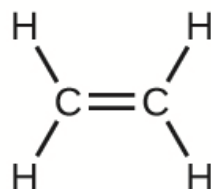


HW 15, chemistry 2

ALKENES

Alkenes - unsaturated hydrocarbons, they have one or more carbon – carbon double bond. The simplest alkene C₂H₄, ethene,

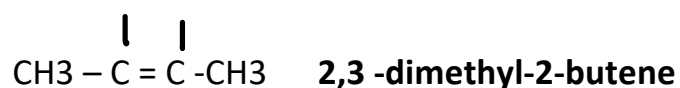


Hydrocarbon	Formula	Bp, °C	Mp, °C	Density, d_4^{20}
ethane	CH ₃ —CH ₃	−88.6	−183 ^a	
ethene	CH ₂ =CH ₂	−105	−169	
ethyne	CH≡CH	−83	−81	
propane	CH ₃ —CH ₂ —CH ₃	−42.1	−187 ^a	0.501 ^b
propene	CH ₃ —CH=CH ₂	−47.8	−185 ^a	0.514 ^b
propyne	CH ₃ —C≡CH	−23.2	−102.7	0.706 ^b
butane	CH ₃ —CH ₂ —CH ₂ —CH ₃	−0.5	−138	0.579 ^b
1-butene	CH ₃ —CH ₂ —CH=CH ₂	−6.3	−185 ^a	0.595 ^b
<i>cis</i> -2-butene	CH ₃ —CH=CH—CH ₃	3.7	−139	0.621 ^b
<i>trans</i> -2-butene	CH ₃ —CH=CH—CH ₃	0.9	−106	0.604 ^b
1-butyne	CH ₃ —CH ₂ —C≡CH	8.1	−126	0.65 ^b
2-butyne	CH ₃ —C≡C—CH ₃	27.0	−32	0.691
pentane	CH ₃ —CH ₂ —CH ₂ —CH ₂ —CH ₃	36.1	−129	0.626
1-pentene	CH ₃ —CH ₂ —CH ₂ —CH=CH ₂	30.0	−165	0.641
<i>cis</i> -2-pentene	CH ₃ —CH ₂ —CH=CH—CH ₃	37.9	−151	0.656
<i>trans</i> -2-pentene	CH ₃ —CH ₂ —CH=CH—CH ₃	36.4	−140	0.648
1-pentyne	CH ₃ —CH ₂ —CH ₂ —C≡CH	40.2	−106	0.690
2-pentyne	CH ₃ —CH ₂ —C≡C—CH ₃	56.1	−109	0.711
hexane	CH ₃ —CH ₂ —CH ₂ —CH ₂ —CH ₂ —CH ₃	68.7	−95	0.659
1-hexene	CH ₃ —CH ₂ —CH ₂ —CH ₂ —CH=CH ₂	63.5	−140	0.674
<i>cis</i> -2-hexene	CH ₃ —CH ₂ —CH ₂ —CH=CH—CH ₃	68.8	−141	0.687
<i>trans</i> -2-hexene	CH ₃ —CH ₂ —CH ₂ —CH=CH—CH ₃	67.9	−133	0.678
<i>cis</i> -3-hexene	CH ₃ —CH ₂ —CH=CH—CH ₂ —CH ₃	66.4	−138	0.680
<i>trans</i> -3-hexene	CH ₃ —CH ₂ —CH=CH—CH ₂ —CH ₃	67.1	−113	0.677
1-hexyne	CH ₃ —CH ₂ —CH ₂ —CH ₂ —C≡CH	71	−132	0.716
2-hexyne	CH ₃ —CH ₂ —CH ₂ —C≡C—CH ₃	84.0	−88	0.732
3-hexyne	CH ₃ —CH ₂ —C≡C—CH ₂ —CH ₃	81.8	−105	0.724

^aAt the triple point (i.e., the temperature at which the solid, liquid, and vapor all are in equilibrium).

^bUnder pressure.

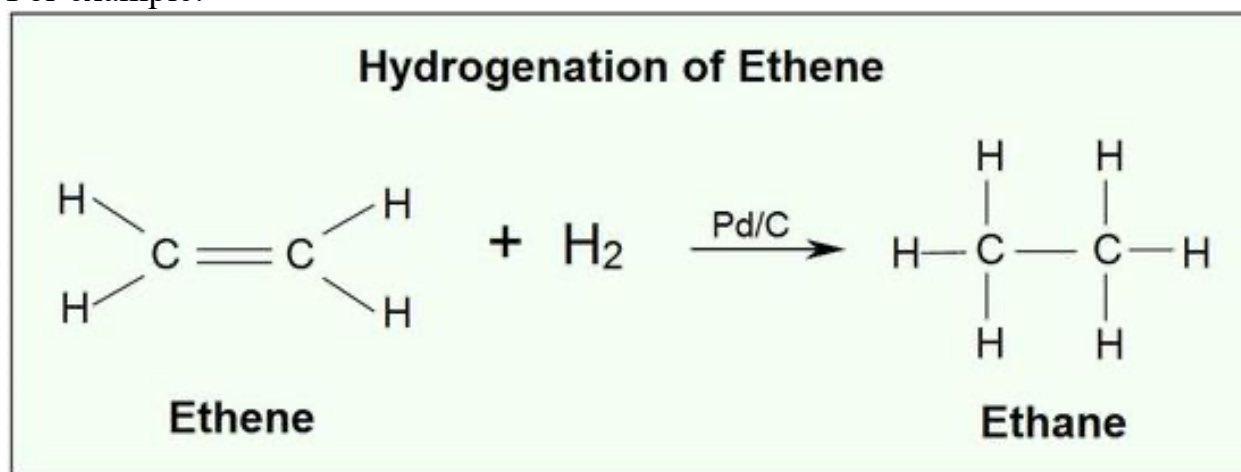
How to name alkenes: number the main chain from the end nearer to the double bond, put this number in the name, also do not forget the positions and names of the substituent groups. CH₃ CH₃



Remember, Cl- Br- groups will be called chloro-, bromo-.

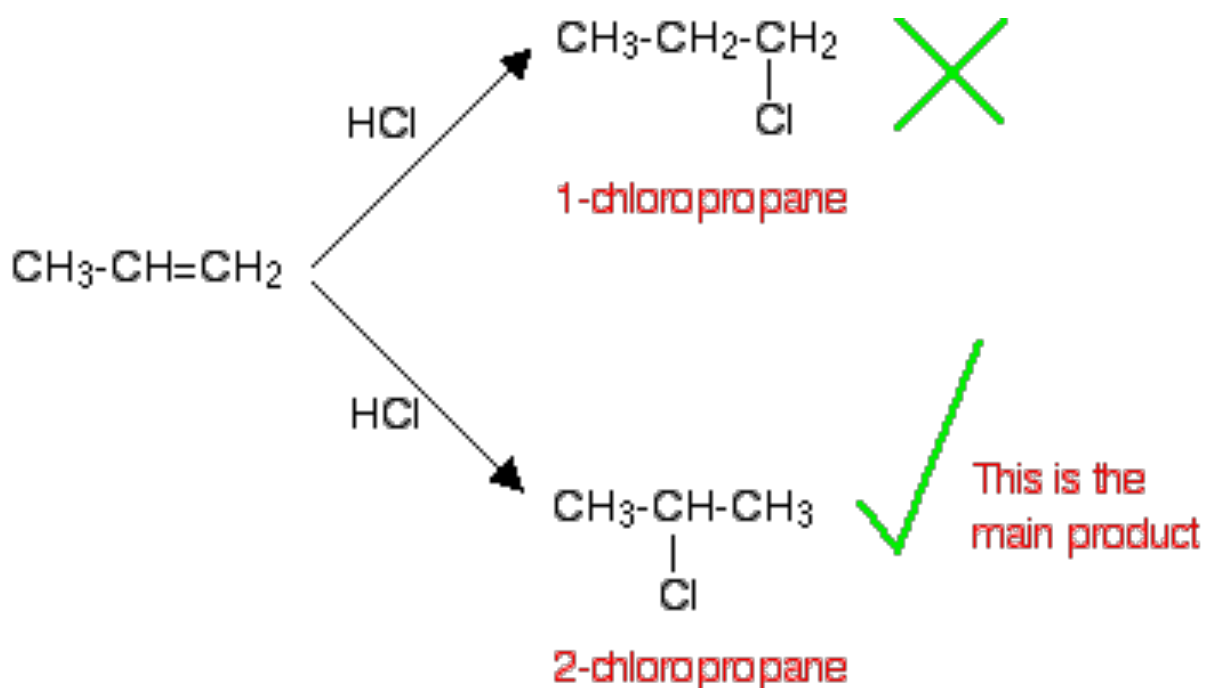
The most characteristic reaction of alkenes is the addition reactions, where double bond is broken and new single bonds are formed.

For example:



When you write addition reactions of alkenes with such compounds like water or hydrogen halides you have to remember Markovnikov's rule:

H attaches to the carbon that already has more H atoms



Questions:

Write the condense structural formulas and the names of the product in the following reactions:

