

## Curriculum Vitae

### Personal Data:

Surname: Fukuhara  
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### Education:

1998-2002 B.S., (Chemistry), Osaka University, Japan  
2002-2004 M.S., (Chemistry), Osaka University, Japan  
2004-2007 Ph.D., (Chemistry), Osaka University, Japan

### Research Experience:

04/2001-03/2002 Bachelor thesis in organic chemistry supervised by Prof. Yoshiteru Sakata and Associate Prof. Takahiro Kaneda, the Institute of Scientific and Industrial Research, Osaka University, Japan. Title: “*Synthesis and Self-Assembly of Bis- and Tris-Azo Dye-modified Permethyated  $\alpha$ -Cyclodextrins*”

04/2002-03/2004 Master thesis in organic chemistry supervised by Prof. Yoshio Aso and Associate Prof. Takahiro Kaneda, the Institute of Scientific and Industrial Research, Osaka University, Japan. Title: “*Supramolecular Self-Assemblies of Novel Azo Dye-modified Permethyated Cyclodextrins*”

04/2004-03/2007 PhD thesis in organic photochemistry supervised by Prof. Yoshihisa Inoue, Department of Applied Chemistry, Osaka University, Japan. Title: “*Studies on Entropy-Controlled Supramolecular Photochirogenesis with Synthetic and Modified Chiral Hosts*”

04/2007-03/2008	Post-doc fellow supervised by Timothy M. Swager, Department of Chemistry and Institute for Soldier Nanotechnologies, Massachusetts Institute of Technology (MIT), USA. Title: <i>“Chemical Sensors Based on Single-Walled Carbon Nanotube Coated with Polythiophenes”</i>
04/2008-03/2017	Assistant Professor, Researcher and Research Supervisor. Title: <i>“Supramolecular Sensing and Photochemistry with Functional Chiral Polymers”</i>
04/2017-present	Associate Professor, Researcher and Research Supervisor. Title: <i>“Supramolecular Allosteric Amplification-Sensing”</i>
10/2017-3/2021	JST-PRESTO Researcher. Title: <i>“Allosteric Signal-Amplification Sensing”</i>

**Membership in Academic Societies:**

The Chemical Society of Japan  
The Japan Society for Analytical Chemistry  
Japanese Cancer Association  
The Japanese Photochemistry Association  
The Society of Polymer Science, Japan  
The Society of Synthetic Organic Chemistry, Japan

**Principal Research Interests:**

Analytical Chemistry, Supramolecular Chemistry, Molecular and Chiral Recognition,  
Polymer Chemistry, Polysaccharide Chemistry, Sensor Technology

## Publications:

- 1) Wakako, S.; Hori, Y.; Kinoshita, T.; Saiki, T.; Qi, X.; Hasegawa, K.; Imai, Y.; Mori, T.; Nakagawa, K.; **Fukuhara, G.\***: Pressure-Responsive Polymer Chemosensors for Hydrostatic-Pressure-Signal Detection: Poly-L-Lysine-Pyrene Conjugates, *ACS Macro Lett.* **2023**, *12*, 1389-1395. [Supplementary Cover] (*ChemRxiv* doi: 10.26434/chemrxiv-2023-ft59l)
- 2) Mizuno, H.; Nakazawa, H.; Harada, M.; Yakiyama, Y.; Sakurai, H.\*; **Fukuhara, G.\***: Sumanene-stacked supramolecular polymers. Dynamic, solvation-directed control, *Chem. Commun.* **2023**, *59*, 9595-9598. [Outside Back Cover] (*ChemRxiv* doi: 10.26434/chemrxiv-2023-d97rm)
- 3) Nishi, R.; Ishida, Y.; Mizuno, H.; Kawauchi, S.; **Fukuhara, G.\***: Allosteric Signal-Amplification Sensing of Peptides with Cyclodextrin-Polymer Conjugates in Aqueous Media, *ACS Appl. Polym. Mater.* **2023**, *5*, 3653-3660.
- 4) Kinoshita, T.; Nakamura, S.; Harada, M.; Hasobe, T.\*; **Fukuhara, G.\***: Control of intramolecular singlet fission in a pentacene dimer by hydrostatic pressure, *Chem. Sci.* **2023**, *14*, 3293-3301. [Press Release] [Highlighted in Chem-Station] [Eurekalert!]
- 5) Kurohara, H.; Hori, Y.; Numata, M.; **Fukuhara, G.\***: Oligosaccharide Sensing Using Fluorophore-Probed Curdlans in Aqueous Media, *ACS Appl. Polym. Mater.* **2023**, *5*, 2254-2263.
- 6) Suzuki, S.; Homma, A.; Nishi, R.; Mizuno, H.; Kawauchi, S.; **Fukuhara, G.\***: A Dynamically Responsive Chemosensor That Can be Modulated by an Effector: Amplification Sensing by Positive Heterotropic Allosterism, *Bull. Chem. Soc. Jpn.* **2022**, *95*, 1183-1189. [Selected Paper]
- 7) Mizuno, H.; **Fukuhara, G.\***: Solution-State Hydrostatic Pressure Chemistry: Application to Molecular, Supramolecular, Polymer, and Biological Systems, *Acc. Chem. Res.* **2022**, *55*, 1748-1762. [Review] [Supplementary Cover]
- 8) Kinoshita, T.; Fujise, K.; Tsurumaki, E.; Toyota, S.\*; **Fukuhara, G.\***: A pressure-induced ratiometric signalling chemosensor: a case of helical anthracenes, *Chem. Commun.* **2022**, *58*, 3290-3293. [2022 Pioneering Investigators]
- 9) Nakasha, K.; **Fukuhara, G.\***: Dynamic hybridization of fluorescence polymers upon complexation of glucan, *J. Photochem. Photobiol. A: Chem.* **2022**, *426*, 113736.
- 10) Tsuchiya, T.; Mizuno, H.; **Fukuhara, G.\***: The factors that govern the allosteric chemical sensing of polythiophene chemosensors: scope and limitation toward signal-amplification sensing, *RSC Adv.* **2021**, *11*, 30472-30478.

- 11) **Fukuhara, G.\***: Smart polymer chemosensors: Signal-amplification systems with allostereism, *Polym. J.* **2021**, *53*, 1325-1334. [\[Review\]](#)
- 12) Matoba, S.; Kanzaki, C.; Yamashita, K.; Kusukawa, T.; **Fukuhara, G.**; Okada, T.; Narushima, T.; Okamoto, H.; Numata, M.\*: Directional Supramolecular Polymerization in a Dynamic Microsolution: A Linearly Moving Polymer's End Striking Monomers, *J. Am. Chem. Soc.* **2021**, *143*, 8731-8746.
- 13) Kinoshita, T.; Imai, Y.\*; **Fukuhara, G.\***: Hydrostatic Pressure-Controllable Chiroptical Properties of Chiral Perylene Bisimide Dyes: A Chiral Aggregation Case, *J. Phys. Chem. B* **2021**, *125*, 5952-5958. [\[Supplementary Cover\]](#)
- 14) Kinoshita, T.; Haketa, Y.; Maeda, H.\*; **Fukuhara, G.\***: Ground- and excited-state dynamic control of an anion receptor by hydrostatic pressure, *Chem. Sci.* **2021**, *12*, 6691-6698. [\[Press Release\]](#) [\[Highlighted in Chem-Station\]](#) [\[EurekaAlert\]](#)
- 15) Kanzaki, C.; Matoba, S.; Inagawa, A.; **Fukuhara, G.**; Okada, T.; Narushima, T.; Okamoto, H.; Numata, M.\*: Linear Momentum of a Microfluid Realizes an Anisotropic Reaction at the Ends of a Supramolecular Nanofiber, *Bull. Chem. Soc. Jpn.* **2021**, *94*, 579-589.
- 16) Kajiyama, K.; Tsurumaki, E.; Wakamatsu, K.; **Fukuhara, G.**; Toyota, S.\*: Complexation of an Anthracene-Triptycene Nanocage Host with Fullerene Guests through CH $\cdots$  $\pi$  Contacts, *ChemPlusChem* **2021**, *86*, 716-722.
- 17) Miyagawa, A.\*; **Fukuhara, G.**; Okada, T.\*: Acid dissociation under hydrostatic pressure: Structural implications for volumetric parameters. *J. Mol. Liq.* **2021**, *328*, 115512 (1-7).
- 18) Yao, J.; Mizuno, H.; Xiao, C.; Wu, W.; Inoue, Y.\*; Yang, C.\*; **Fukuhara, G.\***: Pressure-driven, solvation-directed planar chirality switching of cyclophano-pillar[5]arenes (molecular universal joints), *Chem. Sci.* **2021**, *12*, 4361-4366. [\[Hot Article\]](#)
- 19) Kanzaki, C.; Inagawa, A.; **Fukuhara, G.**; Okada, T.; Numata, M.\*: Proton-Gradient-Driven Self-Assembly of Porphyrin and In Situ Dynamic Analysis in a Microflow Platform, *ChemSystemsChem* **2020**, *2*, e2000006 (1-10) [\[Front Cover\]](#)
- 20) Fukuchi, M.; Oyama, K.\*; Mizuno, H.; Miyagawa, A.; Koumoto, K.; **Fukuhara, G.\***: Hydrostatic Pressure-Regulated Cellular Calcium Responses, *Langmuir* **2021**, *37*, 820-826. [\[Supplementary Cover\]](#)
- 21) Miyagawa, A.; Yoneda, H.; Mizuno, H.; Numata, M.; Okada, T.; **Fukuhara, G.\***: Hydrostatic-Pressure-Controlled Molecular Recognition: A Steroid Sensing Case Using Modified Cyclodextrin, *ChemPhotoChem* **2021**, *5*, 118-122.

- 22) Tsuchiya, T.; **Fukuhara, G.\***: Allosteric Signal Amplification Sensing Using a Bisthiourea-Binaphthyl-Polythiophene Conjugate: A Positive Homotropic Allosterism Case, *J. Org. Chem.* **2020**, *85*, 13239-13245. [\[Supplementary Cover\]](#)
- 23) Miyagawa, A.\*; Kinoshita, T.; Zheng, Y.; Harada, M.; **Fukuhara, G.\***; Okada, T.\*: Multiphase Behavior of Tetraphenylethylene Derivatives with Different Polarities at High Pressures, *J. Phys. Chem. B* **2020**, *124*, 7263-7271.
- 24) Fujise, K.; Tsurumaki, E.; **Fukuhara, G.**; Hara, N.; Imai, Y.; Toyota, S.\*: Multiple Fused Anthracenes as Helical Polycyclic Aromatic Hydrocarbon Motif for Chiroptical Performance Enhancement, *Chem. Asian J.* **2020**, *15*, 2456-2461.
- 25) Nakasha, K.; **Fukuhara, G.\***: Aggregation-Induced Emission-Based Polymer Materials: Ratiometric Fluorescence Responses Controlled by Hydrostatic Pressure, *ACS Appl. Polym. Mater.* **2020**, *2*, 2303-2310. [\[Supplementary Cover\]](#)
- 26) Mizuno, H.; Kitamatsu, M.; Imai, Y.\*; **Fukuhara, G.\***: Smart Fluorescence Materials that Are Controllable by Hydrostatic Pressure: Peptide-Pyrene Conjugates, *ChemPhotoChem* **2020**, *4*, 502-507. [\[Front Cover\]](#)
- 27) Muto, T.; Harada, M.; **Fukuhara, G.**; Okada, T.\*: Ice Confinement-Induced Solubilization and Aggregation of Cyanonaphthol Revealed by Fluorescence Spectroscopy and Lifetime Measurements, *J. Phys. Chem. B* **2020**, *124*, 3734-3742.
- 28) Miyagawa, A.; Harada, M.; **Fukuhara, G.**; Okada, T.\*: Space Size-Dependent Transformation of Tetraphenylethylene Carboxylate Aggregates by Ice Confinement, *J. Phys. Chem. B* **2020**, *124*, 2209-2217.
- 29) Iijima, K.; Harada, M.; **Fukuhara, G.\***; Okada, T.\*: Frozen Solution-Mediated Asymmetric Synthesis: Control of Enantiomeric Excess, *J. Org. Chem.* **2020**, *85*, 4525-4529.
- 30) **Fukuhara, G.\***: Analytical supramolecular chemistry: colorimetric and fluorimetric chemosensors, *J. Photochem. Photobiol. C: Photochem. Rev.* **2020**, *42*, 100340. [\[Review\]](#)
- 31) Miyagawa, A.; Eng, J.\*; Okada, T.; Inoue, Y.; Penfold, T.; **Fukuhara, G.\***: Hydrostatic Pressure-Induced Spectral Variation of Reichardt's Dye: A Polarity/Pressure Dual Indicator, *ACS Omega* **2020**, *5*, 897-903. [\[Supplementary Cover\]](#)
- 32) Nakanishi, K.; Ohtsu, H.\*; **Fukuhara, G.\***; Kawano, M.\*: Do Anionic  $\pi$  Molecules Aggregate in Solution? A Case Study with Multi-interactive Ligands and Network Formation, *Chem. Eur. J.* **2019**, *25*, 15182-15188.
- 33) Iwasaki, T.\*; Murakami, S.; Takeda, Y.; **Fukuhara, G.**; Tohnai, N.; Yakiyama, Y.;

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- 34) Takeda, Y.\*; Mizuno, H.; Okada, Y.; Okazaki, M.; Minakata, S.; Penfold, T.\*; **Fukuhara, G.\***: Hydrostatic Pressure-Controlled Ratiometric Luminescence Responses of Dibenzo[*a,j*]phenazine-Cored Mechanoluminophore, *ChemPhotoChem* **2019**, *3*, 1203-1211. [\[Front Cover\]](#)
- 35) Tamano, K.; Nakasha, K.; Iwamoto, M.; Numata, M.; Suzuki, T.; Uyama, H.\*; **Fukuhara, G.\***: Chiroptical properties of reporter-modified or reporter-complexed highly 1,6-glucose-branched  $\beta$ -1,3-glucan, *Polym. J.* **2019**, *51*, 1063-1071.
- 36) Ji, J.; Wu, W.; Liang, W.; Cheng, G.; Matsushita, R.; Yan, Z.; Wei, X.; Rao, M.; Yuan, D.-Q.\*; **Fukuhara, G.**; Mori, T.; Inoue, Y.\*; Yang, C.\*: An Ultimate Stereocontrol in Supramolecular Photochirogenesis: Photocyclodimerization of 2-Anthracenecarboxylate Mediated by Sulfur-Linked  $\beta$ -Cyclodextrin Dimers, *J. Am. Chem. Soc.* **2019**, *141*, 9225-9238.
- 37) Yonezawa, S.; Sathy, R.; **Fukuhara, G.**; Kawai, T.\*; Nakashima, T.\*: Pressure-dependent guest binding and release on a supramolecular polymer, *Chem. Commun.* **2019**, *55*, 5793-5796.
- 38) **Fukuhara, G.\***: Allosteric signal-amplification sensing with polymer-based supramolecular hosts, *J. Incl. Phenom. Macrocycl. Chem.* **2019**, *93*, 127-143. [\[Review\]](#)
- 39) Ishikawa, H.; Chung, T. S.; **Fukuhara, G.**; Shigemitsu, H.; Kida, T.; Bach, T.; Mori, T.\*: Diastereoselective Photocycloaddition Reaction of Vinyl Ether Tethered to 1,4-Naphthoquinone, *ChemPhotoChem* **2019**, *3*, 243-250.
- 40) Sasaki, M.; Ryoson, Y.; Numata, M.; **Fukuhara, G.\***: Oligosaccharide Sensing in Aqueous Media Using Porphyrin-Curdlan Conjugates: An Allosteric Signal-Amplification System, *J. Org. Chem.* **2019**, *84*, 6017-6027. [\[ACS Editors' Choice\]](#) [\[Supplementary Cover\]](#)
- 41) Kosaka, T.; Iwai, S.; **Fukuhara, G.\***; Imai, Y.; Mori, T.\*: Hydrostatic Pressure on Toroidal Interaction and Propeller Chirality of Hexaarylbenzenes: Explicit Solvent Effects on Differential Volumes in Methylcyclohexane and Hexane, *Chem. Eur. J.* **2019**, *25*, 2011-2018.
- 42) Sagara, Y.\*; Tamaoki, N.; **Fukuhara, G.\***: Cyclophane-Based Fluorescence Tuning Induced by Hydrostatic Pressure Changes, *ChemPhotoChem* **2018**, *2*, 959-963.
- 43) Ishida, Y.; **Fukuhara, G.\***: Efficient Cleavage of Permethylated Cyclodextrins, *ACS Omega* **2018**, *3*, 6279-6282.

- 44) Konishi, A.\*; Morinaga, A.; **Fukuhara, G.**; Nishijima, M.; Mori, T.; Kida, T.; Yasuda, M.\*: 1,8-Diphenyl-9,10-Bis(arylethynyl)phenanthrenes: Synthesis, Distorted Structure, and Optical Properties, *Chem. Eur. J.* **2018**, *24*, 6625-6631.
- 45) Wei, X.#; Wu, W.#; Matsushita, R.#; Yan, Z.#; Zhou, D.; Chruma, J. J.; Nishijima, M.; **Fukuhara, G.**; Mori, T.; Inoue, Y.\*; Yang, C.\* (# Equal contributions): Supramolecular Photochirogenesis Driven by Higher-Order Complexation: Enantiodifferentiating Photocyclodimerization of 2-Anthracenecarboxylate to Slipped Cyclodimers via a 2:2 Complex with  $\beta$ -Cyclodextrin, *J. Am. Chem. Soc.* **2018**, *140*, 3959-3974.
- 46) **Fukuhara, G.\***; Sasaki, M.; Numata, M.; Mori, T.; Inoue, Y.\*: Oligosaccharide Sensing in Aqueous Media by Porphyrin-Curdlan Conjugates: A Prêt-à-Porter Rather Than Haute-Couture Approach, *Chem. Eur. J.* **2017**, *23*, 11272-11278. **[Inside Cover]**
- 47) Yao, J.#; Wu, W.#; Liang, W.; Feng, Y.; Zhou, D.; Chruma, J. J.; **Fukuhara, G.**; Mori, T.; Inoue, Y.; Yang, C.\* (# Equal contributions): Temperature-Driven Planar Chirality Switching of a Pillar[5]arene-based Molecular Universal Joint, *Angew. Chem. Int. Ed.* **2017**, *56*, 6869-6873.
- 48) Kawanami, Y.; Katsumata, S.; Nishijima, M.; **Fukuhara, G.**; Asano, K.; Suzuki, T.; Yang, C.; Nakamura, A.; Mori, T.; Inoue, Y.\*: Supramolecular Photochirogenesis with Higher-Order Complex. Highly Accelerated Exclusively Head-to-Head Photocyclodimerization of 2-Anthracenecarboxylic Acid via 2:2 Complexation with Prolinol, *J. Am. Chem. Soc.* **2016**, *138*, 12187-12201. **[Highlighted in SYNFACTS 2016, 12, 1248]**
- 49) **Fukuhara, G.\***; Imai, M.; Fuentealba, D.; Ishida, Y.; Kurohara, H.; Yang, C.; Mori, T.; Uyama, H.; Bohne, C.; Inoue, Y.: Electrostatically promoted dynamic hybridization of glucans with cationic polythiophene, *Org. Biomol. Chem.* **2016**, *14*, 9741-9750. **[Front Cover]**
- 50) Huang, Q.; Jiang, L.; Liang, W.; Gui, J.; Xu, D.; Wu, W.; Nakai, Y.; Nishijima, M.; **Fukuhara, G.**; Mori, T.; Inoue, Y.\*; Yang, C.\*: Inherently Chiral Azonia[6]helicene-Modified  $\beta$ -Cyclodextrin: Synthesis, Characterization, and Chirality Sensing of Underivatized Amino Acids in Water, *J. Org. Chem.* **2016**, *81*, 3430-3434.
- 51) **Fukuhara, G.\***; Iida, K.; Mori, T.; Inoue, Y.: Critical Control by Scaffold Flexibility Achieved in Diastereodifferentiating Photocyclodimerization of 2-Anthracenecarboxylate, *J. Photochem. Photobiol. A: Chem.* **2016**, *331*, 76-83. **[Special Issue as Guest Editor]**



- 52) Maturi, M. M.; **Fukuhara, G.**; Tanaka, K.; Kawanami, Y.; Mori, T.; Inoue, Y.\*; Bach, T.\*: Enantioselective [4+4] photodimerization of anthracene-2,6-dicarboxylic acid mediated by a C<sub>2</sub>-symmetric chiral template, *Chem. Commun.* **2016**, 52, 1032-1035.
- 53) **Fukuhara, G.**\*; Iida, K.; Kawanami, Y.; Tanaka, H.; Mori, T.; Inoue, Y.\*: Excited-State Dynamics Achieved Ultimate Stereocontrol of Photocyclodimerization of Anthracenecarboxylates on a Glucose Scaffold, *J. Am. Chem. Soc.* **2015**, 137, 15007-15014.
- 54) **Fukuhara, G.**\*: Polymer-Based Supramolecular Sensing and Application to Chiral Photochemistry, *Polym. J.* **2015**, 47, 649-655. [Focus Review]
- 55) Renney, C. M.; **Fukuhara, G.**; Inoue, Y.; Davis, A. P.\*: Binding or Aggregation? Hazards of Interpretation in Studies of Molecular Recognition by Porphyrins in Water, *Chem. Commun.* **2015**, 51, 9551-9554.
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- 58) Yang, C.\*; Wang, Q.; Yamauchi, M.; Yao, J.; Zhou, D.; Nishijima, M.; **Fukuhara, G.**; Mori, T.; Liu, Y.\*; Inoue, Y.\*: Manipulating  $\gamma$ -Cyclodextrin-mediated Photocyclodimerization of Anthracenecarboxylate by Wavelength, Temperature, Solvent and Host, *Photochem. Photobiol. Sci.* **2014**, 13, 190-198. [Special Issue]
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- 61) Nishijima, M.; Tanaka, H.; Yang, C.; **Fukuhara, G.**; Mori, T.; Babenko, V.;

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and 1,3-Cyclooctadiene, *Beilstein J. Org. Chem.* **2012**, *8*, 1305-1311.

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