

Organic Chemistry

- introduction 2 -

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Number of carbons and
number of multiple bonds or substituents

1	2	3	4	5	6	7
meth-	eth-	prop-	but-	pent-	hex-	hept-
mono	di	tri	tetra	penta	hexa	hepta

8	9	10	11	12	13	20
oct-	non-	dec-	undec -	dodec -	tridec -	icosa-
octa	nona	deca				

Exercise

- add names of the compounds:

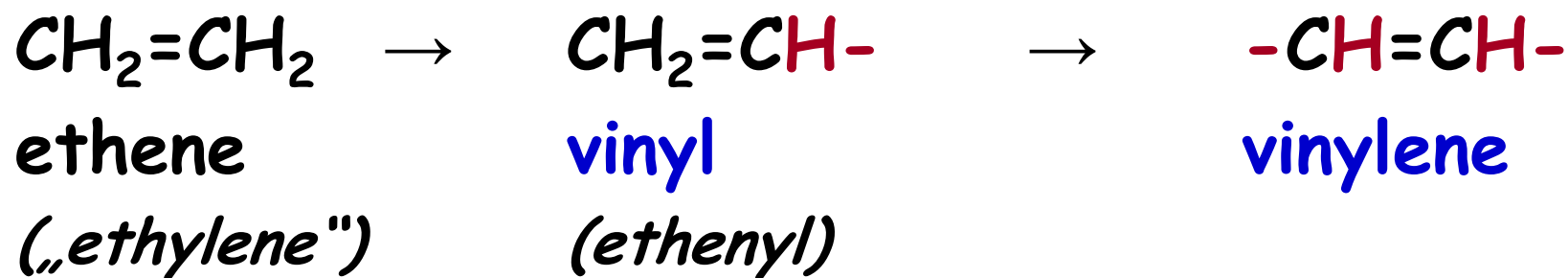
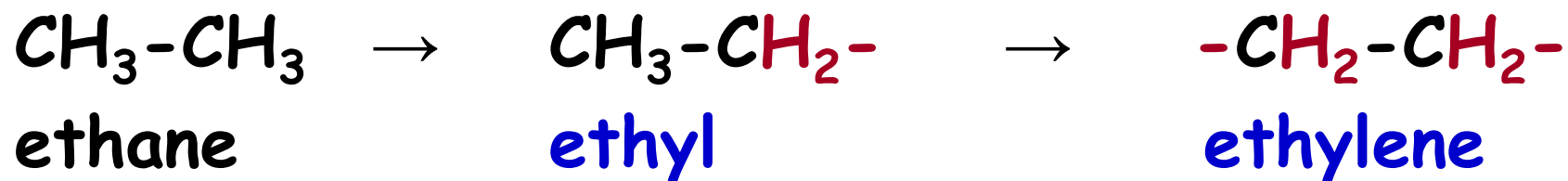
1. $\text{CH}_3\text{-CH}_2\text{-CH}_3$
2. $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2$
3. $\text{CH}_2\text{=CH}_2\text{-CH}_2\text{-CH=CH}_2$
4. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-C}\equiv\text{C-CH}_3$
5. $\text{CH}_3\text{-(CH}_2\text{)}_{16}\text{-CH}_3$

Exercise

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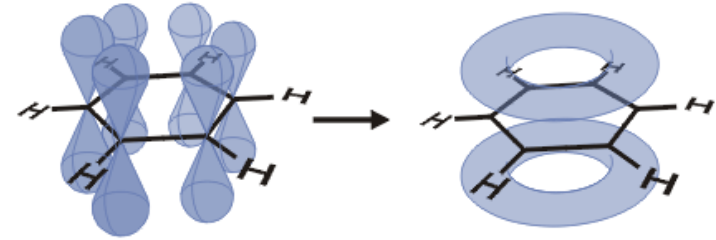
1. $\text{CH}_3\text{-CH}_2\text{-CH}_3$ propane
2. $\text{CH}_3\text{-CH}_2\text{-CH=CH}_2$ but-1-ene
3. $\text{CH}_2\text{=CH}_2\text{-CH}_2\text{-CH=CH}_2$ pent-1,4-diene
4. $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-C}\equiv\text{C-CH}_3$ hex-2-yne
5. $\text{CH}_3\text{-(CH}_2\text{)}_{16}\text{-CH}_3$ octadecane

Hydrocarbon rests (alkyls, R)

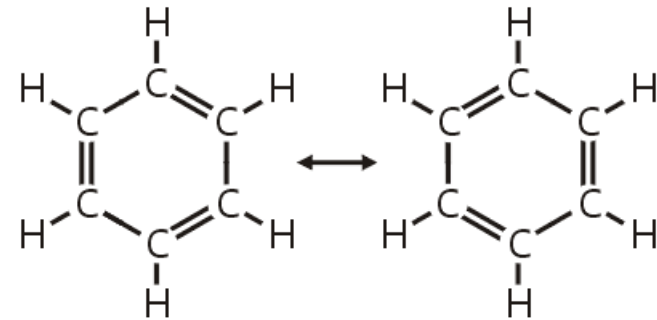


Aromatic compounds

- delocalization of π -elektrons



- more resonance structures

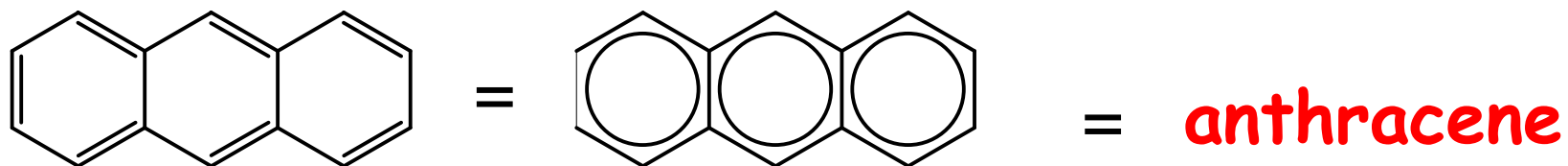
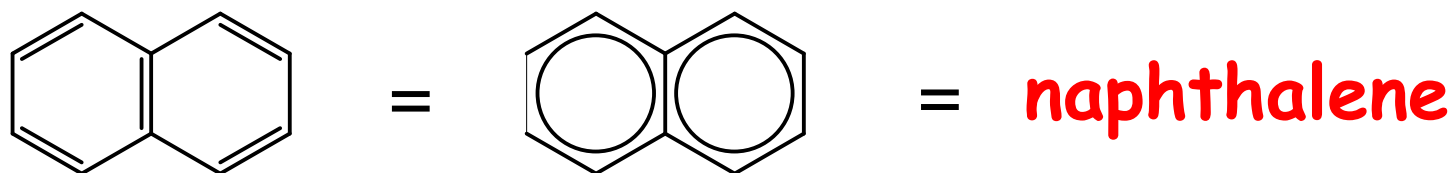
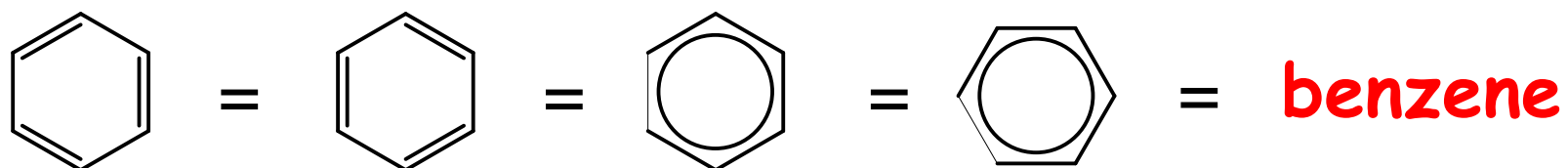


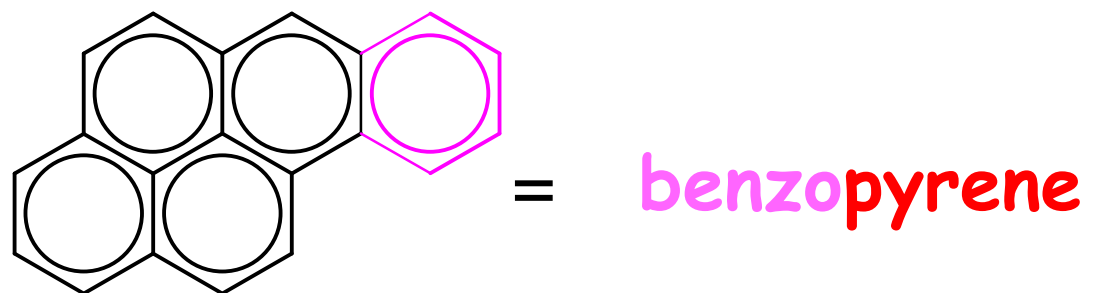
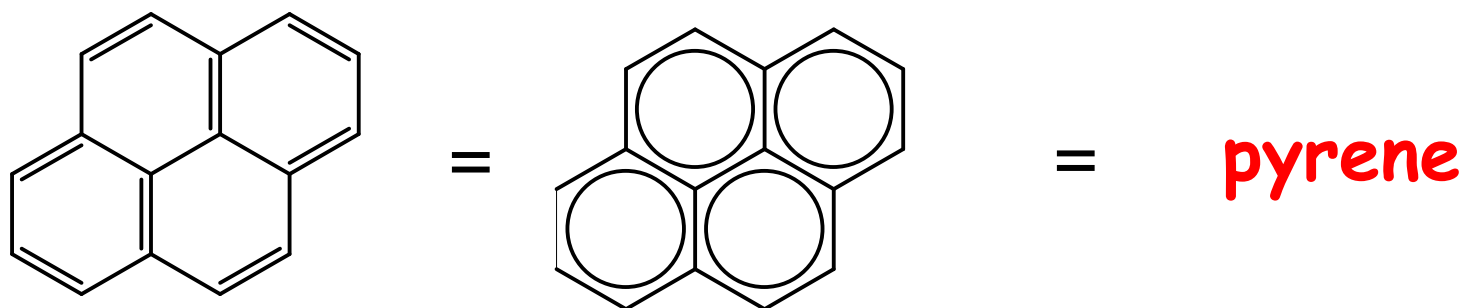
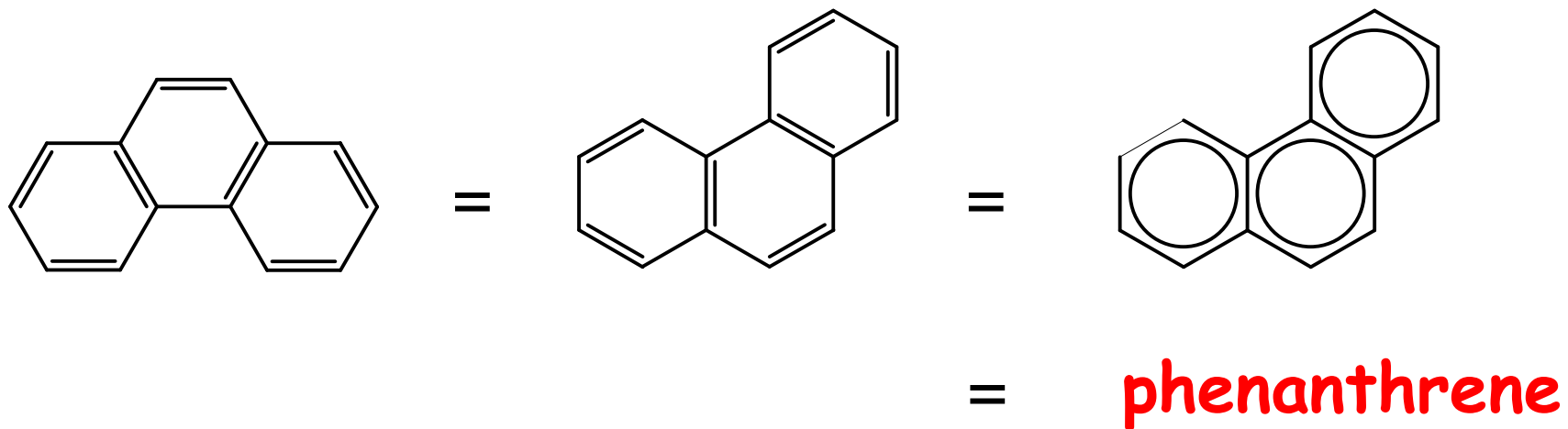
- planar molecules

- Hückel rule:
 $n = 1, 2, 3, \dots$

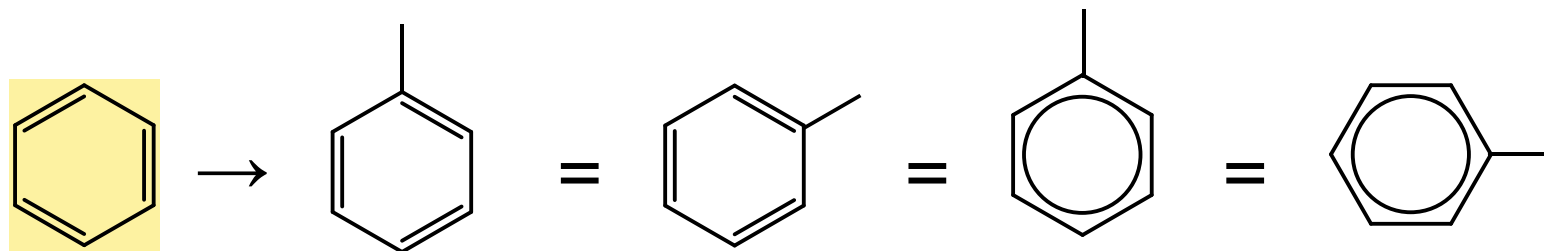
$$4n + 2 = \text{number of } \pi\text{-electrons}$$

Aromatic hydrocarbons (= arenes)



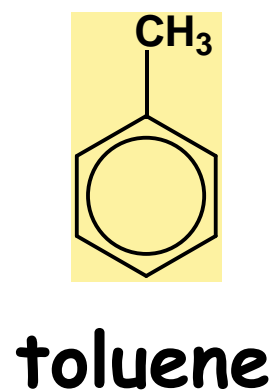
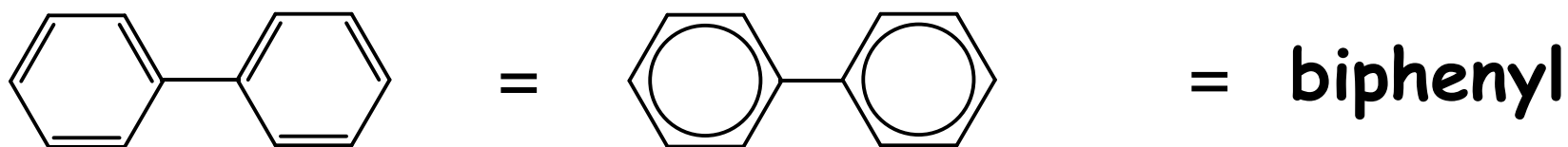


Hydrocarbon rests of arenes (aryls, Ar)

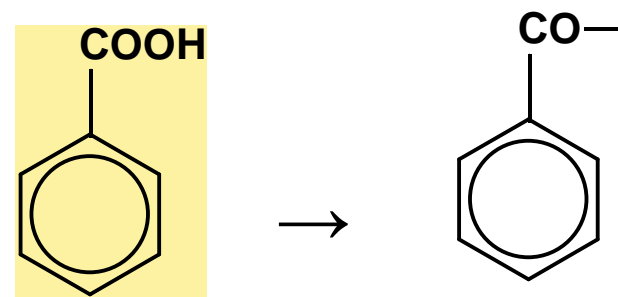


benzene

phenyl



benzyl



benzoic acid

benzoyl

Important derivatives of benzene

- methylbenzene = **toluene**
- dimethylbenzenes = xylenes (*o*-, *m*-, *p*-)
 - 1,2-dimethylbenzene = ***o*-xylene**
 - 1,3-dimethylbenzene = ***m*-xylene**
 - 1,4-dimethylbenzene = ***p*-xylene**
- vinylbenzene = **styrene** (→ polystyrene, PS)

DERIVATIVES OF HYDROCARBONS

The name of the compound is derived from the name of the basic unbranched hydrocarbon

- principal functional group
 - ⇒ type of the derivative ≈ suffix
- other functional groups
 - expressed by special prefixes + locants

derivative	formula	prefix	suffix
carboxylic acid	- COOH	carboxy-	-oic acid
sulfonic acid	- SO ₃ H	sulfo-	sulfonic acid
aldehyde	- CHO	formyl-	-al
ketone	>C=O	oxo- /keto-	-one
alcohol	- OH	hydroxy-	-ol
thiol	- SH	mercapto-	-thiol
amine	- NH ₂	amino-	-amine
ether	- O -	R-oxy-	ether
sulfide	- S -	R-thio-	sulfide
halogen der.	- F, -Cl, -Br, -I	halogeno-	-
nitro der.	- NO ₂	nitro-	-



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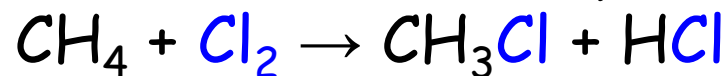


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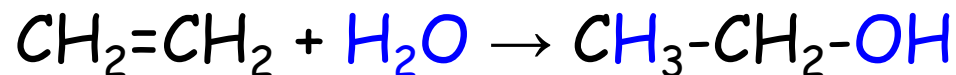


Important chemical reactions of organic compounds

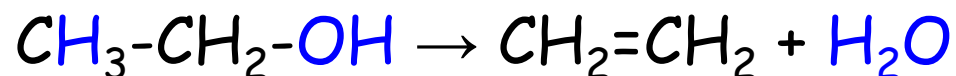
1. **substitution** (= replacement)



2. **addition** (multiplicity of chemical bond is lowered)



3. **elimination** (new multiple bond is often formed,
small molecule is released)



4. **rearrangement** (= formation of an isomer)

