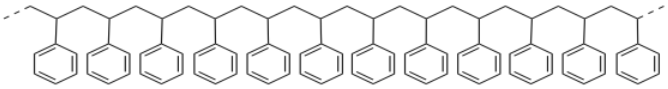
1.3: Olefins

Polyolefins are made from "olefins", which you may know as alkenes. Olefin is an older term for an alkene that is still commonly used in the industry.

These compounds make up a significant fraction of commercially-used polymers today. If you think of the common recyclable plastics, polyethylene (#2 and #4, depending on how the material is made), poly(vinyl chloride) (#3), polypropylene (#5) and polystyrene (#6) are all examples of polyolefins.

Polyolefins have been known for some time, although it took about a century from the time that they were first documented until they were recognized as polymers. German chemists in the mid-1800s were aware that certain tree resins gave rise to hard materials over time, and these materials included polystyrene.



If you compare the repeating structure of polystyrene to the structure of styrene, you can imagine that polystyrene is made from a series of styrene molecules that have been strung together. Essentially, the double bond of styrene has moved to attach to the next molecule, and the double bond there has done the same thing, and so on.

Polyolefins are formed in the same way from a wide variety of alkenes, leading to an array of different materials with properties that are suited to unique applications.

Note that, like ring-opening polymerization, olefin polymerization depends on molecules reacting with other molecules that are just like them. That isn't likely to happen; they will need something to come along and induce reaction between them. Olefin polymerization is thus another case in which monomers are tied together through a chain reaction. The reaction will require an initiator to get things started. That initiator is likely to become an end group, hanging from one end of the polymer chain or the other.