, The University of Tokyo.<br>Studying for one year at the Laboratory of Physical Chemistry and Colloid Science, Wageningen University, the Netherlands. Supervisor: Prof. Luuk K. Koopal. |

Thesis: “Metal Binding to Natural Colloids: Extension from Binary to Ternary Systems”

Doctor of Engineering

Job history

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| 2005 | Post-doctoral researcher at Department of Quantum Engineering and Systems Science, School of Engineering, the University of Tokyo. |
| 2006 | Research associate at Department of Quantum Engineering and Systems Science, School of Engineering, the University of Tokyo. |
| 2007 | Assistant professor at Department of Quantum Engineering and Systems Science, School of Engineering, the University of Tokyo. |
| 2008 - 2012 | Assistant professor at Department of Nuclear Engineering and Management, School of Engineering, the University of Tokyo. |
| 2013 | Lecturer at Nuclear Professional School, School of Engineering, the University of Tokyo. |
| 2014 - 2015 | Researcher, Advance Science Research Center, Japan Atomic Energy Agency. |
| 2015-2022 | Associate Professor, Nuclear Professional School, School of Engineering, The University of Tokyo |
| 2022-present | Professor, Nuclear Professional School, School of Engineering, The University of Tokyo |

Award

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| 2010.6 | Poster Award, IAP (Interface Against Pollution) 2010 conference, Beijing, China<br>Saito, T., “Effects of Humate-surface Interaction on Metal Adsorption: EXAFS study on the Uranyl/Humic acid/Goethite System” |
| 2014.3 | Good Presentation Award, Subcommittees of Nuclear Fuel Cycle and Environment, Japan Atomic Energy Agency, 2014.3.<br>Saito, T., Terashima, M., “Ion complexation and chemical structures of deep underground humic substances”, Japan Atomic Energy Agency, Spring meeting. |

External funding history

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| 2007 - 2009 | Grant-in-Aid for Young Scientists (A), Japan Society for the Promotion of Science<br>“Environmental behaviors of radionuclides by dynamic speciation techniques”<br>23,660,000 JPY (in total) |
| 2010 - 2012 | Basic and important technologies for nuclear waste disposal, Radioactive Waste Management Funding and Research Center<br>“Research on natural colloids in groundwater by field-flow fractionation”<br>9,410,285 JPY (in total) |
| 2010 - 2013 | Research on complexation parameters of organic matters, Mitsubishi Materials<br>7,300,000 JPY (in total) |
| 2013 - 2014 | Grant-in-Aid for Young Scientists (B), Japan Society for the Promotion of Science<br>“Structures, metal binding, origin of natural organic matters in deep underground water”<br>3,300,000 JPY (in total) |

2015 - 2018 Grant-in-Aid (B), Japan Society for the Promotion of Science
"Sorption and desorption dynamics of cesium by chemical and radiation imaging"
15,770,000 JPY (in total, in FY2015)

2018 - 2020 Grant-in-Aid (B), Japan Society for the Promotion of Science
"Variety of natural organic materials in deep underground water and their impacts on radionuclide transport"
13,600,000 JPY (in total)

2018 - 2020 Projects for nuclear science and technology and human resource development, MEXT
"Identification of fuel debris alternation by laser fluorescence spectroscopy"
28,982,000 JPY (in total)

2021 - 2023 Grant-in-Aid (B), Japan Society for the Promotion of Science
"Understanding barrier performance of Preneogene sedimentary rocks"
13,650,000 JPY (in total)

Research interests

- Chemodynamics and migration of radionuclides in environments including deep groundwater and soils
  - Size and elemental distribution of nano colloids in deep groundwater
  - Chemical dynamics and migration of radionuclides in real contaminated soils
- Modeling of the interaction between metal ions including actinides and radionuclides and natural reactants such as small inorganic and organic ligands, humic substances and mineral surface
- Development of advanced speciation techniques using laser spectroscopy and field-flow fractionation technique
- Ion migration and water dynamics in micro-structures of compacted bentonite

Areas of expertise

*Academic fields*

- Nuclear engineering, especially, fuel cycle and waste management
- Geochemistry
- Radiochemistry
- Colloid Science
- Physical chemistry

*Technical experience*

- Spectroscopy: UV/Vis, FTIR including ATR methods, fluorescence.
- Laser spectroscopy: time-resolved laser fluorescence spectroscopy, laser raman spectroscopy, dynamic light scattering.
- X-ray absorption spectroscopy: XANES, EXAFS.
- Powder X-ray diffraction and small-angle X-ray scattering (SAXS).
- Chromatography: ion chromatography, liquid chromatography, field-flow fractionation.
- ICP-MS, AES.

- Electrophoresis for zeta potential measurement.
- Electrochemistry: potentiometric titration, voltammetry (CV, ASV, CSV).
- Radiation detection: HPGe detector, liquid scintillation counter.

- Numerical calculation: MATLAB (more than 10-year experience).
- Statistical analysis: PCA, PLS, factor analysis including multi-mode factor analysis.
- Molecular simulation: molecular orbital calculation with the Gaussian code, density functional theory calculation with the Gaussian and ADF codes.

- Synthesis, purification and handling of humic substances and minerals.
- Handling of field samples (soil and ground water).
- Handling of radioisotopes and actinide elements.

*Management and administrative skills*

- System administrator in the laboratory and departments: Linux, Windows, Mac.
- Web administrator in the laboratory and department.

*Language*

- English: Writing and speaking

Teaching experiences

*Undergraduate teaching*

- "Laser, beam, and plasma: application of energy science to daily life", College of Arts and Science, The University of Tokyo, 2013 (Japanese).
- "Basics of Safety Science", Department of Systems Innovation, Faculty of Engineering, The University of Tokyo, 2013 (Japanese).
- "Nuclear Energy Engineering", Department of Systems Innovation, Faculty of Engineering, The University of Tokyo, 2013 (Japanese).
- Tutor and supervisor of the undergraduate theses in Department of Quantum Engineering and Systems Science and Department of Systems Innovation, Faculty of Engineering, The University of Tokyo, 2003 - present.
- Supervisor of the exercise courses of the Department of Systems Innovation, The University of Tokyo, 2011-2013.

*Graduate teaching*

- "System Safety", Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, 2013 (English).
- "Chemistry in Nuclear Engineering", Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, 2013 (English).

- *"*Advanced Lecture on Nuclear Fuel Cycle", Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, 2013 (English).
- *"*Introduction to Nuclear Engineering", Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, 2013 (English).
- *"*Advanced Radiation Engineering", Department of Nuclear Engineering and Management, School of Engineering, The University of Tokyo, 2013 (English).
- "Advanced Modeling E" , Department of Nuclear Engineering and Management, School of Engineering, the University of Tokyo, 2008 (English).
- "Nuclear Fuel Cycle Engineering", Nuclear Professional School, School of Engineering, The University of Tokyo, 2010 - 2013 (Japanese).
- "Nuclear Waste Management", Nuclear Professional School, School of Engineering, The University of Tokyo, 2013 (Japanese).
- Co-supervisor of the master and doctor theses of the Department of Quantum Engineering and Systems Science and Department of Nuclear Engineering and Management, School of Engineering, the University of Tokyo, 2003 - present.

  16 master-course and 3 doctor-course students.

Professional activities

*Consulting*

- Technical advisory committee, Nuclear Waste Management Organization of Japan (NUMO). Apr 2015 - present
- Review committee for "Implementation of Safe Geological Disposal in Japan", Nuclear Waste Management Organization of Japan (NUMO).
  Oct 2010 – Mar 2011
- Advisory committee for "Radionuclides in sea and groundwater due to the Fukushima Daiichi Nuclear Power Plant", Tokyo Electric Power Company (TEPCO).
  May 2013 - Feb 2014

Publications

(* Corresponding author)

(1) Miyazaki, K., Tkehara, M., Minomo, K., Horie, K., Takehara, M., Yamasaki, S., Saito, T., Ohnuki, T., Takano, M., Shiotsu, H., Iwata, H., Vettese, G. F., Sarparanta, M. P., Law, G. T. W., Grambow, B., Ewing, R. C., Utsunomiya, S., ""Invisible" radioactive cesium atoms revealed: Pollucite inclusion in cesium-rich microparticles (CsMPs) from the Fukushima Daiichi Nuclear Power Plant", *J. Hazard. Mater.* **470**, 134104 (2024).

(2) Yıldırım, A. C., Toda, K., Saito, T., "Determination of the sorption mechanisms of sodium-alkalinized metakaolin-based geopolymers", *Appl. Clay Sci.*, **251**, 107303 (2024).

(3) Mei, H., Aoyagi, N., Saito, T., Tanaka, K., Sugiura, Y., Tachi, Y., "U(VI) sorption on illite in the presence of carbonate studied by cryogenic time-resolved laser fluorescence spectroscopy and parallel factor analysis", *Appl. Geochem.*, **162**, 105926 (2024).

(4) Saito, T.*, Nishi, S., Amano, Y., Beppu, H., Miyakawa, K., "Origin of dissolved organic matters in deep groundwater of marine deposits and its implication for metal binding", *ES&T Water*, **3**,

4103-4112 (2023).

(5) Racette, J., Walker, A., Nagasaki, S., Yang, T. T., Saito, T., Vilks, P., “Influence of Ca–Na–Cl Physicochemical Solution Properties on the Adsorption of Se(-II) onto Granite and MX-80 Bentonite to Support the Post-Closure Safety Assessment of a Used Nuclear Repository in Crystalline Rock”, *Nucl. Eng. Technol.*, **55**, 3831-3843 (2023).

(6) Saito, T.*, Motokawa, R., Ohkubo, T., Miura, D., Kumada, T., “Heterogeneous Aggregation of Humic Acids Studied by Small-Angle Neutron and X-ray Scattering”, *Environ. Sci. Technol.*, **57**, 9802–9810 (2023).

(7) Murota, K.*, Takahashi, Y., Saito, T., “Adsorption of cesium and strontium on mesoporous silicas”, *Phys. Chem. Chem. Phys.*, **25**, 16135-16147 (2023).

(8) Murota, K.*, Aoyagi, N., Mei, H., Saito, T., “Hydration states of europium(III) adsorbed on silicas with nano-sized pores”, Appl. Geochem. 152, 105620 (2023).

(9) Wang, Y., Saito, T., Fakhreddine, S., Nagasaki, S., “Mechanisms of Selenate Adsorption at the Imogolite-Water Interface”, *Colloid Surf. A* **656**, 130444 (2022).

(10) Rizaal, M.*, Nakajima, K., Saito, T., Osaka, M., and Okamoto, K., "High-Temperature Gaseous Reaction of Cesium with Siliceous Thermal Insulation: The Potential Implication to the Provenance of Enigmatic Fukushima Cesium-Bearing Material", *ACS Omega* **7**, 29326–29336 (2022).

(11) Toda, K.*, Minato, D., Saito, T., Kikuchi, R., Otake, T., Sato, T., “Effects of lignosulfonate on synthesis products of the pozzolanic reaction”, *Cement* **9**, 100042 (2022).

(12) Murota, K.*, Saito, T., “Pore size effects on surface charges and interfacial electrostatics of mesoporous silicas”, *Phys. Chem. Chem. Phys.* **24**, 18073-18082 (2022).

(13) Fueda, K., Takami, R., Minomo, K., Morooka, K., Horie, K., Takehara, M., Yamasaki, S., Saito, T., Shiotsu, H., Ohnuki, T., Law, G. T. W., Grambow, B., Ewing, R. C., Utsunomiya, S., “Volatilization of B4C control rods in Fukushima Daiichi nuclear reactors during meltdown: B–Li isotopic signatures in cesium-rich microparticles”, *J. Haz. Mat.* **428**, 128214 (2022).

(14) Mei, H., Aoyagi, N., Saito, T., Kozai, N., Sugiura, Y., Tachi, Y., “Uranium (VI) sorption on illite under varying carbonate concentrations: Batch experiments, modeling, and cryogenic time-resolved laser fluorescence spectroscopy study”, *Appl. Geochem.* **136**, 105178 (2022).

(15) Koopal, L. K., Xiong, J., Wenfeng, T., Saito, T., Avena, M., “Proton binding to humic nano particles: Electrostatic interaction and the condensation approximation”, *Phys. Chem. Chem. Phys.* **24**, 704-714 (2022).

(16) Nakano, S.; Marumo, K.; Kazami, R.; Saito, T.; Haraga, T.; Tasaki-Handa, Y.; Saito, S., “Stoichiometry between Humate Unit Molecules and Metal Ions in Supramolecular Assembly Induced by Cu2+ and Tb3+ Measured by Gel Electrophoresis Techniques. Environ Sci Technol 55, 15172-15180 (2021).

(17) Zhou, Q.,* Saito, T., Suzuki, S., Yano, K., Suzuki, S., “Microparticles with diverse sizes and morphologies from mechanical and laser cutting of fuel debris simulants and geopolymer as a covering material”, *J. Nucl. Sci. Technol.* **58**, 461-472 (2021).

(18) Murota, K., Tanoi, K., Ochiai, A., Utsunomiya, T., Saito, T., “Desorption mechanisms of cesium from illite and vermiculite”, *Appl. Geochem.* **123**, 104768 (2020).

(19) Saeki, M.*, Yomogida, T., Matsumura, D., Saito, T., Nakanishi, R., Tsuji, T., Ohba, H., “Application of augmentation method to MCR-ALS analysis for XAFS and Raman data matrices in structural change of isopolymolybdates”, *Anal. Sci.* **36**, 1371-1378 (2020).

(20) Rizaal, M., Saito, T., Okamoto, K., Erkan, N., Nakajima, K., Osaka, M., “Room-temperature adsorption behavior of cesium onto calcium silicate insulation”, *Mech. Eng. J.* **7**, 19-00563-19-00563 (2020).

(21) Zhang, X.*, Okamoto, K., Erkan, N., Saito, T., “Experimental study on the effects of fine bubbles

on polydisperse submicron aerosol removal efficiency during pool scrubbing", *Mech. Eng. Lett.*, 6, 19-00655 (2020).

(22) Rizaal, M.*, Nakajima, K., Saito, T., Osaka, M., Okamoto, K., "Investigation of high temperature chemical interaction of calcium silicate insulation and cesium hydroxide", *J. Nucl. Sci. Technol.* **57**, 1062-1073 (2020).

(23) McGrady, J.*, Yamashita, S., Kimura, A., Kano, S., Yang, H., Duan, Z, Saito, T., Abe, H., "γ-radiation effects on metal oxide particles and their wetted surfaces", *J. Nucl. Sci. Technol.* **57**, 463-471 (2020).

(24) Marumo, K., Matsumoto, A., Nakano, S., Shibukawa, M., Saito, T., Haraga, T., Saito, S.*, "Advanced Gel Electrophoresis Techniques Reveal Heterogeneity of Humic Acids Based on Molecular Weight Distributions of Kinetically Inert $Cu^{2+}$–Humate Complexes", *Environ. Sci. Technol.* **53**, 14507-14515 (2019).

(25) Kato, T.*, Yu, Q., Tanaka, K., Kozai, N., Saito, T., Ohnuki, T., "Reduction behaviors of permanganate by microbial cells and concomitant accumulation of divalent cations of $Mg^{2+}$, $Zn^{2+}$, and $Co^{2+}$", J. Environ. Sci. 86, 78-86 (2019).

(26) Kobayashi, T., Nakajima, S., Motokawa, R., Matsumura, D., Saito, T., Sasaki, T., "A Structural Approach to Understanding the Solubility of Metal Hydroxides", *Langmuir* **35**, 7795-8006 (2019).

(27) Kimuro, S.*, Kirishima, A., Nagao, S., Saito, T., Amano, Y., Miyakawa, K., Akiyama, D., Sato, N., "Characterization and thermodynamic study of humic acid in deep groundwater at Horonobe, Hokkaido, Japan", *J. Nucl. Sci. Technol.* **55**, 503-515 (2018).

(28) Nagasaki, S.*, Riddoch, J., Saito, T., Goguen, J., Walker, A., Yang, T., "Sorption behaviour of Np(IV) on illite, shale and MX-80 in high ionic strength solutions", *J. Radioanal. Nucl. Chem.* **313**, 1-11 (2017).

(29) Saito, T.*, Aoyagi, N., Terashima, M., "Europium binding to humic substances extracted from deep underground sedimentary groundwater studied by time-resolved laser fluorescence spectroscopy", *J. Nucl. Sci. Technol.* **54**, 444-451 (2017).

(30) Daryakenari, A. D., Hosseini, D., Ho, Y. L., Saito., T., Apostoluk, A., Mueller, C. R., Delaunay, J. J.*, "Single-Step Electrophoretic Deposition of Non-Noble Metal Catalyst Layer with Low Onset Voltage for Ethanol Electro-oxidation", *ACS Appl. Mater. Interfaces* **8**, 15975-15984 (2016).

(31) Fujiwara, T., Mitsuya, Y., Yanagida, T., Saito, T., Toyokawa, H., Takahashi, H., "High-photon-yield scintillation detector with Ar/CF4 and glass gas electron multiplier", Jpn. J. Appl. Phys. 55, 106401–106404 (2016).

(32) Nagasaki, S.*, Saito, T., Yang, T., "Sorption behavior of Np(V) on illite, shale and MX-80 in high ionic strength solutions", *J. Radioanal. Nucl. Chem.* **308**, 143-153 (2016).

(33) Sasaki, T*, Ueda, K., Saito, T., Aoyagi, N., Kobayashi, T., Takagi, I., Kimura, T., Tachi, Y., "Sorption of $Eu^{3+}$ on Na-montmorillonite studied by time-resolved laser fluorescence spectroscopy and surface complexation modeling", *J. Nucl. Sci. Technol.* **53**, 592-601 (2016).

(34) Murota, K., Saito, T.*, and Tanaka, S., "Desorption kinetics of cesium from Fukushima soils", *J. Environ. Radioact.* **153**, 134-140 (2016).

(35) Saito, T.*, Terashima, M., Aoyagi, N., Nagao, S., Fujitake, N., Ohnuki, T., "Physicochemical and ion-binding properties of highly aliphatic humic substances extracted from deep sedimentary groundwater", *Env. Sci. Process. Impact* **17**, 1386-1395 (2015).

(36) Yamashita, Y.*, Saito, T., "Effects of weak organic acids on the size distribution and size-dependent metal binding of humic substances as studied by flow field-flow fractionation", *J. Environ. Chem. Eng.* **3**, 3024-3029 (2015).

(37) Daryakenari, A. A., Hosseini, D., Saito, T., Apostoluk, A., Muller, C. R., Delaunay, J.-J.*,

"Ethanol electro-oxidation on nanoworm-shaped Pd particles supported by nanographitic layers fabricated by electrophoretic deposition", *RSC Advances* **5**, 52578-52587 (2015).

(38) Saito, T.*, Hamamoto, T., Mizuno, T., Iwatsuki, T., Tanaka, T., "Comparative study of granitic and sedimentary groundwater colloids by flow field flow fractionation coupled with ICP-MS", *J. Anal. At. Spectrom.* **30**, 1229-1236 (2015).

(39) Saito, T.*, Aoyagi, N., Kimura, T., "Time-resolved laser-induced fluorescence spectroscopy combined with parallel factor analysis: a robust speciation technique for $UO_2^{2+}$", *J. Radioanal. Nucl. Chem.* **303**, 1129-1132 (2015).

(40) Saito, T.*, Makino, H., Tanaka, S., "Geochemical and grain-size distribution of radioactive and stable cesium in Fukushima soils: implications for their long-term behavior", *J. Environ. Radioact.* **138**, 11-18 (2014).

(41) Shimojo, K.*, Nakai, A., Okamura, H., Saito, T., Ohashi, A., Naganawa, H., "Comprehensive Extraction Study using N,N-Dioctyldiglycolamic Acid", *Anal. Sci.*, **30**, 513-517 (2014).

(42) Shimojo, K.*, Aoyagi, N., Saito, T., Okamura, H., Kubota, F., Ohashi, A., Naganawa, H., "Highly Efficient Extraction Separation of Lanthanides Using a Diglycolamic Acid Extractant", *Anal. Sci.* **30**, 263-269 (2014).

(43) Abdelouas, A.*, El Mendili, Y., Aït Chaou, A., Karakurt, G., Hartnack, C., Bardeau, J., Saito, T., Matsuzaki, H., "A Preliminary Investigation of the ISG Glass Vapor Hydration", I*nt. J. Appl. Glass Sci.* **4**, 307-316 (2013).

(44) Niida, K.*, Saito, T., Tanaka, S., "Comparison of uranyl adsorption on $Fe^{3+}$ oxyhydroxide colloids", *Chem. Let.* **42**, 1380-1382 (2013).

(45) Saito, T.*, Suzuki, Y., Mizuno, T., "Size and elemental analyses of nano colloids in deep granitic groundwater: Implications for transport of trace elements", *Colloids Surf. A* **435**, 48-55 (2013).

(46) Tsubaki, H., Saito, T., Murakami, T.*, "Size distribution of ferrihydrite aggregate and its implication for metal adsorption and transport", *J. Miner. Petrol. Sci.* **107**, 244-249 (2012).

(47) Okamura, H., Ikeda-Ohno, A., Saito, T., Aoyagi, N., Naganawa, H., Hirayama, N., Umetani, S., Imura, H., Shimojo, K.*, "Specific Cooperative Effect of a Macrocyclic Receptor for Metal Ion Transfer into an Ionic Liquid", *Anal. Chem.* **84**, 9332-9339 (2012).

(48) Miyake, Y.*, Matsuzaki, H., Fujiwara, T., Saito, T., Yamagata, T., Honda, M., Muramatsu, Y., "Isotopic ratio of radioactive iodine ($^{129}I/^{131}I$) released from Fukushima Daiichi NPP accident", *Geochem. J.* **46**, 327–333 (2012).

(49) Sakai, M.*, Shigeto, Y., Sun, X., Aoki, T., Saito, T., Xiong, J., Koshizuka, S., "Lagrangian-Lagrangian modeling for a solid-liquid flow in a cylindrical tank", *Chem. Eng. J.* **200-202**, 663–672 (2012).

(50) Fujiwara, T.*, Saito, T., Muroya, Y., Sawahata, H., Yamashita, Y., Nagasaki, S., Okamoto, K., Takahashi, H., Uesaka, M., Katsumura, Y. and Tanaka, S., "Isotopic ratio and vertical distribution of radionuclides in soil affected by the accident of Fukushima Dai-ichi nuclear power plants", *J. Environ. Radioact.* **113**, 37-44 (2012).

(51) Lukman, S., Saito, T.*, Aoyagi, N., Kimura, T. , Nagasaki, S., "Speciation of $Eu^{3+}$ Bound to Humic Substances by Time-Resolved Laser Fluorescence Spectroscopy (TRLFS) and Parallel Factor Analysis (PARAFAC)", *Geochim. Cosmochim. Acta* **88**, 199-215 (2012).

(52) Ishida, K., Saito, T.*, Aoyagi, N., Kimura, T., Nagaishi, R., Nagasaki, S., Tanaka, S., "Surface Speciation of $Eu^{3+}$ Adsorbed on Kaolinite by Time-Resolved Laser Fluorescence Spectroscopy (TRLFS) and Parallel Factor Analysis (PARAFAC)", *J. Colloid Interface Sci.* 374 (1), 258-266 (2012).

(53) Okamura, H., Sakae, H., Kidani, K., Hirayama, N., Aoyagi, N., Saito, T., Shimojo, K., Naganawa, H.,Imura, H.*, "Laser-induced fluorescence and infrared spectroscopic studies on

the specific solvation of tris (1-(2-thienyl)-4,4,4-trifluoro-1,3-butanedionato) europium(III) in an ionic liquid", *Polyhedron* **31** (1), 748-753 (2012).

(54) Collins, R. N.*, Saito, T., Aoyagi, N., Payne, T. E., Kimura, T., Waite, T. D., "Application of Time-Resolved Laser Fluorescence Spectroscopy to the Environmental Biogeochemistry of Actinides", *J. Environ. Qual.* **40** (3), 731-741 (2011).

(55) Saito, T.*, Sao, H., Ishida, K., Aoyagi, N., Kimura, T., Nagasaki, S., Tanaka, S., "Application of Parallel Factor Analysis for Time-Resolved Laser Fluorescence Spectroscopy: Implication for Metal Speciation Study", *Environ. Sci. Technol*. **44**, 5055-5060 (2010).

(56) Hattori, T.*, Saito, T., Ishida, K., Scheinost, A. C., Tsuneda, T., Nagasaki, S., Tanaka, S., "The Structure of Monomeric and Dimeric Uranyl Adsorption Complexes on Gibbsite: A Combined DFT and EXAFS Study", *Geochim. Cosmochim. Acta* **73**, 5975-5988 (2009).

(57) Saito, T.*, Koopal, L. K., Nagasaki, S., Tanaka, S., "Electrostatic Potentials of Humic Acid: Fluorescence Quenching Measurements and Comparison with Model Calculations", *Colloids Surf. A* **347**, 27-32 (2009).

(58) Ishida, K.*, Kimura, T., Saito, T., Tanaka, S., "Adsorption of Eu(III) on a Heterogeneous Surface Studied by Time-Resolved Laser Fluorescence Microscopy (TRLFM)", *Environ. Sci. Technol*. **43**, 1744-1749 (2009).

(59) Saito, T.*, Koopal, L. K., Nagasaki, S., Tanaka, S., "Adsorption of Heterogeneously Charged Nanoparticles on a Variably Charged Surface by the Extended Surface Complexation Approach: Charge Regulation, Chemical Heterogeneity and Surface Complexation", *J. Phys. Chem. B* **112**, 1339-1349 (2008).

(60) Takenaka, Y.*, Saito, T., Nagasaki, S., Tanaka, S., Kozai N., Ohnuki, T., "Metal sorption to Pseudomonas fluorescens: Influence of pH, ionic strength and metal concentrations." *Geomicrobiol. J.* **24**, 205-210 (2007).

(61) Koopal, L. K.*, Saito, T., Pinheiro, J. P., van Riemsdijk, W. H., "Ion binding to natural organic matter: General considerations and the NICA–Donnan model", *Colloids Surf. A* **265**, 40-54 (2005).

(62) Saito, T.*, Nagasaki, S., Tanaka, S., Koopal, L. K., "Electrostatic Interaction Models for Ion Binding to Humic Substances", *Colloids Surf. A* **265**, 104-113 (2005).

(63) Saito, T.*, Nagasaki, S., Tanaka, S., Koopal, L. K.:, "Analysis of Copper Binding in the Ternary System $Cu^{2+}$/Humic Acid/Goethite at Neutral to Acidic pH", *Environ. Sci. Technol.* **39**, 4886-4893 (2005).

(64) Saito, T.*, Nagasaki, S., Tanaka, S., Koopal, L. K., "Application of the NICA-Donnan model for proton, copper and uranyl binding to Humic Acid", *Radiochim. Acta* **92**, 567-574 (2004).

(65) Saito, T.*, Koopal, L. K., van Riemsdijk, W. H., Nagasaki, S., Tanaka, S., "Adsorption of humic acid on goethite: Isotherms, charge adjustments, and potential profiles." *Langmuir* **20**, 689-700 (2004).

(66) Nagasaki, S.*, Saito, T., Tanaka, S., "Influence of Heterogeneity of Biding Sites of Humic Acid on its Complexation with Actinyl Ions", J. Nuclear Sci. Technol., Suppl. 3, 466-472 (2003).

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Books

(1) Aoyagi, N., Saito, T., “Luminescence spectroscopy as versatile probes for chemical diagnostics on the solid-liquid interface”, in Laser Surface Engineering. Processes and Applications, Lawrence J., Waugh D. G. eds., Woodhead publishing, Cambridge, 2014.

(2) Tanoi, K., Nobori, T., Shiomi, S., Saito, T., Kobayashi, N. I., Leonhardt, and N., Nakanishi, T. M., “Cesium Translocation in Rice” in Agricultural Implications of the Fukushima Nuclear Accident (III). After 7 years, Nanishi, T. M., O`Brien, M., and Tanoi, K., eds., Springer, Sinpapore, 2019.

Talks in international conferences

*Invited & keynote talk*

(1) Saito, T., “Origin and Ion Binding Properties of Dissolved Organic Matters in Deep Sedimentary Groundwater studied by EEM and FT-ICR-MS”, keynote lecture, ISBEC 2023, Tsukuba, Japan, 2023.3.

(2) Saito, T., Motokawa, R., Kumada, T., “Aggregation structures of humic substances studied by small-angle X-ray and neutron scattering”, TGSW2020 (Tsukuba Global Science Week 2020, online, 2020.9.

(3) Saito, T., “Humic substances in deep sedimentary groundwater”, invited talk, Japan Geoscience Union (JpGU) Meeting 2019, Chiba, Japan, 2019.5.

(4) Saito, T., “Cadmium binding and formation of nano-sized particles with humic acid extracted from deep sedimentary groundwater”, Keynote lecture, IAP 2018, La Grande Motte, France, 2018.7.

(5) Saito, T., “Ion-binding properties of humic substance in deep sedimentary groundwater”, Keynote lecture, IAP2016, Lleida, Spain, 2016.9.

(6) Saito, T., “Application of multi-mode factor analysis as a robust data reduction tool for time-resolved laser fluorescence spectroscopy”, invited talk, International Workshop on Advanced Techniques for Actinide Spectroscopy (ATAS 2012), Dresden, Germany, 2012.11.

(7) Saito, T., ” Actinide Adsorption at Solid-Liquid Interfaces: Current Status and Future Challenges”, invited talk, PACIFICHEM 2010 (2010 INTERNATIONAL CHEMICAL CONGRESS OF PACIFIC BASIN SOCIETIES), Honolulu, Hawaii, 2010.12.

*Oral presentation*

(8) Saito, T., Nishi, S., Sato, H., Toda, K., Miyakawa, K., “REVEALING THE ORIGIN AND ION-BINDING PROPERTIES OF DISSOLVED ORGANIC MATTTERS IN DEEP SEDIMENTARY GROUNDWATER”, Migration 2023, Nantes, 2023.9.

(9) Mei, H., Aoyagi, N., Saito, T., Sugiura, Y., Ishidera, T., Tanaka, K., Tachi, Y., “U(VI) SORPTION ON ILLITE IN THE PRESENCE OF CARBONATE STUDIED BY CRYOGENIC TIMERESOLVED LASER FLUORESCENCE SPECTROSCOPY AND PARALLEL FACTOR NALYSIS: COMPARISON WITH TRIVALENT LANTHANIDES”, Migration 2023, Nantes, 2023.9.

(10) Nishi, N., Toda, K., Saito, T., “Origin and ion binding properties of dissolved organic matters in deep sedimentary groundwater”, IAP 2022, Antwarp, 2022.9.

(11) Murota, K., Saito, T., “Unique sorption of Cs and Sr onto mesoporous silicas” , IAP 2022, Antwarp, 2022.09.

(12) Yildirim, A. C., Toda, K., Aoyagi, N., Saito, T., “Modeling of Cs+, Sr2+ and Eu3+ Sorption to Sodium-Activated Metakaolin-Based Geopolymers”, IAP 2022, Antwarp, 2022.9.

(13) Saito, T., Tanaka, T., Fukuoka, M., “Lability of radioactive cesium in soil and aqueous environemnts of Fukushima studied by Cs-DGT”, PACIFICHEM 2021, online, 2021.12.

(14) Saito, T., Motokawa, R., Kumada, T., “Hierarchical aggregation structures of humic acid by small-angle X-ray and neutron scattering”, IAP 2021, online, 2021.5.

(15) Kobayashi, T., Nakajima, S., Nishikawa, S., Motokawa, R., Saito, T., Sasaki, T., “Solubility Limiting Solid Phase in Zr(IV)/Th(IV) Hydroxide System under Elevated Temperature: Solubility and SWAXS Study”, Migration 2017, Barcelona, Spain, 2017.9.

(16) Saito, T., “$Eu^{3+}$ binding to deep groundwater humic substances studied by time resolved laser fluorescence spectroscopy and factor analysis”, International Workshop on Advanced Techniques for Actinide Spectroscopy (ATAS 2014), Dresden, Germany, 2014.11.

(17) Sasaki, T., Ueda, K., Saito, T., Aoyagi, N., Kobayashi, T., Takagi, I., Kimura, T., Tachi, Y., “Sorption of Eu3+ on montmorillonite studied by time-resolved laser fluorescence spectroscopy and surface complexation modeling”, International Workshop on Advanced Techniques for Actinide Spectroscopy (ATAS 2014), Dresden, Germany, 2014.11.

(18) Saito, T., Aoyagi, N., Kimura, T., “Application of multi-mode factor analysis for time-resolved laser fluorescence spectroscopy to study radionuclide interaction with minerals and natural organic materials”, 248th ACS National Meeting, San Francisco, 2014.8.

(19) Saito, T., Mizuno, T., “Size And Elemental Analyses of Nano-Colloids in Deep Granitic Groundwater: Implications for Transport of Trace Elements”, IAP2012, Nancy, France, 2012.6.

(20) Ishida, K., Kimura, T., Saito, T. and Tanaka, S., “Adsorption of Eu(III) on A Heterogeneous Surface Studied by Time-Resolved Laser Fluorescence Microscopy (TRLFS)”, Migration ’09, Kennewich, USA, 2009.9.

(21) Saito, T., Hattori, T., Nagasaki, S.,Tanaka, S., “Effects of Protonation and Hydrogen Bonding of Surface Hydroxyl Sites on Uranyl Sorption to Gibbsite: Comparison between DFT and EXAFS”, Migration ’09, Kennewich, USA, 2009.9.

(22) Takahashi, M., Kawasaki, D., Saito, T., Shimizu, I., Nagasaki, S., Tanaka, S., ”Studies on matrix diffusion of colloid in a fractured medium”, IAP 2008, Kyoto, Japan, 2008.6.

(23) Saito, T., Nagasaki, S., Tanaka, S., “Evaluation of the electrostatic potential of a humic acid molecule by a fluorescence quenching technique”, IAP 2008, Kyoto, Japan, 2008.6.

(24) Saito, T., Nagasaki, S., Tanaka, S., Koopal, L. K., “Effects of Humic Acid-Oxide Interaction on Proton and Metal Ion Binding to the Complex of Both Colloids”, IAP2006, Granada, Spain, 2006.6.

(25) Saito, T., Nagasaki, S., Tanaka, S., Koopal, L. K., ”Metal Binding to Natural Colloids: Extension from Binary to Ternary Systems”, PACIFICHEM 2005 (2005 INTERNATIONAL CHEMICAL CONGRESS OF PACIFIC BASIN SOCIETIES), Honolulu, Hawaii, 2005.12.

(26) Saito, T., Nagasaki, S., Tanaka, S., Koopal, L. K., “Electrostatic Interaction Models for Ion Binding to Humic Substances", IAP 2004, Jülich, Germany, 2004.5.

(27) Saito, T., Nagasaki, S., Tanaka, S., “Molecular Fluorescence Spectroscopy and Mixture Analysis for the Evaluation of the Complexation between Humic Acid and $UO_2^{2+}$.”, Migration ’01, Bregenz, Austria, 2001.9.

*Poster presentation*

(28) Sugiura, Y., Ishidera, T., Aoyagi, N., Mei, H., Saito, T., Tachi, Y., “TRIVALENT LANTHANIDES SORPTION ONTO ILLITE IN THE PRESENCE OF CARBONATE”, Migration 2023, Nantes, 2023.9.

(29) Hou, L., Toda, K., Saito, T., “METAL IONS ADSORPTION AND MODELING ON A PRENEOGENESEDIMENTARY ROCK”, Migration 2023, Nantes, 2023.9.

(30) Yildirim, A. C., Toda, K., Saito, T., “METAL ION DIFFUSION THROUGH METAKAOLIN-BASED GEOPOLYMER”, Migration 2023, Nantes, 2023.9.

(31) Toda, K., Saito, T., “Influence of humic acid to structure of matrices in cementitious materials”,

IAP 2022, Antwarp, 2022.09.

(32) Fukuoka, M., Saito, T., “Evaluation of labile Cs-137 in contaminated environments by diffusive gradients in thin films”, Migration 2019, Kyoto, Japan, 2020.9.

(33) Aoyagi, N., Motokawa, R., Saito, T., Okumura, A., Ikeda-Ohno, A., “ON FORMING “GIANT CLUSTERS” IN AN ACIDIC SOLUTION OF Ce(IV) NITRATES”, Migration 2019, Kyoto, Japan, 2020.9.

(34) Hamamoto, T., Ishida, K., Saito, T., Fujisaki, K., “UNCERTAINTY ON Kd SETTING WITH NUMERICAL SORPTION MODEL”, Migration 2019, Kyoto, Japan, 2020.9.

(35) Saito, T., Murota, K., “Long-term desorption of radioactive cesium from soils and minerals”, Migration 2017, Barcelona, Spain, 2017.9.

(36) Terashima, M., Saito, T., Ito, M., Akagi, Y., Tachi, Y., “LOADING EFFECT ON Eu(III) BINDING ABILITY OF HUMIC ACID ISOLATED FROM DEEP SEDIMENTARY GROUNDWATER ”, Migration 2017, Barcelona, Spain, 2017.9.

(37) Nagasaki, S., Yang, T., Saito, T., Riddoch, J., “SORPTION OF Np(IV) ON ILLITE, SHALE AND MX-80 IN HIGH IONIC STRENGTH SOLUTIONS”, Migration 2017, Barcelona, Spain, 2017.9.

(38) Sasaki, T., Ueda, K., Saito, T., Aoyagi, N., Kobayashi, T., Takagi, I., Kimura, T., Tachi, Y., “Sorption of $Eu^{3+}$ on montmorillonite studied by time-resolved laser fluorescence spectroscopy and surface complexation modeling”, International Workshop on Advanced Techniques for Actinide Spectroscopy (ATAS 2014), Dresden, Germany, 2014.11.

(39) Saito, T., Aoyagi, N.,, Kimura, T., “Time-resolved laser fluorescence spectroscopy combined with parallel factor analysis: a robust speciation technique for $UO_2^{2+}$”, APSORC’13 (5th Asia-Pacific Symposium on Radiochemistry), Kanazawa, Japan, 2013.9.

(40) Niida, K., Saito, T., Tanaka, S., “COMPARISON OF URANYL ADSORPTION ON IRON(III) OXYHYDROXIDES”, Migration ’13, Brighton, United Kingdom, 2013.9.

(41) Hamamoto, T., Saito, T. , Tanaka, S., “SIZE AND ELEMENTAL COMPOSITION ANALYSES OF GRANITIC GROUNDWATER BY FLOW-FIELD FLOW FRACTIONATION”, Migration ’13, Brighton, United Kingdom, 2013.9.

(42) Saito, T., Makino, H., Tanaka, S., “FIXATION AND ITS DYNAMCIS OF RADIOACTIVE CESIUM IN FUKUSHIMA SOILS”, Migration ’13, Brighton, United Kingdom, 2013.9.

(43) Niida, K., Saito, T., Nagasaki, S., “COMPARISON OF RADIONUCLIDES ADSORPTION ON 2-LINE AND 6-LINE FERRIHYDRITES”, Migration ’11, Beijing, China, 2011.9.

(44) Saito, T., “EXAFS INVESTIGATION OF THE EFFECTS OF HUMIC ACID ON URANYL ADSORPTION ON GOETHITE”, Migration ’11, Beijing, China, 2011.9.

(45) Collins, R. N., Aoyagi, N., Saito, T., Payne, T. E., Kimura, T., Waite, T. D., “A LOW TEMPERATURE (77 K) TIME-RESOLVED LASER FLUORESCENCE SPECTROSCOPY STUDY ON THE AQUEOUS SPECIATION OF U(VI) IN THE PRESENCE OF FERRIHYDRITE AND CITRATE”, Migration ’11, Beijing, China, 2011.9.

(46) Lukman, S., Saito, T., Nagasaki, S. , Kimura, T., “INVESTIGATION OF EUROPIUM(III) SPECIATION WITH HUMIC SUBSTANCES FROM VARIOUS ORIGINS: APPLICATION OF TRLFS-PARAFAC”, Migration ’11, Beijing, China, 2011.9.

(47) Saito, T., Aoyagi, N., Kimura, T.: Nagasaki, S., Tanaka, S., “Complexation of $Eu^{3+}$ with humic substances studied by time-resolved laser fluorescence spectroscopy and parallel factor analysis”, Goldschmidt 2011, Prague, Czech Republic, 2011.8.

(48) Saito, T., Aoyagi, N., Kimura, T.: Nagasaki, S., Tanaka, S., “Parallel factor analysis for time-resolved laser fluorescence spectroscopy: A powerful tool for speciation studies”, Goldschmidt 2010, Knoxville, USA, 2010.7.

(49) Yamashita, Y., Yamamoto, M., Nagasaki, S., Saito, T., Tanaka, S., “Hydrodynamic size of humic substances with different origin evaluated by flow field flow fractionation”, IAP 2010,

Beijing, China, 2010.6.

(50) Saito, T., “Effects of Humate-surface Interaction on Metal Adsorption: EXAFS study on the Uranyl/Humic acid/Goethite System”, IAP 2010, Beijing, China, 2010.6.

(51) Sao, H., Ishida, K., Saito, T., Aoyagi, N., Nagasaki, S., Tanaka, S., “MULTIVARIABLE FACTOR ANALYSIS FOR TIME-RESOLVED LASER FLUORESCENCE SPECTROSCOPY OF THE URANYL ADSORPTION ON GIBBSITE ”, Migration ’09, Kennewich, USA, 2009.9.

(52) Ishida, K., Saito, T., Aoyagi, N., Kimura, T., Nagasaki, S., Tanaka, S., “STUDY ON THE SURFACE COMPLEXES OF Eu(III) ON KAOLINITE BY TIME-RESOLVED LASER FLUORESCENCE SPECTROSCPY (TRLFS): TRLFS MEASUERMENT IN H2O/D2O SYSTEMS ”, Migration ’09, Kennewich, USA, 2009.9.

(53) Yamamoto, M., Saito, T., Nagasaki, S., Tanaka, S., “SIZE DEPENDENCE OF METAL BINDING TO HUMIC ACID STUDIED BY FIELD-FLOW FRACTIONATION-ICP-MS”, Migration ’09, Kennewich, USA, 2009.9.

(54) Ishida, K., Kimura, T., Saito, T., Toraishi, T., Tanaka, S., ” Fluorescence Lifetime Imaging Microscopy applied for Eu(III) adsorbed on Granite” , IAP 2008, Kyoto, Japan, 2008.6.

(55) Ishida, K., Saito, T., Nagasaki,S., Tanaka, S., “Effect of dissolved silicates on uranyl adsorption on gibbsite”, IAP2006, Granada, Spain, 2006.6.

(56) Saito, T., Nagasaki, S., Tanaka, S., “Limitation of Conventional Thermodynamic Models for Metal Binding in Soil/Aquatic Systems: A New Insight on the Effects of Humic Acid-Oxide interaction”, GLOBAL 2005, Tsukuba, Japan, 2005.10.

(57) Saito, T., Toraishi, T., Nagasaki, S., Tanaka, S., Koopal, L. K., “Stoichiometry for Eu(III) Adsorption on Gibbsite by Time-Resolved Laser-Induced Fluorescence Spectroscopy", IAP 2004, Jülich, Germany, 2004.5.

(58) Saito, T., Nagasaki, S., Tanaka, S., Koopal, L. K., "Application of the NICA-Donnan model for proton, copper and uranyl binding to Humic Acid", Migration '03, Gyeongju, Korea, 2003.9.

(59) Saito, T., Nagasaki, S., Tanaka, S., “Migration of U(VI) associated with organic substances.”, PACIFICHEM 2000 (2000 INTERNATIONAL CHEMICAL CONGRESS OF PACIFIC BASIN SOCIETIES), Honolulu, Hawaii, 2000.12.