CHAPTER 8

- Alkynes are SP hybridized and linear in geometry

- Alkynes are named similar to alkenes. Alkenes will have priority for the lowest number if it is equidistant from the end of the chain, otherwise, whichever is closest to an end gets the lowest number.

- Alkynes are prepared by elimination reactions of vinyl halides (halides on a double bond), or two eliminations from dihaloalkanes.

- The electrophilic addition to alkynes is very similar to alkenes, but additions can add twice. This occurs with Markovnikov regioselectivity in both additions!

- Tetrahalides can be produced by the addition of $X_2$. In principle, these two additions could be separated to introduce different halogens, or an excess of one reagent could be added to get four of the same halogens.
The oxidation of alkynes leads to fully oxidized products with either ozonolysis or treatment with potassium permanganate:

\[
\text{O}_3, \text{then H}_2\text{O}_2, \text{NaOH} \quad \text{or} \quad \text{KMnO}_4, \text{H}_3\text{O}^+ \rightarrow \text{C} = \text{O} + \text{O} = \text{C} = \text{O}
\]

Alkynes can be reduced under a variety of conditions to provide different hydrogenation products. Reduction with hydrogen and a metal catalyst usually gives the fully saturated alkane. Using a special deactivated catalyst, Lindlar's Catalyst, the reduction can be stopped at the alkene stage giving cis double bonds. Trans double bonds can be obtained using lithium or sodium metal dissolved in ammonia.

Hydration of alkynes occurs readily with mercury (II) catalysts. Note that the product is an "enol" which isomerizes (tautomerizes) to a ketone.

**Tautomers** - constitutional isomers that are rapidly interconverted

**Keto-Enol tautomerism** occurs readily and favors the ketone form.