Pheromones (chemical messengers)

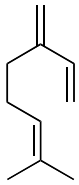
From the Greek	Pherein	Horman
	to carry	excitement

1959 – Adolf Butenandt (Nobel prize)

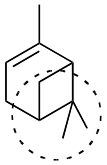
Sex Pheromones – Insects can detect 10^{-17} moles/L (i.e. 10^{-17} M or 10^{-17} molar)

Alarm Pheromones
Trail Pheromones

Swarm Pheromones



myrcene



α-pinene
major component of terpentine

Both of these are monoterpenes

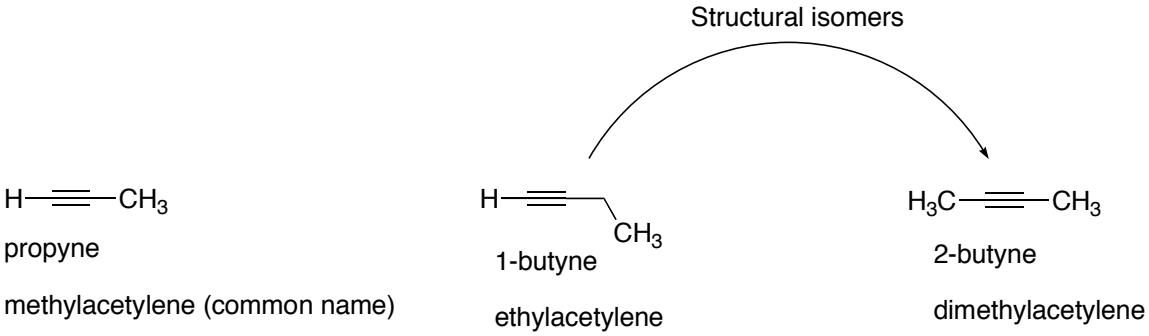
Nomenclature of alkynes

Rule:

- Find longest chain with max no. of multiple bonds
- Number from end to give 1st multiply bonded position lowest nunmber
- drop "ane" and add "yne"
- for multiple triple bonds, drop "ne" and add "diyne"," triyne", etc.

eg.

- ethyne / acetylene (common name)

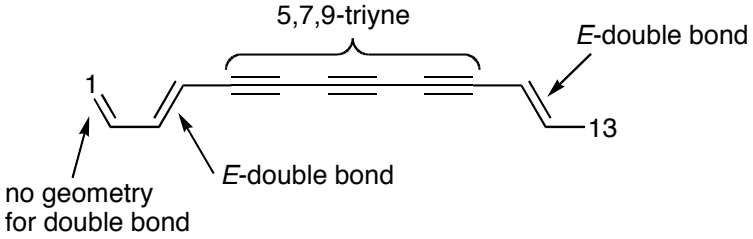


Multiple alkynes end with :

2	C≡C	diyne
3	C≡C	triyne

Mixed double and triple bond containing compounds are "eneynes"

The below example is from Canola – defense substance – anti-nematode



1,3[*E*],11[*E*]-tridecatriene-5,7,9-triyne

Both above drawn structure are the same. And both are considered "Diyne". If the structure contains three triple bonds it is "Triyne" … and so forth.

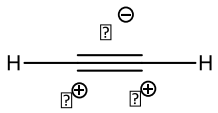
Hydrocarbons → C and H only
Physical properties

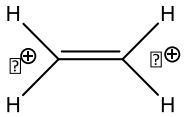
- alkanes – very non-polar
- alkenes – non-polar, but more polar than alkanes
- alkynes – non-polar, but more polar than alkenes

- overall, they all are very non-polar

- density less than water (1.0 g/cm^3) ρ = rho = density ~ 0.8g/cm^3
- immiscible with water
- dissolve well in non-polar solvents (eg, haloalkanes)
- low mp. & bp. compared to other organic molecules due to hydrophobic interaction
- temporary dipoles : London (dispersion) forces control self-association
- reactivity: alkynes > alkenes > alkanes
- double (and triple) bonds have partial negative charge in the centre of the bond and partial positive charges on the carbon nuclei

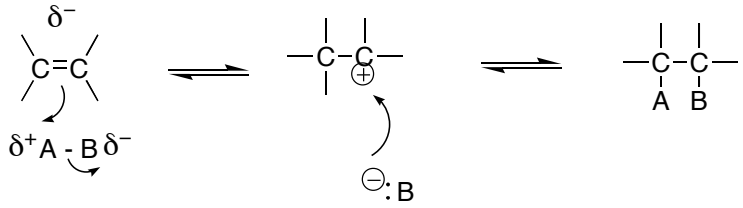
Comparing the acidity of ethylene and acetylene:





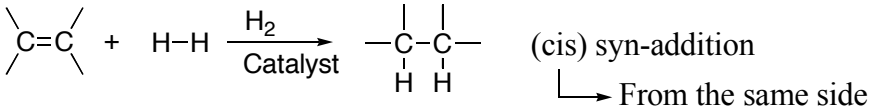
pka= 26 more acidic than pka=36

Reaction of Alkenes: Addition Reactions



Reverse is called an elimination reaction

Hydrogenation (H-H addition): Addition of H_2



Catalyst is one of Ni (Nickel), Pd(Palladium), Pt(Platinum)

Stereospecific Reaction: Is one in which the stereochemistry of the starting material determines the stereochemistry of product.

Catalyst: Lowers the activation energy of a reaction (transition state) but is not permanently transformed. Catalyst provides a path with less activation energy.