Our research program focuses on development of new synthetic methods, which enable precise control of polymers in terms of their size and structure. Our attention is especially directed to control of reactive carbon species, such as carbon centered radicals and carbocations, with the aid of synthetic organic chemistry, element chemistry, computational chemistry, and so on. We also study various polymer condensed states by both static and dynamic methods to understand the relation of physical properties and structures.

**Scope of Research**

**Research Activities (Year 2008)**

**Publications**


**Presentations**

Synthesis of Structurally Well-Defined Telechelic Polymers by Organostibine-Mediated Living Radical Polymerization

There has been growing interest in new synthetic methods for the preparation of well-defined polymers with controlled chain-end functional groups. These end-functional polymers, as exemplified by telechelic polymers, serve as precursors not only for block and graft copolymers, but also for cyclic, branched, and cross-linked polymers. We have recently reported organostibine compounds mediate living radical polymerization with varieties of vinyl monomers. While introduction of functionality into the chain transfer agents would enhance the abilities for the synthesis of telechelic polymers, strong basic conditions required for preparation of the transfer agents have limited this possibility. We report here a new synthetic route to organostibine chain transfer agents from diazo-initiators and distibines. As the synthesis proceeds under neutral conditions, a variety of polar functional groups can be introduced into the chain transfer agent and, thus, the α-polymer ends. Subsequent transformation of the organostibine ω-polymer ends provides structurally well-defined telechelic polymers.

Figure 1. Synthesis of telechelic polymers by organostibine-mediated living radical polymerization.


Grants

Yamago S, Precise Control of Radical Reactions Using Synergetic Effects of “Heavy” Heteroatom Compounds, Grant-in Aid on Priority Areas, 1 October 2006–31 March 2010.

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