Requests for Collaboration

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Research Interests

- Synthesis of well-defined polymers (block copolymers, hyperbranched polymers, graft copolymers, etc.) by (living) radical polymerization
- Debondable adhesive materials based on well-defined reactive polymers
- Stimuli-responsive polymers in organic medium

Creative Achievements in the Application of New and Existing Science and Technology

Synthesis and Materials: Facile synthesis of high molecular weight acrylic block copolymers ($M_n > 10^5$) was achieved by organo-tellurium- mediated living radical polymerization (TERP) in combination with binary azo initiator, where all reagents can be handled under atmospheric conditions [4]. One-pot and metal-free synthesis of curable hyperbranched polymers containing dense reactive groups was developed [3]. **Application:** De-bondable (dismantlable) adhesive systems using reactive polymers were developed and superior performances as de-bondable adhesives was achieved by using well-defined reactive polymers such as reactive block copolymers and hyperbranched polymers [1,4,5]. Furthermore, latent catalysts for the polymer reactions were designed and enabled the achievement of both the stability of the reactive polymers at moderate temperatures and rapid progress of the polymer reactions at elevated temperatures. (Meth)acrylic polymers containing coumarin derivative units were found to be a novel dual-stimuli responsive polymer, in which a single functional group has the functions of both thermo- and photo-responsivities [2].

Research topics that I want to collaborate

- Interfacial analysis and theoretical simulations for functional adhesive systems
- Application of stimuli-responsive polymers and gels in organic medium
- Rheological study of stimuli-responsive gels in organic medium

A list of 5 key publications

[1] Dismantlable Adhesion Properties of Reactive Acrylic Copolymers Resulting from Cross-linking and Gas Evolution, E. Sato*, S. Iki, K. Yamanishi, H. Horibe, and A. Matsumoto*, *J. Adhes*., **93**(10), 811-822 (2017).

[2] Dual Stimuli-Responsive Homopolymers: Thermo- and Photo-responsive Properties of Coumarin-Containing Polymers in Organic Solvents, E. Sato*, Y. Masuda, J. Kadota, T. Nishiyama, H. Horibe, *Eur. Polym. J.,* **69**, 605-615 (2015).

[3] One-Step Synthesis of Thermally Curable Hyperbranched Polymers by Addition-Fragmentation Chain Transfer Using Divinyl Monomers, E. Sato*, I. Uehara, H. Horibe, and A. Matsumoto, *Macromolecules*, **47**(3), 937-943 (2014).

[4] Organotellurium-Mediated Living Radical Polymerization (TERP) of Acrylates Using Ditelluride Compounds and Binary Azo Initiators for the Synthesis of High-Performance Adhesive Block Copolymers for On-Demand Dismantlable Adhesion, T. Inui, K. Yamanishi, E. Sato*, and A. Matsumoto*, *Macromolecules*, **46**(20), 8111-8120 (2013).

[5] Cohesive Force Change Induced by Polyperoxide Degradation for Application to Dismantlable Adhesion, E. Sato*, H. Tamura, and A. Matsumoto, *ACS Appl. Mater. Interfaces*, **2**(9), 2594-2601 (2010).