

Division of Environmental Chemistry

– Molecular Materials Chemistry –



<https://www.scl.kyoto-u.ac.jp/~moma/index-e.html>



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*New Research Field Development Project



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Guest Scholar

HUDSON, Zachary (D. Chem.) The University of British Columbia, Canada, 20 February 2024–31 March 2024

Guest Res. Assoc.

JUNG, Andre Philipp Karlsruhe Institute of Technology, Germany, 2 September 2024–17 September 2024
BERGMANN, Katrina University of British Columbia, Canada, 30 September 2024–20 December 2024

Scope of Research

Our research goal is to develop high-performance organic electroluminescence devices, organic solar cells, and polymer materials. Toward this, we carry out syntheses, device fabrications, precise structure characterizations, and quantum chemical calculations for high functional organic materials. Along with exploring novel synthetic routes and novel devices, we perform detailed analyses of structures and dynamics, mainly by sophisticated solid-state NMR spectroscopy, in order to obtain structure–dynamics–property relationships.

KEYWORDS

Organic Light-Emitting Diodes Solid-State NMR
Quantum Chemical Calculation Amorphous Materials
Dynamic Nuclear Polarization Enhanced NMR



Recent Selected Publications

Okumura, R.; Tanaka, H.; Shizu, K.; Fukushima, S.; Yasuda, Y.; Kaji, H., Development of an Organic Emitter Exhibiting Reverse Intersystem Crossing Faster than Intersystem Crossing, *Angew. Chem. Int. Ed.*, **63**, e202409670 (2024).
Shizu, K.; Kaji, H., Quantitative Prediction of Rate Constants and Its Application to Organic Emitters, *Nat. Commun.*, **15**, 4723 (2024).
Shizu, K.; Ren, Y.; Kaji, H., Promoting Reverse Intersystem Crossing in Thermally Activated Delayed Fluorescence via the Heavy-Atom Effect, *J. Phys. Chem. A*, **127**, 439–449 (2023).
Tanaka, H.; Mizuhata, Y.; Tokitoh, N.; Miyamoto, R.; Kanamori, K.; Kaji, H., Multiple Stimuli-Responsive Supramolecular Organic Framework under Concomitant Emission Color Changes, *J. Phys. Chem. C*, **127**, 20459–20465 (2023).
Suzuki, K.; Kaji, H., Torsion Angle Analysis of a Thermally Activated Delayed Fluorescence Emitter in an Amorphous State Using Dynamic Nuclear Polarization Enhanced Solid-State NMR, *J. Am. Chem. Soc.*, **145**, 16324–16329 (2023).