

超高速分子計測研究チーム / Ultrafast Spectroscopy Research Team

(1) 原著論文 (accept を含む) / Original Papers

1. H. Kuramochi, S. Takeuchi, H. Kamikubo, M. Kataoka, and T. Tahara, "Fifth-order time-domain Raman spectroscopy of photoactive yellow protein for visualizing vibrational coupling in its excited state", *Sci. Adv.*, 5, eaau4490, (2019).
2. S. Tahara, H. Kuramochi, S. Takeuchi, and T. Tahara, "Protein dynamics preceding photoisomerization of the retinal chromophore in bacteriorhodopsin revealed by deep-UV femtosecond stimulated Raman spectroscopy", *J. Phys. Chem. Lett.*, 10, 5422-5427, (2019).
3. C. Chang, H. Kuramochi, M. Singh, R. Abe-Yoshizumi, T. Tsukuda, H. Kandori, and T. Tahara, "Acid-base equilibrium of the chromophore counterion results in distinct photoisomerization reactivity in the primary event of proteorhodopsin", *Phys. Chem. Chem. Phys.*, 21, 25728-25734, (2019).
4. H. Kuramochi, S. Takeuchi, M. Iwamura, K. Nozaki, and T. Tahara, "Tracking photoinduced Au-Au bond formation through transient terahertz vibrations observed by femtosecond time-domain Raman spectroscopy", *J. Am. Chem. Soc.*, 141, 19296-19303, (2019).
5. M. Ahmed, K. Inoue, S. Nihonyanagi, and T. Tahara, "Hidden isolated OH at the charged hydrophobic interface revealed by two-dimensional heterodyne-detected VSFG spectroscopy", *Angew. Chem. Int. Ed.*, 59, 9498-9505, (2020).

(2) 著書・解説など / Book Editions, Review Papers

1. K. Inoue, S. Nihonyanagi and T. Tahara, "Ultrafast vibrational dynamics at aqueous interfaces studied by 2D heterodyne-detected vibrational sum frequency generation spectroscopy", In: *Coherent Multidimensional Spectroscopy*, Cho M. (ed), Springer Series in Optical Science book Series vol. 226, Chap. 10, 215-236, (2019).

(3) 招待講演 / Invited Talks

1. T. Tahara, "Vibrational sum-frequency generation with quadrupole mechanism investigated by HD-VSFG spectroscopy", International workshop on nonlinear optics at interfaces, Shanghai, China, June, (2019).
2. T. Tahara, "Challenges with interface-selective nonlinear spectroscopy", Seminar, Institute for interdisciplinary research, Jiangnan University, Wuhan, China, June, (2019).
3. T. Tahara, "Structural dynamics of chemical bond formation in the Au(I) complex oligomers revealed by femtosecond time-domain Raman spectroscopy", International Conference on Ultrafast Structural Dynamics (ICUSD2019), Daejeon, Korea, June, (2019).
4. T. Tahara, "Structural dynamics of bond formation in metal complex oligomers elucidated by

- femtosecond time-resolved impulsive stimulated Raman spectroscopy” , Telluride Science Research Center (TSRC) Workshop “Vibrational Dynamics” , Colorado, USA, July, (2019).
5. M. Iwamura, K. Nozaki, H. Kuramochi, S. Takeuchi, T. Tahara, “Nuclear wave-packet motions of metallophilic oligomers in solution” , 10th International Conference on Advanced Vibrational Spectroscopy (ICAVS 10), Auckland, New Zealand, July, (2019).
 6. H. Kuramochi, S. Takeuchi, M. Iwamura, K. Nozaki, T. Tahara, “Direct observation of ultrafast structural dynamics of the dicyanoaurate trimer upon photo-induced tight Au-Au bond formation” , 10th International Conference on Advanced Vibrational Spectroscopy (ICAVS 10), Auckland, New Zealand, July, (2019).
 7. T. Tahara, “Ultrafast dynamics at aqueous interface revealed by time-resolved HD-VSFG spectroscopy” , CECAM workshop on “Dynamics of Water in Complex Environments, Bridging the Gap between Molecular and Mesoscopic Interfaces” , Paris, France, July, (2019).
 8. T. Tahara, “Tracking ultrafast photochemical processes with observing excited-state coherent nuclear motion” , The 29th International Conference on Photochemistry (ICP 2019), Colorado, USA, July, (2019).
 9. 田原太平, “挑戦したい幾つかの問題”、公益信託分子科学研究奨励森野基金 第6回森野ディスカッション, 東京, 9月2日, (2019).
 10. H. Kuramochi, T. Tahara, “Mapping ultrafast chemical reaction dynamics with femtosecond time-resolved time-domain Raman spectroscopy using few-cycle pulses” , 19th Time Resolved Vibrational Spectroscopy Conference (TRVS2019), Auckland, New Zealand, September, (2019).
 11. M. Ahmed, S. Nihonyanagi, T. Tahara, “Vibrational spectra and ultrafast dynamics of interfacial water studied by steady-state and time-resolved HD-VSFG spectroscopy” , Indo-Japan workshop on “Frontiers in Molecular Spectroscopy: From Fundamentals to Applications in Chemistry and Biology” , Kobe, Japan, October, (2019).
 12. H. Kuramochi, “Mapping ultrafast chemical reaction dynamics with femtosecond time-resolved time-domain Raman spectroscopy” , Indo-Japan workshop on "Frontiers in Molecular Spectroscopy: From Fundamentals to Applications in Chemistry and Biology", Kobe, Japan, November, (2019).
 13. T. Tahara, “Ultrafast dynamics at the water surface revealed by femtosecond interface-selective nonlinear spectroscopy” , Nature Conference on Functional Dynamics -Visualizing Molecules in Action-, Arizona, USA, November, (2019). Keynote
 14. T. Tahara, “Time-domain Raman spectroscopy and its application to ultrafast photochemical / photobiological reactions” , Vellore, India, February, (2020).
 15. T. Tahara, “Structure and dynamics at aqueous interface revealed by heterodyne-detected

- vibrational sum-frequency” , Department Seminar, Indian Institute of Science (IISc), Bangalore, India, February, (2020).
16. T. Tahara, “Wonder world seen with ultrashort light” , Special Colloquium 2020, Pune, India, February, (2020).
 17. T. Tahara, “Structure and dynamics at aqueous interface revealed by heterodyne-detected vibrational sum-frequency” , Department Seminar, Indian Institute of Technology at Bombay, Mumbai, India, February, (2020).
 18. T. Tahara, “Time-domain Raman spectroscopy and its application to ultrafast photochemical/photobiological reactions” , Department Seminar, Tata Institute for Fundamental Research (TIFR), Mumbai, India, February, (2020).
 19. T. Tahara, “Wonder world seen with ultrashort light” , Mizushima-Raman Public Lecture, Delhi, India, February, (2020).
 20. T. Tahara, “Wonder world seen with ultrashort light” , Institute Lecture, Indian Institute of Science Education and Research (IISER) Bhopal, Bhopal, India, February, (2020).
 21. T. Tahara, “Structure and dynamics at aqueous interface revealed by heterodyne-detected vibrational sum-frequency” , Department Seminar, Indian Institute of Science Education and Research (IISER) Bhopal, Bhopal, India, February, (2020).
 22. 倉持光、“超高速ラマン分光で観る光受容タンパク質におけるプロトン移動ダイナミクス”、TIA 連携プログラム探索事業「かけはし」量子反応シンポジウム、野田市、3月5日、(2020).

(4) 会議、シンポジウム、セミナー主催 / Meeting, Symposiums and Seminars

1. RIKEN Seminar: Prof. Michiel Sprik (University of Cambridge, UK.), “Electromechanics of the water liquid-vapour interface” , Wako, Saitama, 4月16日, (2019).
2. Seminar: Ms. Bluebell Drummond (University of Cambridge, UK.), “The effects of molecular modification on intersystem crossing for improved thermally activated delayed fluorescence” , Wako, Saitama, 9月24日, (2019).
3. RIKEN Seminar: Prof. David M. Leitner (University of Nevada, Reno), “Energy Transport across Interfaces in Biomolecular Systems” , Wako, Saitama, 10月21日, (2019).
4. RIKEN Seminar: Prof. Sudipta Maiti (Tata Institute of Fundamental Research) , “In search of the elusive toxic oligomer in Amyloid diseases” , Wako, Saitama, 12月5日, (2019).
5. RIKEN Seminar: Prof. Eric Borguet (Temple University), “Impact of ions on structure and dynamics at aqueous interfaces” , Wako, Saitama, 1月6日, (2020).
6. Seminar: Mr. Masafumi Koga (Osaka University), “Direct Observation of Photoionization Dynamics in Solution Phase Induced by Simultaneous and Stepwise Two-Photon Excitation” , Wako, Saitama, 3月18日, (2020).

(5) 特筆すべき事項・トピックス / Topics

1. RIKEN RESEARCH News, “Protein changes precede photoisomerization of retinal chromophore”, Nov. 29, (2019).
2. 理研プレスリリース, “1 兆分の3 秒で進む分子の構造変化を追跡”, 11月28日, (2019).
3. Nature Review Chemistry, 4, 64 (2020), “Real-time bond formation”.
4. RIKEN RESEARCH News, “Gold bond formation tracked in real time using new molecular spectroscopy technique”, Feb. 14, 2020.
5. Cover picture, Angewandte Chemie International Edition (Inside back cover), “Hidden Isolated OH at the Charged Hydrophobic Interface Revealed by Two-Dimensional Heterodyne-Detected VSFG Spectroscopy”.
<https://onlinelibrary.wiley.com/doi/full/10.1002/anie.202004650>