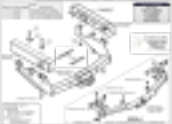


10.1 POLYMERIZATION OF VINYL MONOMERS



10.1.1 Free-Radical Polymerization

The free-radical polymerization mechanism involves three main steps: initiation, propagation, and termination. In the initiation step, an initiator molecule decomposes to form free radicals. These radicals then attack the double bond of a monomer, forming a radical intermediate. In the propagation step, this intermediate reacts with another monomer, and the process repeats, leading to a long polymer chain. The termination step occurs when two radical chains react, forming a stable, non-radical product.

10.1.2 Kinetics of Free-Radical Polymerization

The kinetics of free-radical polymerization are governed by the rates of initiation, propagation, and termination. The overall rate of polymerization is determined by the balance between these three processes. The rate of initiation is proportional to the concentration of the initiator, while the rate of propagation is proportional to the concentration of the monomer and the concentration of the radical intermediate. The rate of termination is proportional to the square of the concentration of the radical intermediate.