

**B.Sc. Semester-VI
Organic Chemistry
Paper-XIV**

2. Synthetic Polymers

Coverage:

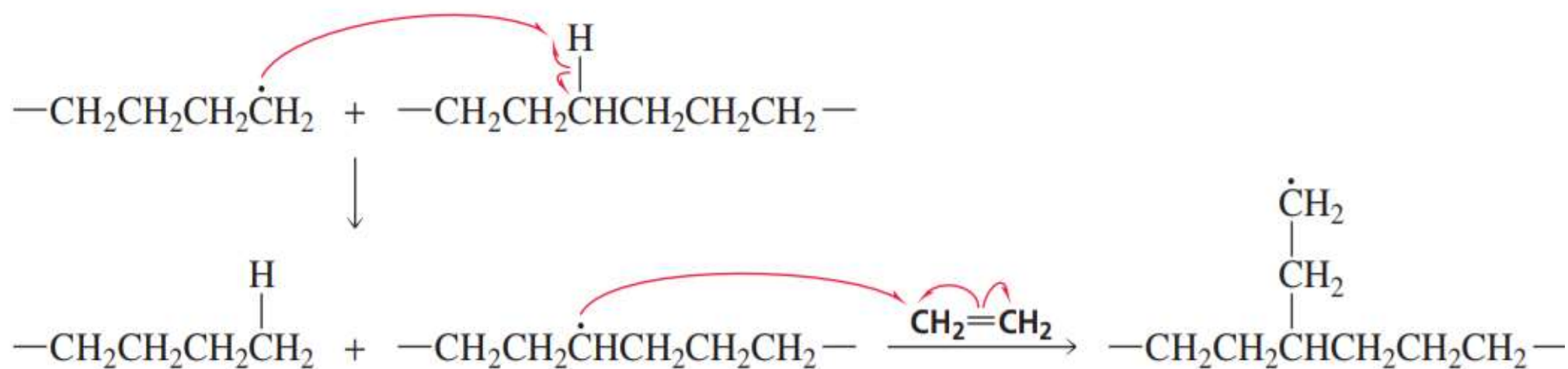
7. Branching of The Polymer Chain in Radical Polymerization



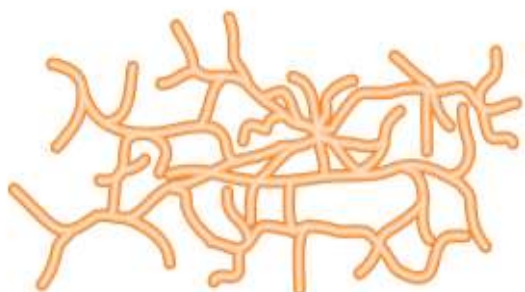
**Dr. Rajeev Ranjan
University Department of Chemistry
Dr. Shyama Prasad Mukherjee University, Ranchi**

Branching of The Polymer Chain in Radical Polymerization

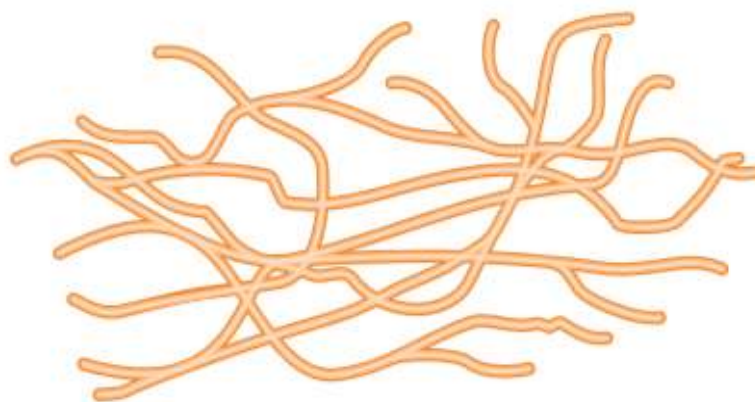
If the propagating site abstracts a hydrogen atom from a chain, a branch can grow off the chain at that point.



Abstraction of a hydrogen atom from a carbon near the end of a chain leads to short branches, whereas abstraction of a hydrogen atom from a carbon near the middle of a chain results in long branches. Short branches are more likely to be formed than long ones because the ends of the chain are more accessible.

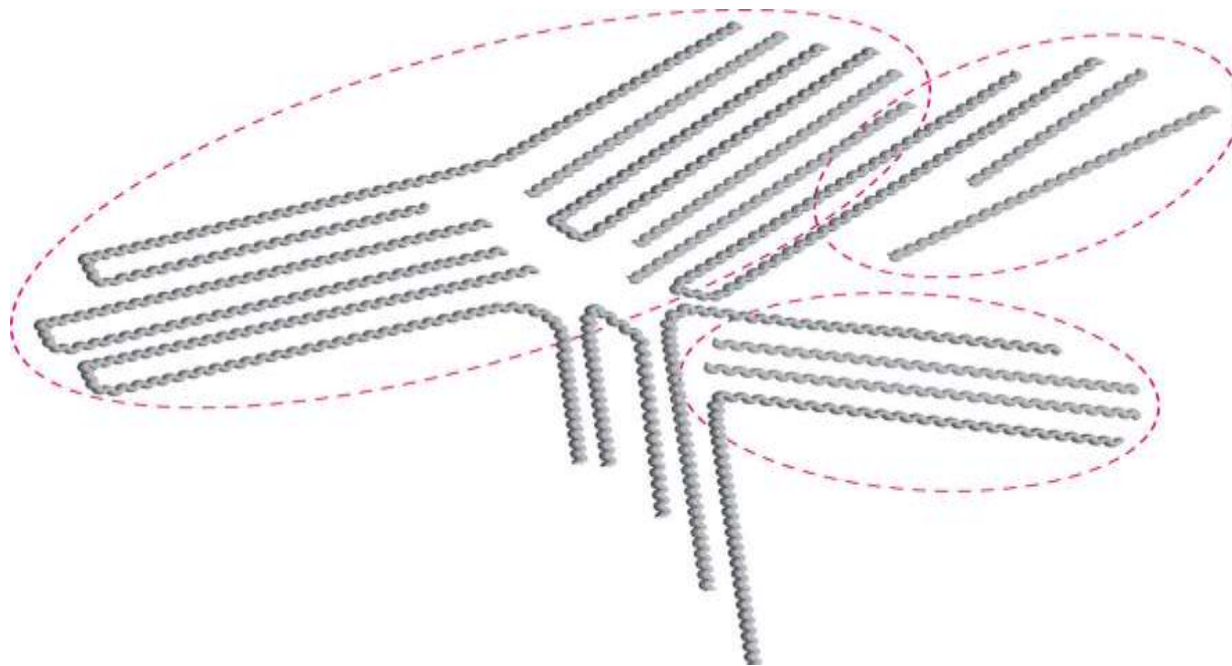


chain with short branches



chain with long branches

Branching greatly affects the physical properties of the polymer. Linear unbranched chains can pack together more closely than branched chains can. Consequently, linear polyethylene (known as high-density polyethylene) is a relatively hard plastic, used for the production of such things as artificial hip joints, while branched polyethylene (low-density polyethylene) is a much more flexible polymer, used for trash bags and dry-cleaning bags.



Polymers experience substantially larger van der Waals forces than do small molecules, producing regions that are crystallites.