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Polymerization mechanism

2.3 Polymerization kinetics for single- and multiple-site catalysts 2.3.1 Homopolymerization; 2.3.2 Copolymerization; 2.3.3 Long-chain branch formation; 2.4 Inter- and intraparticle mass and heat transfer resistances; 2.4.1 Particle fragmentation and morphology control; 2.4.2 Single particle models: inter- and intraparticle mass and heat transfer; 2.5 Industrial olefin polymerization reactors; 2.5.1 Reactor configurations and designs; 2.5.2 Polyethylene manufacturing processes; 2.5.3 Polypropylene manufacturing processes; 2.5.4 Mathematical models for industrial reactors; Acknowledgments References 3 Free-Radical Polymerization: Homogeneous Systems; 3.1 Free-radical polymers: properties and applications; 3.2 FRP mechanisms and kinetics; 3.2.1 Homopolymerization; 3.2.2 Copolymerization; 3.2.3 Diffusion-controlled reactions; 3.2.4 Kinetic balances for modeling polymer MWs; 3.3 Controlled radical polymerization; 3.3.1 Stable free-radical polymerization; 3.3.2 Atom transfer radical polymerization; 3.3.3 Reverse addition-fragmentation chain transferpolymerization; 3.4 Polymer reaction engineering aspects; 3.4.1 Heat removal and temperature programming; 3.4.2 Batch reactors 3.4.3 Semibatch (semicontinuous) reactors 3.4.4 Continuous stirred-tank reactors; 3.4.5 Tubular reactors; 3.5 A ""roadmap"" for mathematical modeling; References; 4 Free-Radical Polymerization: Heterogeneous Systems; 4.1 Introduction; 4.2 High-impact polystyrene; 4.2.1 Interrelationship between microstructure and application properties; 4.2.2 Modeling HIPS polymerization; 4.2.3 Optimizing final properties: melt flow index in a continuous HIPS process; 4.2.4 Final remarks for HIPS; 4.3 Vinyl chloride monomer bulk polymerization; 4.3.1 Kinetic mechanism; 4.3.2 PVC morphology; Acknowledgments
References

Sommario/riassunto

Polymers are an example of ""products-by-process"", where the final product properties are mostly determined during manufacture, in the reactor. An understanding of processes occurring in the polymerization reactor is therefore crucial to achieving efficient, consistent, safe and environmentally friendly production of polymeric materials.Polymer Reaction Engineering provides the link between the fundamentals of polymerization kinetics and polymer microstructure achieved in the reactor. Organized according to the type of polymerization, each chapter starts with a description of the main