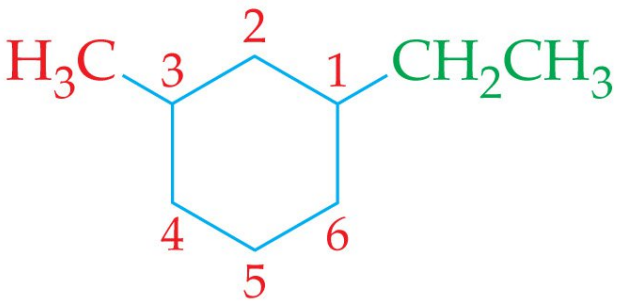
Academie toegepaste biowetenschappen en chemie

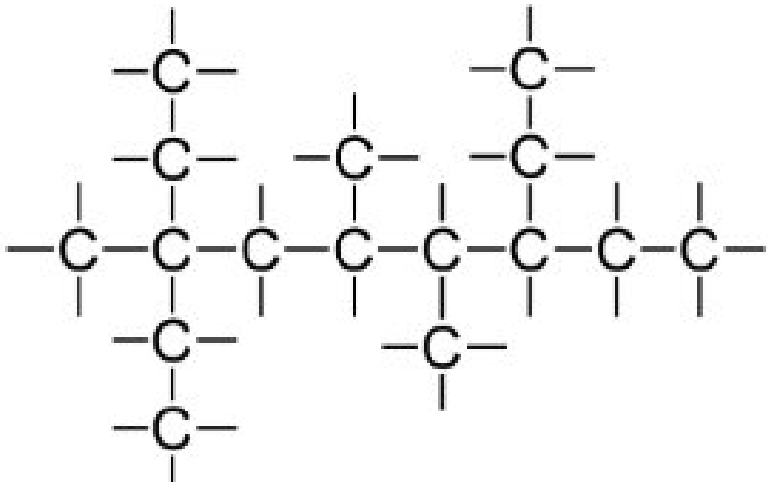
Chemie
Course 3

Week 6: H13

HAN_UNIVERSITY
OF APPLIED SCIENCES

Eerst even oefenen





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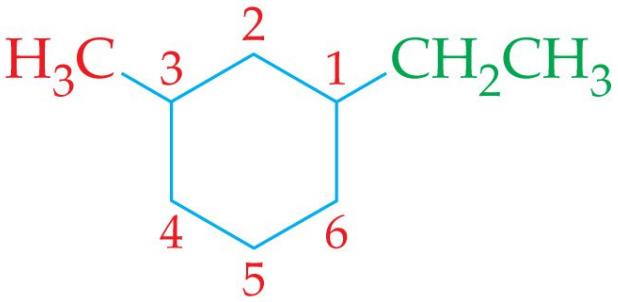
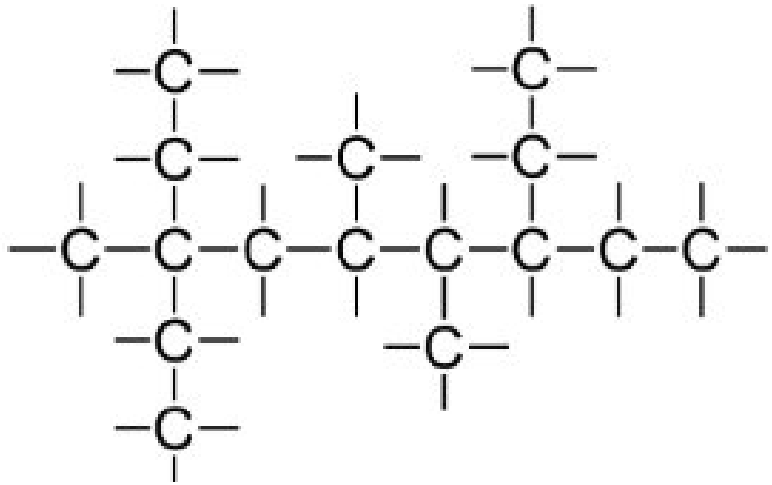




1-ethyl-3-methylcyclohexaan

3,7-diethyl-3,5,6-trimethylnonaan

Hoofdstuk 13; alkenen, alkynen en aromatische stoffen

Vandaag

- Alkenen en alkynen benoemen

13.1 alkenen en alkynen

Wat betekent het als een organisch molecuul onverzadigd is?

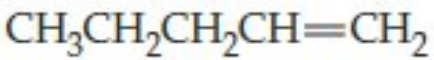
13.1 alkenen en alkynen

- **Verzadigd vs. Onverzadigd**

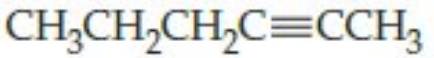
- **Alkaan, alkeen, alkyn**

13.2 Benoemen van alkenen en alkynen

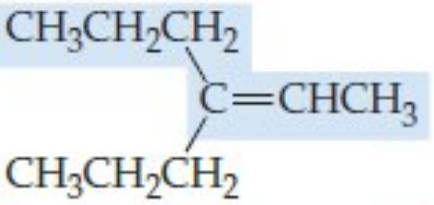
STEP 1: Name the parent compound. Find the longest chain containing the double or triple bond, and name the parent compound by adding the suffix *-ene* or *-yne* to the name for the main chain. If there is more than one double or triple bond, the number of multiple bonds is indicated using a numerical prefix (*di*ene = two double bonds, *tri*ene = three double bonds, and so forth).



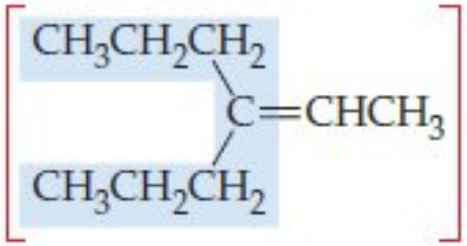
Name as a *pentene*—a 5-carbon chain containing a double bond.



Name as a *hexyne*—a 6-carbon chain containing a triple bond.



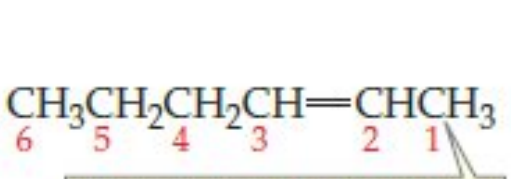
Name as a *hexene*—a 6-carbon chain containing a double bond . . .



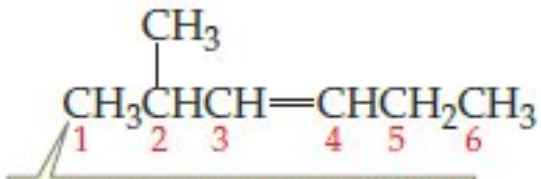
. . . *not* as a heptene, because the double bond must be included in the longest chain.

13.2 Benoemen van alkenen en alkynen

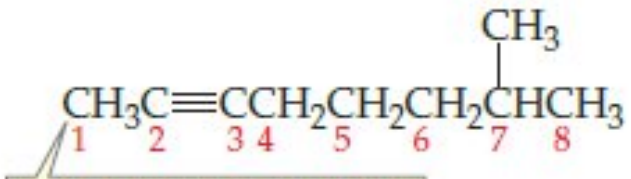
STEP 2: Number the carbon atoms in the main chain so that those with multiple bonds have the lowest index numbers possible. Thus, begin numbering at the end nearer the multiple bond (Examples 1 and 3). If the multiple bond is an equal distance from both ends, begin numbering at the end nearer the first branch point (Example 2).



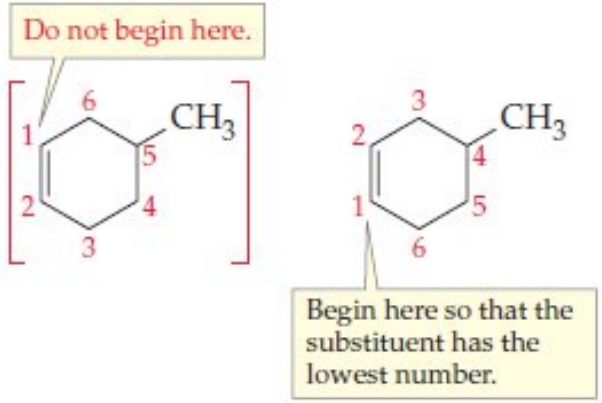
Example 1



Example 2

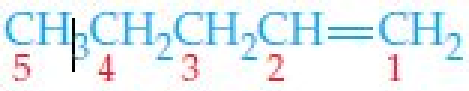


Example 3

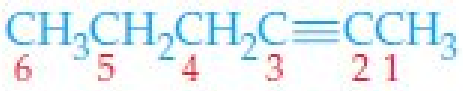


13.2 Benoemen van alkenen en alkynen

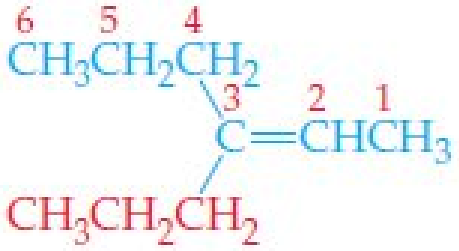
STEP 3: Write the full name. Assign numbers to the branching substituents, and list the substituents alphabetically. Use commas to separate numbers and hyphens to separate words from numbers. Indicate the position of the multiple bond in the chain by giving the number of the *first* multiple-bonded carbon. If more than one double bond is present, identify the position of each and use the appropriate name ending (e.g., 1,3-buta*diene* and 1,3,6-hepta*triene*).



Pent-1-ene

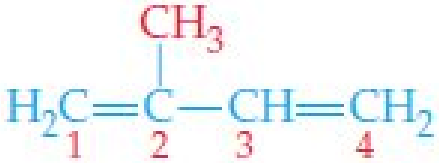


Hex-2-yne

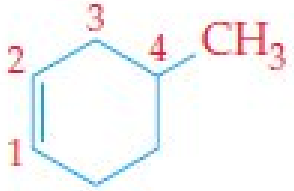


3-Propylhex-2-ene

7-Methyloct-2-yne



2-Methylbuta-1,3-diene
(Isoprene)



4-Methylcyclohexene

Nu

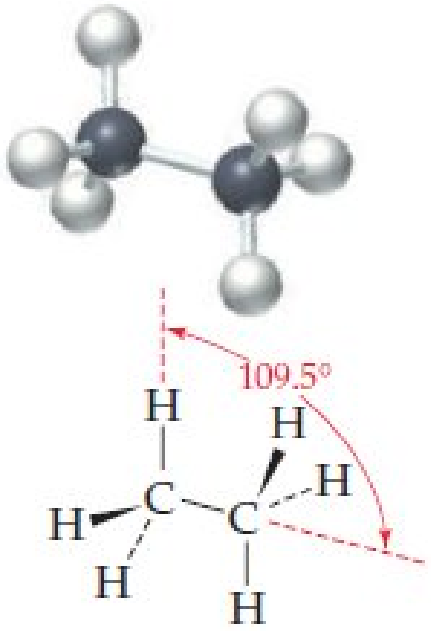
Aan de slag
t/m 13.3

13.3 De structuur van alkenen: Cis-Trans isomeren

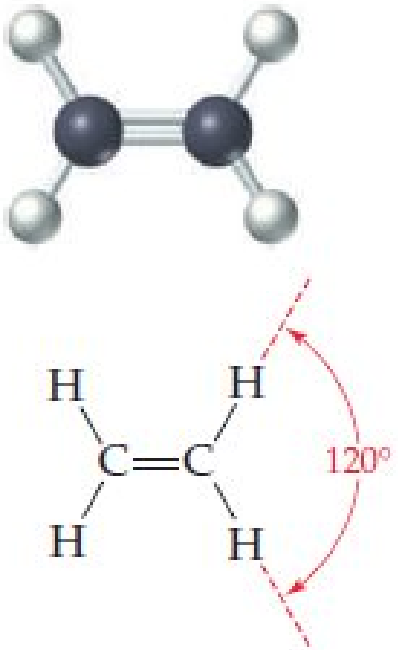
Wat zijn isomeren?

Wat zijn cis-transisomeren?

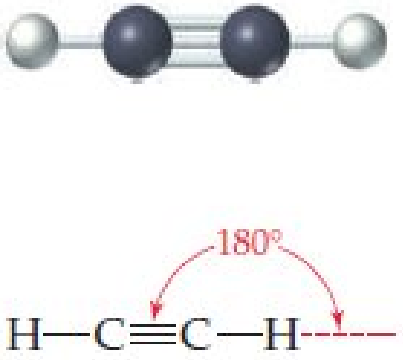
13.3 De structuur van alkenen: Cis-Trans isomeren



Ethane—a tetrahedral molecule with bond angles of 109.5°



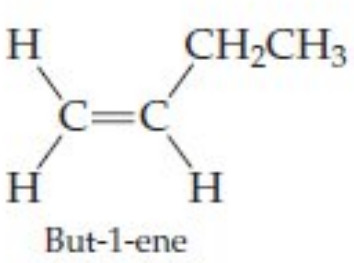
Ethene—a flat molecule with bond angles of 120°

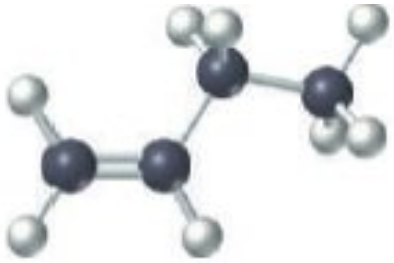


Ethyne—a linear molecule with bond angles of 180°

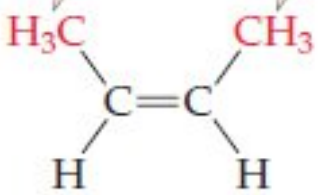
13.3 De structuur van alkenen: Cis-Trans isomeren

De verschillende isomeren van C_4H_8

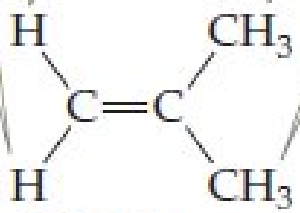




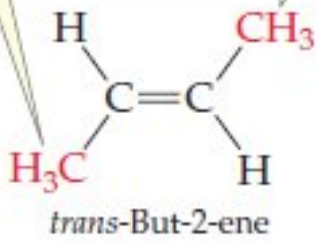
In *cis* configurations, the groups are on the same side of the double bond.



When the groups are the same on both sides, no *cis* or *trans* isomers are possible.



In *trans* configurations, groups attach on the opposite sides of the double bond.



Nu

Aan de slag
t/m 13.6

13.4 Eigenschappen van alkenen en alkynen

Vergelijkbaar met alkanen:

- nonpolair
- ontvlambaar
- dubbele/drievoudige bindingen maken de moleculen reactiever dan alkanen.
- Cis-transisomerie

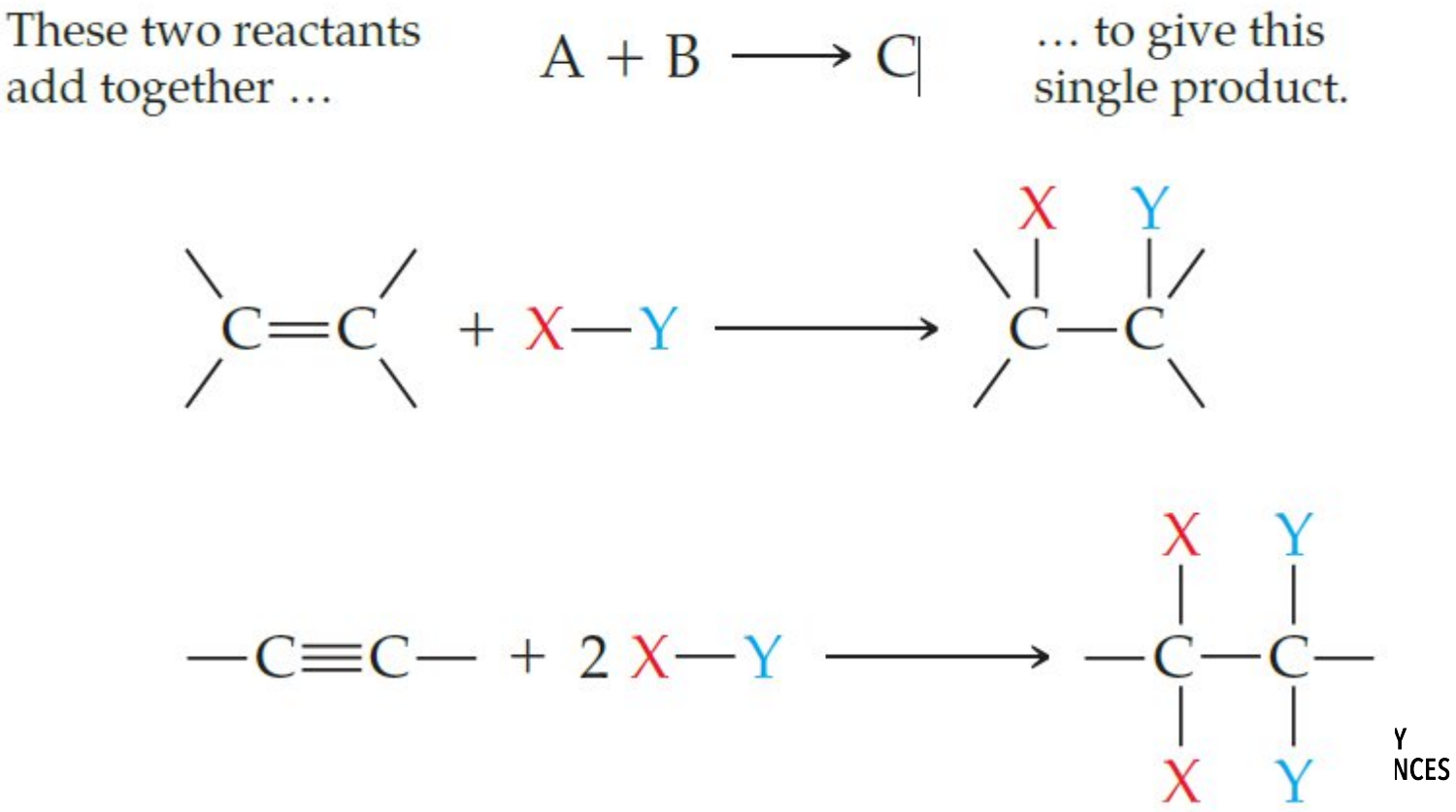
13.5 Types of Organic Reactions

4 typen organische reacties

- Addities (additions)
- Eliminaties (eliminations)
- Substituties (substitutions)
- Herschikkingen (rearrangements)

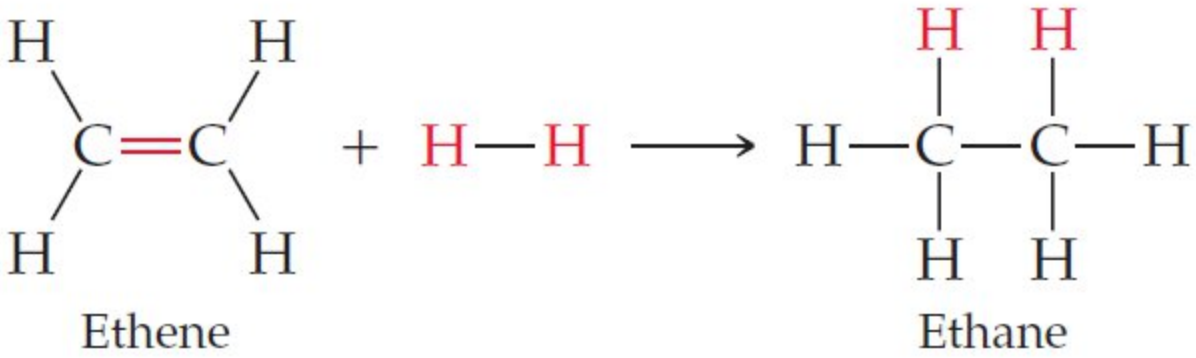
13.5 Types of Organic Reactions

Addities



13.5 Types of Organic Reactions

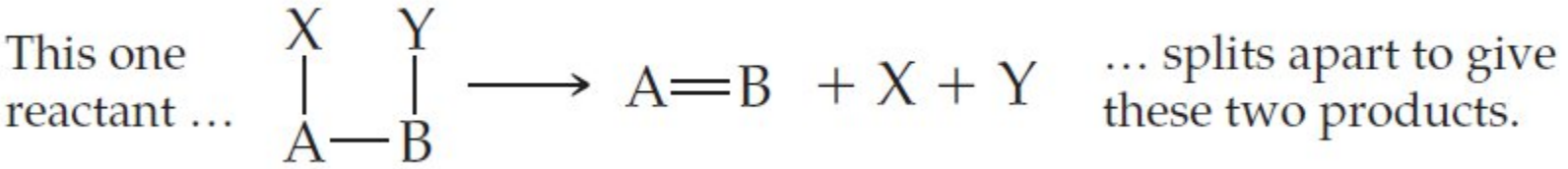
Addities (voorbeeld)

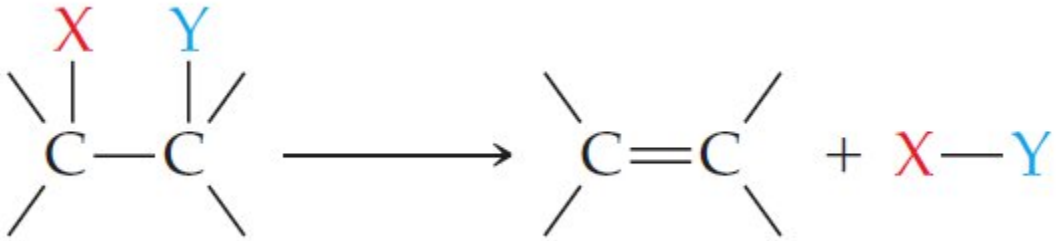


13.5 Types of Organic Reactions

Eliminaties

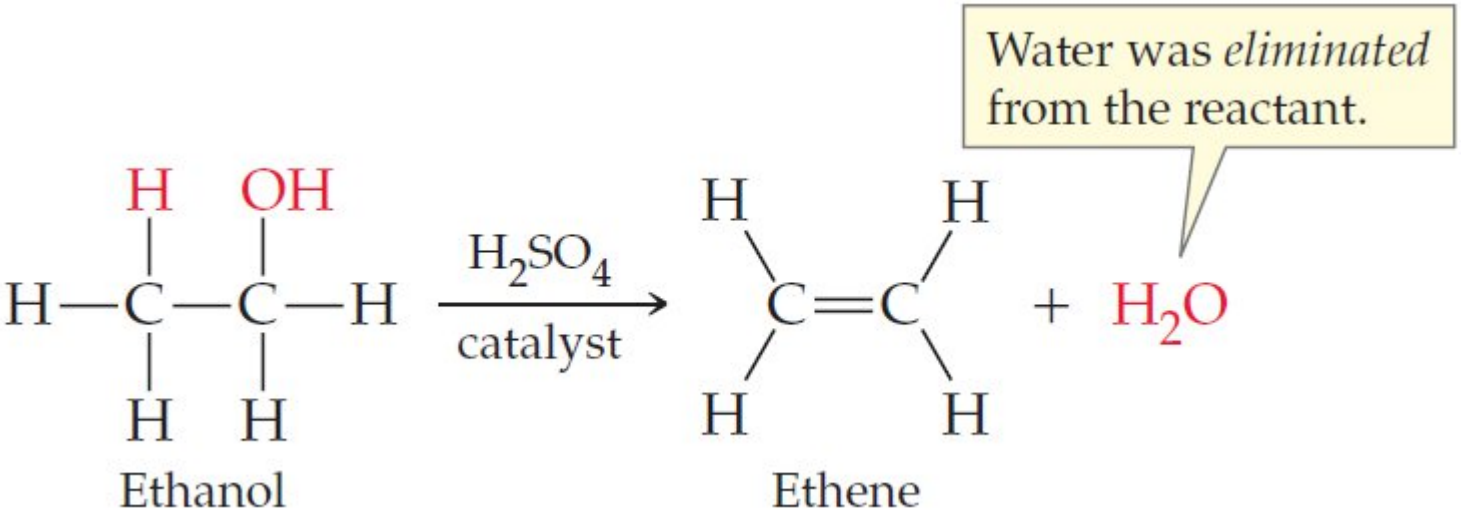
- Tegenovergestelde van een additie





13.5 Types of Organic Reactions

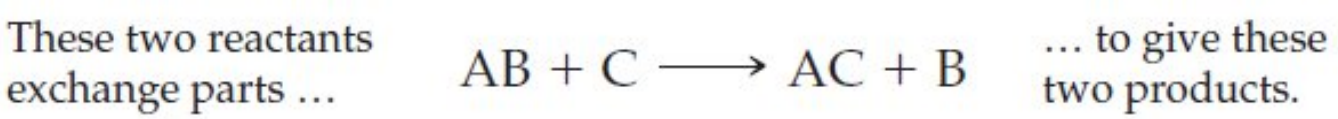
Eliminaties (voorbeeld)



13.5 Types of Organic Reactions

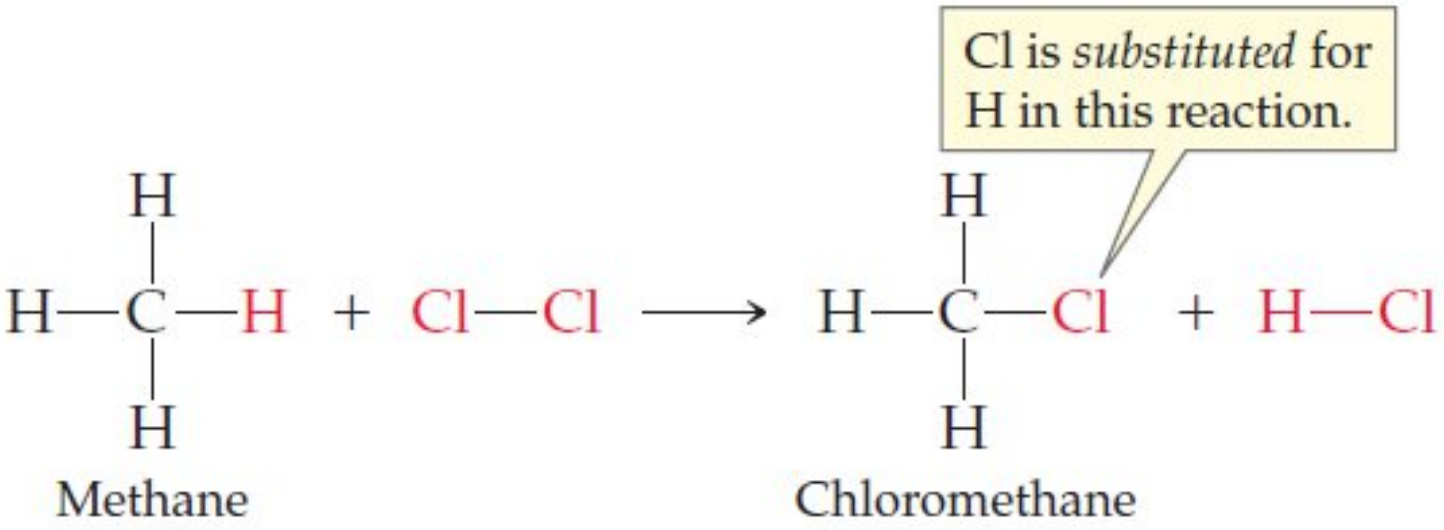
Substitutie

- twee reactanten 2 nieuwe producten



13.5 Types of Organic Reactions

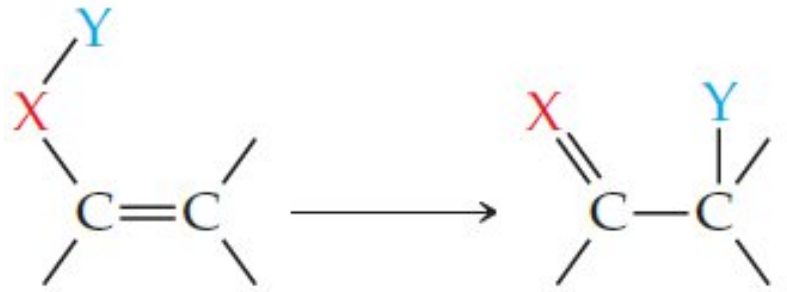
Substitutie (voorbeeld)

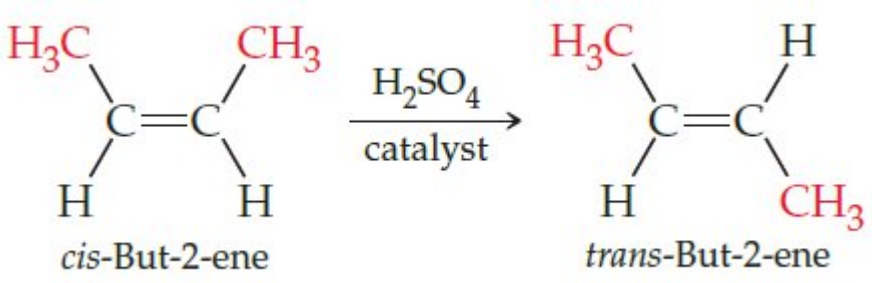


13.5 Types of Organic Reactions

Herschikking

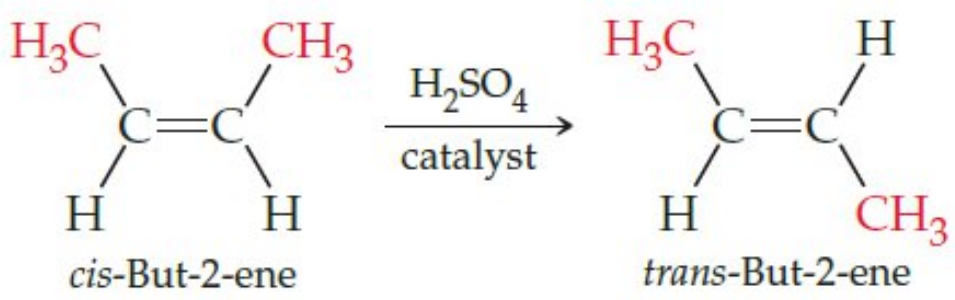
- Product is een isomeer van de reactant





13.5 Types of Organic Reactions

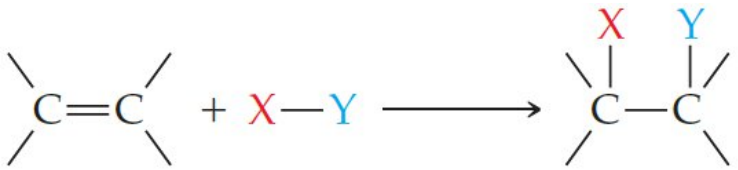
Herschikking (voorbeeld)

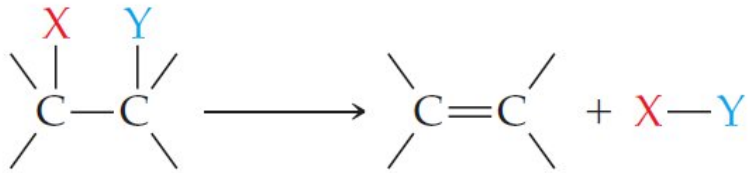


13.5 Types of Organic Reactions

4 typen organische reacties

- Addities (additions)
- Eliminaties (eliminations)
- Substituties (substitutions)
- Herschikkingen (rearrangements)

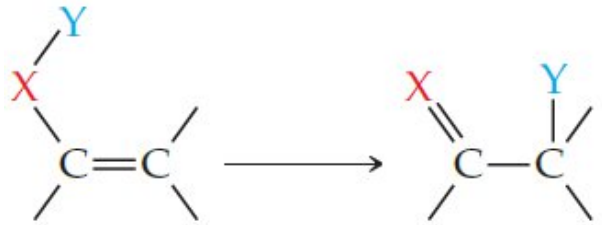




These two reactants exchange parts …

$$AB + C \longrightarrow AC + B$$

… to give these two products.

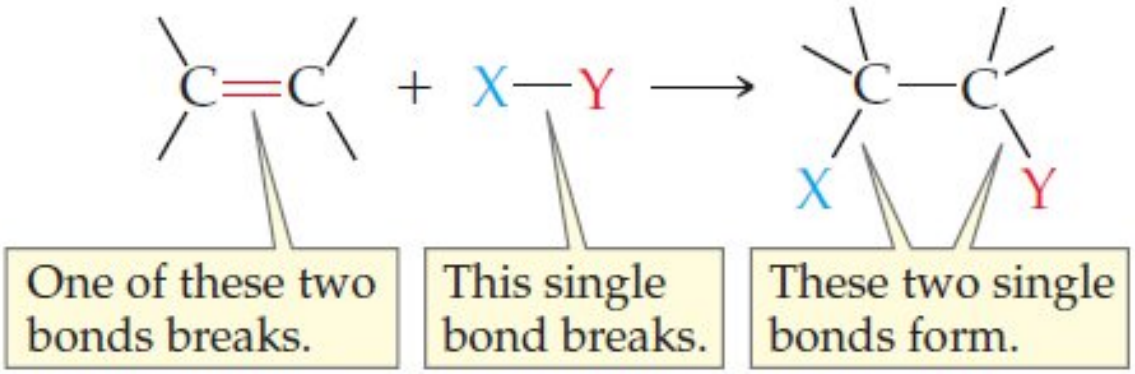


13.5 Types of Organic Reactions

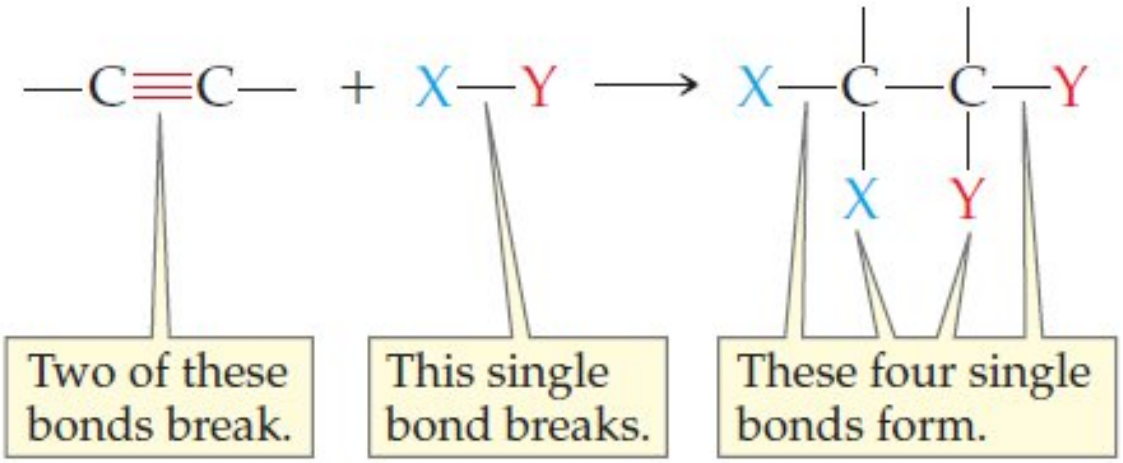
Nu

- Maken WE 13.4 en 13.7

13.6 Additie reacties van alkenen en alkynen



Addition reactions



13.6 Additie reacties van alkenen en alkynen

Hydrogenatie
- Reacties met waterstof

Halogenatie
- Reactie met een halogeen

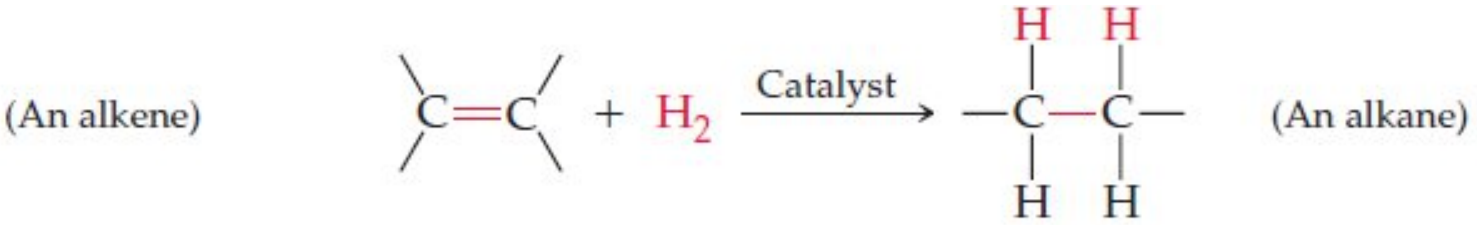
Hydrohalogenatie
- Reacties met HBr en HCl

Hydratie
- Reactie met water

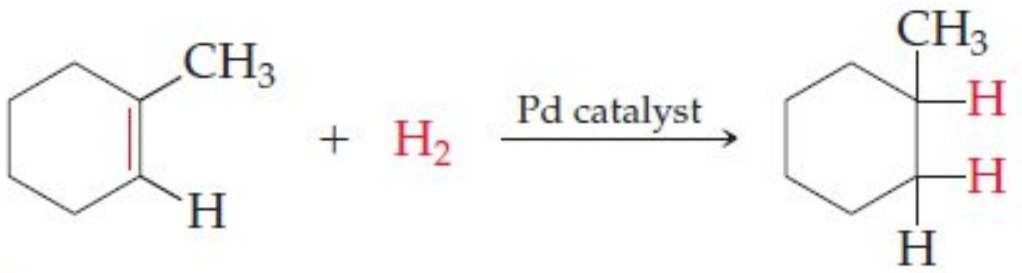
13.6 Additie reacties van alkenen en alkynen

Hydrogenatie

- Reacties met waterstof



For example,



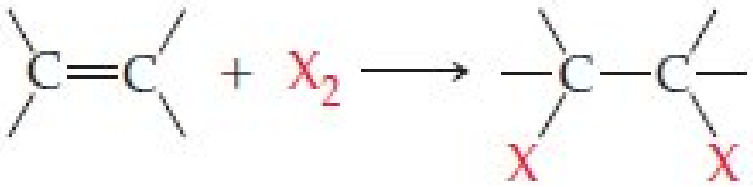
1-Methylcyclohexene

Methylcyclohexane (85% yield)

13.6 Additie reacties van alkenen en alkynen

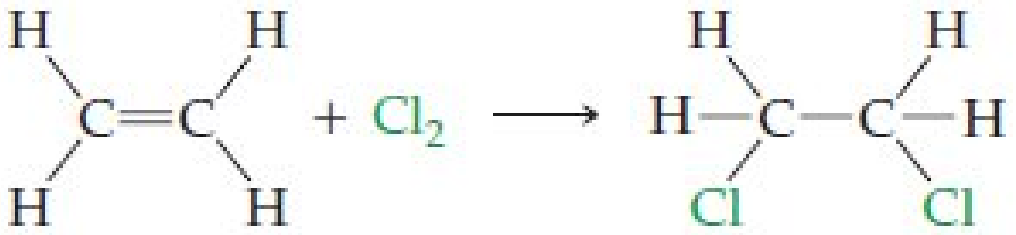
Halogenatie

- Reactie met een halogeen



(A 1,2-dihaloalkane where X = Br or Cl)

For example,



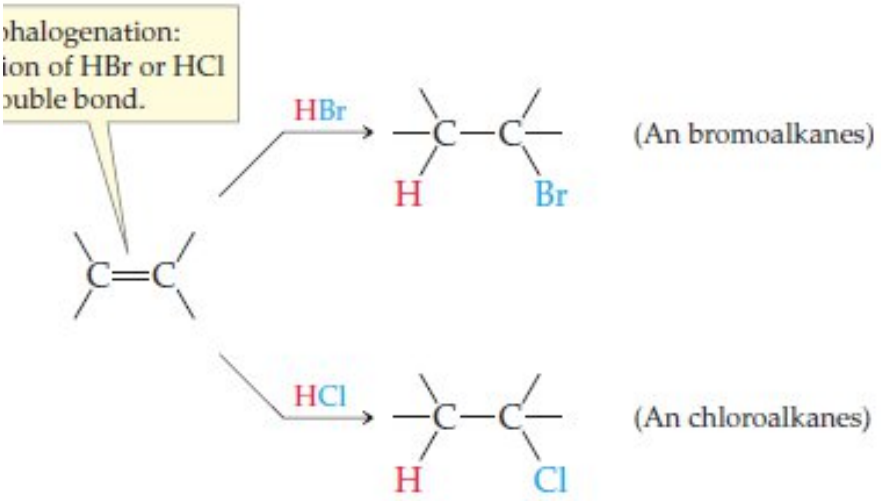
Ethene

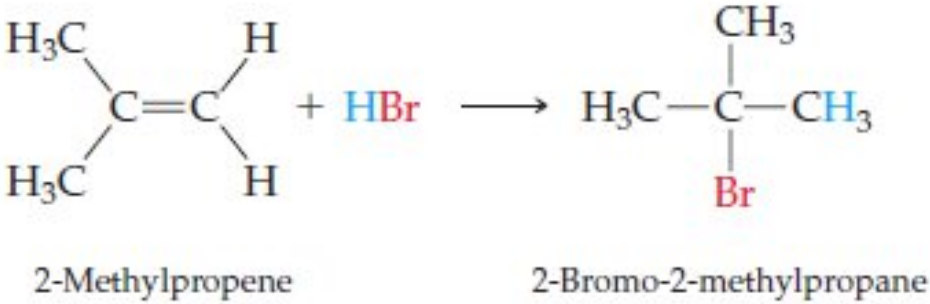
1, 2-Dichloroethane

13.6 Additie reacties van alkenen en alkynen

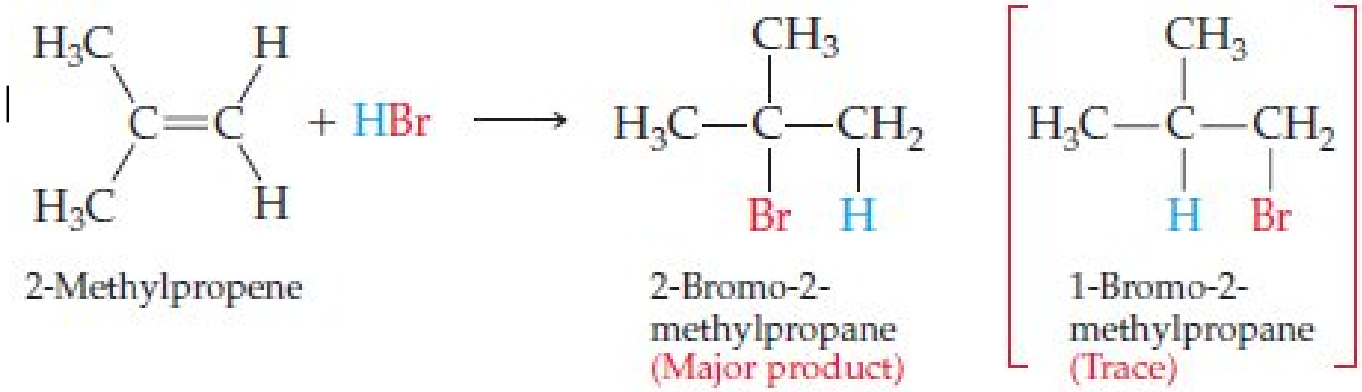
Hydrohalogenatie

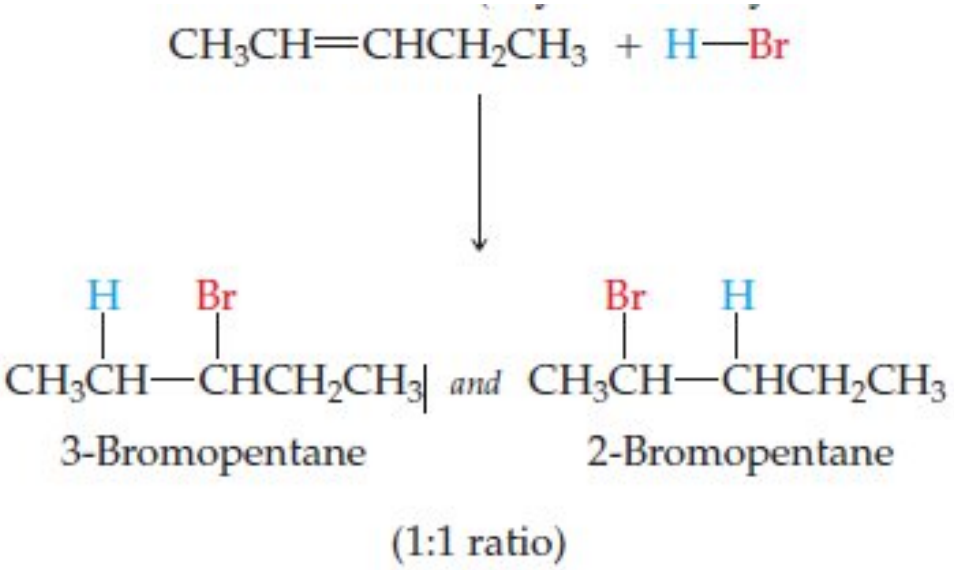
- Reacties met HBr en HCl





13.6 Additie reacties van alkenen en alkynen

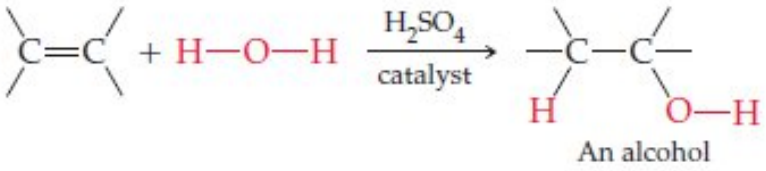




13.6 Additie reacties van alkenen en alkynen

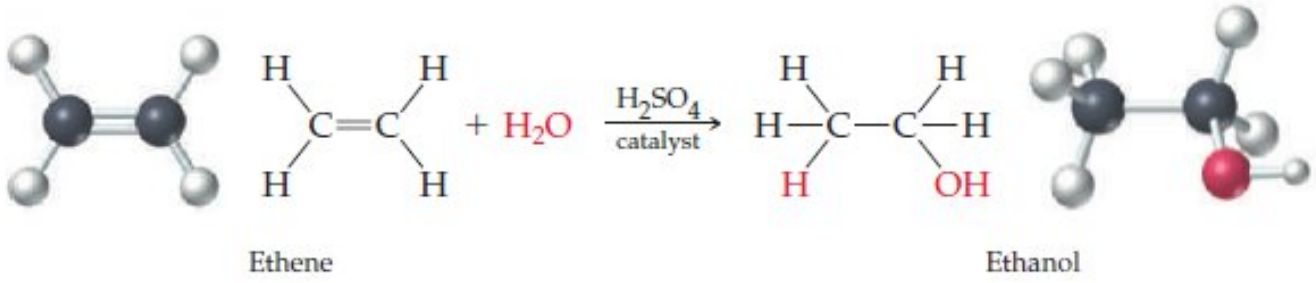
Hydratie

- Reactie met water



An alcohol

For example,



Ethene

Ethanol

13.6 Additie reacties van alkenen en alkynen

Hydrogenatie
- Reacties met waterstof

Halogenatie
- Reactie met een halogeen

Hydrohalogenatie
- Reacties met HBr en HCl

Hydratie
- Reactie met water

Nu

Maken t/m 13.16

Bronnen

Afbeeldingen afkomstig van:

- McMurry - Fundamentals of general, organic, and biological chemistry. 7th edition, uitgever: Pearson.
  - Veplicht boek boekenlijst opleiding