

## Lecture 44

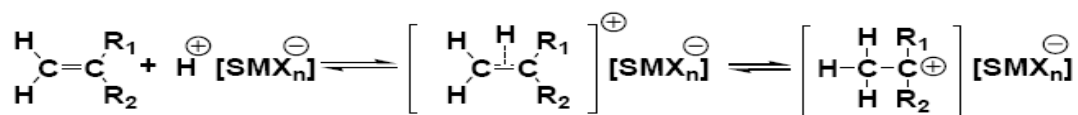
### Cationic Polymerization

Cationic polymerization is a type of chain growth polymerization in which a cationic initiator transfers charge to a monomer which then becomes reactive. This reactive monomer goes on to react similarly with other monomers to form a polymer.

#### Cationic Polymerization Initiation:

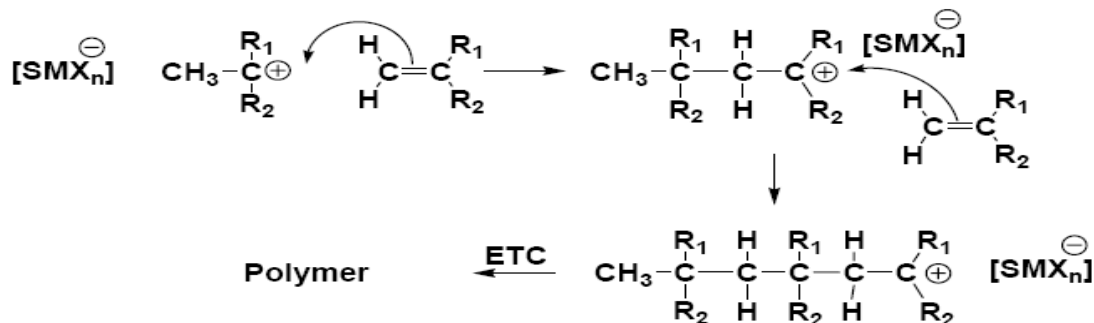
Initiation is the first step in cationic polymerization. During initiation, a carbenium ion is generated from which the polymer chain is made. The counterion should be non-nucleophilic, otherwise the reaction is terminated instantaneously. There are a variety of initiators available for cationic polymerization, and some of them require a coinitiator to generate the needed cationic species.

##### (i) Initiation



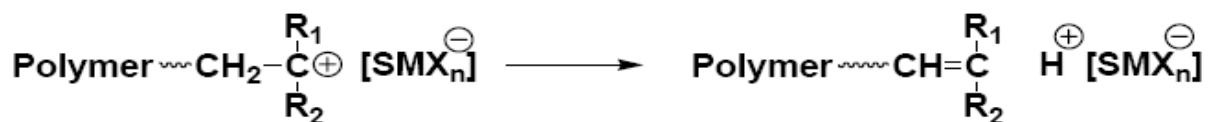
#### Cationic Propagation:

Propagation proceeds via addition of monomer to the active species, i.e. the carbenium ion. The monomer is added to the growing chain in a head-to-tail fashion; in the process, the cationic end group is regenerated to allow for the next round of monomer addition.



### Cationic Termination:

Termination generally occurs via unimolecular rearrangement with the counterion. In this process, an anionic fragment of the counterion combines with the propagating chain end. This not only inactivates the growing chain, but it also terminates the kinetic chain by reducing the concentration of the initiator-coinitiator complex.



#### References:

<http://research.cm.utexas.edu/nbould/polymers.htm>

[http://ocw.mit.edu/courses/chemical-engineering/10-569-synthesis-of-polymers-fall-2006/lecture-notes/lec25\\_11132006.pdf](http://ocw.mit.edu/courses/chemical-engineering/10-569-synthesis-of-polymers-fall-2006/lecture-notes/lec25_11132006.pdf)