PERSONAL

Retirement

Professor Tsujii, Yoshinobu
Division of Materials Chemistry
– Chemistry of Polymer Materials –

On March 31, 2026, Dr. Tsujii Yoshinobu retired from Kyoto University and was honored with the title of Professor Emeritus of Kyoto University.

Dr. Tsujii graduated from the Faculty of Engineering, Kyoto University in 1983. He received his master's degree from the Graduate School of Engineering in 1985 and his Doctor of Engineering in 1991, both from Kyoto University. He joined the Institute for Chemical Research (ICR), Kyoto University, as a Research Associate in 1989 and subsequently spent one and a half year (1993–1994) in Germany as a Postdoctoral Associate at the Max Planck Institute for Polymer Research. He was promoted to Associate Professor in 2001 and to Full Professor in 2008, both at ICR. He also served as Vice Director (2012–2016) and Director (2018–2022) of ICR, as Vice Director of Kyoto University (2020–2022), and as Director of the Kyoto University Research Coordination Alliance (2022–2025).

Dr. Tsujii has made significant contributions to polymer science, particularly in the area of functionalization of solid surface via precision polymerization. His major achievements include: (1) establishment of the concentrated polymer brush (CPB) system based on surface-initiated living radical polymerization (SI-LRP); (2) discovery of fascinating interfacial properties (high elasticity, ultralow friction, unique size exclusion, etc.) of CPB owing to highly ordered architecture; (3) development of polymeric soft tribological materials via thickening CPB layers using polymerization kinetics; and (4) elucidation of wear mechanisms and improvement of resiliency of CPB systems.

Dr. Tsujii is best known for achievements (1) and their wide range of applications based on (2). His pioneering research opened new frontiers in surface modification and significantly advanced surface science. Motivated by his deep expertise in polymerization kinetics and physical chemistry, he discovered that densely grafted CPB structures universally exhibit ultralow friction, fundamentally distinct from swollen polymer gels, owing to entropy-driven uniaxial elongation of the grafted chains.

Dr. Tsujii also emphasized the social implementation of CPB-based tribological materials. The first challenge for macroscopic-scale application was durability of CPB layers. Thin CPB layer (~100 nm) suffered damage due to localized load from asperity of counter surfaces. He overcame this problem by establishing a high-pressure synthesis method of CPB layer with ultra-large thicknesses (exceeding micrometers), far greater than above-mentioned asperities. Thickening not only improved durability but also enabled the use of various spectroscopic and characterization techniques, leading to a deeper understanding of the correlation between CPB microstructures and macroscopic properties. Building on this, he focused on the molecular architecture and potential of highly branched bottlebrush polymer (BBP), demonstrating that CPB-like functionality could be achieved simply via coating. Currently, CPB/BBP coatings are applied in various fields, including mechanical seals, anti-icing and anti-biofouling surfaces, flow-resistance reduction, and liquid crystal displays.

He has published more than 200 research papers and holds more than 60 granted patents. His contributions have been recognized through several awards, including the Cellulose Society of Japan Award (2015), the Society of Fiber Science and Technology Award (2005), and the Wiley Award of the Society of Polymer Science, Japan (2003). He has served as Principal Investigator of major competitive research programs such as ACCEL and CREST of Japan Science and Technology Agency (JST). He has proposed the concept of Soft and Resilient Tribology (SRT) and organized the SRT Industry-Academia Consortium, bringing together five universities/institutions and six companies to accelerate the implementation of CPB technologies. He has also held key positions in various related academic societies, including director, council member, and auditor; he has been President of the Cellulose Society of Japan since 2023 and of the Society of Fiber Science and Technology, Japan since 2024. Internationally, he has played influential roles, including Chair for the International Symposium on Fiber Science and Technology in 2024, Executive Committee Member and Co-Organizer (Japanese Representative) for the 6th, 8th, and 9th International Polysaccharide Conferences of the European Polysaccharide Network of Excellence, and a member of the Advisory Board for Polymer Chemistry.

His contributions to Kyoto University and the Institute for Chemical Research through his scientific, teaching, and administrative activities are greatly appreciated. His warm and sincere personality will remain in the hearts of his colleagues and students.