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Ionic polymerization using flow microreactor systems and its applications to syntheses of structurally well-defined Polymers

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Polymerization using the characteristic features of flow microreactor systems such as fast mixing, fast heat transfer, and short residence time has attracted a great deal of attention, and extensive studies have been reported. In this presentation, we report that the cationic polymerization of vinyl monomers can be achieved in a flow microreactor system with excellent molecular-weight distribution control without adding a capping agent, which decelerates the propagation due to the equilibrium between active and dormant species. We also report that flow microreactor systems are effective for accomplishing the controlled anionic polymerization of styrenes or alkyl methacrylates or alkyl acrylates. A high level of control of the molecular weight distribution can be achieved in a flow microreactor under easily accessible conditions. Moreover, the efficient synthesis of well-defined polymers was successfully achieved using an integrated flow microreactor system. Diblock copolymers and triblock copolymers were obtained with narrow molecular weight distributions.

Biography

Aiichiro Nagaki received his Ph.D. in 2005 from Kyoto University under the supervision of Professor Jun-ichi Yoshida. He worked with Professor Hiroaki Suga, Tokyo University from 2005 as a postdoctoral fellow. In 2006, he became an assistant professor of Kyoto University. He was promoted to junior associate professor in 2013. My current research interests are organic synthesis, polymer synthesis, and microreactor synthesis. Awards: Takeda Pharmaceutical Co., Ltd. Award in Synthetic Organic Chemistry, Japan (2012), Incentive Award in Synthetic Organic Chemistry, Japan (2012), and Young Innovator Award on Chemistry and Micro-Nano Systems (2013).

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