

Division of Multidisciplinary Chemistry – Molecular Aggregates –



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*New Research Field
Development Project



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YU, Ming-Hsuan (D3) National Taiwan University, Taiwan, 12 September 2024–3 December 2024

Scope of Research

We design and synthesize unique electronic materials with sophisticated device applications in mind. These materials have novel solid-state aggregation structures or well-defined interface orientation that promote efficient electrical current flow or enhance device lifetime. Electronic devices based on these new materials are then evaluated using advanced measurement techniques, and the results are used to inform the next direction of the materials chemistry. We call this synergistic approach for achieving our research goals “Needs Inspired Fundamental Science”.



KEYWORDS

Molecular Design and Synthesis Molecular Aggregation Functional Materials Semiconductors Perovskite Solar Cells

Recent Selected Publications

Truong, M. A.; Ueberricke, L.; Funasaki, T.; Adachi, Y.; Hira, S.; Hu, S.; Yamada, T.; Sekiguchi, N.; Nakamura, T.; Murdey, R.; Iikubo, S.; Kanemitsu, Y.; Wakamiya, A., Tetrapodal Hole-Collecting Monolayer Materials Based on Saddle-Like Cyclooctatetraene Core for Inverted Perovskite Solar Cells, *Angew. Chem. Int. Ed.*, **63**, e202412939 (2024).
Tan, T.; Murdey, R.; Sumitomo, S.; Nakamura, T.; Truong, M. A.; Wakamiya, A., Anhydrous *N,N*-Dimethyl-*N,N*-Dineopentylammonium Fluoride Electrolyte for Fluoride Ion Batteries, *Chem. Mater.*, **36**, 4533–4560 (2024).
Hu, S.; Thiesbrummel, J.; Pascual, J.; Stolterfoht, M.; Wakamiya, A.; Snaith, H. J., Narrow Bandgap Metal Halide Perovskites for All-Perovskite Tandem Photovoltaics, *Chem. Rev.*, **124**, 4079–4123 (2024).
Liu, W.; Huang, G.; Chen, C.-Y.; Tan, T.; Fuyuki, H.; Hu, S.; Nakamura, T.; Truong, M. A.; Murdey, R.; Hashikawa, Y.; Murata, Y.; Wakamiya, A., An Open-Cage Bis[60]Fulleroid as an Electron Transport Material for Tin Halide Perovskite Solar Cells, *Chem. Commun.*, **60**, 2172–2175 (2024).
Nakamura, T.; Kondo, Y.; Ohashi, N.; Sakamoto, C.; Hasegawa, A.; Hu, S.; Truong, M. A.; Murdey, R.; Kanemitsu, Y.; Wakamiya, A., Materials Chemistry for Metal Halide Perovskite Photovoltaics, *Bull. Chem. Soc. Jpn.*, **97**, uoad025 (2024).