FY 2025 Annual Report

Unit Name

Organic Optoelectronics Unit

Associate Professor Ryota Kabe

Collaborations

Akimitsu Narita, Organic and Carbon Nanomaterials Unit, OIST, Japan, Spectroscopic analysis of nanographene

Chihaya Adachi, Kyushu University, Japan, Development of organic long persistent luminescence systems

Masanori Koshimizu, Shizuoka University, Japan, Development of organic dosimeters

Mischa Bonn and Xiaomin Liu, Max Planck Institute for Polymer Research (MPIP), Germany, Blinking mechanism of super-resolution microscopes

Toshinori Matsushima, Kyushu University, Japan, Analysis of the hole transport layer in perovskite solar cells

Yanqiong Zheng, Shaghai University, China, Organic semiconductor devices utilizing nanopore structures

Kiyoshi Miyata, Kyushu University, Japan, Observation of charge separation behavior by transient absorption

Yoshinori Okada, Quantum Materials Science Unit, OIST, Control of superconductivity by organic molecules

Research Personnel

Katsuya Ono, Senior Staff Scientist

Chandramouli Kulshreshtha, Staff Scientist

Kirill Mitrofanov, Staff Scientist

Dominik Madea, Postdoctoral Scholar (from Sep. JSPS Fellow at Kabe Unit)

Ruttapol Malatong, Postdoctoral Scholar

Yurino Uezu, Research Unit Technician

Liliia Moshniaha, JSPS Fellow

Rengo Yoshioka, PhD Student

Dmitry Kovalevskiy, PhD Student

Yuxiang Guan, PhD Student

Jiahao Zhang, PhD Student

Kaede Kawaguchi, PhD Student

Tam Minh Hieu Huynh, Research Intern

Scholarly Contributions and Creative Productions (by Faculty)

Journal Article

1. Malatong, R.; Yoshioka, R.; Kovalevskiy, D.; Takaji, K.; Shigemitsu, H.; Kawaguchi, K.; Narayana, Y. S. L. V.; Kida, T.; Kabe, R.

   Circularly Polarized Long-Persistent and Photostimulated Luminescence Enabled through Förster Resonance Energy Transfer and Upconversion Strategies. Advanced science (Weinheim, Baden-Wurttemberg, Germany) 2026, e23415.

2. Oyama, R.; Kawaguchi, K.; Moshniaha, L.; Narayana, Y. S. L. V.; Madea, D.; Mitrofanov, K.; Suchiang, H.; Jose, A.; Kabe, R.

   Investigating Charge Accumulation Mechanisms in Organic Materials via Slow Transient Emission Spectroscopy. Science advances 2025, 11, eadx9806.

3. Rabehi, lhem N.; Mariotti, S.; Fukuda, K.; Lee, S. Y.; Zhao, D.; Ji, P.; Yuan, S.; Zhang, J.; Ding, C.; Mitrofanov, K.; Madea, D.; Kabe, R.; Yokota, T.; Ono, L. K.; Someya, T.; Qi, Y.

   Dual Hole Transport Layer for Ultra-Flexible Perovskite Solar Cells with Unprecedented Stability. Joule 2025, 9.

4. Zhang, J.; Liu, X.; Wang, H.; Ji, P.; Yuan, S.; Wang, H.; Guo, T.; Mariotti, S.; Rabehi, I. N. N.; Huo, X.; Wu, T.; Zhang, C.; Ding, C.; Moshniaha, L.; Mitrofanov, K.; Madea, D.; Kabe, R.; Song, D.; Xu, Z.; Wu, Z.; Li, Y.; Zhao, Y.; Bu, T.; Tong, G.; Ono, L. K.; Qi, Y.

   Synergistic Versatile Bistriflimide Salts in Light-Accelerated Spiro-OMeTAD Oxidation and Perovskite Module Photovoltaics Engineering. Nature communications 2025, 17, 89.

5. Chang, Y.; Li, J.; Lv, X.; Yue, Y.; Xie, Y.; Yang, J.; Xie, X.; Zhou, C.; Liu, L.; Li, Z.; Ono, L. K.; Kabe, R.; Tong, G.

   Recent Advances in Enhancing the Stability of $CsPbI_3$ Perovskite Quantum Dots for Light-Emitting Diodes. Rare Metals 2025.

6. Yang, Q.; Failla, A. V. V.; Turunen, P.; Mateos-Maroto, A.; Gai, M.; Zuschratter, W.; Westendorf, S.; Gelléri, M.; Chen, Q.; Goudappagouda; Zhao, H.; Zhu, X.; Morsbach, S.; Scheele, M.; Yan, W.; Landfester, K.; Kabe, R.; Bonn, M.; Narita, A.; Liu, X.

   Reactivatable Stimulated Emission Depletion Microscopy Using Fluorescence-Recoverable Nanographene. Nature communications 2025, 16, 1341.

7. Lin, Z.; Ye, J.; Shinohara, S.; Tanaka, Y.; Yoshioka, R.; Chan, C.-Y. Y.; Lee, Y.-T. T.; Tang, X.; Mitrofanov, K.; Wang, K.; Ouchi, H.; Moshniaha, L.; Narayana, Y. S. L. V.; Ishii, H.; Zhang, X.-H. H.; Adachi, C.; Chen, X.-K. K.; Kabe, R.

   Blue Organic Long-Persistent Luminescence via Upconversion from Charge-Transfer to Locally Excited Singlet State. Nature communications 2025, 16, 2686.

8. Xu, X.; Moshniaha, L.; Vasylevskyi, S.; Kabe, R.; Ohto, T.; Narita, A.

   Synthesis and Characterizations of Dibenzo-Fused Perioctacene. Angewandte Chemie International Edition 2025, 64, e202418334.

9. Marae, I. S.; Tan, J.; Yoshioka, R.; Ziadi, Z.; Khaskin, E.; Vasylevskyi, S.; Kabe, R.; Xu, X.; Narita, A.

   Synthesis and Characterizations of Highly Luminescent 5-Isopropoxybenzo[rst]pentaphene. Beilstein journal of organic chemistry 2025, 21, 270–276.

Patent and Intellectual Property

1. Kabe, R.; Adachi, C.

   蓄光体および蓄光素子

   Phosphorescent Substance and Phosphorescent Element, 7642219, WO/2018/105633, 2025.

Presentation at Conference

1. Kabe, R.

   Organic Long-Persistent Luminescence Based on Long-Lived Charge Carriers, The 106th CSJ Annual Meeting 2026

   寿命電荷キャリアに基づく有機蓄光システムの開発, 日本化学会 第 106 春季年会 2026.

2. Kabe, R.

   Photoinduced Charge Accumulation and Recombination Dynamics in Organic Materials. 15th International Conference on Optical Probes of Organic and Hybrid Semiconductors (OP2025) 2025.

3. Kabe, R.

   Organic Materials Enabling Persistent Charge Carriers and Their Unique Photonic Functions. NPG Asia Materials Symposium & Editorial Meeting 2025.

4. Kabe, R.
   Controlling Persistent Charge Carriers in Organic Materials. AMIO Symposium 2025.
5. Kabe, R.
   Persistent Charge Carriers in Organic Semiconductors. The 2nd OIST-OU Joint Symposium on Emergent Functional Materials and Reactions 2025.
6. Kabe, R.
   Charge Accumulation Behavior and Persistent Luminescence in Organic Materials. ICPST-42 2025.
7. Kabe, R.
   Stable Organic Charge Optical Function, The 266 JOEM, 2025.
   安定な有機電荷の光機能, 第 266 回 JOEM 研究会
8. Kabe, R.
   Research Activities at OIST (message to Young Researchers), The 266 JOEM, 2025.
   OIST での研究活動（若手研究者へのメッセージ）, 第 266 回 JOEM 研究会

Seminars

1. Kabe, R.
   Luminescent System Enabled by Charge Carrier Control in Organic Materials. 2026.

Scholarly Contributions (by Unit Members)

Name of Unit Member	Type	Title	Outlet	Year Pub
Luis K. Ono	Poster Presentation at Conference	Perovskite Solar Cell Research: Achievements and Challenges	OIST-I2CNER JOINT SYMPOSIUM “Bridging Energy Research For A Sustainable Future”	2026
Yuxiang Guan	Poster Presentation at Conference	Investigation of Electric Field Induced Ionic Diffusion in Perovskite Solar Cells by X-ray Photoelectron Spectroscopy	MATSUS Spring 2026, Barcelona, Spain.	2026
Luis K. Ono	Presentation at Conference	Hole-Transporting Layers in Perovskite Solar Cells for Long-Term Operational Stability	MATSUS Spring 2026	2026
Liliia Moshniaha	Poster Presentation at Conference	Organic Long-Persistent Luminescence Enhanced by Charge-Transfer States in Donor–Acceptor Molecules	The 32nd International Conference on Photochemistry (ICP2025)	2025
Ruttapol Malatong	Poster Presentation at Conference	Achieving Circularly Polarized Long-Persistent Luminescence Through Forster Resonance Energy Transfer and Upconversion Strategies	The 15th International Conference on Optical Probes of Organic and Hybrid Semiconductors (OP2025)	2025
Dmitry Kovalevskiy	Poster Presentation at Conference	Persistent Charge Storage in Organic Photostimulated Luminescence Systems	The 15th International Conference on Optical Probes of Organic and Hybrid Semiconductors (OP2025)	2025
Dmitry Kovalevskiy	Poster Presentation at Conference	Optical Charge Storage in Organic Photostimulated Luminescence Systems	The 2nd OIST-OU Joint Symposium on Emergent Functional Materials and Reactions	2025
Kaede Kawaguchi	Poster Presentation at Conference	有機半導体分子-酸化物超伝導体 LiTi2O4 界面における Li イオン共役電子移動と ARPES によるバンド構造解析	表面・光融合先端計測研究会-Surface Photonic Processes and Advanced Research Convergence (SPARC)	2025

Name of Unit Member	Type	Title	Outlet	Year Pub
Ruttapol Malatong	Poster Presentation at Conference	Circularly polarized organic long-persistent luminescence and organic photostimulated luminescence	The 2nd OIST-OU Joint Symposium on Emergent Functional Materials and Reactions	2025
Rengo Yoshioka	Poster Presentation at Conference	Efficient Organic Long-Persistent Luminescence Enabled by Thermally Activated Delayed Fluorescence Molecule	The 32nd International Conference on Photochemistry (ICP2025)	2025
Dominik Madea	Presentation at Conference	Structure-activity relationship of heptazine chromophore	Annual Meeting on Photochemistry 2025	2025
Rengo Yoshioka	Presentation at Conference	Excited-State Engineering of Organic Long-Persistent Luminescence Enabled by Thermally Activated Delayed Fluorescence Molecules	Annual Meeting on Photochemistry 2025	2025
Kaede Kawaguchi	Presentation at Conference	スピネル型酸化物超伝導体 LiTi2O4 薄膜への分子吸着による輸送特性の変化	日本物理学会第 80 回年次大会	2025
Kaede kawaguchi	Presentation at Conference	Modulation of Transport Properties in Oxide Superconductor LiTi2O4 via Organic Molecule Adsorption	The 86th JSAP Autumn Meeting 2025	2025
Luis K. Ono	Presentation at Conference	Interfacial Energy Levels in Perovskite Solar Cells	The 2nd OIST-OU Joint Symposium on Emergent Functional Materials and Reactions	2025

Honors, Awards & Fellowships [By Unit Members Only]

Term 1 2025 - Term 1 2025	Rengo Yoshioka, Journal of Photochemistry and Photobiology C: Photochemistry Reviews Presentation Prize (Elsevier), "Excited-State Engineering of Organic Long-Persistent Luminescence Enabled by Thermally Activated Delayed Fluorescence Molecules" [Fiscal Year: 2025-09-06] 光化学討論会最優秀学生発表賞, 2025, 光化学協会

Outreach Activities [For Unit Members Only]

Term 2 2026	Dmitry Kovalevskiy, INNOVATIVE FESTA - Multiple SSH Half day SEED Program [Fiscal Year: 2026-01-27]
Term 1 2025	Dmitry Kovalevskiy, SEED Program: Yokohama Science Frontier High School students visit [Fiscal Year: 2025-10-22]
Term 1 2025	Dmitry Kovalevskiy, Kanagawa Prefectural Hakuyo High School visit [Fiscal Year: 2025-10-02]
Term 1 2025	Dmitry Kovalevskiy, SEED Program: Sapporo Asahigaoka Senior High School visit [Fiscal Year: 2025-11-02]
Term 1 2025	Dmitry Kovalevskiy; Rengo Yoshioka, SEED Program: Kyoto Prefectural Momoyama High School visit [Fiscal Year: 2025-10-14]
Term 3 2025	Dmitry Kovalevskiy, OIST-KEIO Summer Camp [Fiscal Year: 2025-08-06]

Workshops and Seminars [Organized and Hosted by Faculty/Units]

Speaker Name(s)	Title	Location	Date
Prof. Ho-Hsiu Chou (National Tsing Hua University, Taiwan)	[Seminar]Design and synthesis of semiconducting polymers for nature-inspired electronics and energy	Seminar Room L4F01	2025-08-27
Dr. Marine Labro (Kyoto University)	[Seminar] A Photoinduced Annulation Strategy Towards a Polycyclic Heteroaromatic Chromophore: Scope, Mechanism, Properties and Applications	OIST Seminar Room L4E01	2025-08-22
Dr. Tomasz Marszalek (Max Planck Institute for Polymer Research & Lodz University of Technology)	[Seminar] 2 - Dimensional Hybrid Perovskite as a Promising Semiconductor for Large Area Electronics	OIST Seminar Room L4F01	2025-07-22