



# 8.

## seminář LC

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# „HLAVNÍ ŘETĚZ“

(acyklická sloučenina)

nasycená

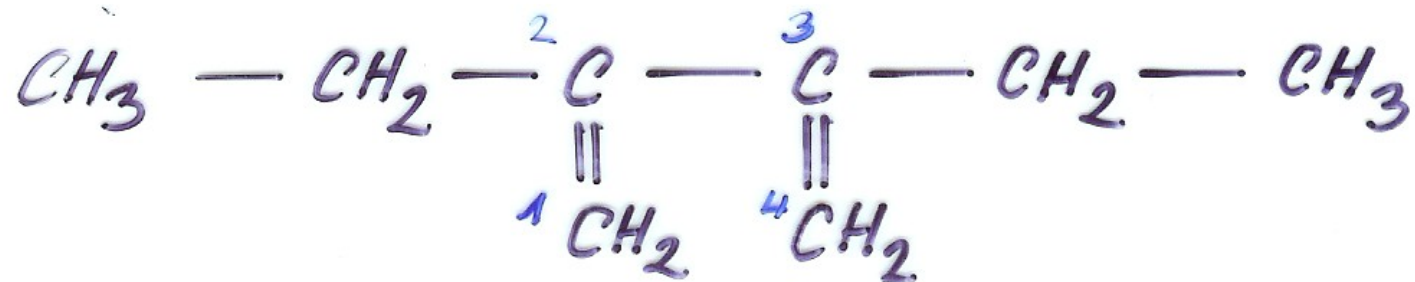
„největší počet uhlíkových atomů“

nenasycená

„největší počet násobných vazeb“  
(= mají přednost před  $\equiv$ )

při stejné délce a stejném stupni nasycení

→ „hlavní řetězec je ten, který má největší počet substituentů“

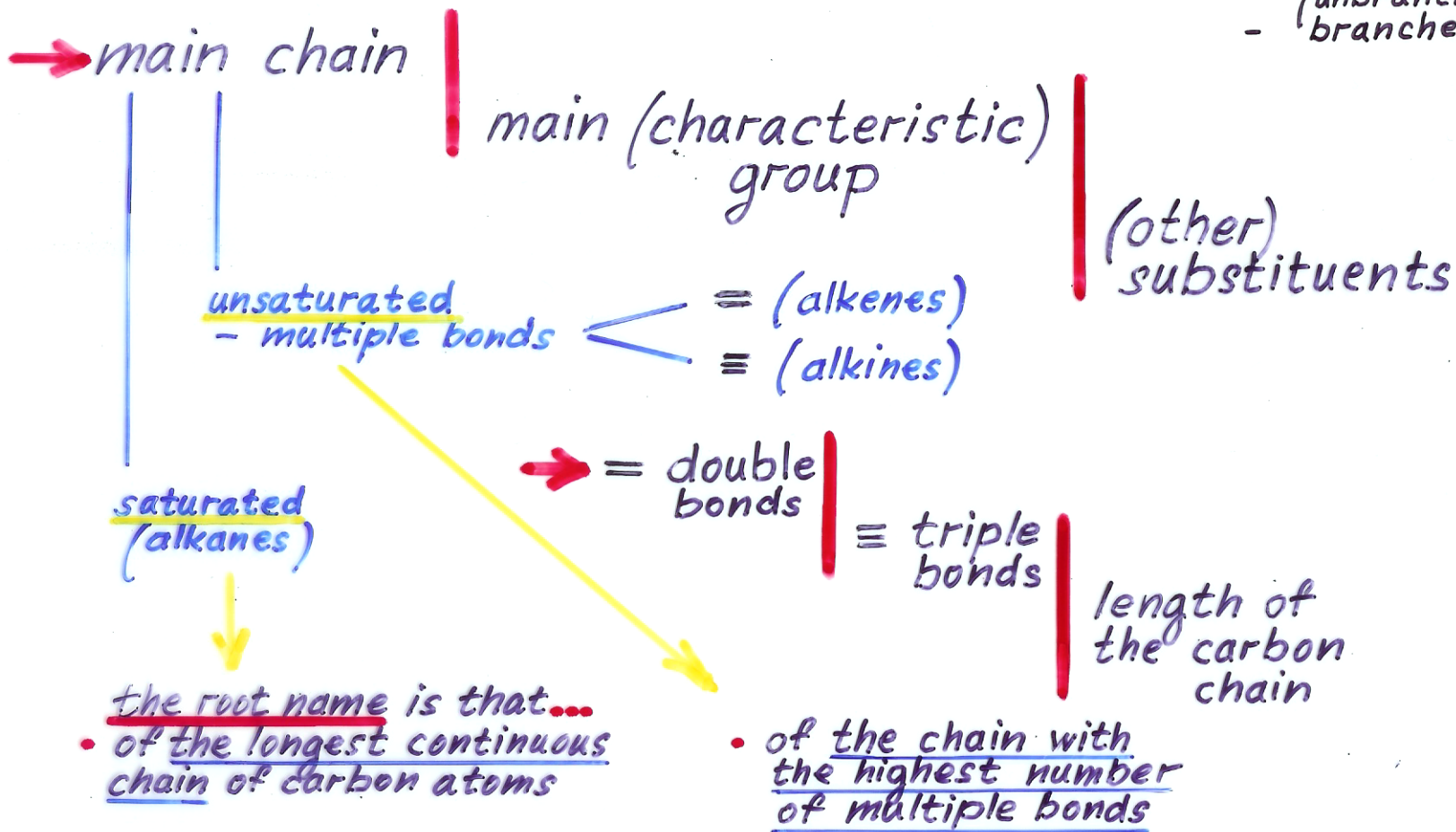


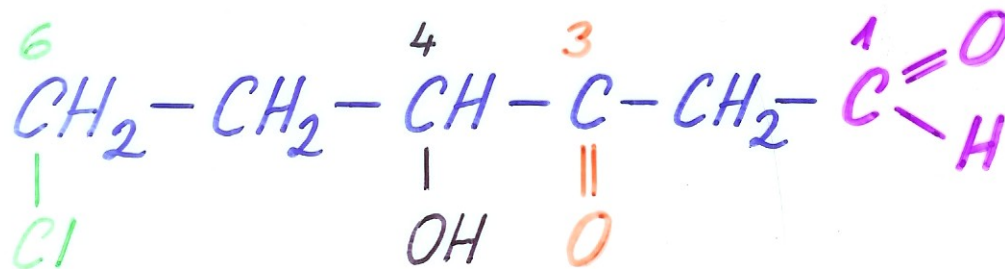
2,3-diethyl-1,3-butadien

# ACYCLIC COMPOUNDS (HYDROCARBONS)

## NAMING PRIORITIES:

carbon chain  
- continuous  
  (unbranched)  
- branched





4-hydroxy-6-chlor-3-oxo-hexanal

↓  
hlavní skupina

1. Oniové kationty
2. Karboxylové kyseliny, sulfonové kyseliny
3. Anhydridy kyselin
4. Estery
5. Halogenidy kyselin
6. Amidy
7. Nitrily
8. Aldehydy
9. Ketony
10. Alkoholy, fenoly, thioly
11. Hydroperoxydy, thiohydroperoxydy
12. Aminy
13. Etery, sulfidy
14. Peroxydy, disulfidy

Typ sloučeniny	Skupina	Předpona	Přípona
Oniový kation	- <sup>a</sup>	-	-onium
Karboxylové kyseliny	-COOH	karboxy-	-(karboxyl)ová kyselina
Sulfonové kyseliny	-SO <sub>3</sub> H	sulfo-	-sulfonová kyselina
Soli karbox. kyselin	-COO <sup>-</sup>	-	-(o)át, -karboxylát
Estery	-COOR	R-oxykarbonyl-	R-(o)át, R-karboxylát
Amidy	-CONH <sub>2</sub>	karbamoyl-	-karboxamid
Nitrily	-C≡N	kyan-	-(karbo)nitril
Aldehydy	-CH=O	formyl-	-al, -karbaldehyd
Ketony	>C=O	oxo-	-on
Alkoholy, fenoly	-OH	hydroxy-	-ol
Thioly	-SH	sulfanyl-	-thiol
Aminy	-NH <sub>2</sub>	amino-	-amin
Etery	-OR	R-oxy-	-ether
Sulfidy <sup>b</sup>	-SR	R-sulfanyl-	-
Halogenderiváty <sup>b</sup>	-F, -Cl, -Br, -I	fluor-, chlor-, brom-, jod-	-
Nitroderiváty <sup>b</sup>	-NO <sub>2</sub>	nitro-	-

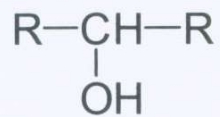
<sup>a</sup> Např. RNH<sub>3</sub><sup>+</sup> alkylamonium, R<sub>4</sub>N<sup>+</sup> tetraalkylamonium, ROH<sub>2</sub><sup>+</sup> alkyloxonium, R<sub>3</sub>S<sup>+</sup> trialkylsulfonium.

<sup>b</sup> Výhradně jako předpony.

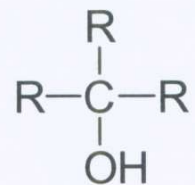




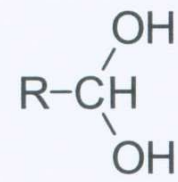
prim. alkohol



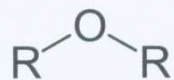
sek. alkohol



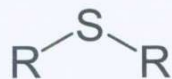
terc. alkohol



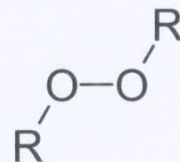
aldehyd-hydrát



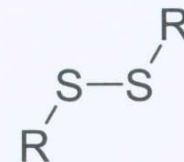
ether



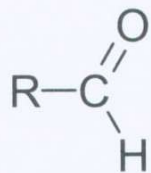
sulfid



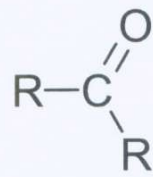
peroxid



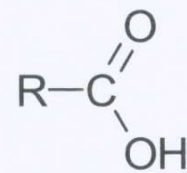
disulfid



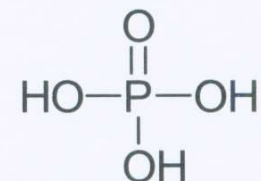
aldehyd



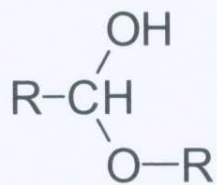
keton



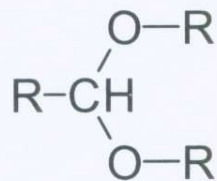
karboxylová kys.



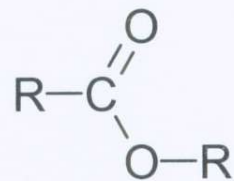
kys. fosforečná



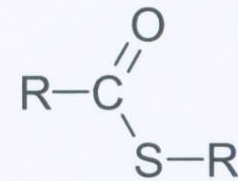
poloacetal



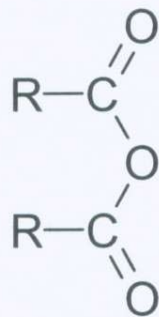
acetal



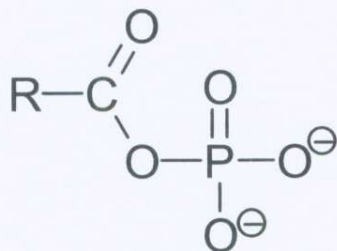
ester



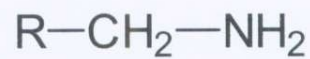
thioester



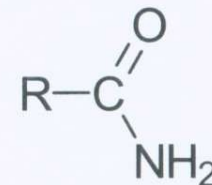
anhydrid



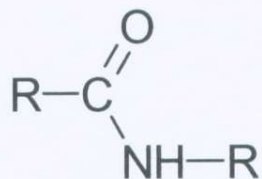
acylfosfát



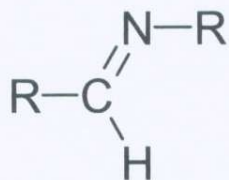
amin



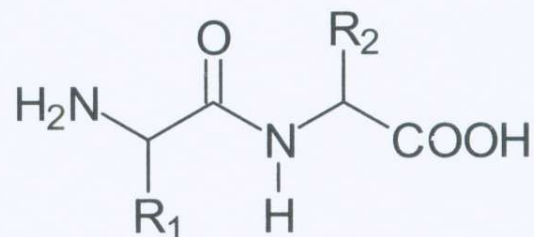
amid



N-alkylamid



aldimin

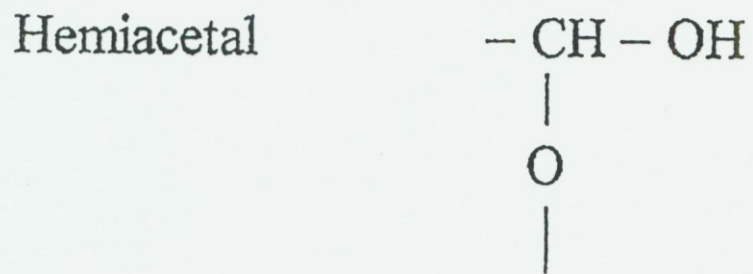
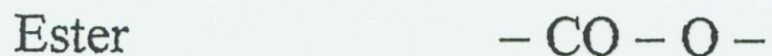
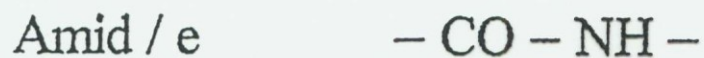
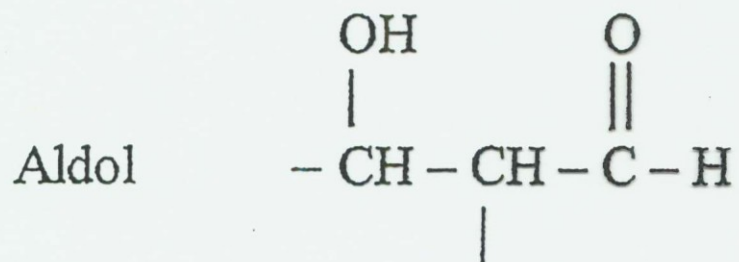
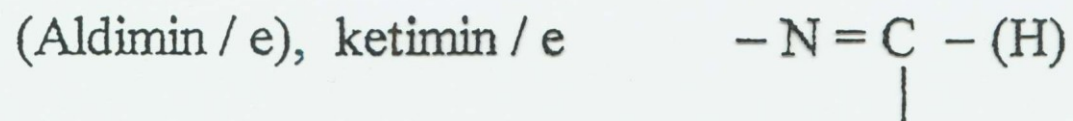


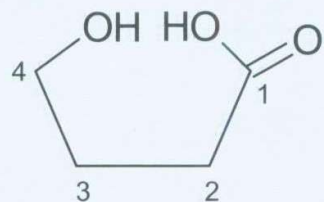
dipeptid

	Kyselina	Aldehyd	Thiol	Alkohol
Alkohol	ester $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagdown \\ \text{O}-\text{R} \end{array}$	poloacetal <sup>a</sup> $\begin{array}{c} \text{OH} \\   \\ \text{R}-\text{CH} \\   \\ \text{O}-\text{R} \end{array}$	-	ether $\text{R}-\text{O}-\text{R}$
Thiol	thioester $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagdown \\ \text{S}-\text{R} \end{array}$	thiopoloacetal $\begin{array}{c} \text{OH} \\   \\ \text{R}-\text{CH} \\   \\ \text{S}-\text{R} \end{array}$	sulfid $\text{R}-\text{S}-\text{R}$	
Amin	amid <sup>b</sup> $\begin{array}{c} \text{O} \\ \parallel \\ \text{R}-\text{C} \\ \diagdown \\ \text{NH}-\text{R} \end{array}$	aldimin <sup>c</sup> $\begin{array}{c} \text{N}-\text{R} \\ \parallel \\ \text{R}-\text{C} \\ \diagdown \\ \text{H} \end{array}$		
Aldehyd	-	aldol <sup>d</sup> $\begin{array}{ccccccc} & & & \text{O} & & & \\ & & & \parallel & & & \\ \text{CH}_2 & - & \text{CH} & - & \text{CH} & - & \text{C} \\   & &   & &   & & \diagdown \\ \text{R} & & \text{OH} & & \text{R} & & \text{H} \end{array}$		
Kyselina	anhydrid $\begin{array}{c} \text{O}=\text{C}-\text{O}-\text{C}=\text{O} \\   \quad \quad   \\ \text{R} \quad \quad \text{R} \end{array}$	<sup>a</sup> Reakcí poloacetalu s alkoholem vzniká acetal R-CH(OR) <sub>2</sub> . <sup>b</sup> Produkt kondenzační reakce (uvolní se voda). Při acidobazické reakci dusík přijme H <sup>+</sup> od kyseliny a vznikne alkylamonná sůl R-NH <sub>3</sub> <sup>+</sup> R-COO <sup>-</sup> . <sup>c</sup> Také zvaný Schiffova báze. <sup>d</sup> Vzniká pouze v silně alkalickém prostředí.		

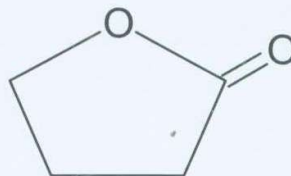
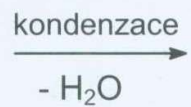
Vzájemné reakce funkčních skupin  
Mutual reactions of functional groups

	KYSELINA ACID	ALDEHYD / E KETON / E	AMIN / E	ALKOHOL ALCOHOL FENOL PHENOL
ALKOHOL ALCOHOL - OH FENOL PHENOL	ester	poloacetal hemiacetal	-	ether
AMIN / E - NH <sub>2</sub>	amid / e	aldimin / e	-	
(ALDEHYD / E) KETON / E (H) - C = O	-	aldol		
KYSELINA ACID - COOH	anhydrid / e			



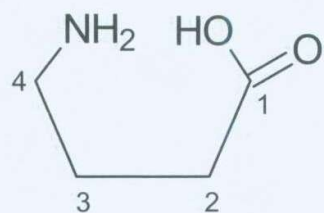


4-hydroxybutanová kys.

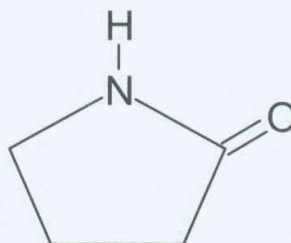
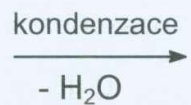


butano-4-lakton

LAKTON  
cyklický ester

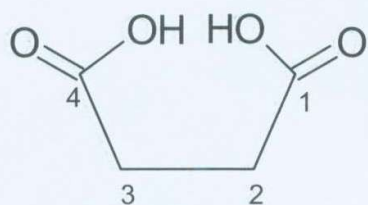


4-aminobutanová kys.

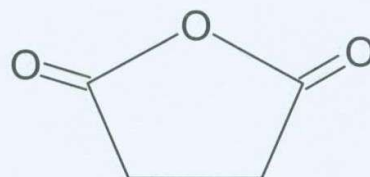
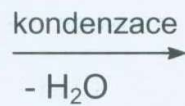


butano-4-laktam

LAKTAM  
cyklický amid

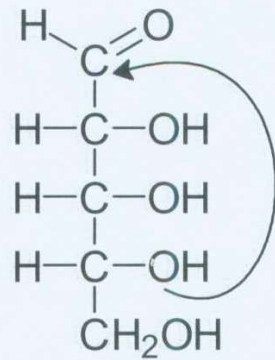


jantarová kys.

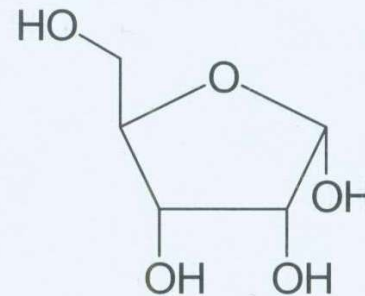
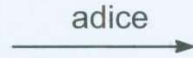


sukcinanhydrid

cyklický anhydrid

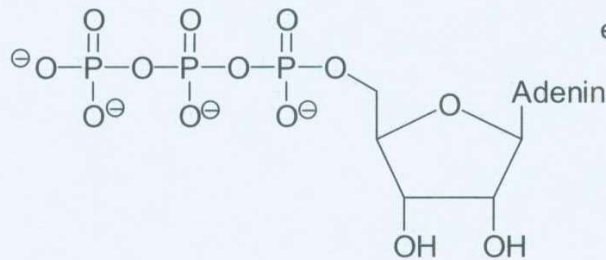


*α*-D-ribosa



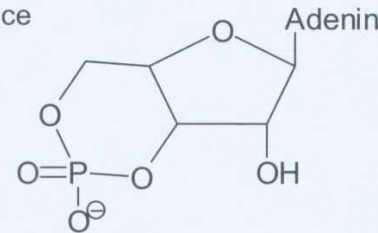
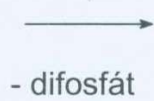
$\alpha$ -D-ribofuranosa

FURANOSA  
cyklický poloacetal



ATP

enzymová kondenzace  
(adenylátcyklasa)

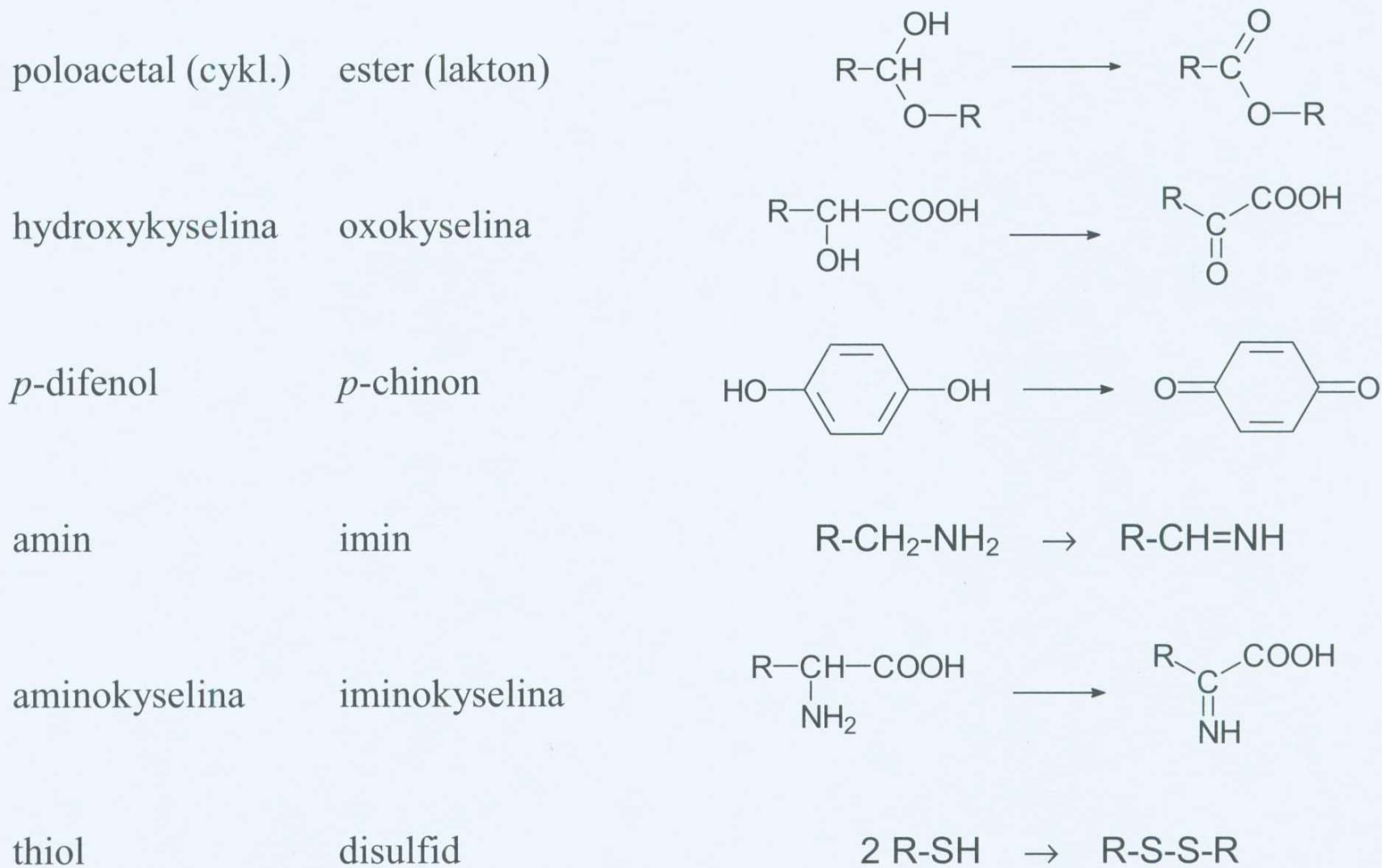


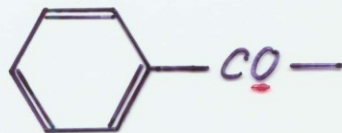
cAMP

cyklický diester  
kys. fosforečné

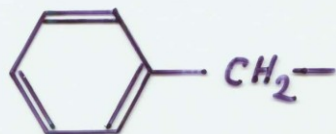
Substrát	Produkt	Obecné schéma dehydrogenace
alkan	alken	$R-CH_2-CH_2-R \rightarrow R-CH=CH-R$
alkanoyl-CoA	2,3-alkenoyl-CoA	$R-CH_2-CH_2-\overset{\overset{O}{\parallel}}{C}-S-CoA \longrightarrow R-CH=CH-\overset{\overset{O}{\parallel}}{C}-S-CoA$
prim. alkohol	aldehyd	$R-CH_2-OH \longrightarrow R-\overset{\overset{O}{\parallel}}{C}-H$
sek. alkohol	keton	$R-\underset{\underset{OH}{ }}{CH}-R \longrightarrow R-\overset{\overset{O}{\parallel}}{C}-R$
endiol	diketon	$\begin{array}{ccc} R & & R \\ & \diagdown & / \\ & C=C & \\ & / & \diagdown \\ HO & & OH \end{array} \longrightarrow \begin{array}{ccc} R & & R \\ & \diagdown & / \\ & C-C & \\ & / & \diagdown \\ O & & O \end{array}$
aldehyd-hydrát	karboxylová kys.	$R-\underset{\underset{OH}{ }}{\overset{\overset{OH}{ }}{CH}} \longrightarrow R-\overset{\overset{O}{\parallel}}{C}-OH$



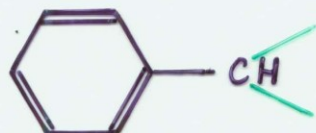




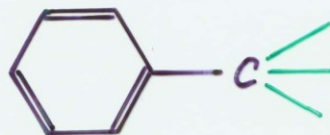
benzoyl-



benzyl-



benzylidene



benzylidine



fenyl-

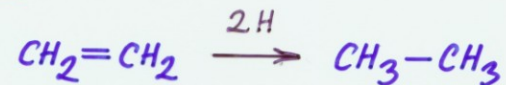


tolyl-

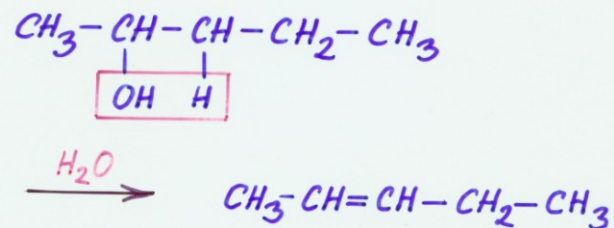
(různé polohy  
o-, m-, p-

## Základní typy reakcí org. sloučenin:

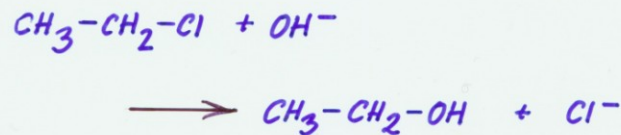
### 1 ADICE



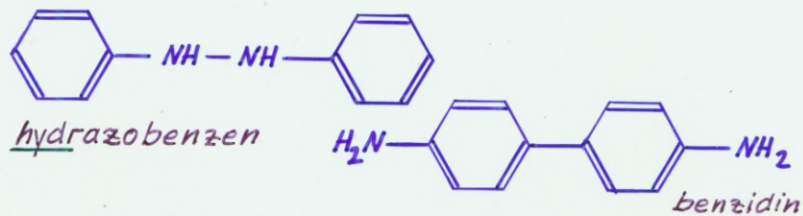
### 2 ELIMINACE



### 3 SUBSTITUCE



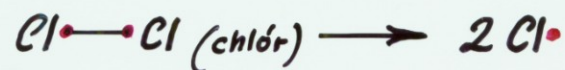
### 4 MOLEKULOVÉ PŘESMYKY



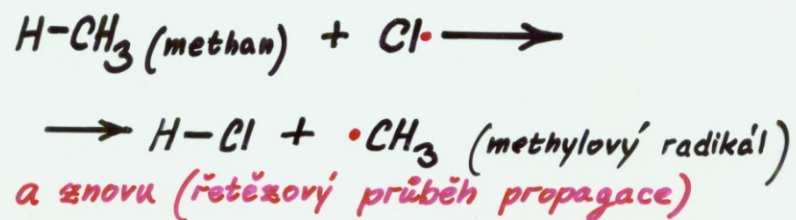
## Radikálové substituce:

- charakteristické pro sloučeniny s nepolárními kovalentními vazbami (např.: alkany)
- v jejím průběhu: homolýza vazeb C-H neb C-C ....

1) iniciace (vznik radikálů):



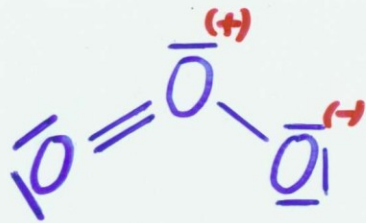
2) propagace:



3) terminace (vymizení radikálů):



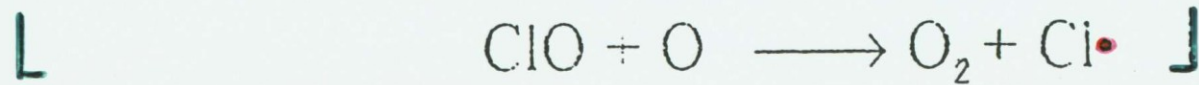
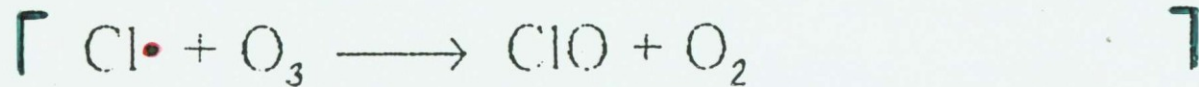
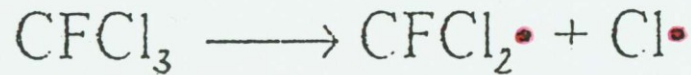
(obdobně dál:  $\longrightarrow$  di-, tri- až tetra chlormethan)



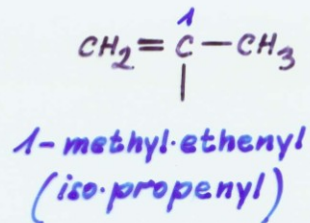
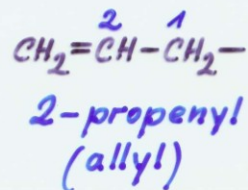
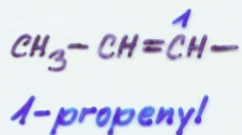
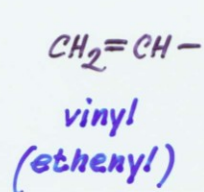
ozone



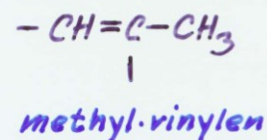
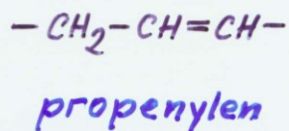
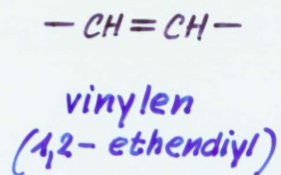
freony, CFC, chlorofluorocarbons



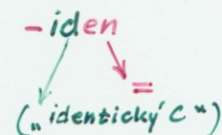
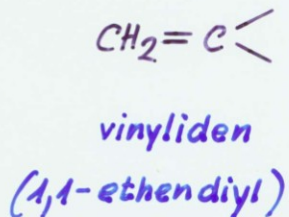
## JEDNOVAZNÉ ALKENYLY



## DVOJVAZNÉ ALKENYLENY (ALKENDIYLY)



## ALKENYLIDENY



$-SH$	(merkaptó- sulfhydro-)	thiol (alkyl.sulfid)
$-S-$	thio-ether	sulfid (di-alkyl.sulfid)
$-S-S-$	di.sulfid	
$-\overset{\oplus}{S}-$ ↓	sulfonium	

← a, e, i, o, u

$-SO_3H$	sulfonová kys.	sulto-
$-SO_2H$	sulfinová kys.	sulfino-
$-SOH$	sulfenová kys.	sulfeno-

$>SO_2$	-sulfon
$>SO$	-sulfoxid

dithioničitan sodný	$Na_2S_2O_4$
thio-síran	$Na_2S_2O_3$
tetrathionan	$Na_2S_4O_6$

