

論文内容の要旨

Organozinc compounds such as diethylzinc and dimethylzinc have been widely used for nucleophilic addition reactions and transition metal catalyzed cross-couplings. Alkyl zinc has similar properties to alkylborane, which has become increasingly important as key reagents in radical chemistry. However, like other dialkylzincs, conventional diethylzinc are highly combustible in air, reacts violently with water and should be kept under an inert atmosphere, which limits the application of them. In recent years, there have been few reports on the use of diethylzinc as an initiator.

Alkyl-9-borabicyclo-[3.3.1]-nonanes (9-BBN) and diethyl(1,10-phenanthroline N^1, N^{10})zinc(Phen-DEZ) were used as an initiator in my research. Since alkylboron and diethylzinc are hydrolytically unstable, emulsion polymerization system was selected to evaluate the initiation properties of two initiators.

I have tried various polymerization systems and polymerization methods, selected a variety of monomers and substrates, and changed various reaction conditions to study the properties and applying conditions of diethylzinc. My experiments were designed to investigate if polymerization could be conducted in emulsion system, and to scope of grafting substrates. Herein, a new efficient diethyl(1,10-phenanthroline N^1, N^{10})zinc and alkyl-9-initiator for radical homopolymerization and graft polymerization in different solvent and reaction system is developed.

The accomplished work in this dissertation:

- Research on the characteristic and kinetic of 9-BBN initiator in emulsion system.
- Study on characteristic and kinetic of homopolymerization initiated by Phen-DEZ in emulsion system.
- Surface modification of polypropylene and polyethylene through graft polymerization initiated by Phen-DEZ in solvent system.
- Surface modification of cotton and silk through graft polymerization initiated by Phen-DEZ in emulsion system.