

NOMENKLATURA WĘGLOWODORÓW NIENASYCONYCH

1. Wyznacza się najdłuższy łańcuch zawierający wiązanie wielokrotne i do rdzenia nazwy alkanu o takiej samej liczbie atomów węgla dodaje się końcówkę – EN dla alkenów lub –IN/YN dla alkinów;

ALKAN	ALKEN	ALKIN
CH_3CH_3	$CH_2=CH_2$	$H-C\equiv C-H$
ETAN	ETEN	ETYN

2. Atomy węgla numeruje się w ten sposób, aby atom węgla przy wiązaniu wielokrotnym miał najniższy lokant

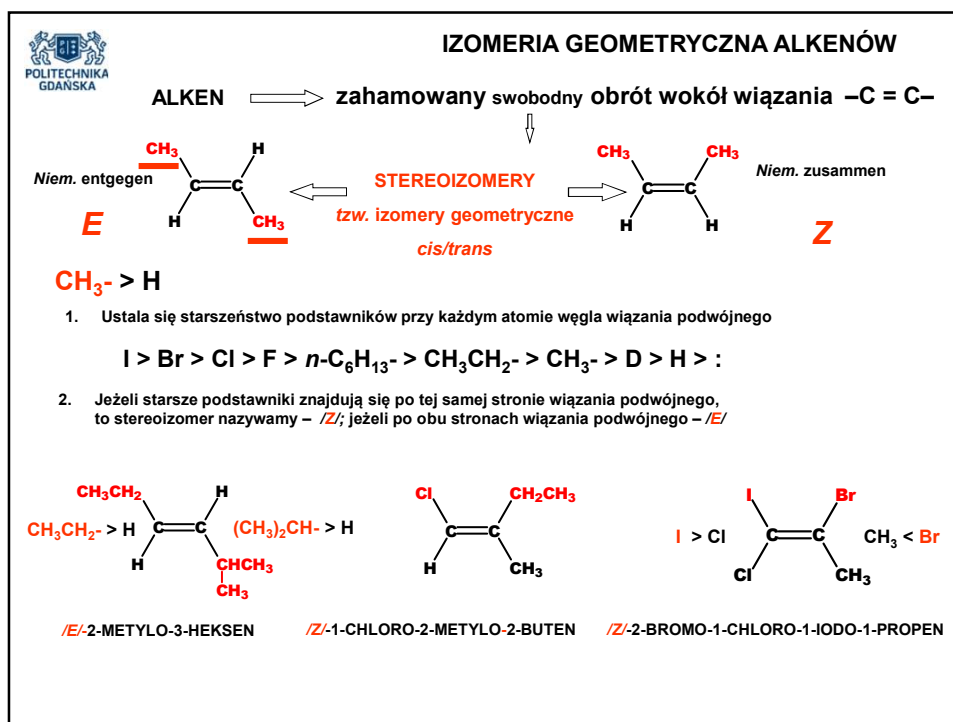
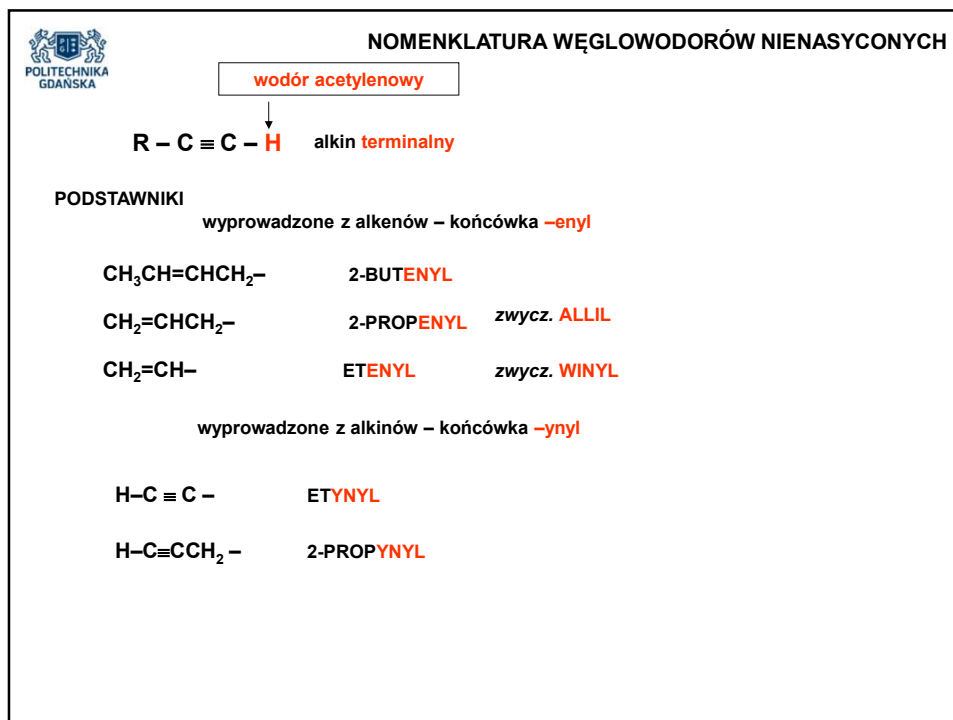
$\begin{array}{cccc} 1 & 2 & 3 & \\ CH_3 & CH_2 & CH=CH & CH_3 \\ & & 2 & 1 \end{array}$ <p>2-PENTEN a nie 3-penten</p>	$\begin{array}{cccc} 1 & 2 & 3 & \\ CH_3 & CH_2 & C\equiv C & CH_2 & CH_2 & CH_3 \\ & & 4 & 3 & 2 & 1 \end{array}$ <p>3-HEPTYN a nie 4-heptyn</p>
$\begin{array}{c} CH_3 \\ \\ CH_3CH_2CCH_2CH=CHCH_3 \\ \\ CH_3 \end{array}$ <p>5,5-DIMETYLO-2-HEPTEN 5,5-DIMETYLOHEPT-2-EN</p>	a nie 3,3-dimetylo-5-hepten

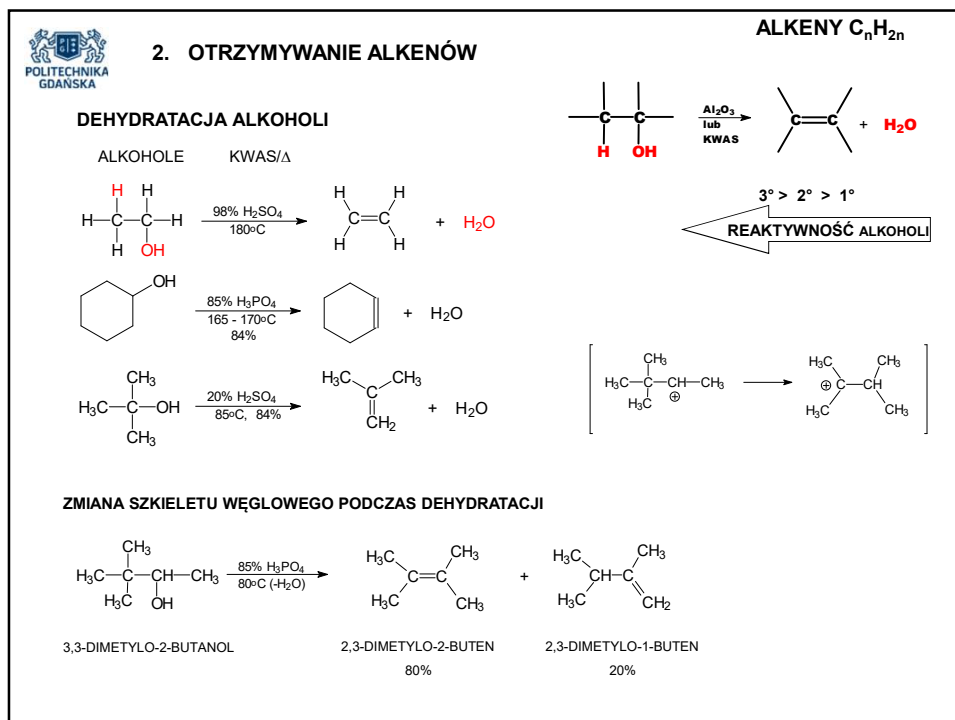
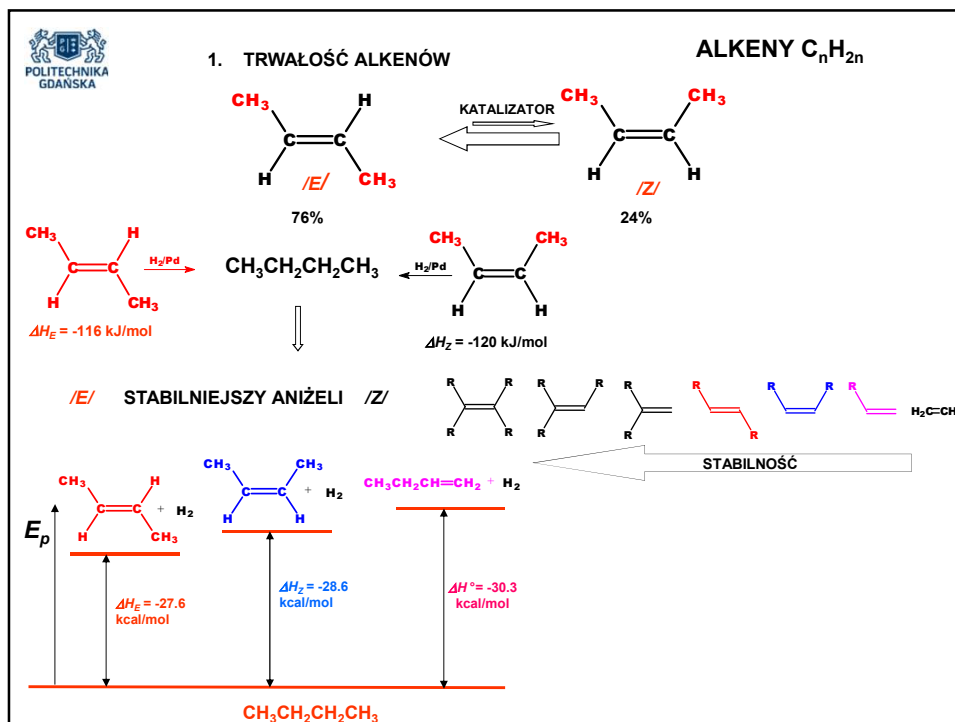
3. Jeżeli w cząsteczce jest obecnych więcej niż jedno wiązanie wielokrotne, to atomy węgla numeruje się w ten sposób, aby suma lokantów była jak najniższa, a atom węgla przy wiązaniu podwójnym miał najniższy z możliwych lokantów

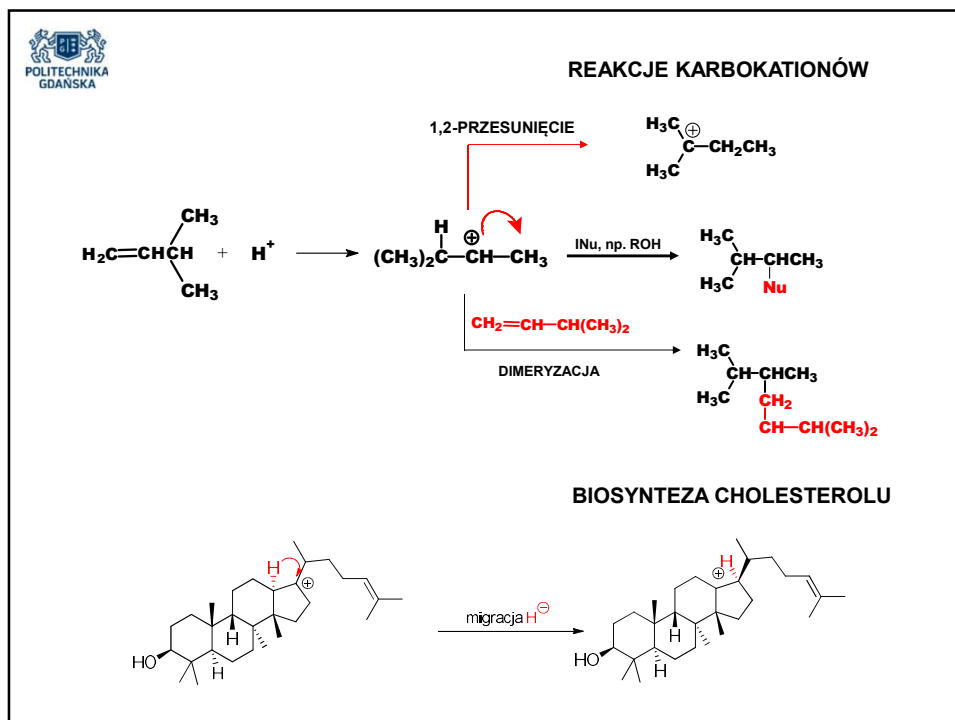
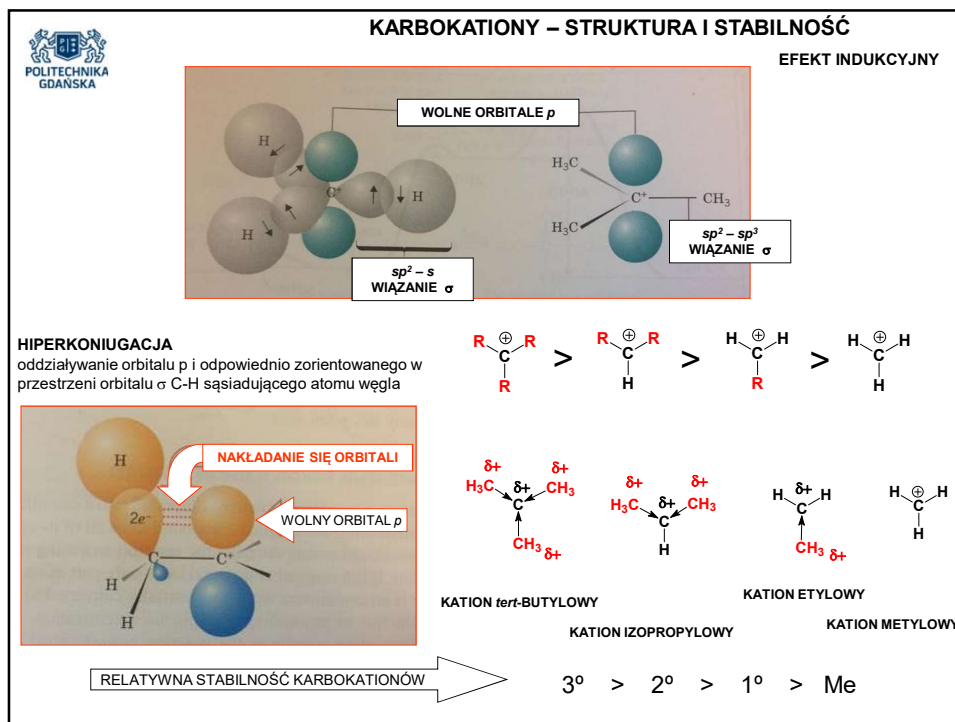
$H-C\equiv C-CH_2CH_2CH=CH_2$ <p>1-HEKSEN-5-YN</p>	$\begin{array}{c} CH_3 \\ \\ CH_2=CHCCH_2C\equiv CH \\ \\ CH_3 \end{array}$ <p>3,3-DIMETYLO-1-HEKSEN-5-YN</p>
---	--

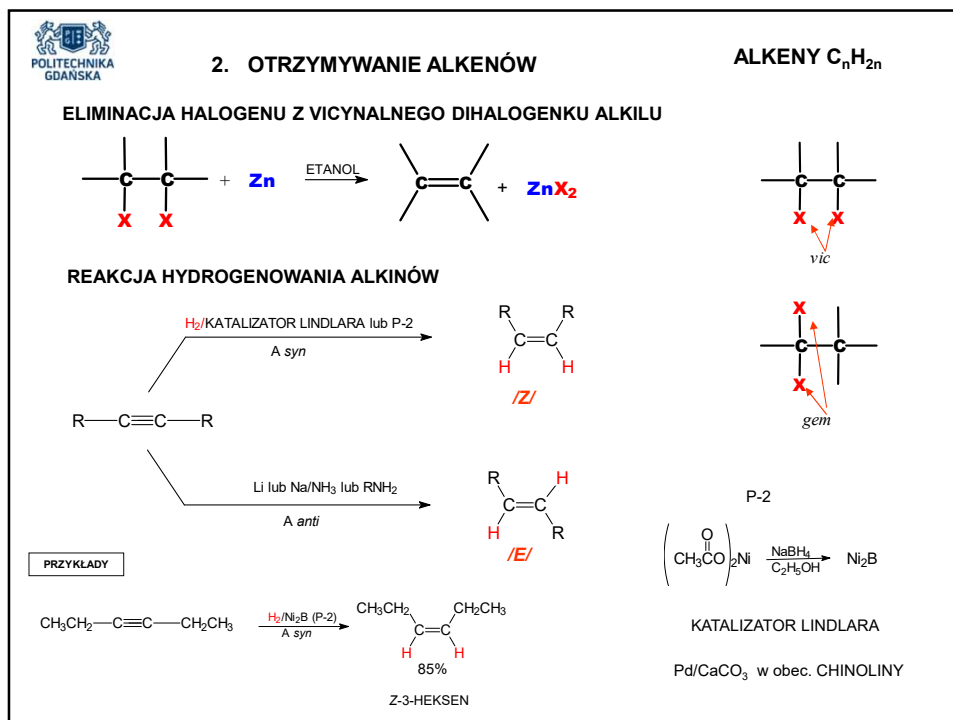
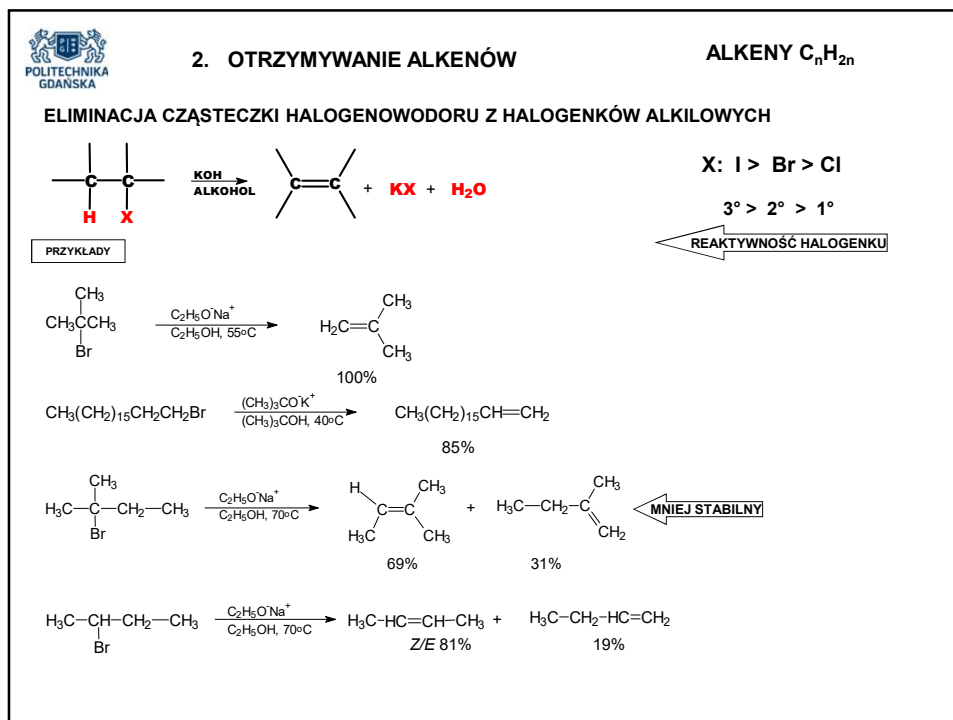
INNE

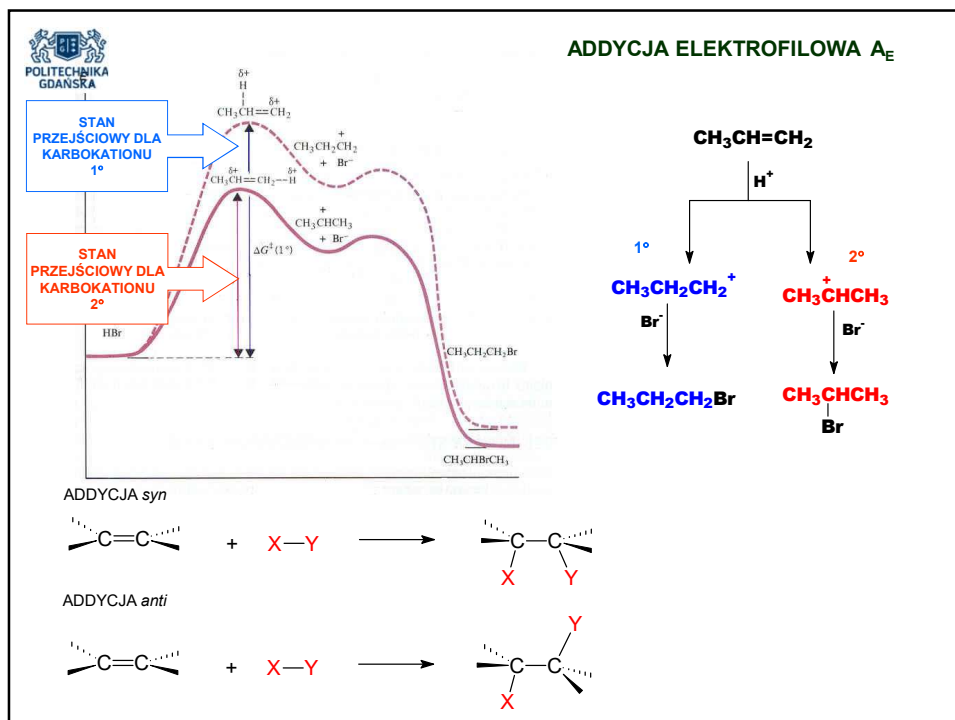
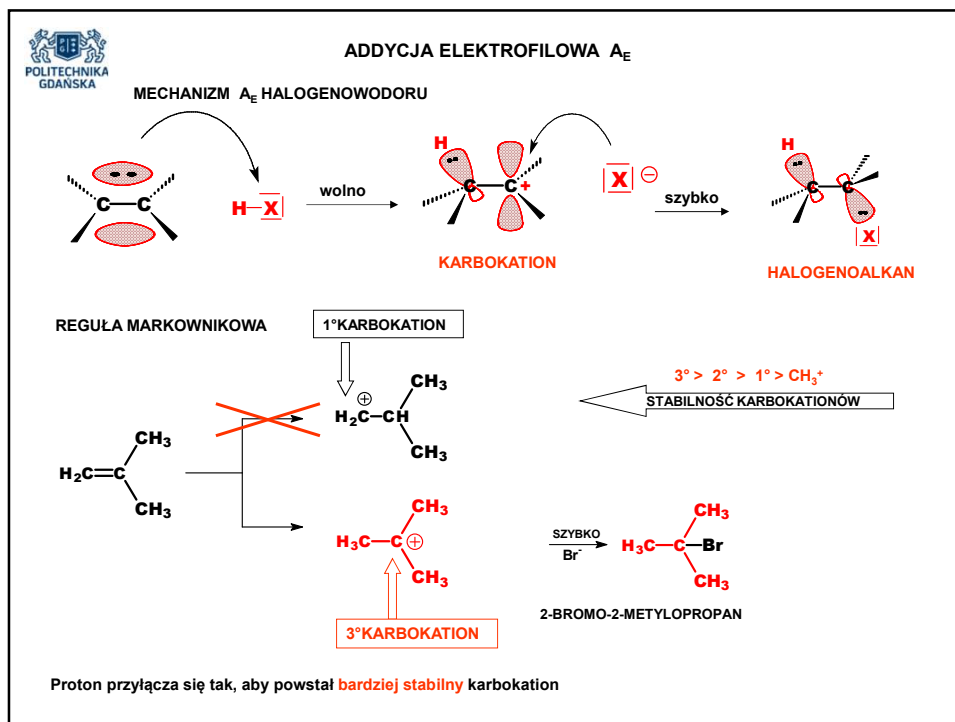
$H-C\equiv C-CH_2CH_2CH_2OH$ <p>4-PENTYN-1-OL PENT-4-YN-1-OL</p>	$ClCH_2CH_2CH=CH_2$ <p>4-CHLORO-1-BUTEN 4-CHLOROBUT-1-EN</p>	$CH_2=CHC(OH)CH_2C\equiv CH$ <p>1-HEKSEN-5-YN-3-OL HEKS-1-EN-5-YN-3-OL</p>
--	---	--

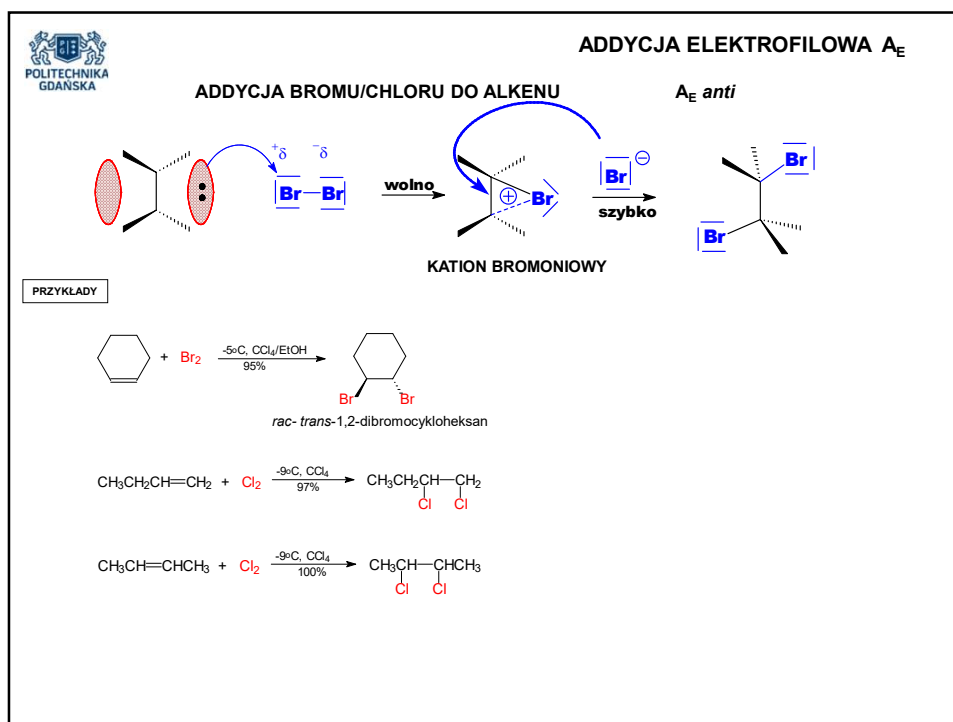
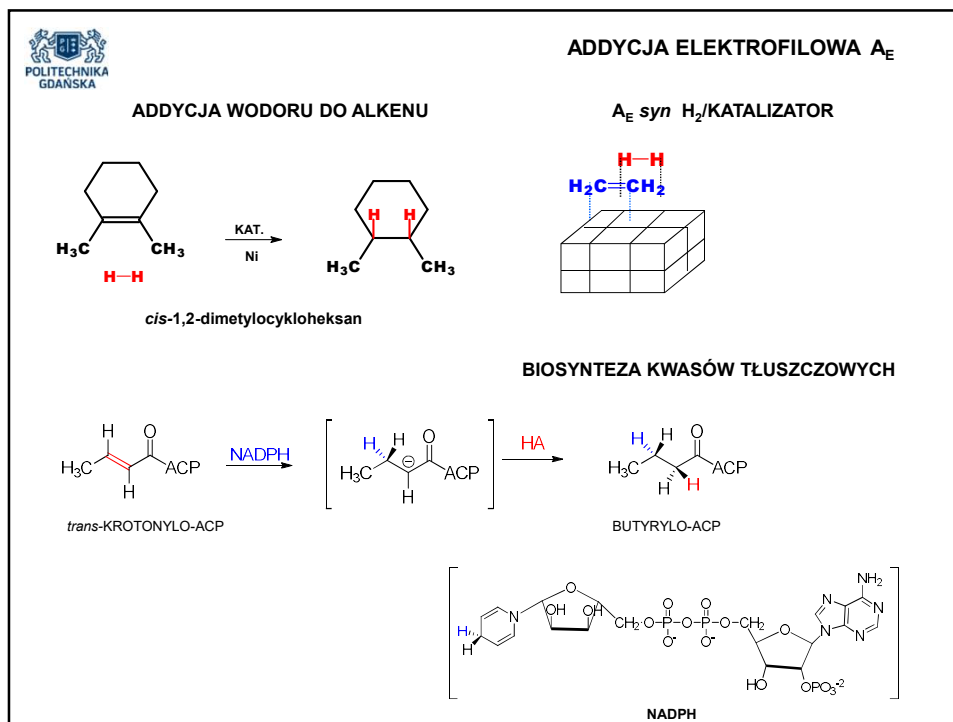


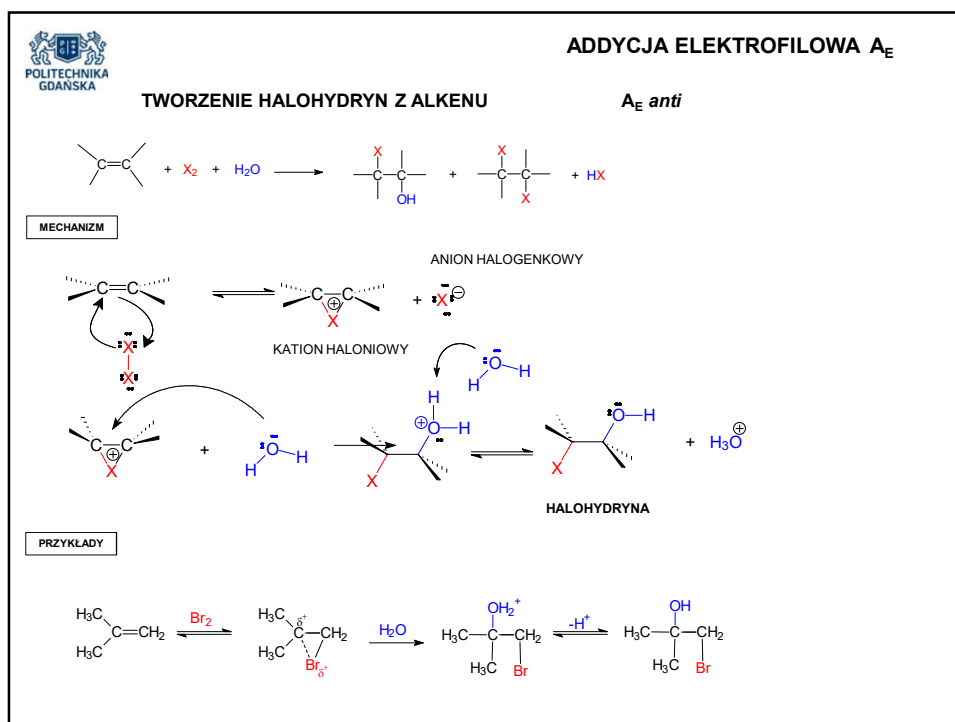
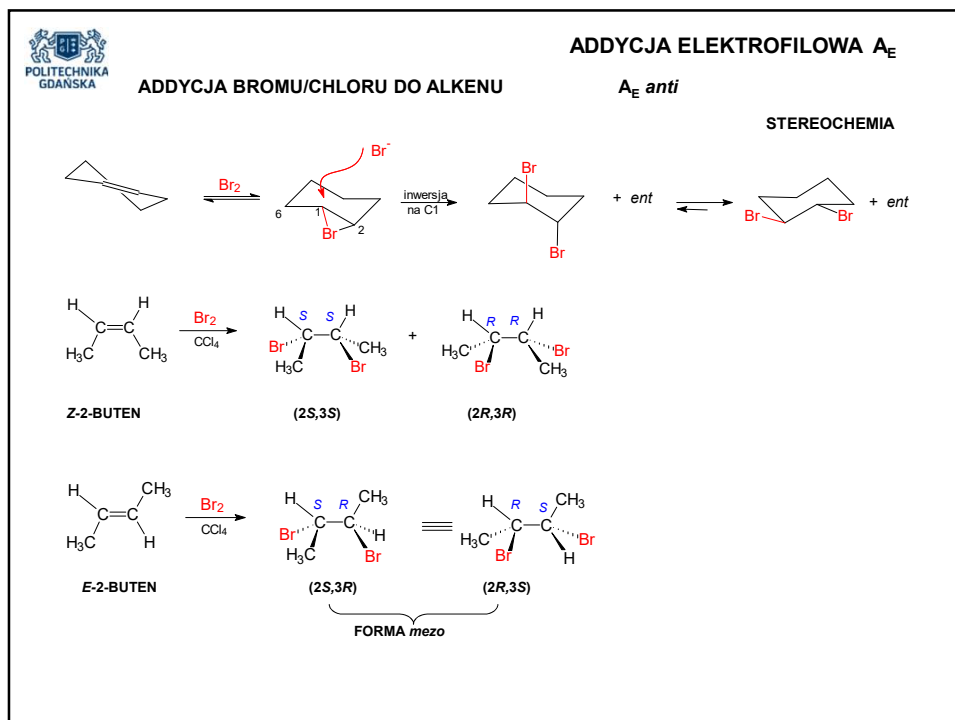


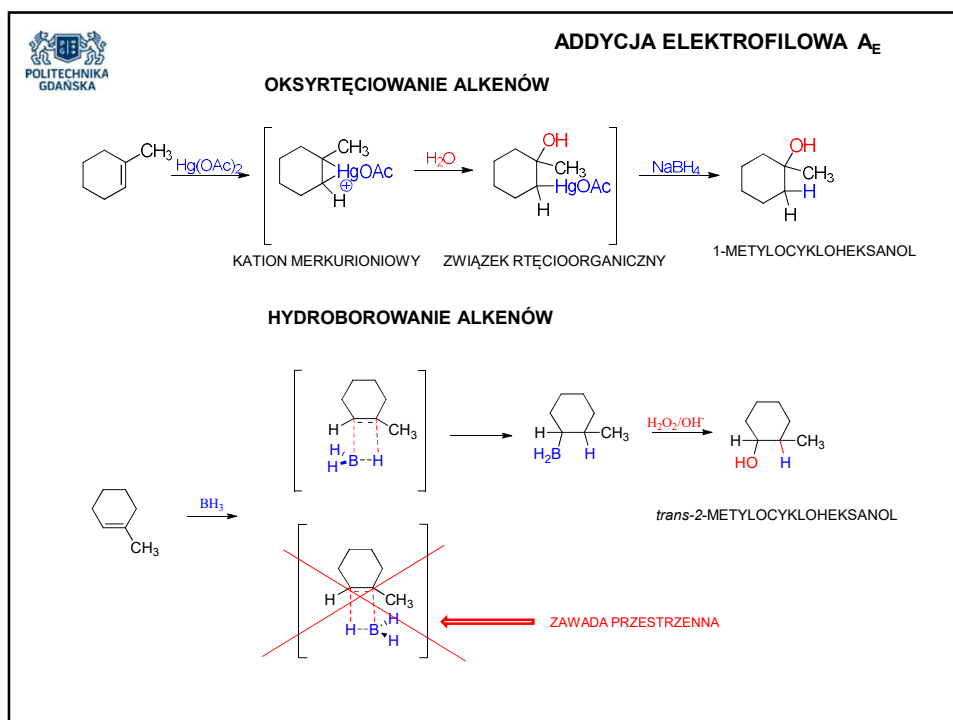
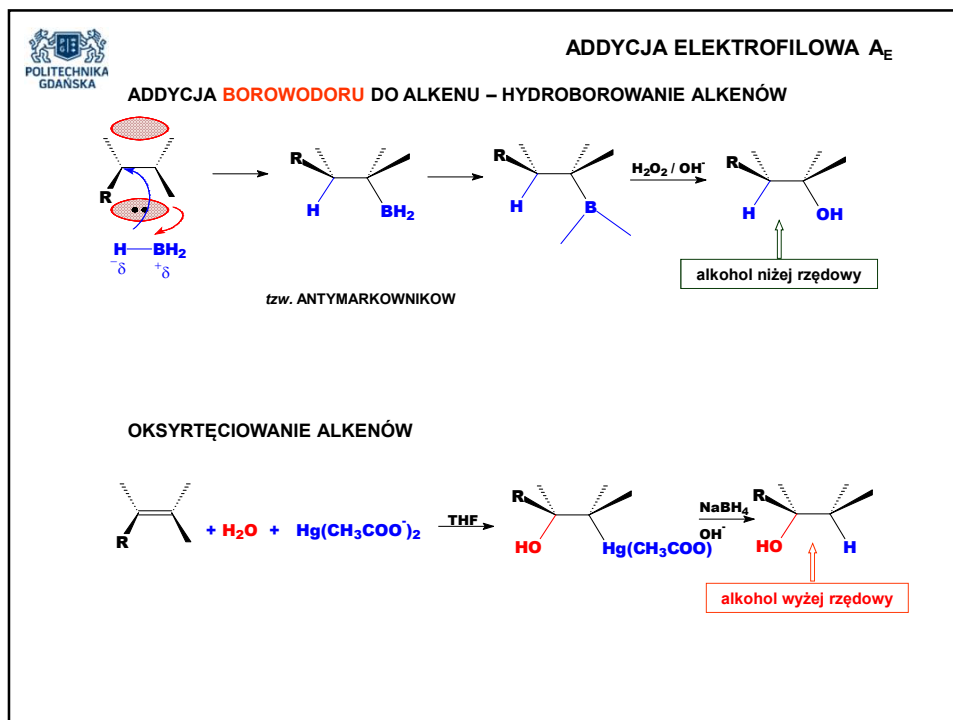


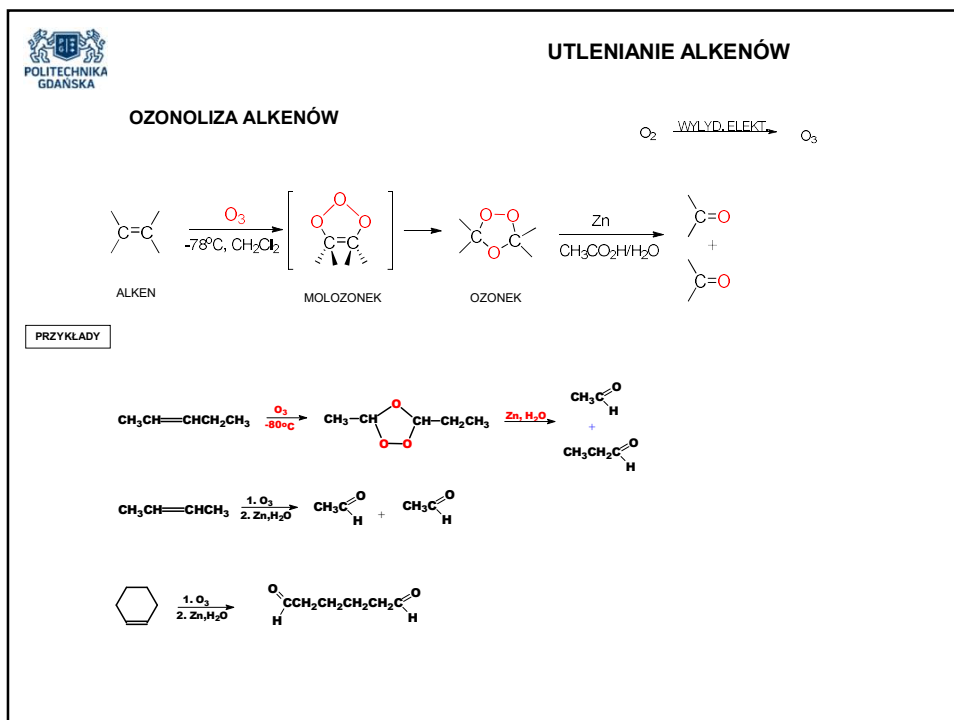
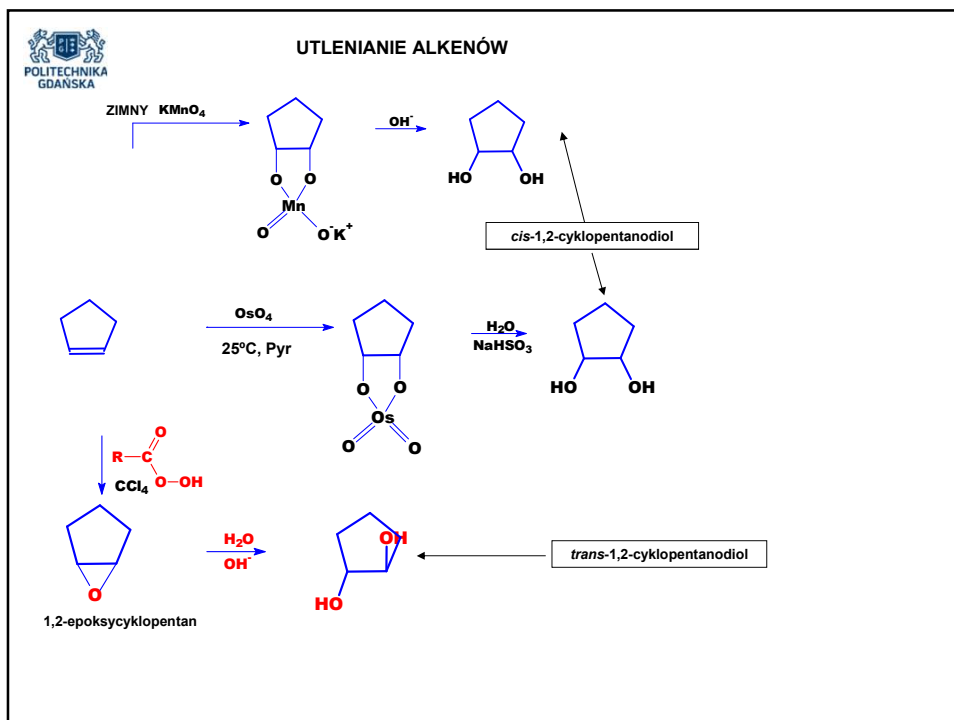


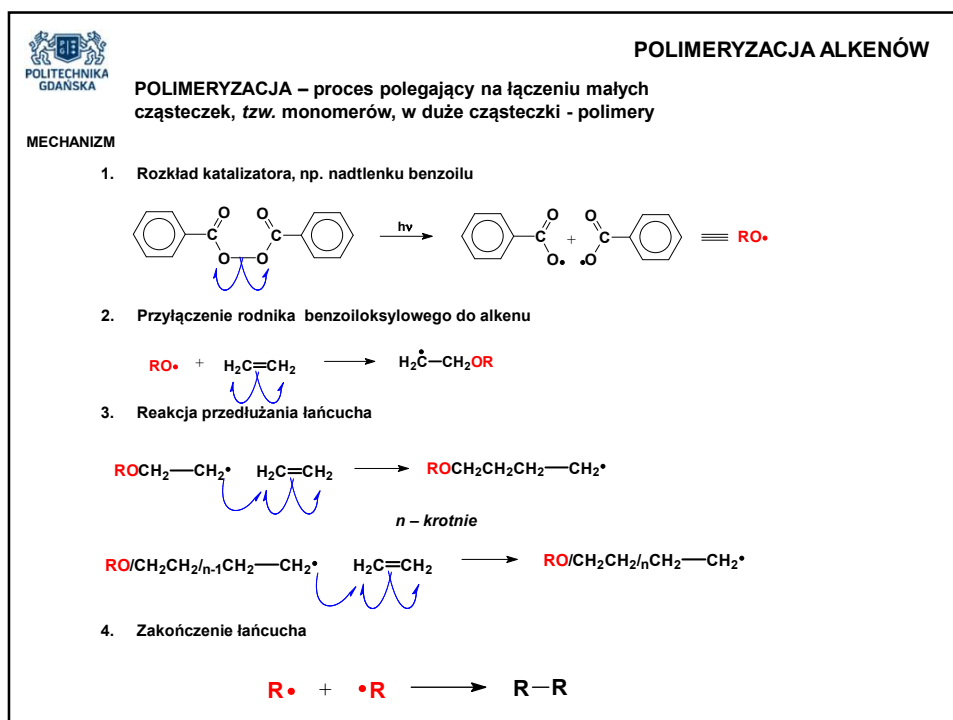
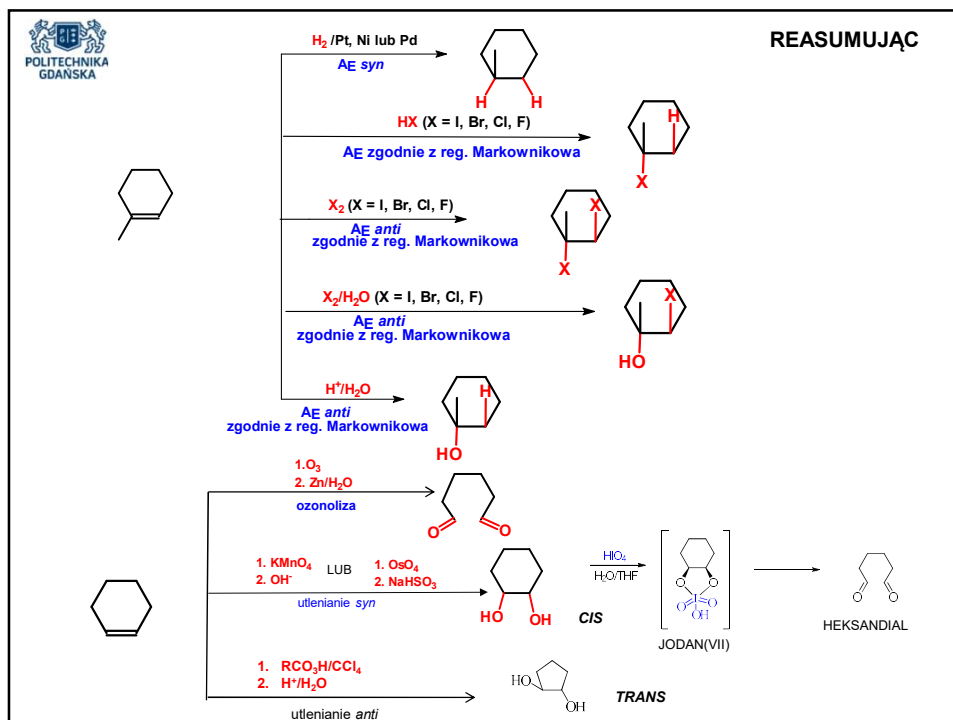


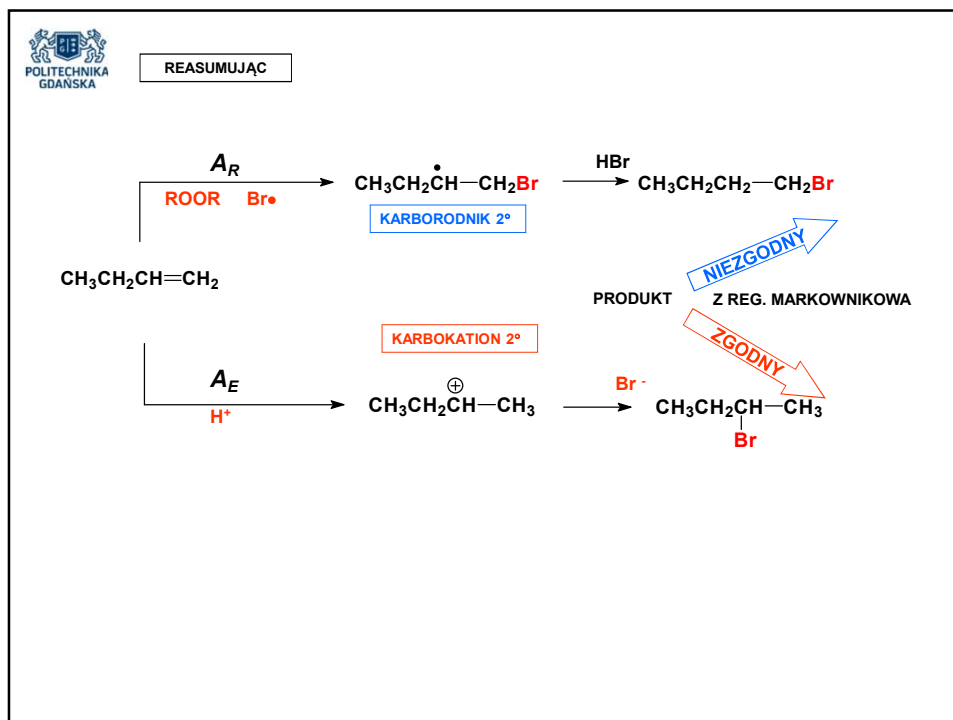
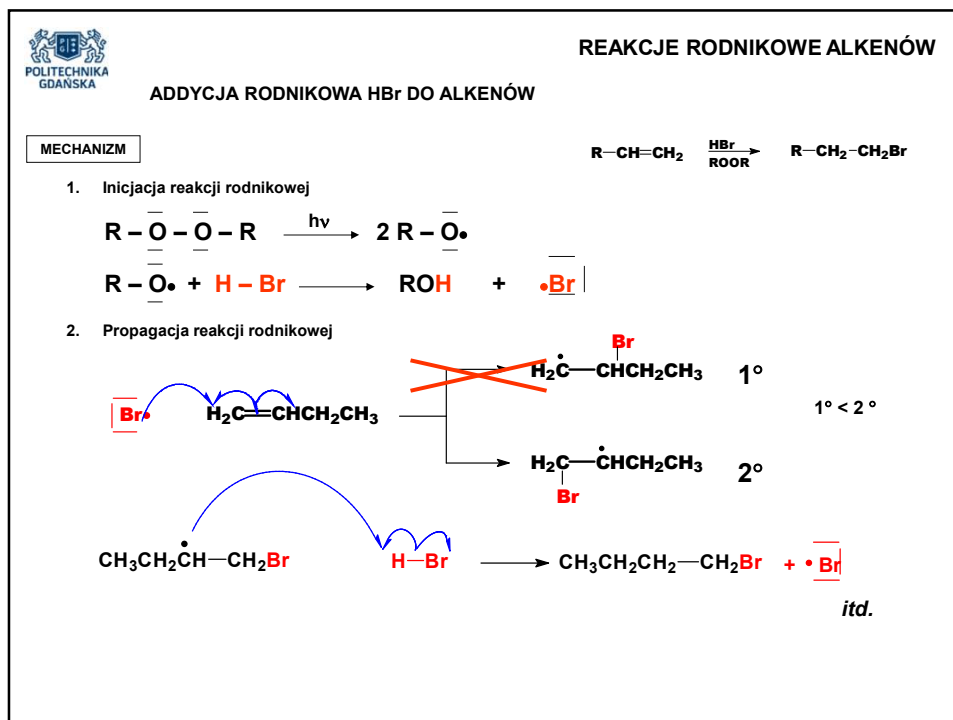


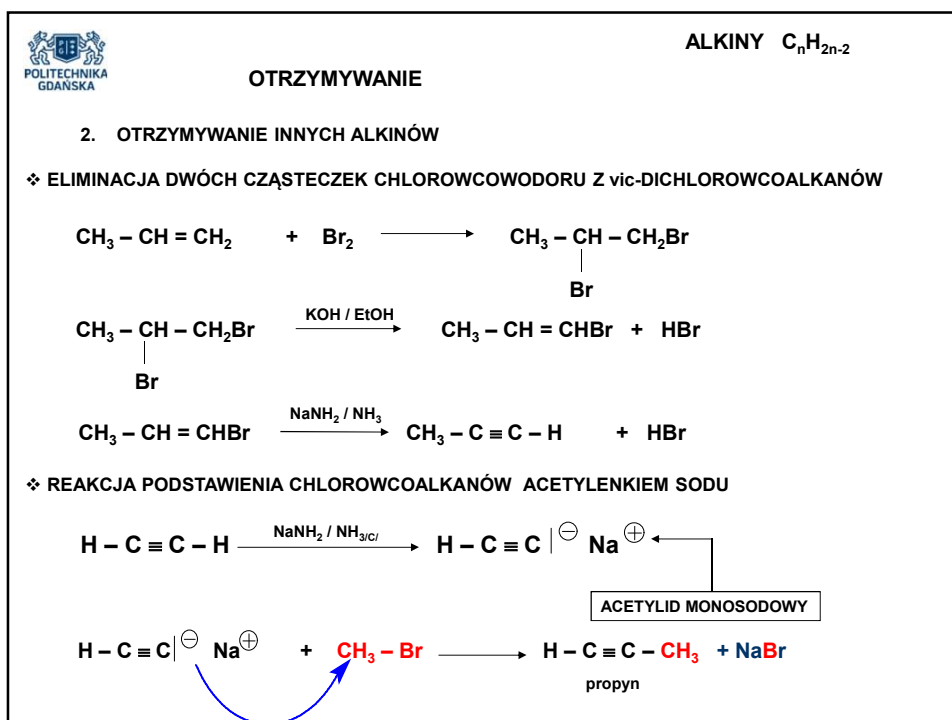
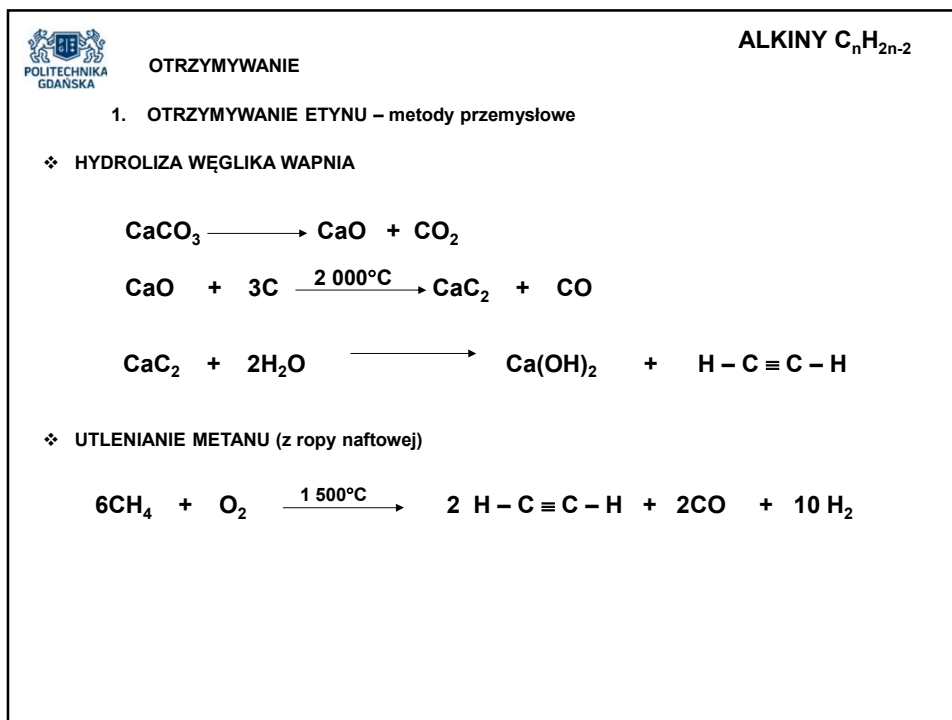


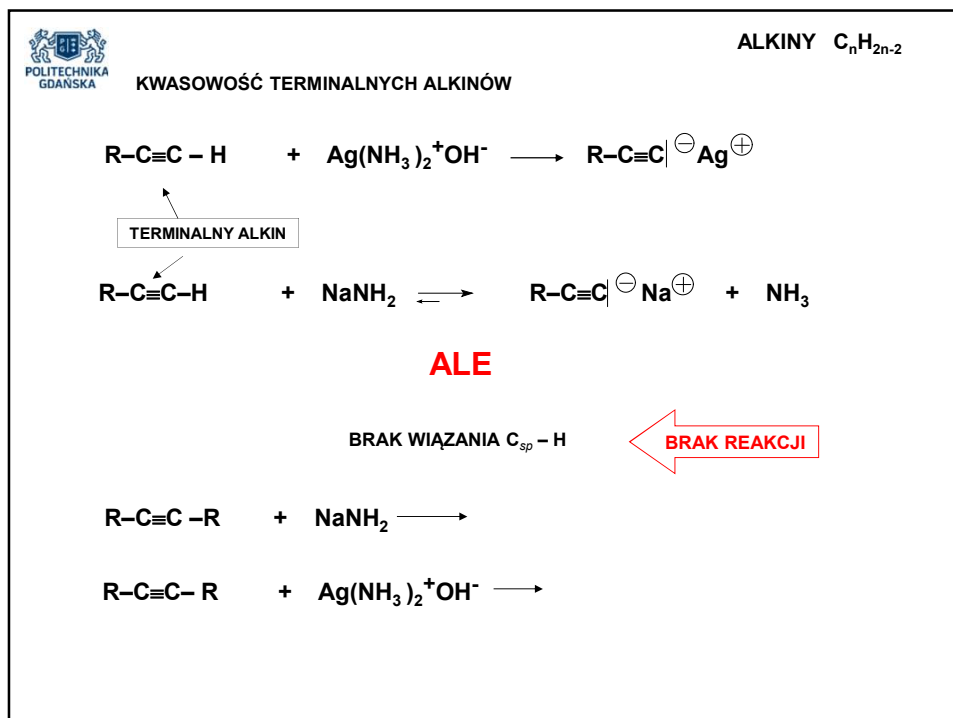
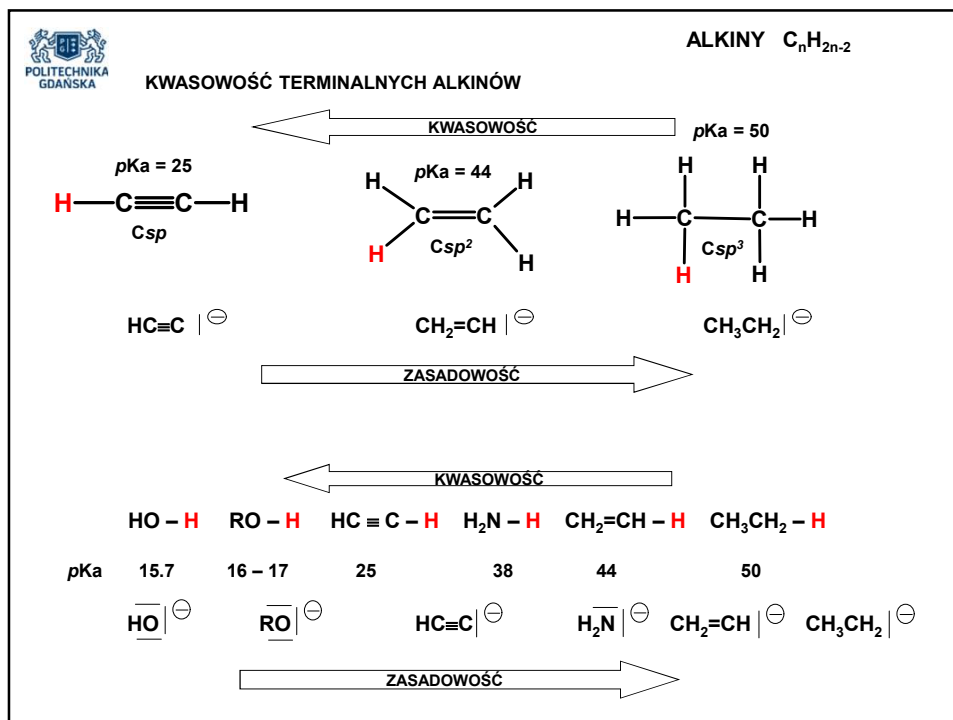


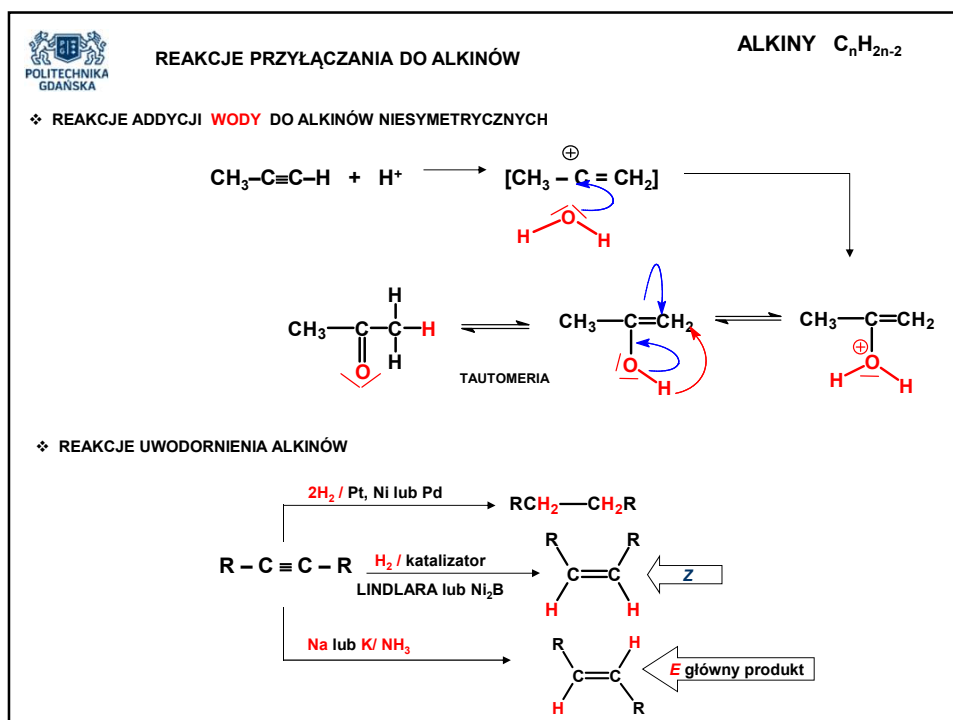
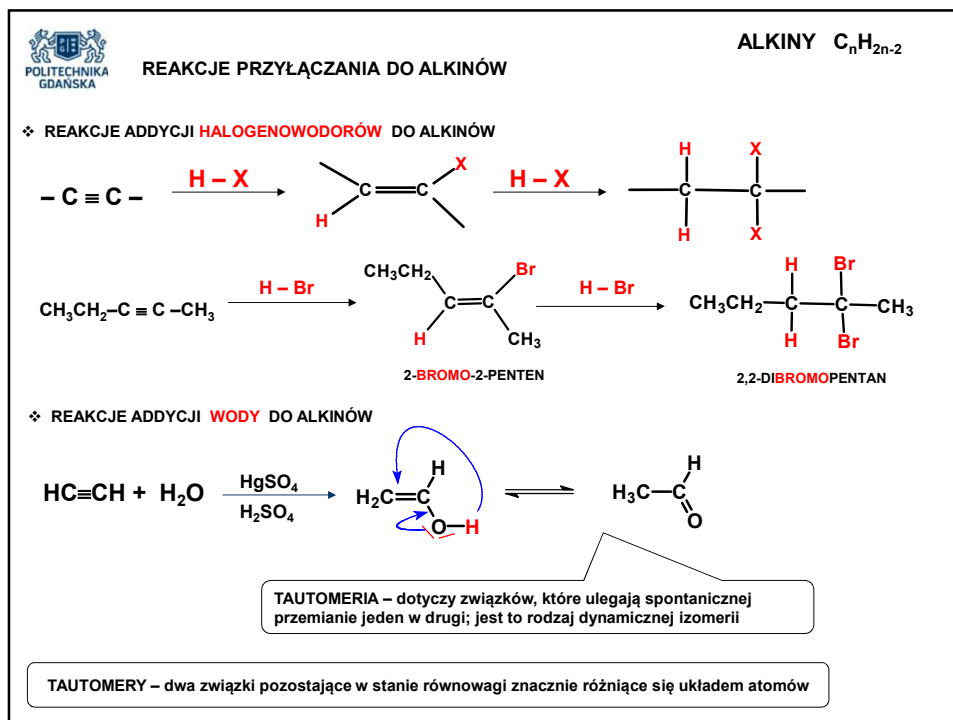


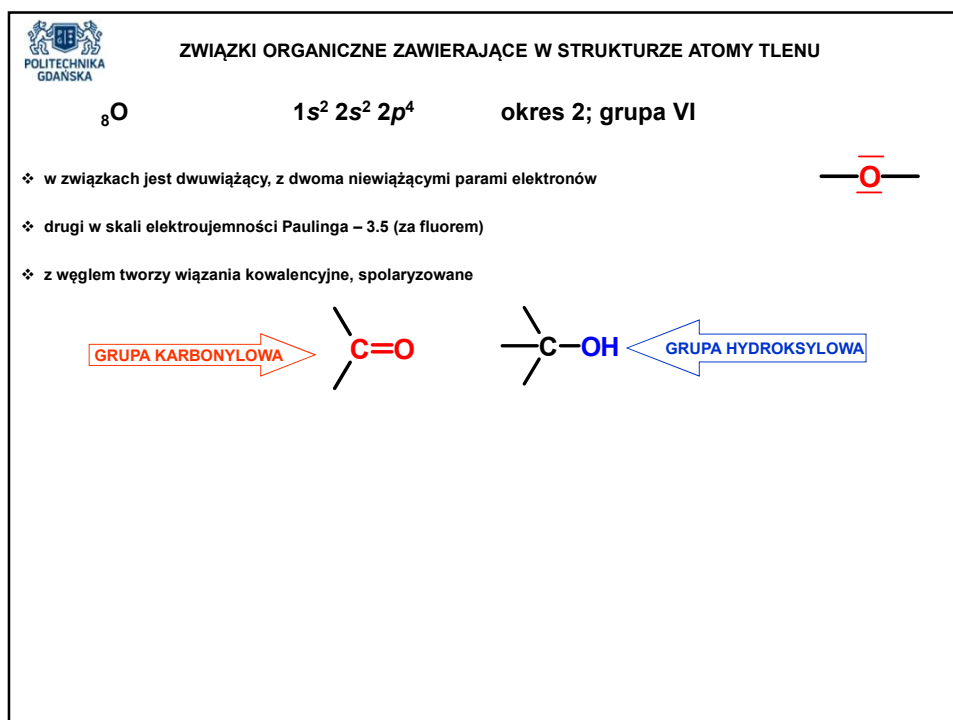
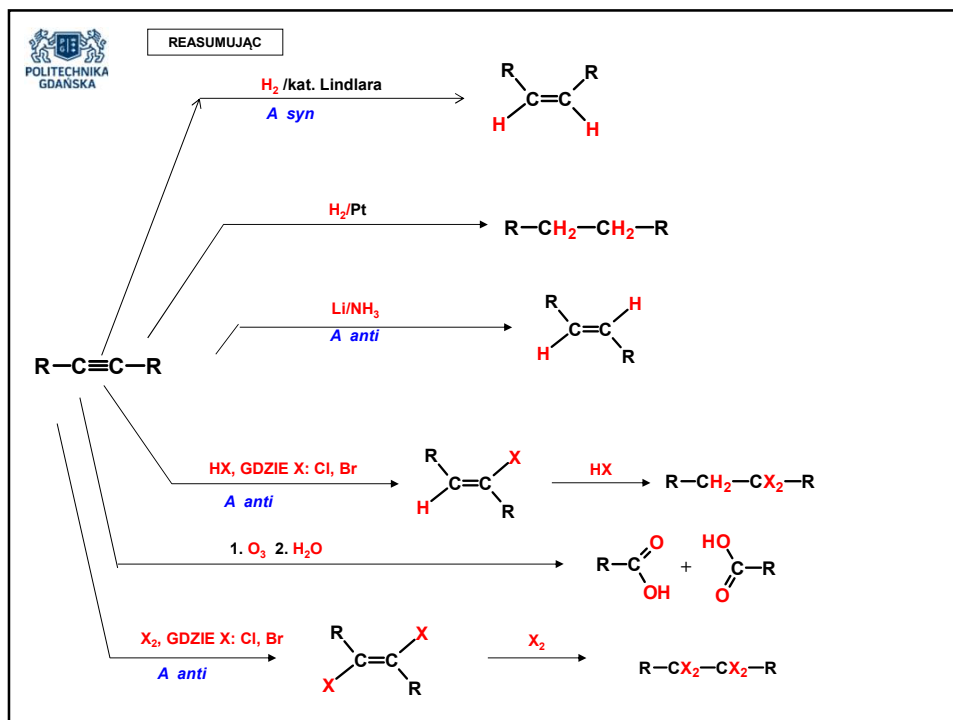


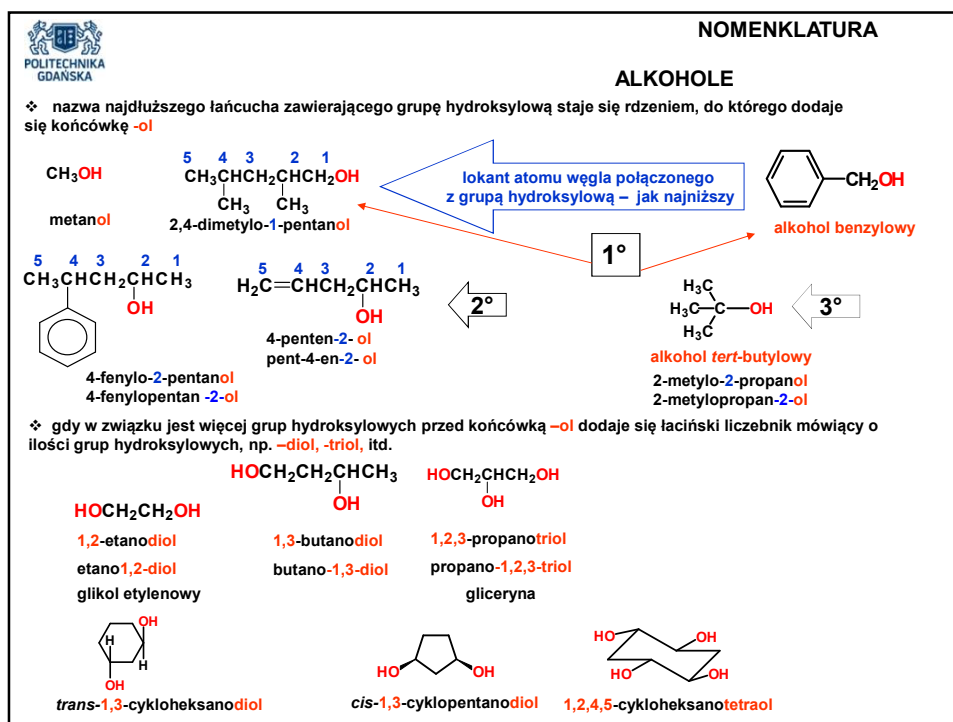
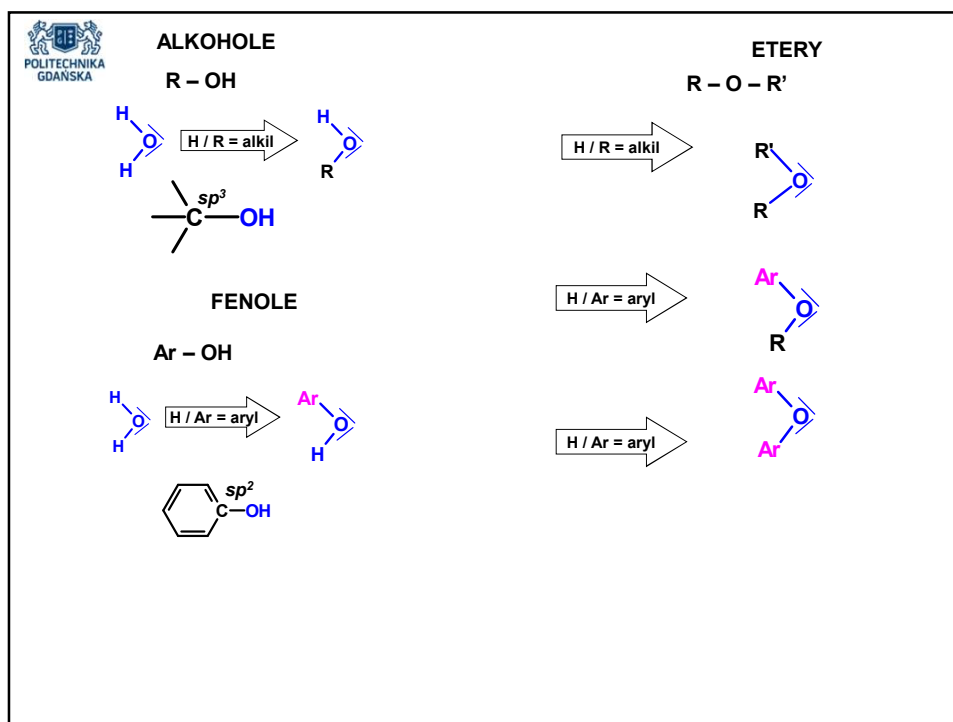







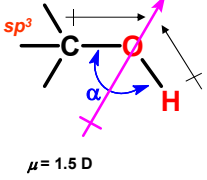






 POLITECHNIKA GDAŃSKA

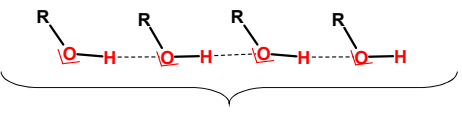
WŁAŚCIWOŚCI FIZYCZNE **ALKOHOLE**



sp^3

$\mu = 1.5 \text{ D}$

- ❖ wiązania C-O i H-O są kowalencyjne i spolaryzowane
- ❖ kąt walencyjny COH $\alpha \approx 106 - 110^\circ$
- ❖ cząsteczka posiada wypadkowy moment dipolowy
- ❖ cząsteczki alkoholi oddziałują ze sobą wiązaniami wodorowymi



WIAZANIA WODOROWE
20 -- 40 kJ/mol

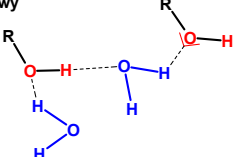
$M_{cz} \ 46$


❖ wysokie temperatury wrzenia

$\text{CH}_3\text{OCH}_3 \quad t_w -24.9^\circ\text{C}$

$\text{CH}_3\text{CH}_2\text{OH} \quad t_w +78.3^\circ\text{C}$

❖ dobra rozpuszczalność w wodzie – charakter hydrofilowy



 POLITECHNIKA GDAŃSKA


WŁAŚCIWOŚCI FIZYCZNE **ALKOHOLE**

WŁAŚCIWOŚCI
HYDROFILOWE

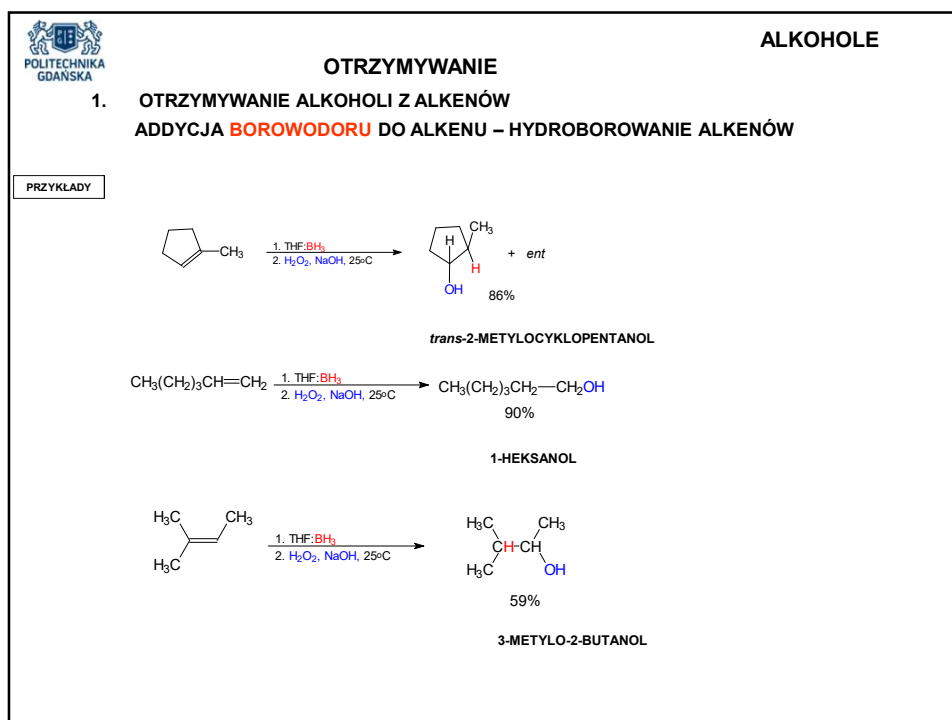
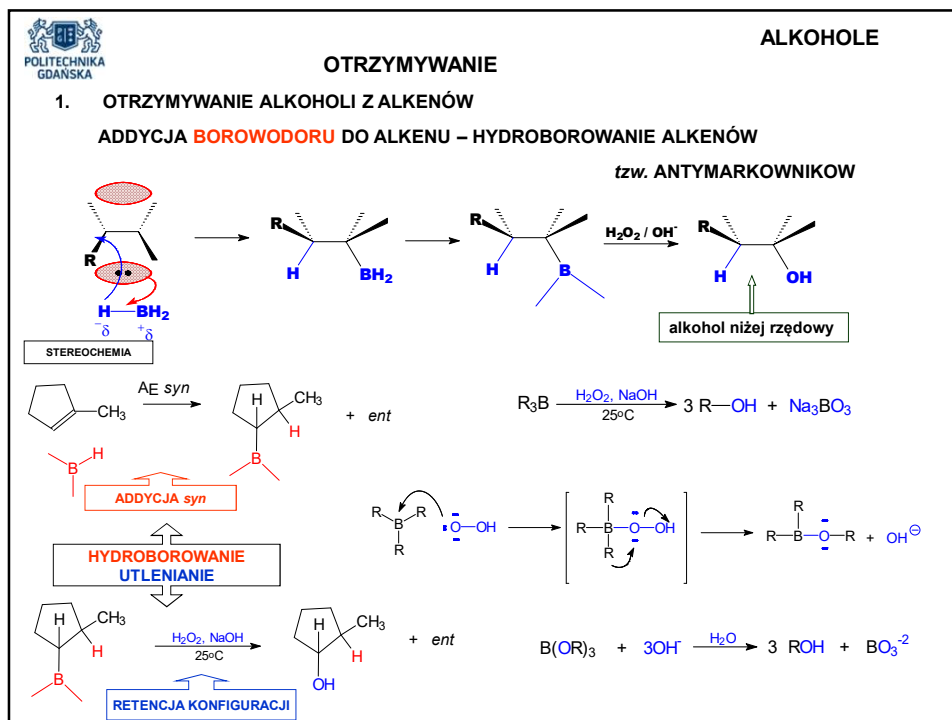
$\text{CH}_3\text{CH}_2\text{OH}$ ∞

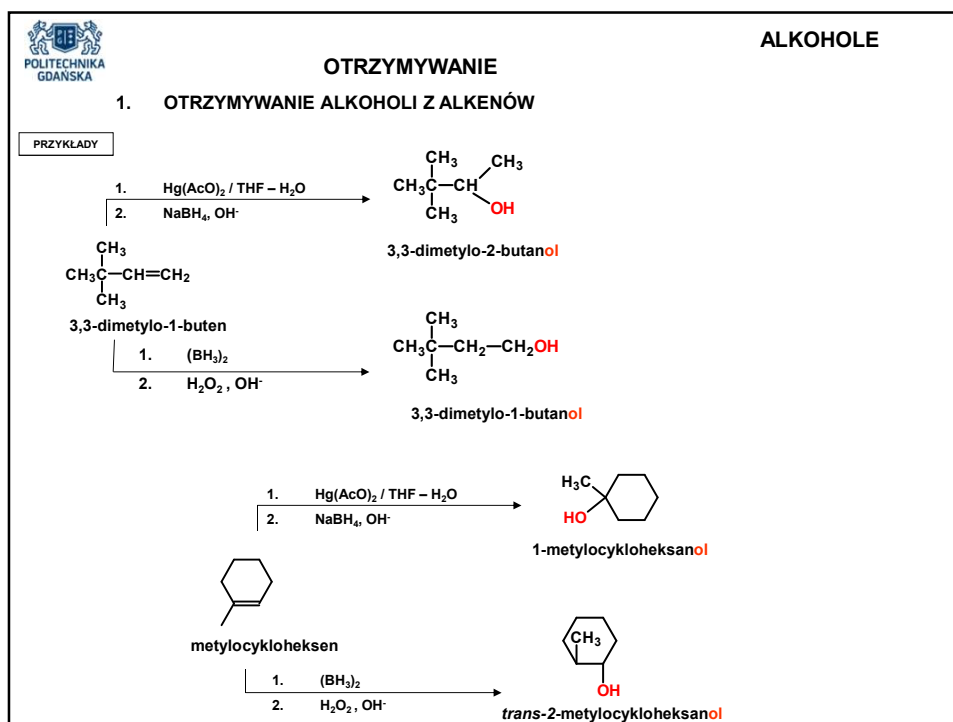
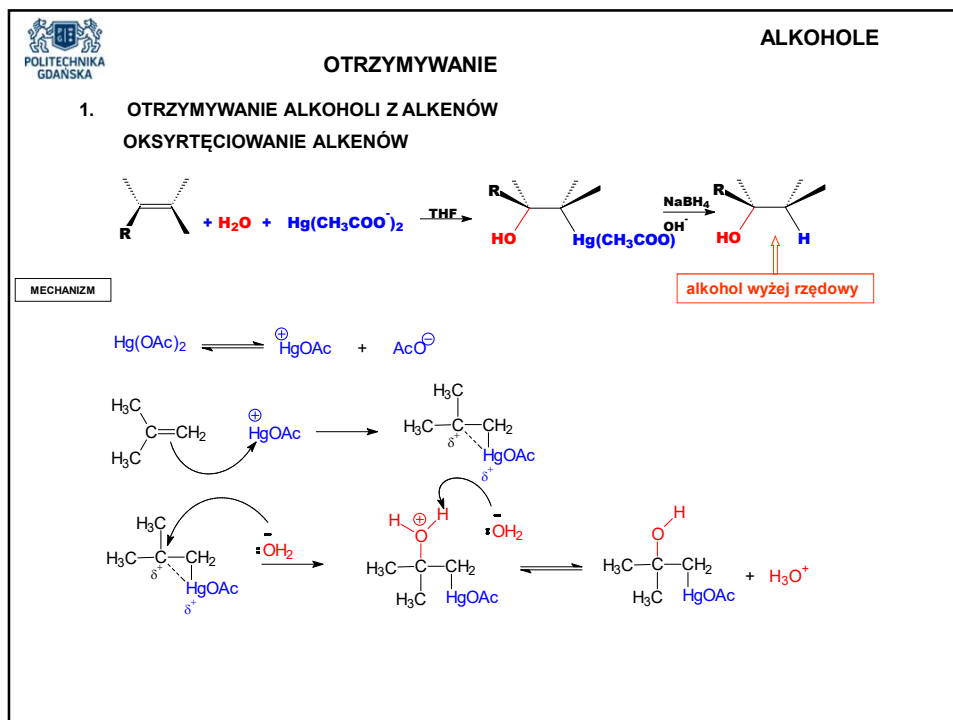
$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ 8.3 g/100ml H_2O

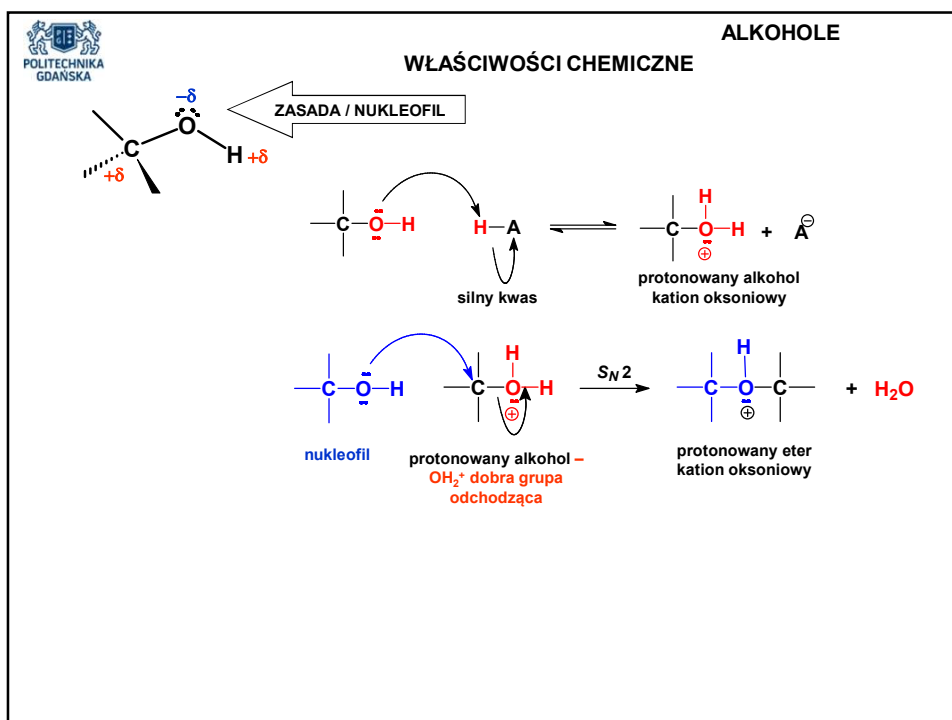
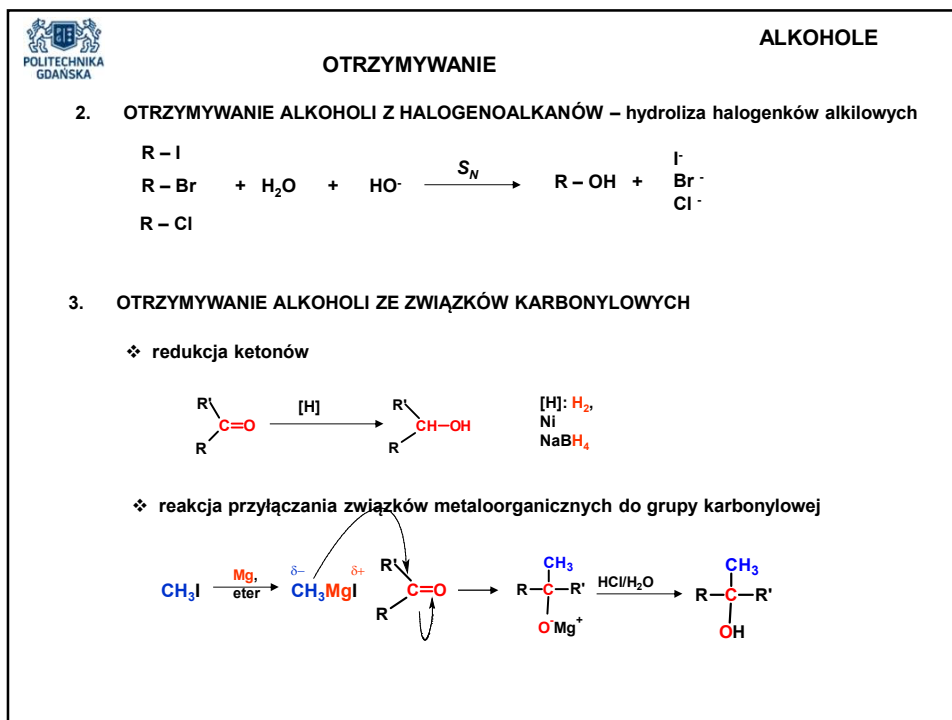
$\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{OH}$ 0.05 g/100ml H_2O

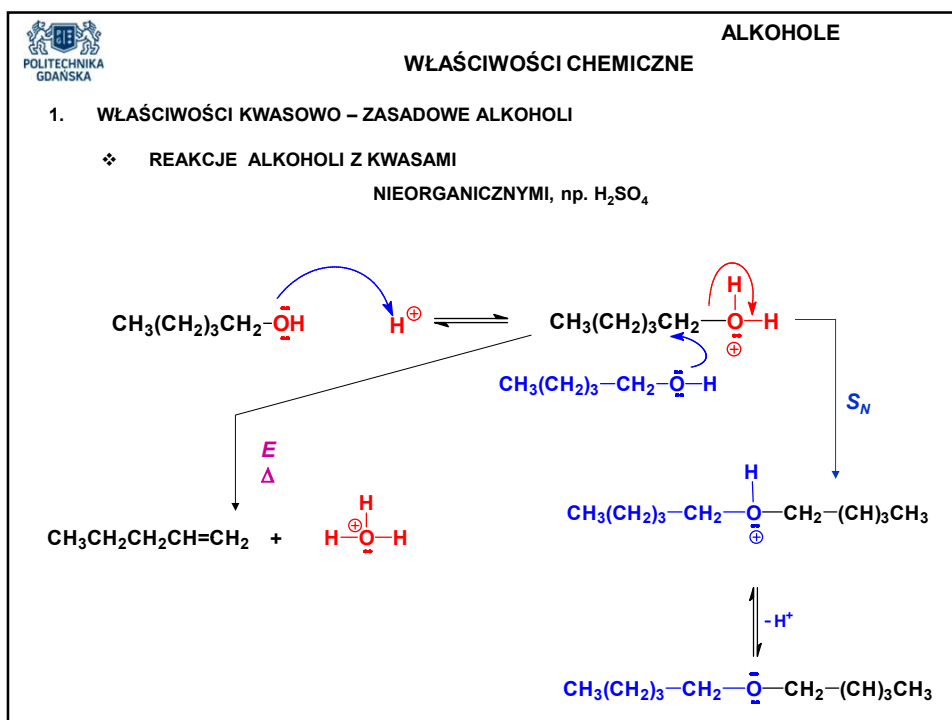
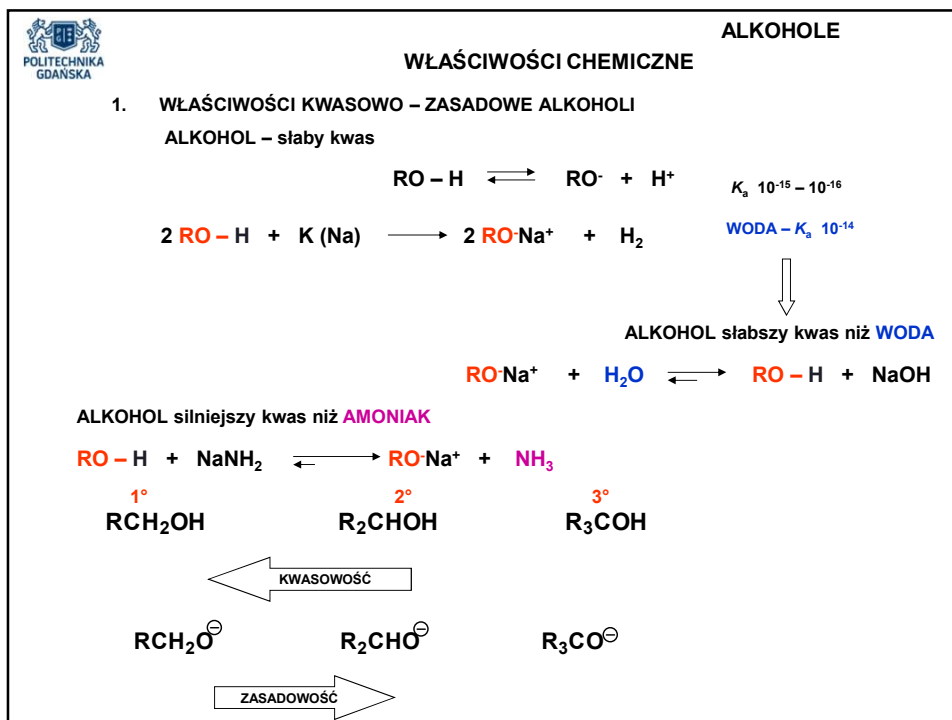


WŁAŚCIWOŚCI
HYDROFOBOWE









ALKOHOLE

WŁAŚCIWOŚCI CHEMICZNE

1. WŁAŚCIWOŚCI KWASOWO – ZASADOWE ALKOHOLI

❖ REAKCJE ALKOHOLI Z KWASAMI

ORGANICZNYMI, np. CH₃CO₂H

$$\text{CH}_3\text{CO}_2\text{H} + \text{CH}_3\text{OH} \xrightleftharpoons[\text{K}]{+\text{H}^+} \text{CH}_3\text{-C} \begin{array}{l} \text{O} \\ \parallel \\ \text{OCH}_3 \end{array} + \text{H}_2\text{O}$$

ESTER

$$K = \frac{[\text{ESTER}] [\text{H}_2\text{O}]}{[\text{ROH}] [\text{RCO}_2\text{H}]}$$

ALKOHOLE

WŁAŚCIWOŚCI CHEMICZNE

1. WŁAŚCIWOŚCI KWASOWO – ZASADOWE ALKOHOLI

❖ REAKCJE ALKOHOLI Z KWASAMI

HALOGENOWODORAMI, np. HCl, HBr

$$\text{R-CH}_2\text{-OH} + \text{HX} \rightleftharpoons \text{R-CH}_2\text{-OH}_2^{\oplus} + \text{X}^{\ominus}$$

X: I, Br, Cl

$$\downarrow$$

$$\text{R-CH}_2\text{-X} + \text{H}_2\text{O}$$

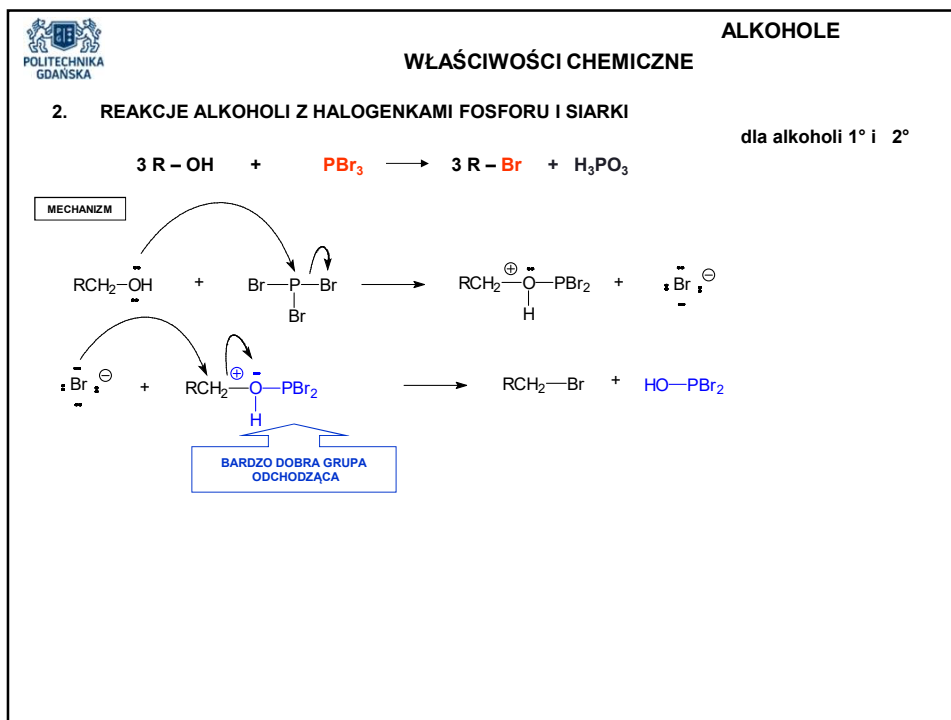
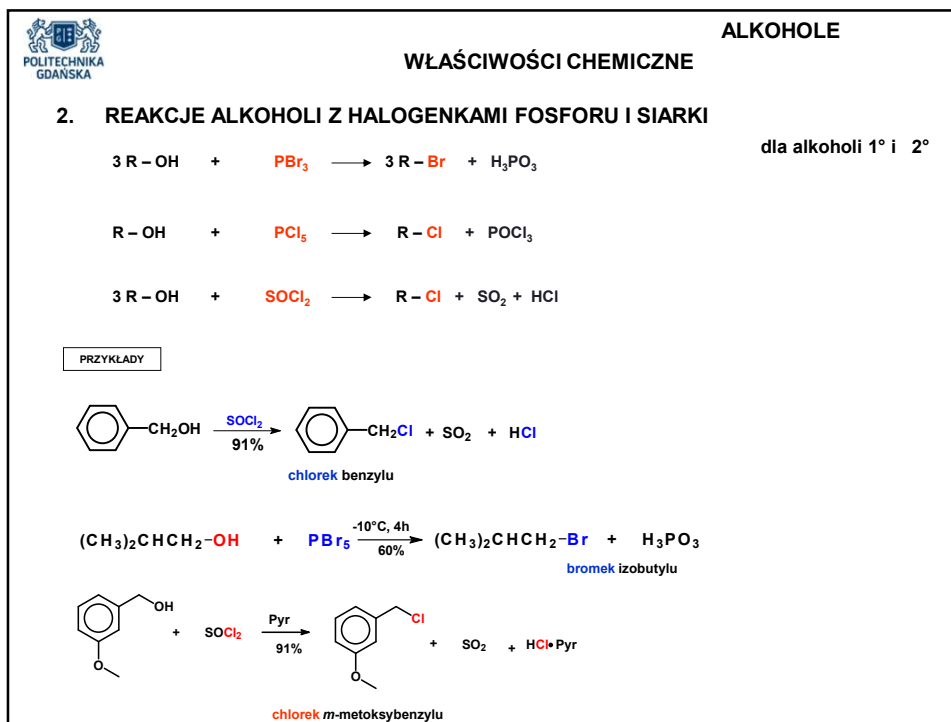
PRZYKŁADY

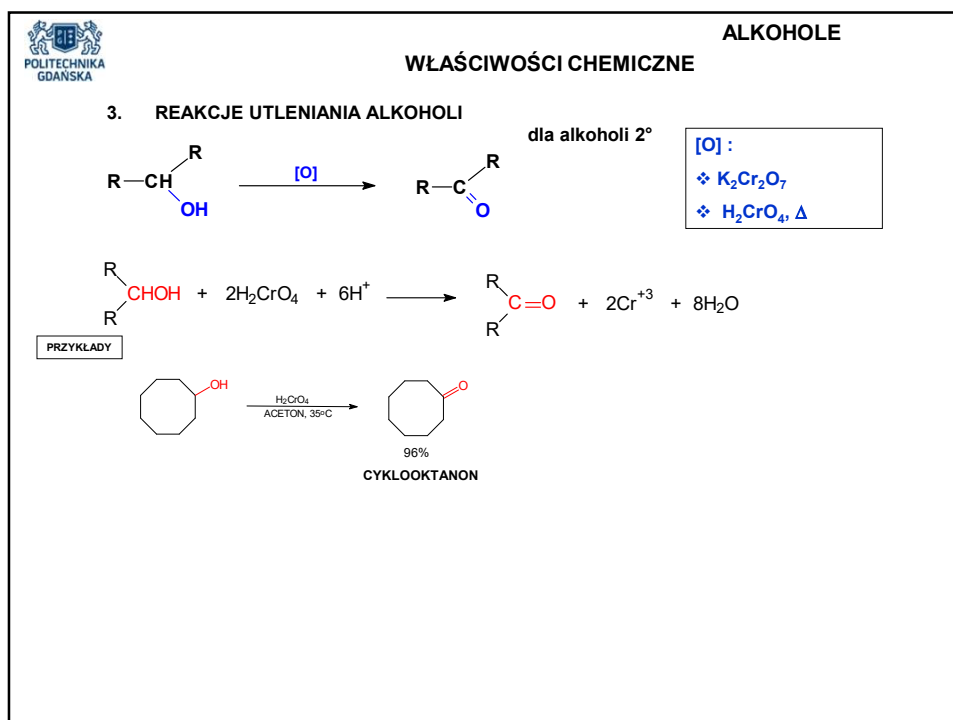
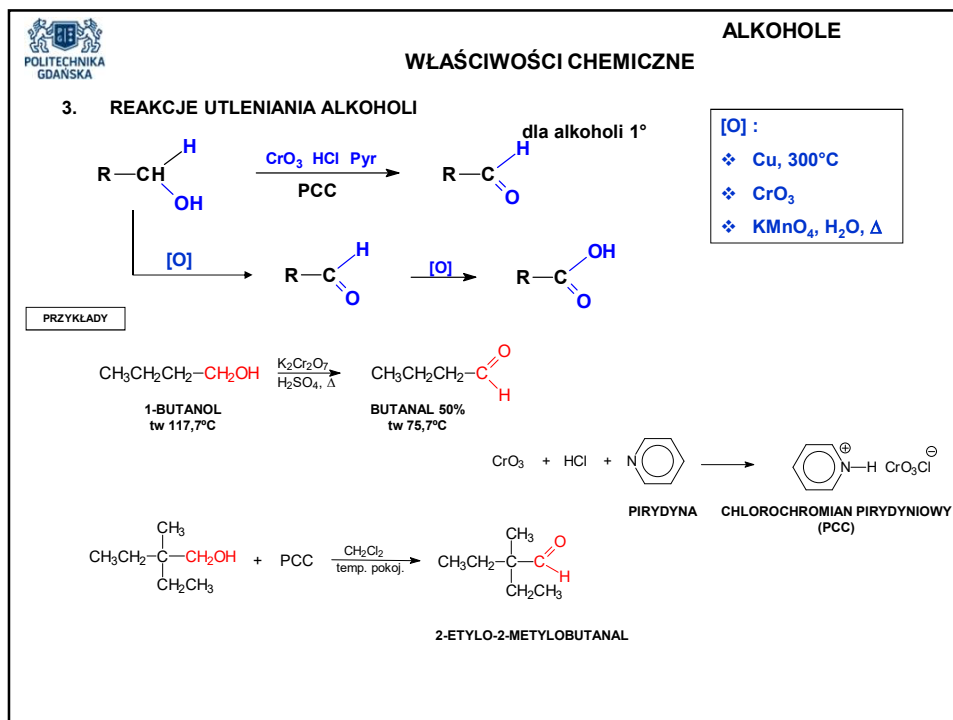
$$\begin{array}{c} \text{CH}_3 \\ | \\ \text{H}_3\text{C}-\text{C}-\text{O}-\text{H} \\ | \\ \text{CH}_3 \end{array} + \text{HCl} \xrightarrow[94\%]{25^\circ\text{C}} \begin{array}{c} \text{CH}_3 \\ | \\ \text{H}_3\text{C}-\text{C}-\text{Cl} \\ | \\ \text{CH}_3 \end{array} + \text{H}_2\text{O}$$

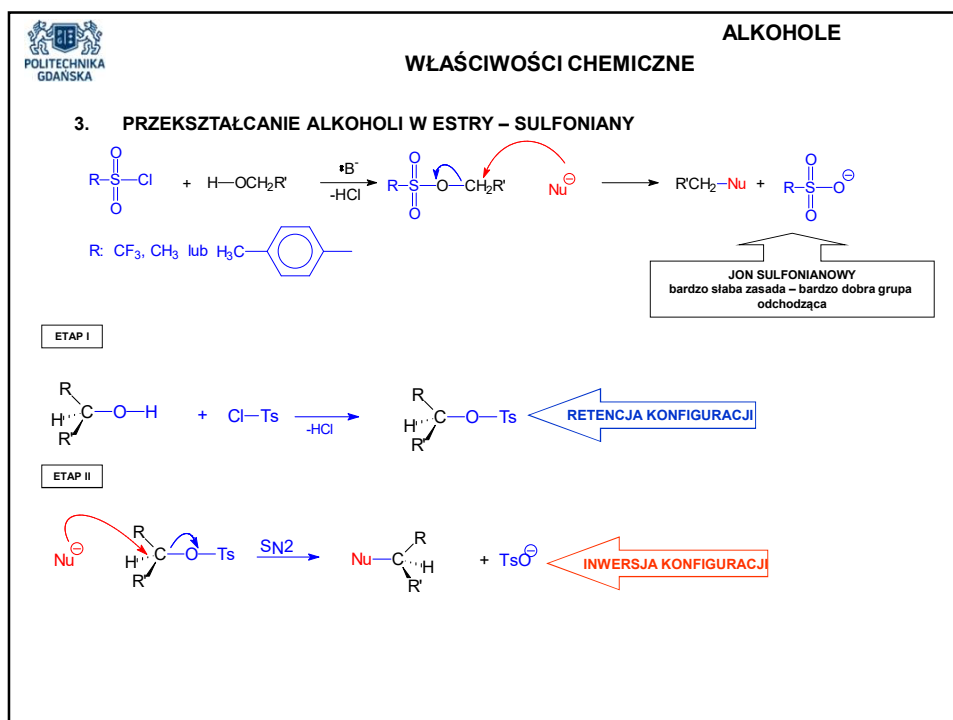
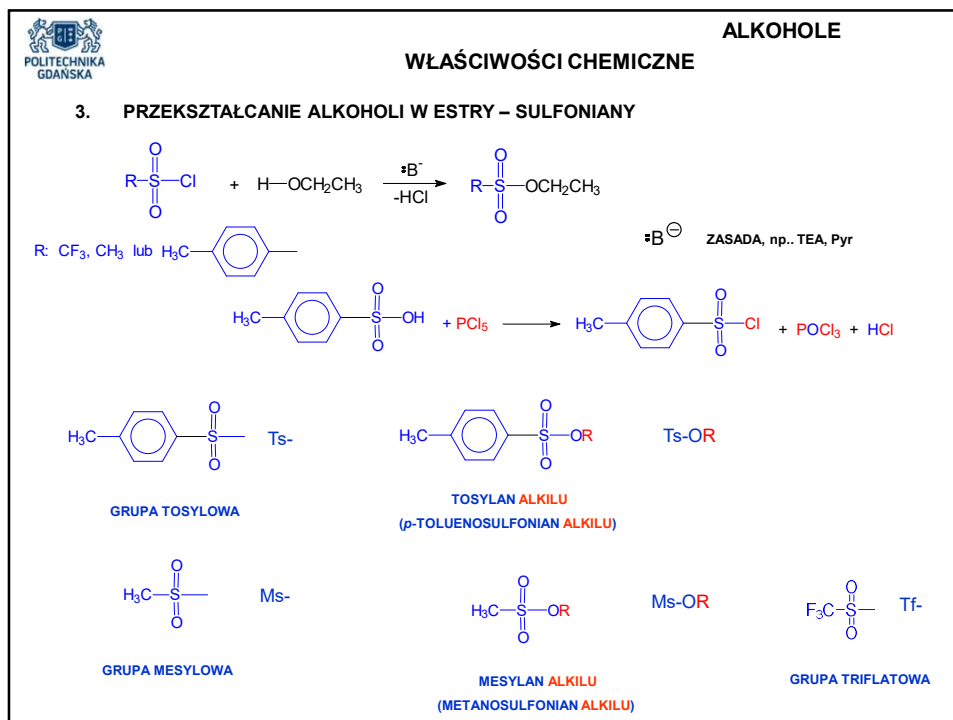
chlerek tert-butylu

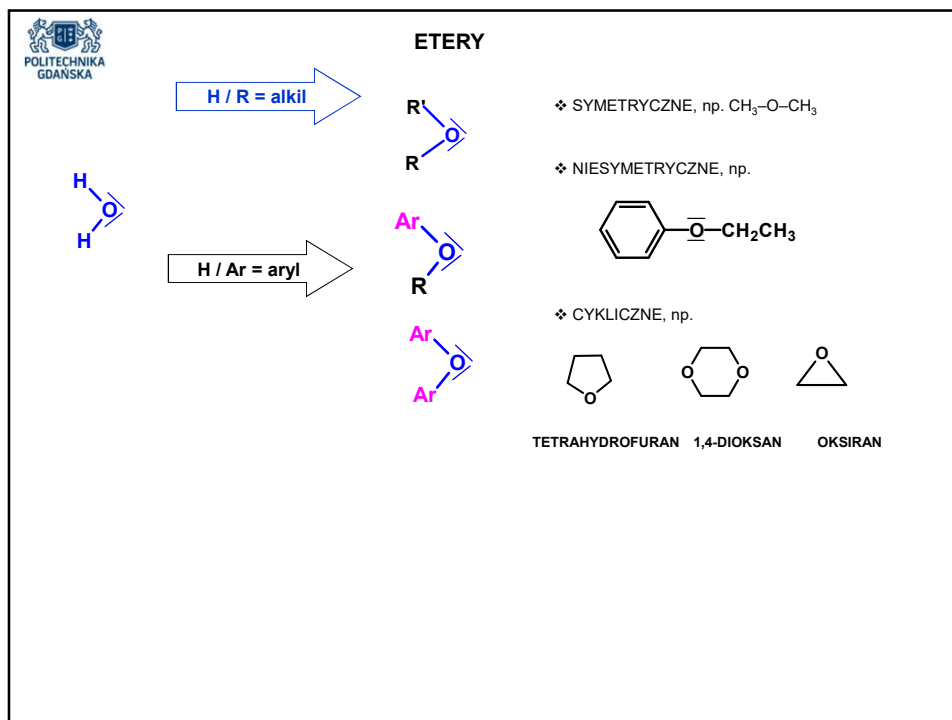
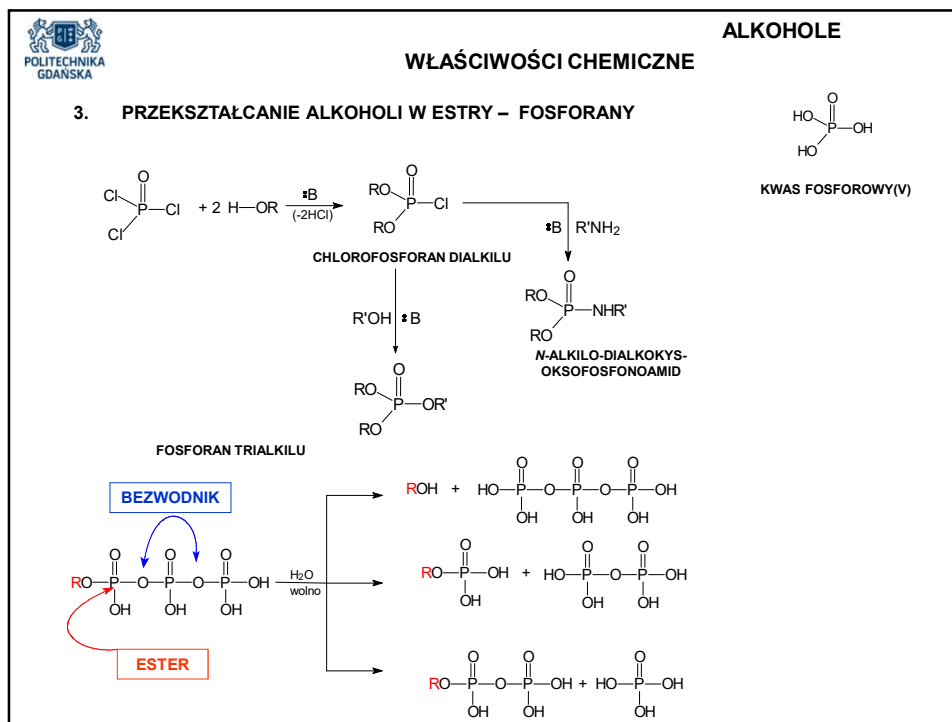
$$(\text{CH}_3)_2\text{CHCH}_2\text{-OH} + \text{HBr} \xrightarrow[95\%]{\Delta} (\text{CH}_3)_2\text{CHCH}_2\text{-Br} + \text{H}_2\text{O}$$

bromek izobutyłu









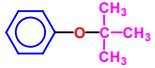
ETERY

NOMENKLATURA

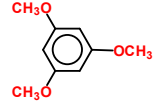
❖ nazwy tworzy się zazwyczaj przez podanie po słowie 'eter' nazw dwóch grup w formie przymiotnikowej wg kolejności alfabetycznej

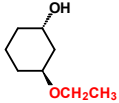
$\text{CH}_3\text{-O-CH}_2\text{CH}_3$
ETER ETYLOWOMETYLOWY
METOKSYETAN

$\text{CH}_3\text{CH}_2\text{-O-CH}_2\text{CH}_3$
ETER DIETYLOWY
ETOKSYETAN


ETER tert-BUTYLOWOFENYLOWY
tert-BUTOKSYBENZEN

❖ IUPAC – jeżeli jedna z grup nie ma prostej nazwy, to należy związek traktować jako pochodną **alkoksylową**

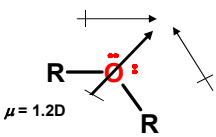

1,3,5-TRIMETOKSYBENZEN


trans-3-ETOKSYCYKLOHEKSANOL

$\text{CH}_3\text{CHCH}_2\text{CH}_2\text{CH}_3$
 OCH_2CH_3
2-ETOKSY-PENTAN

ETERY

WŁAŚCIWOŚCI FIZYCZNE

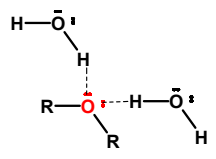


- ❖ wiązania C – O są kowalencyjne i spolaryzowane
- ❖ kąt walencyjny COR $\alpha \approx 110^\circ$
- ❖ cząsteczka posiada wypadkowy moment dipolowy $\mu = 1.2\text{D}$; jest słabo polarna

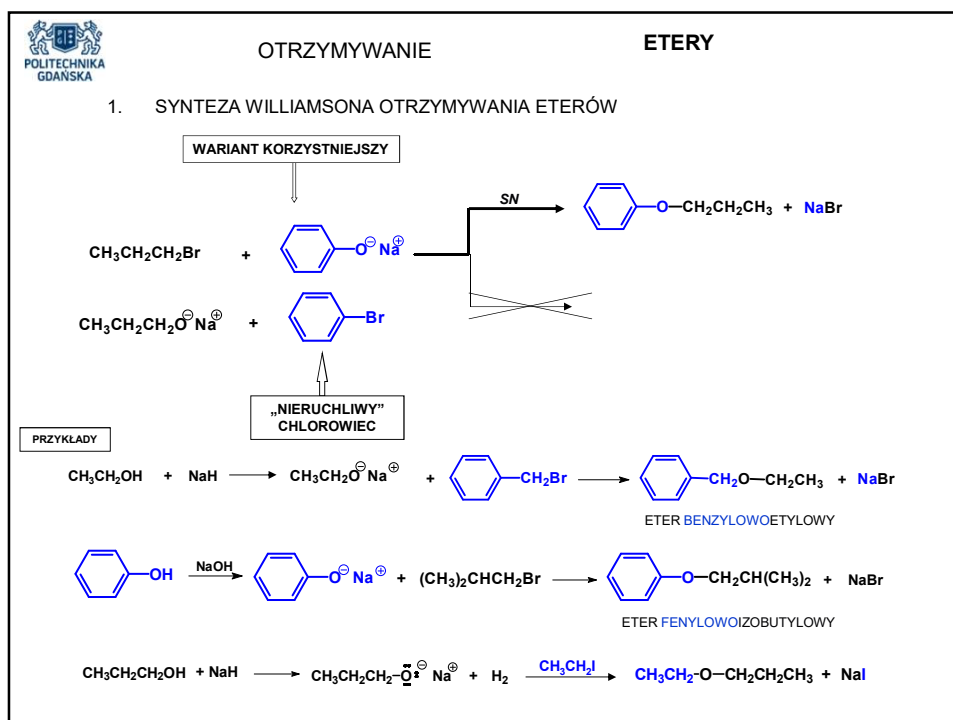
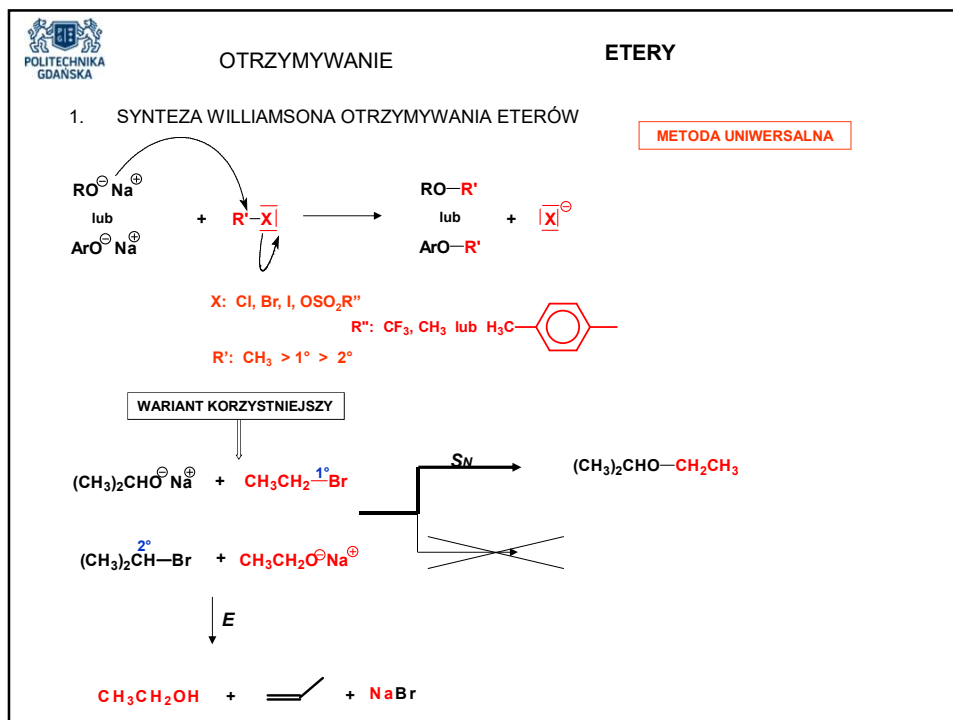
❖ temp. wrzenia eterów są zbliżone do temp. wrzenia alkanów o tej samej masie cząsteczkowej

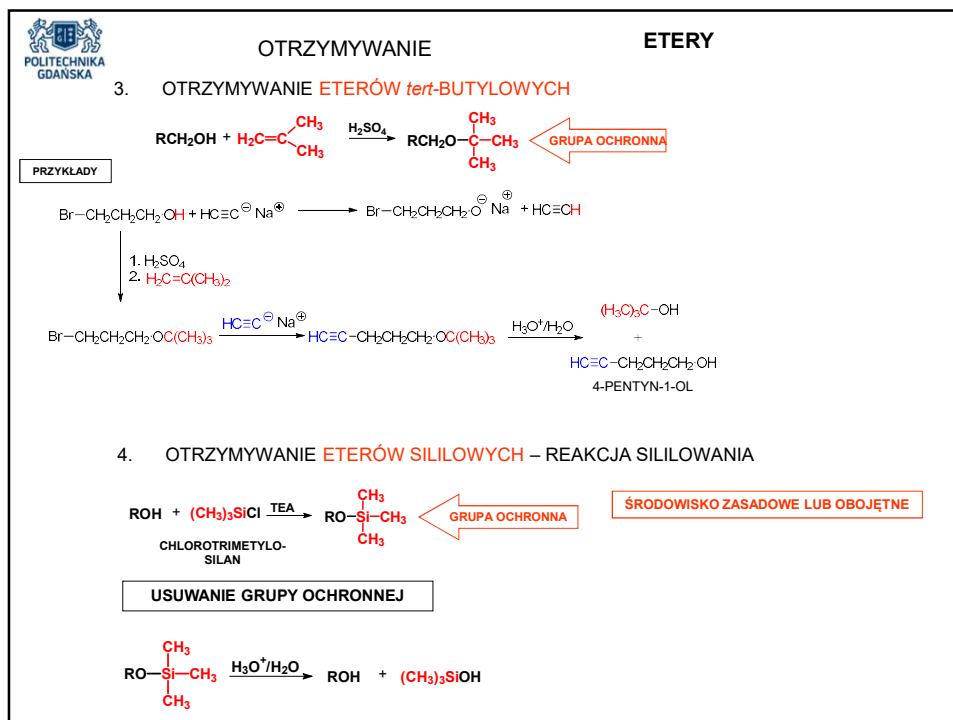
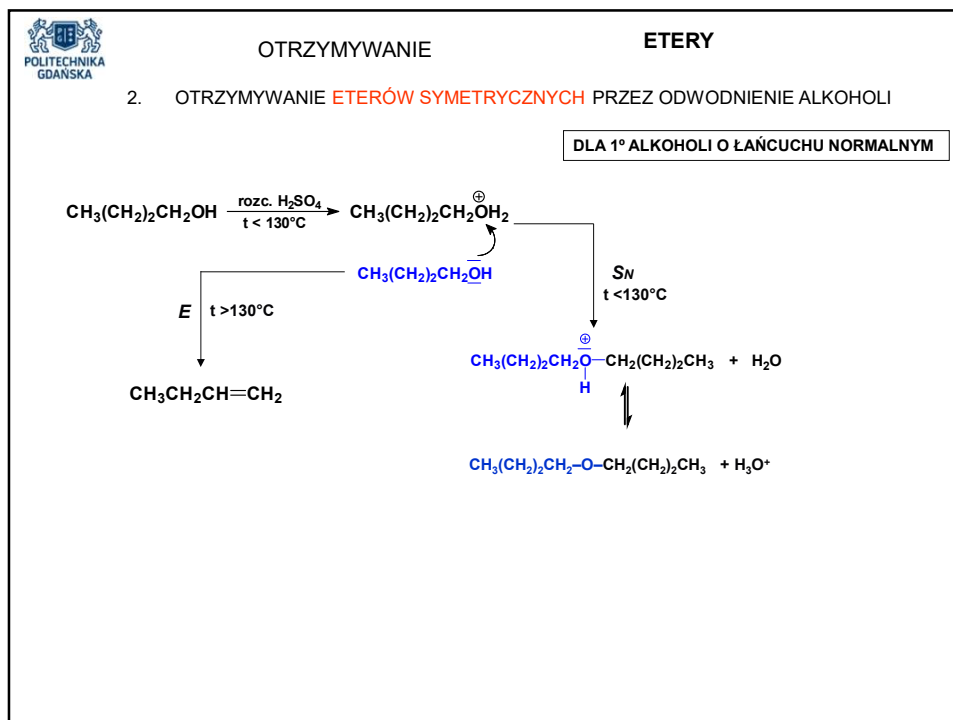
	<i>Mcz</i>	<i>tw</i>
1-butanol	74	118°C
eter dietylowy	74	35°C
pentan	76	36°C

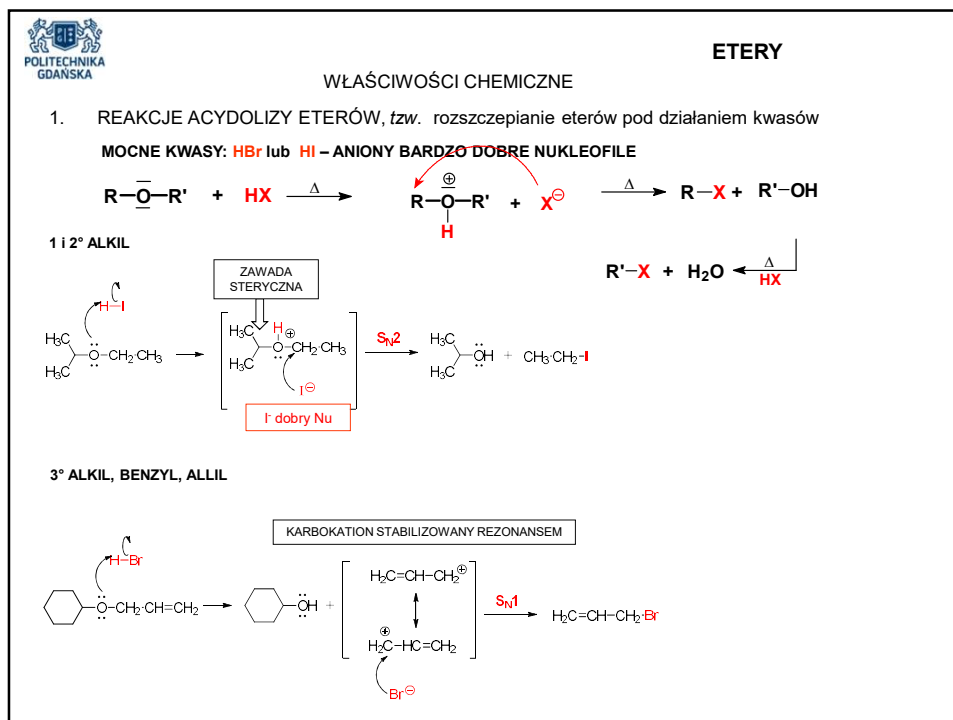
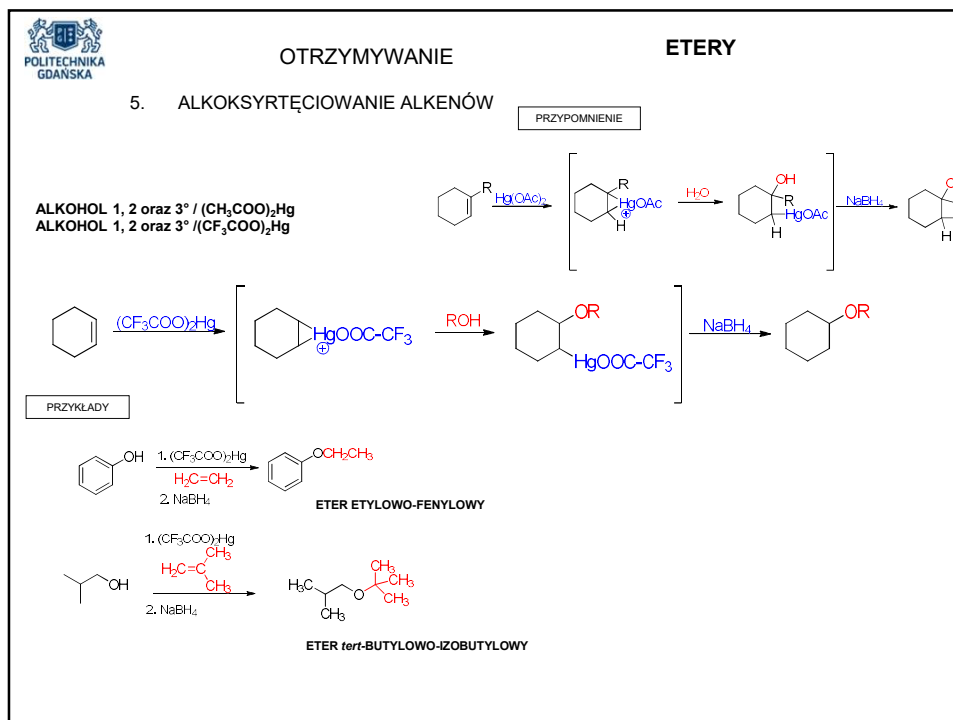
❖ cząsteczki eterów o małych podstawnikach są solwatowane przez cząsteczki wody; ale już eter dietylowy jest nierozpuszczalny w wodzie; **wyjątek**: etery cykliczne

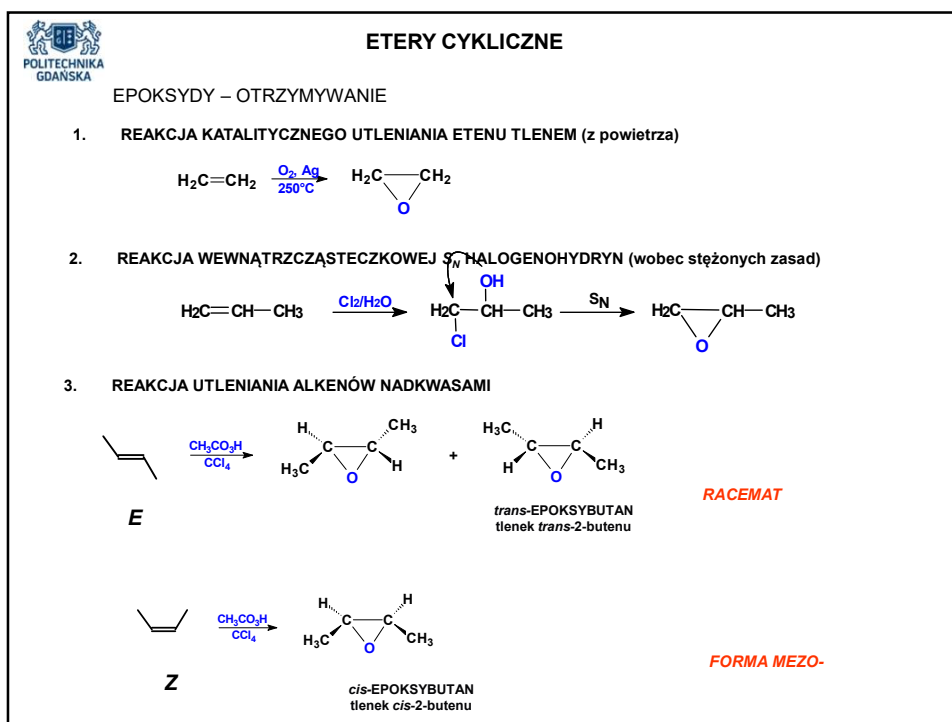
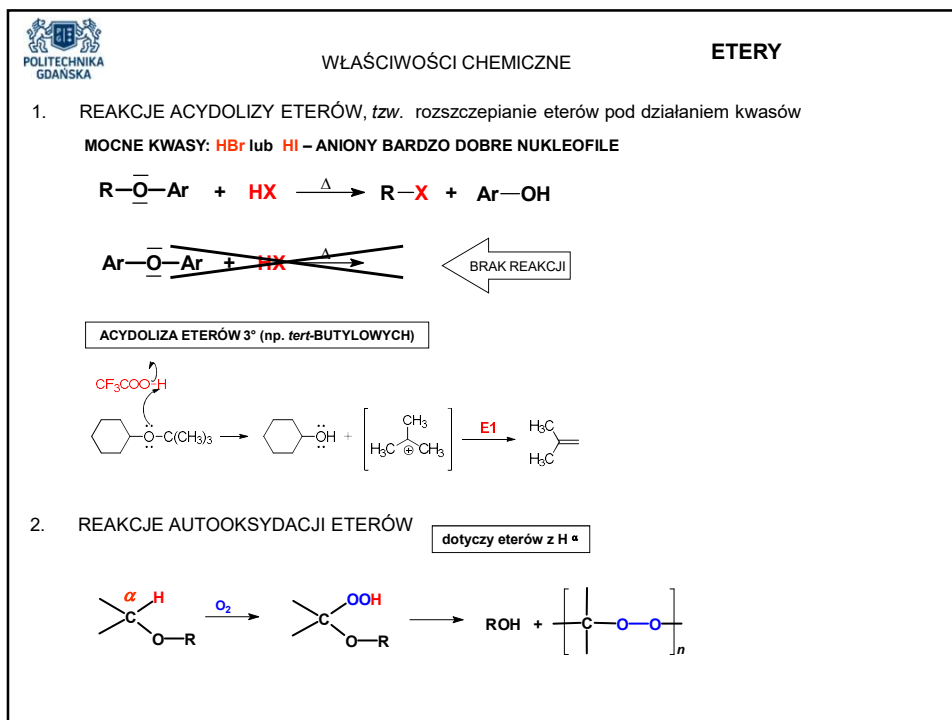


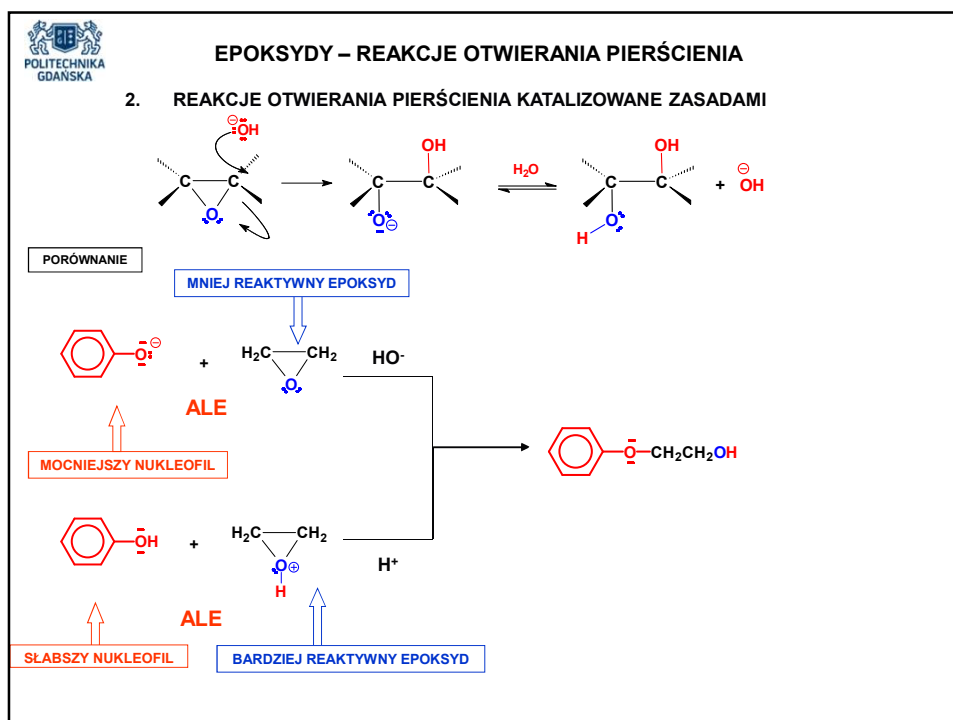
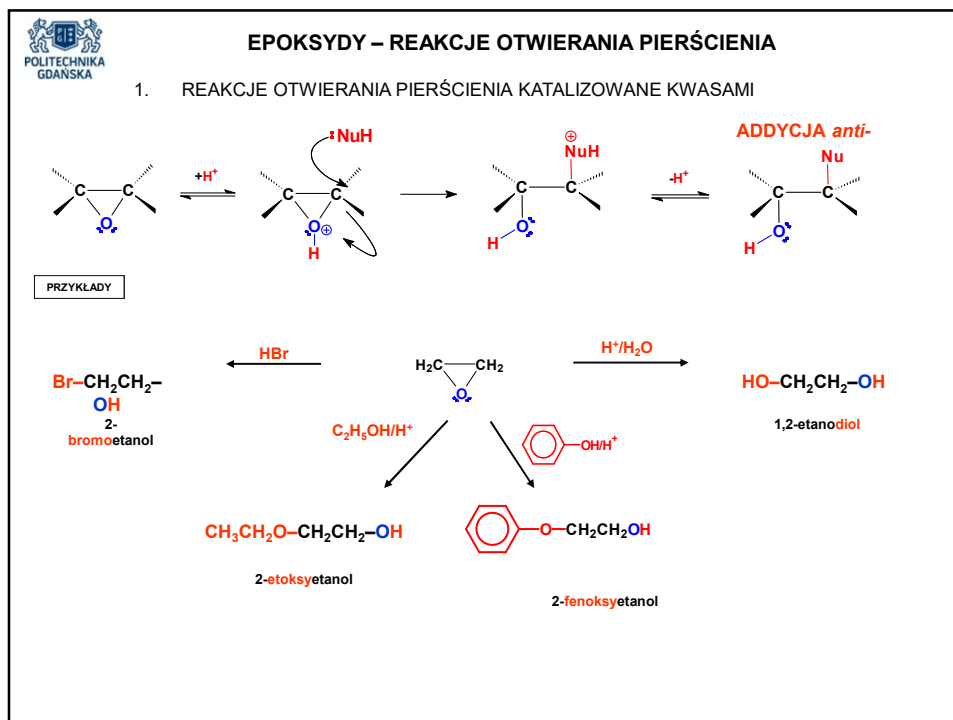
- ❖ ETERY SĄ NIEREAKTYWNE CHEMICZNIE

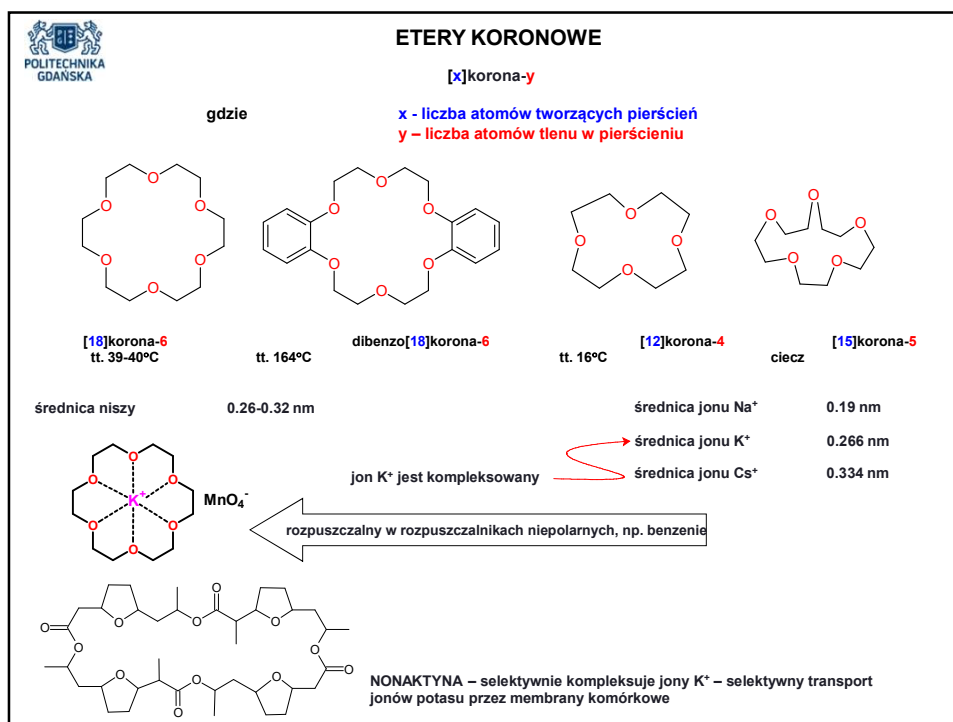
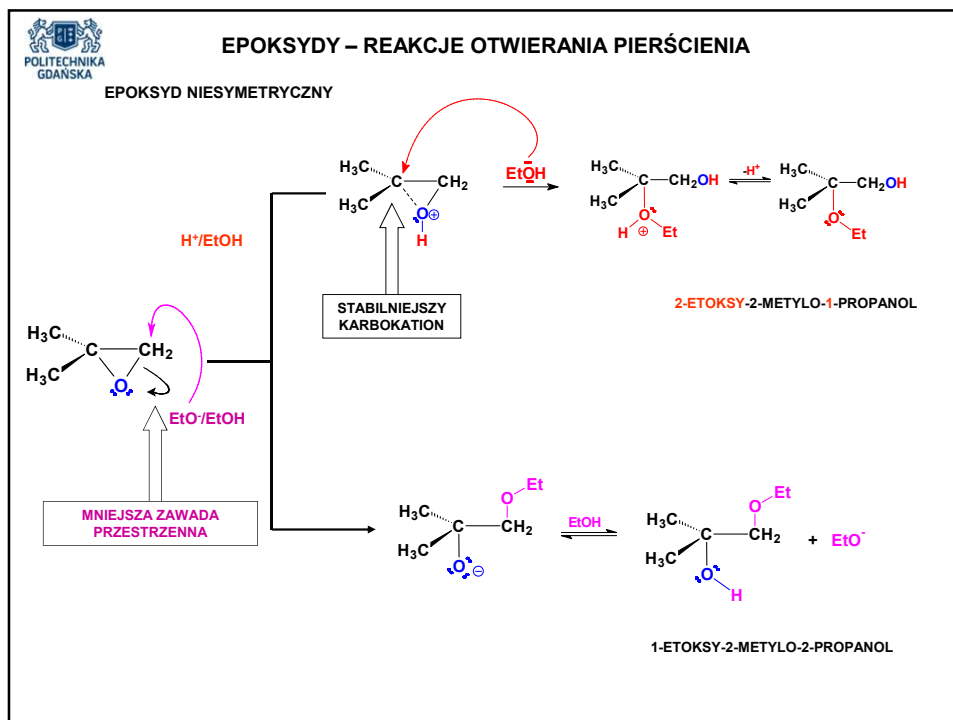


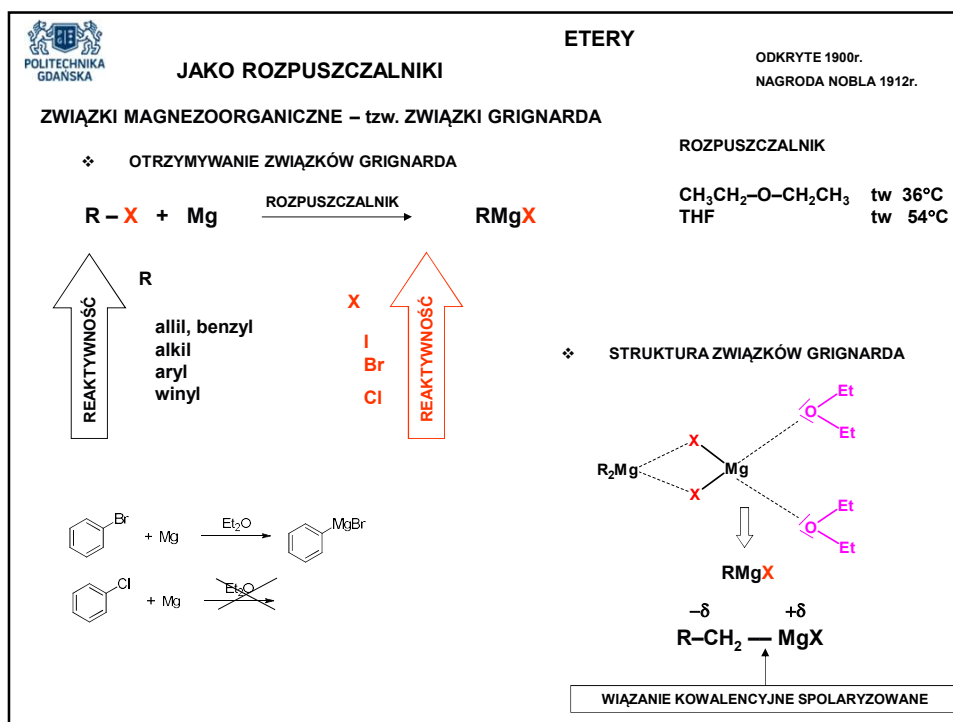
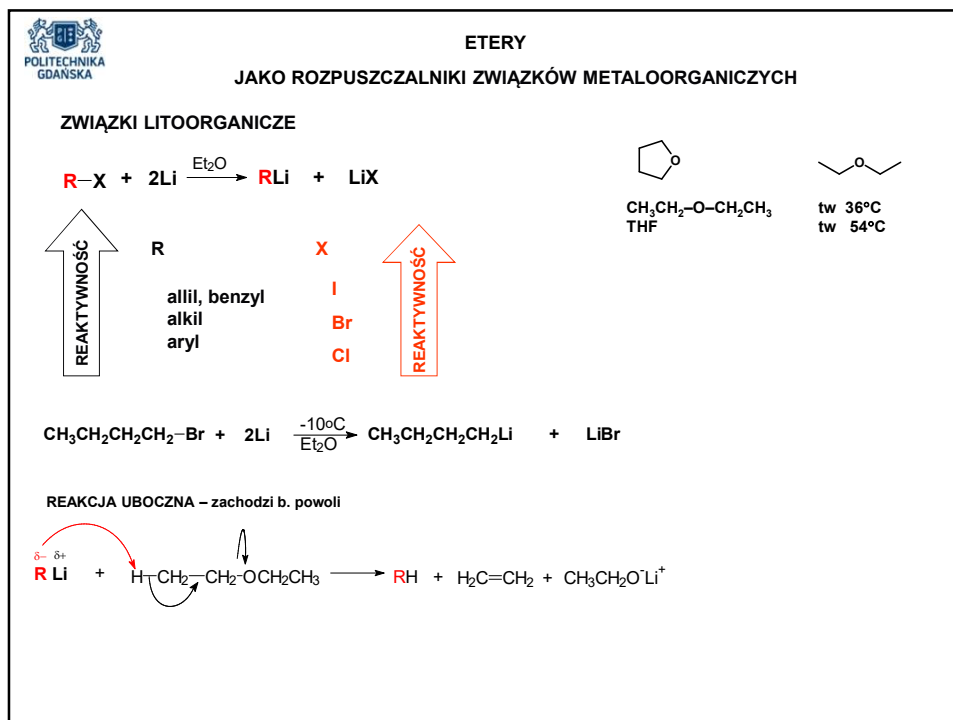


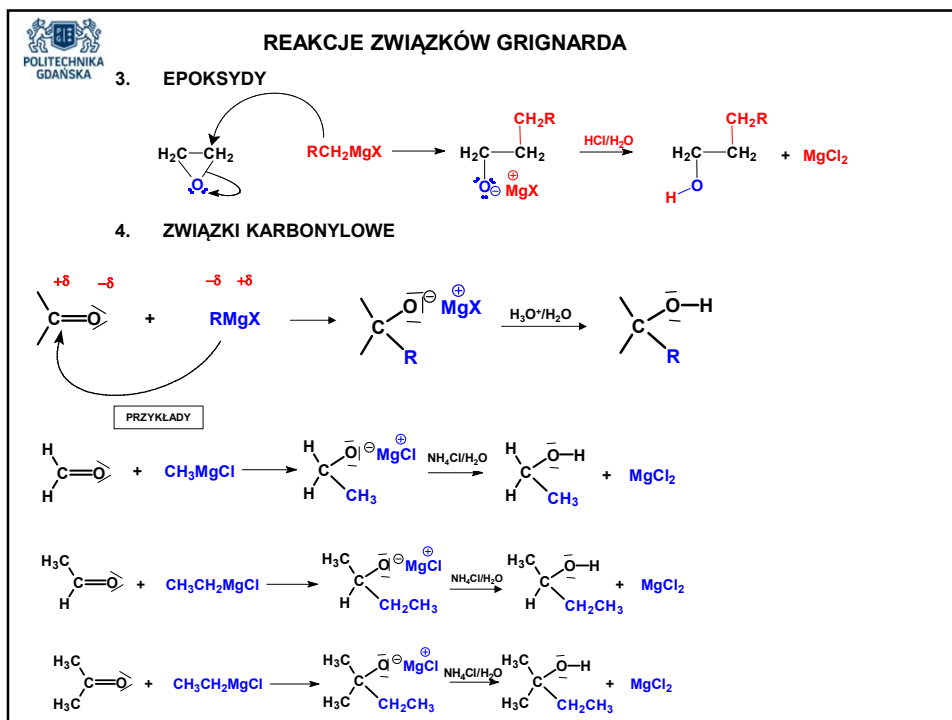
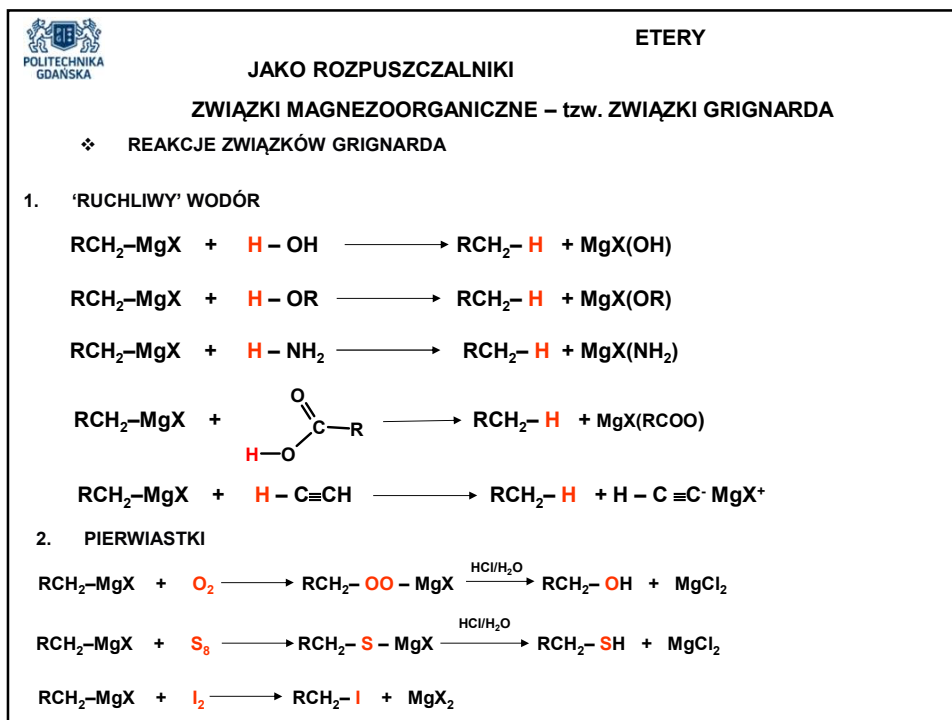


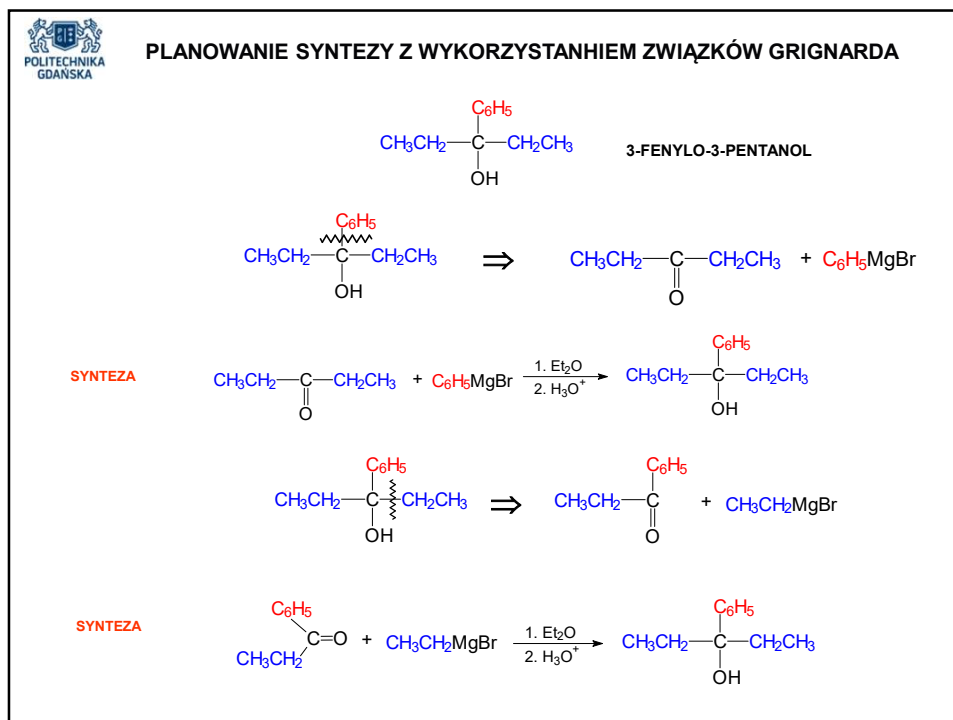
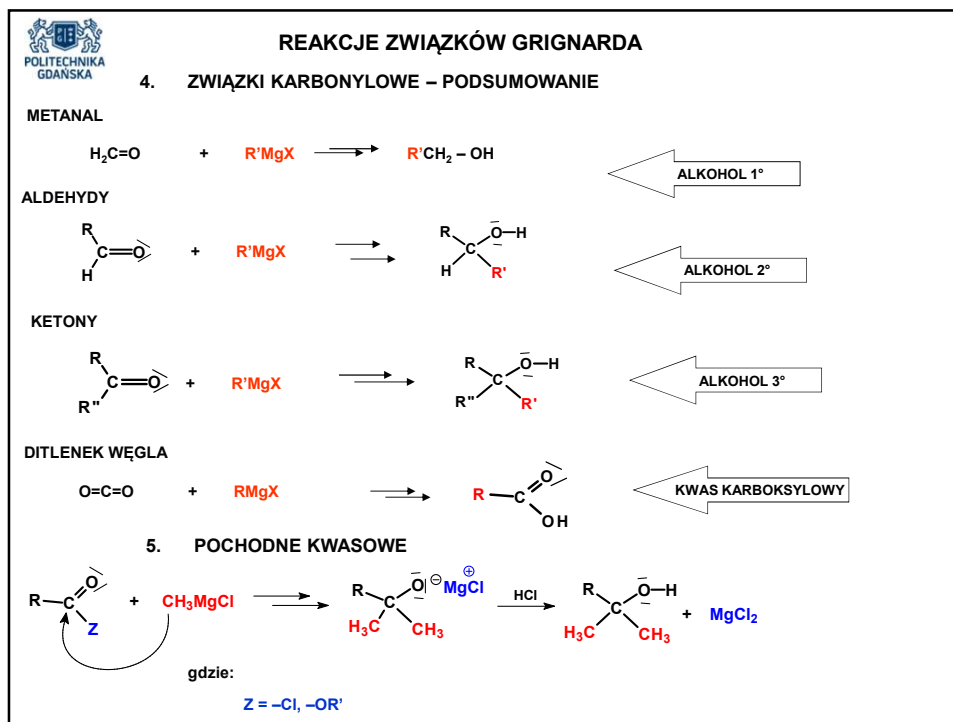


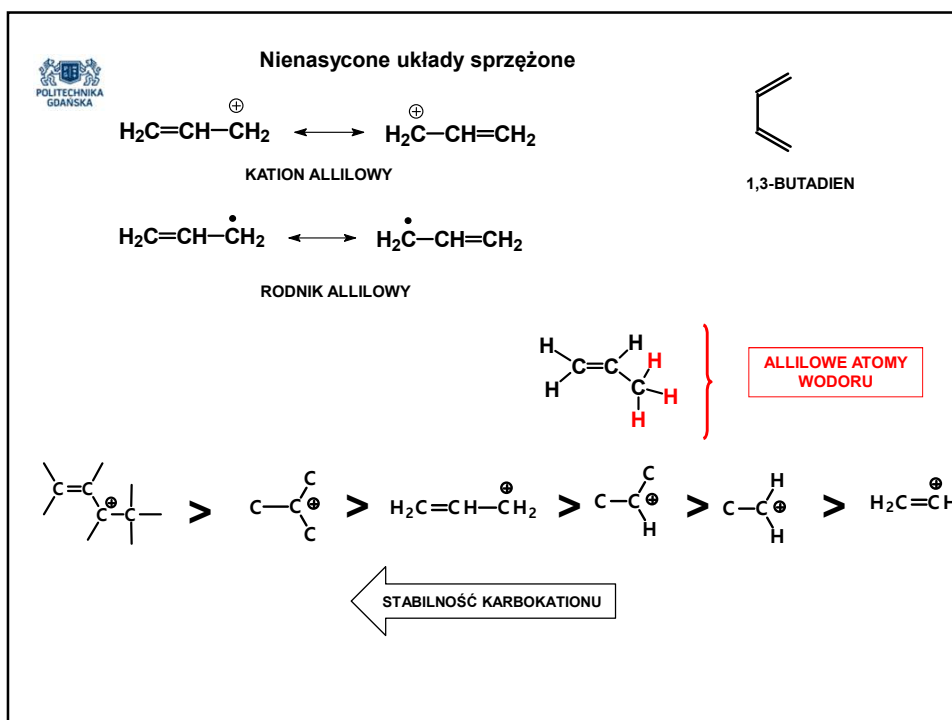
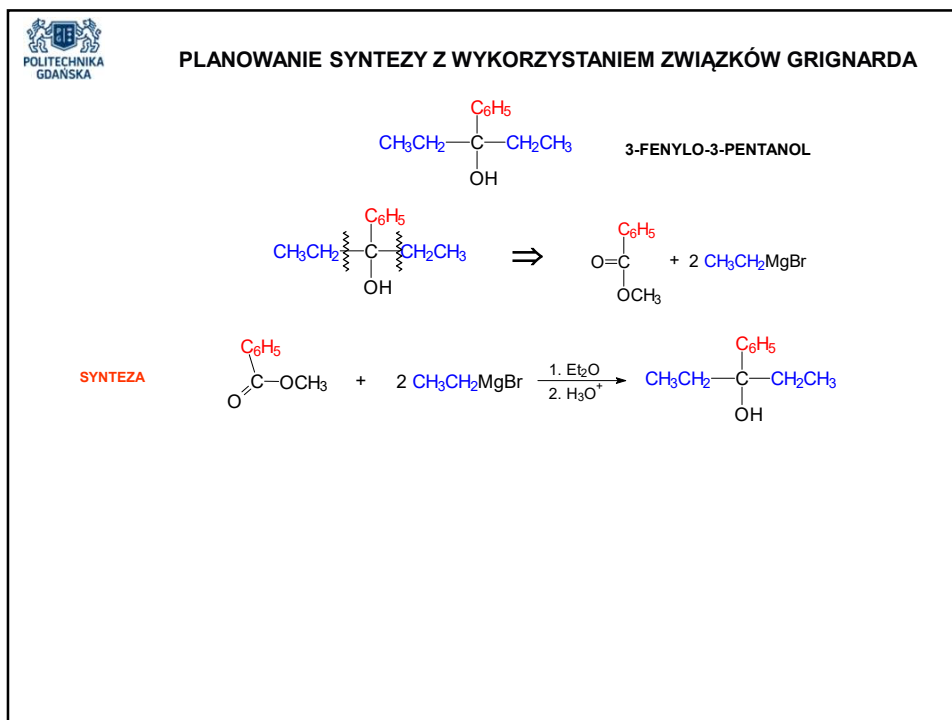


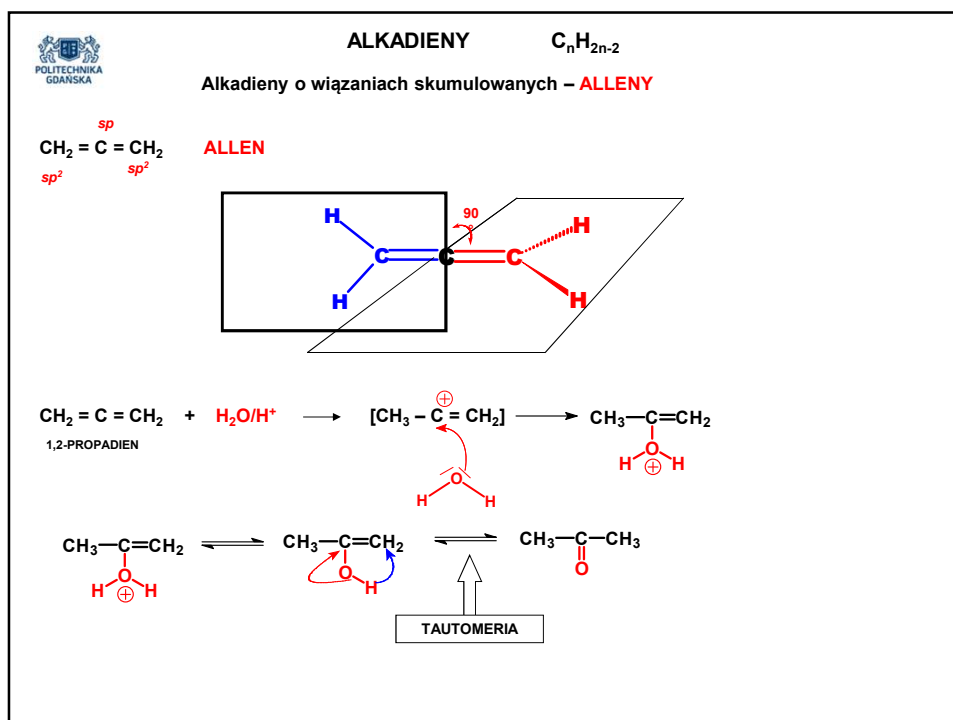
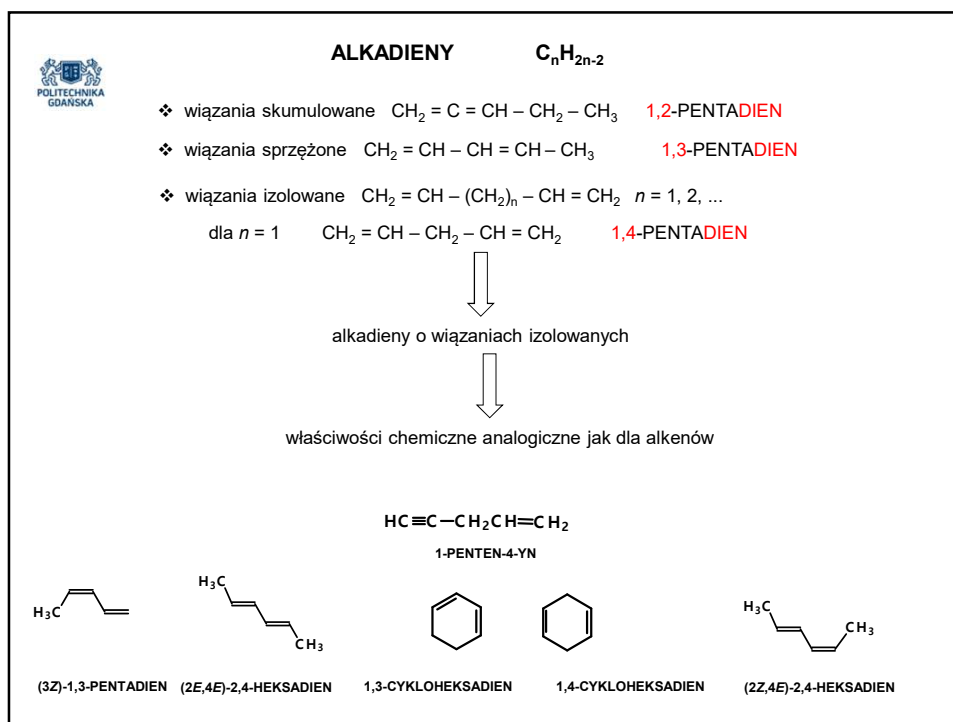


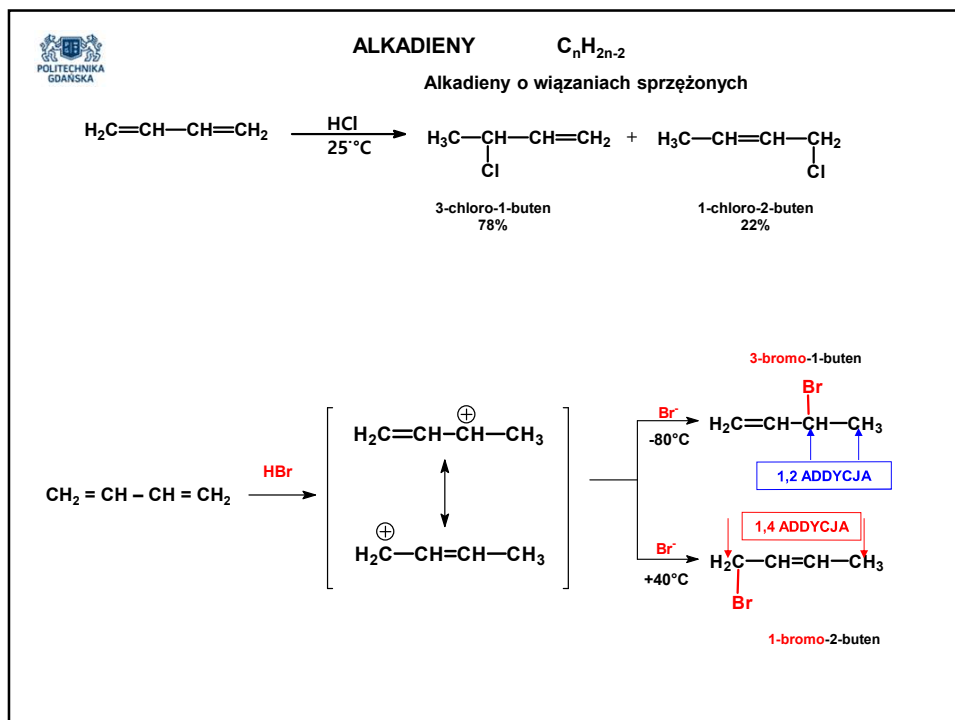
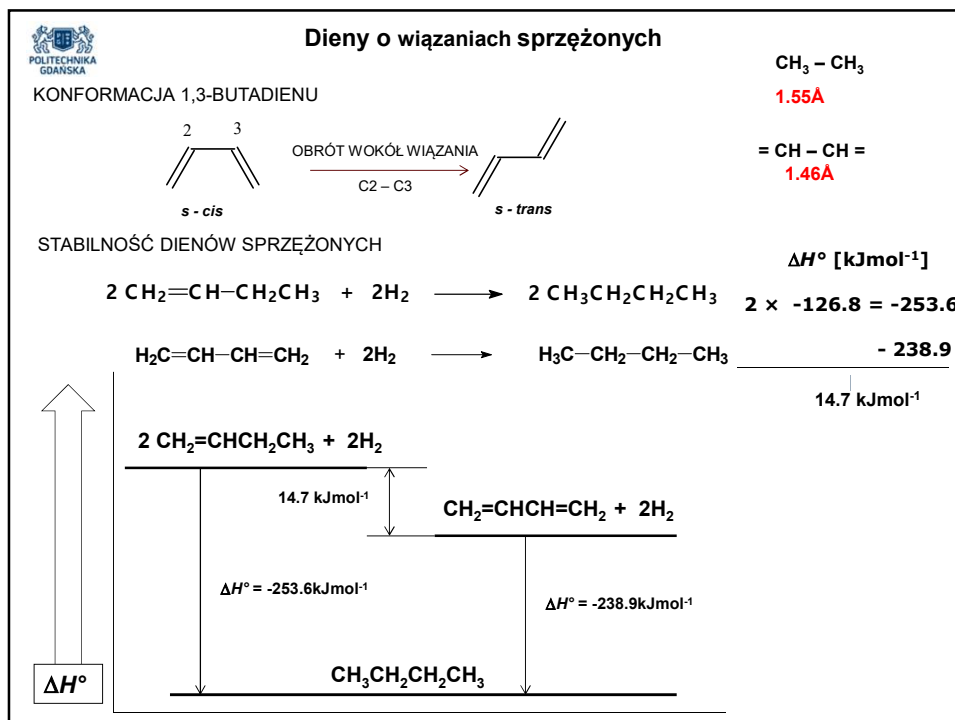


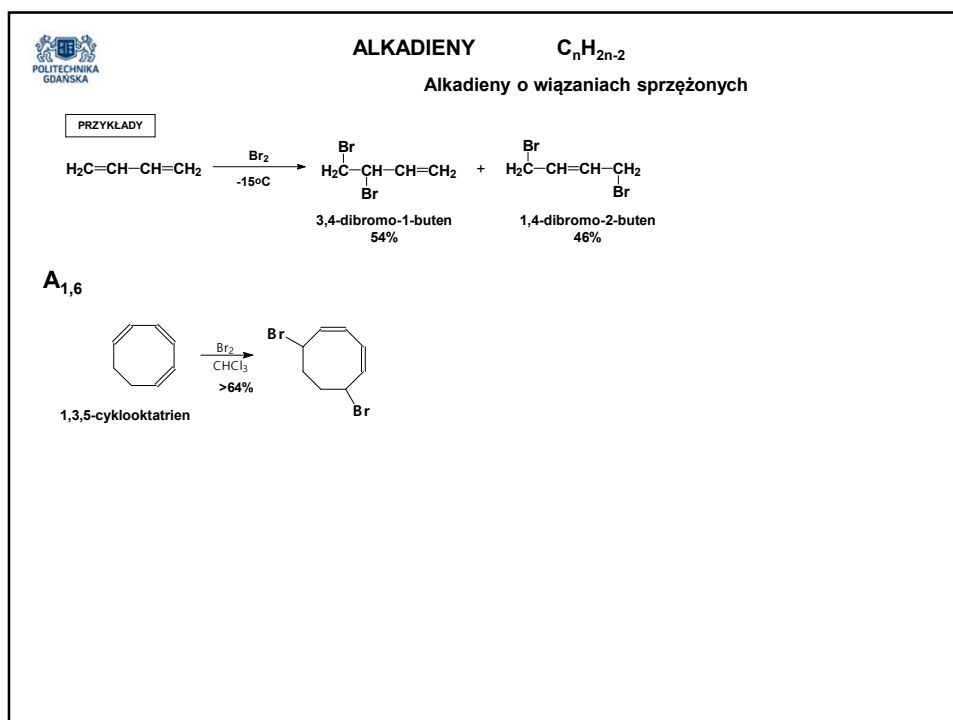
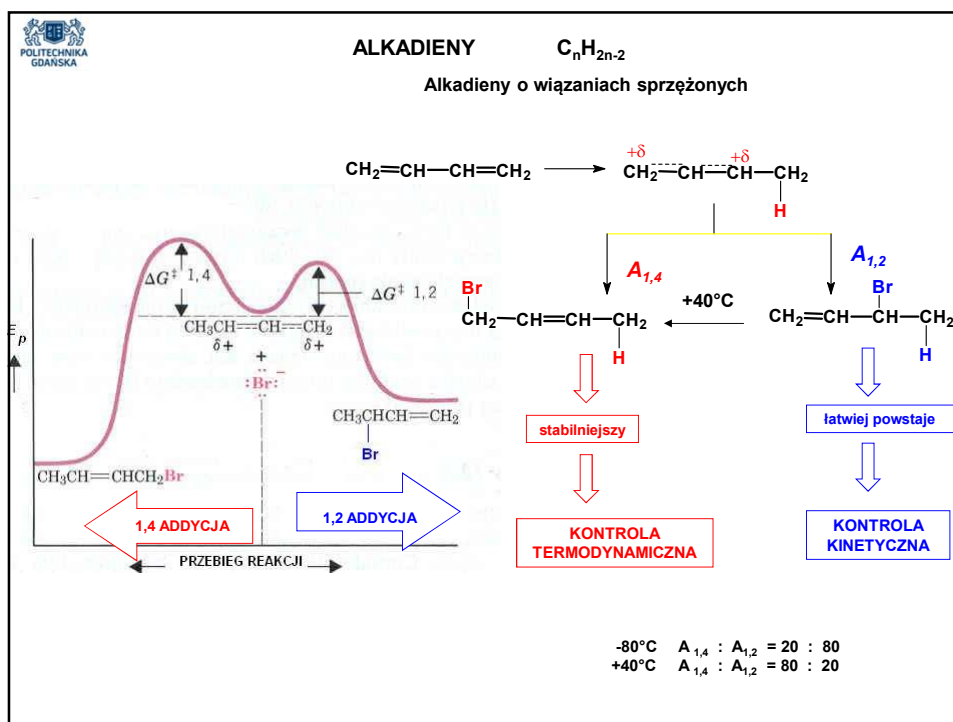


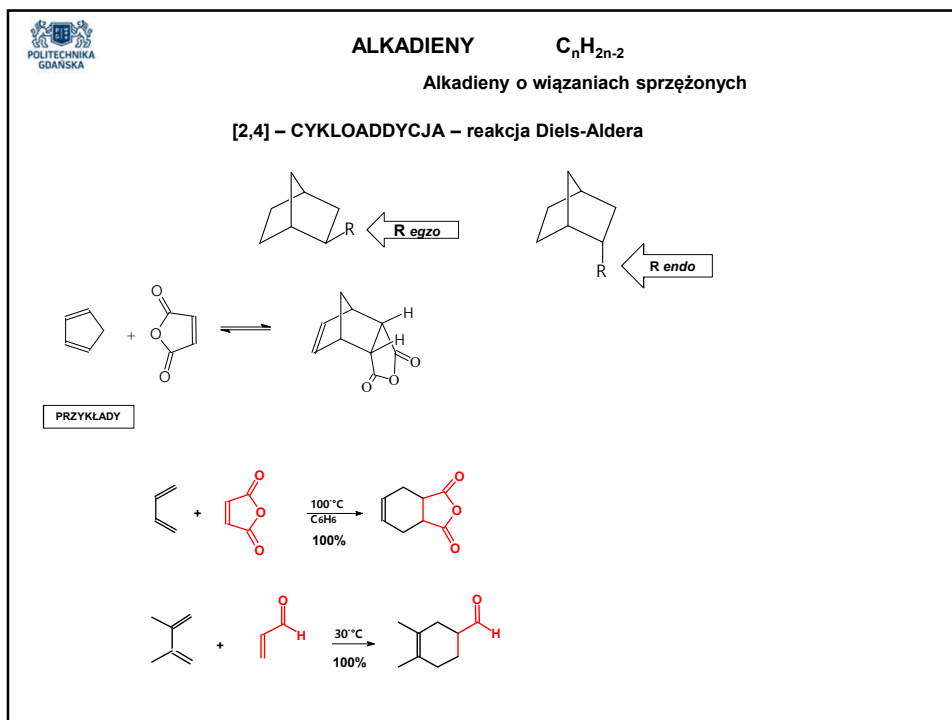
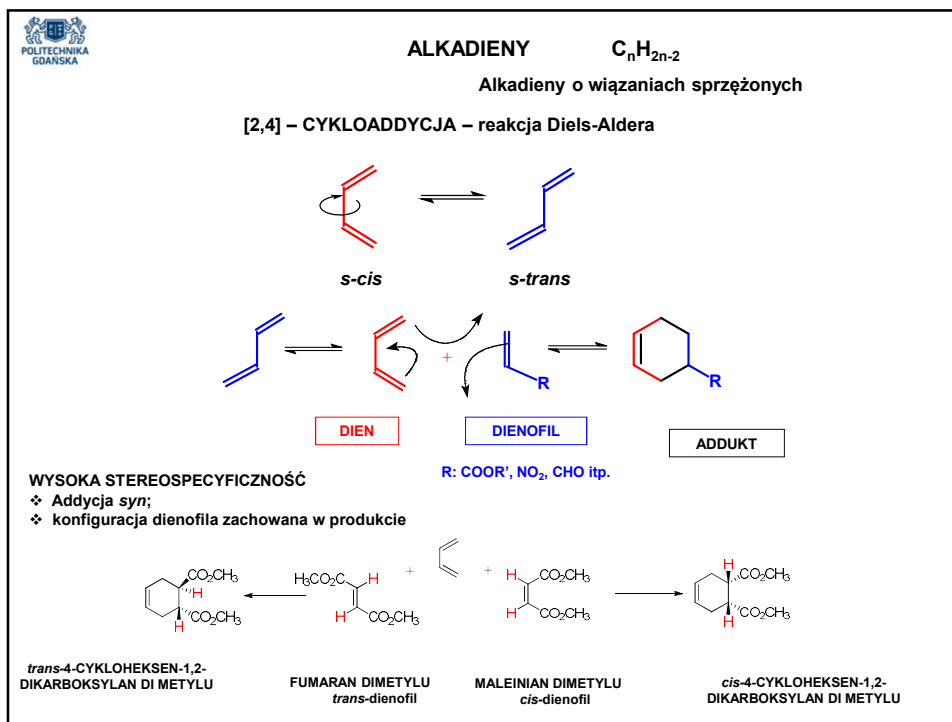


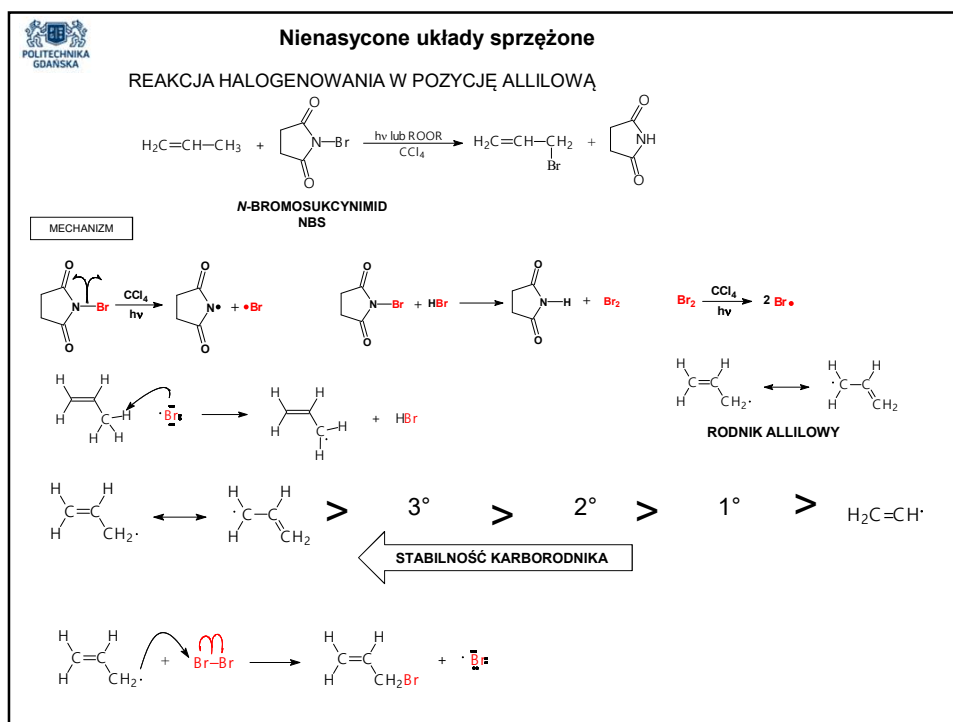
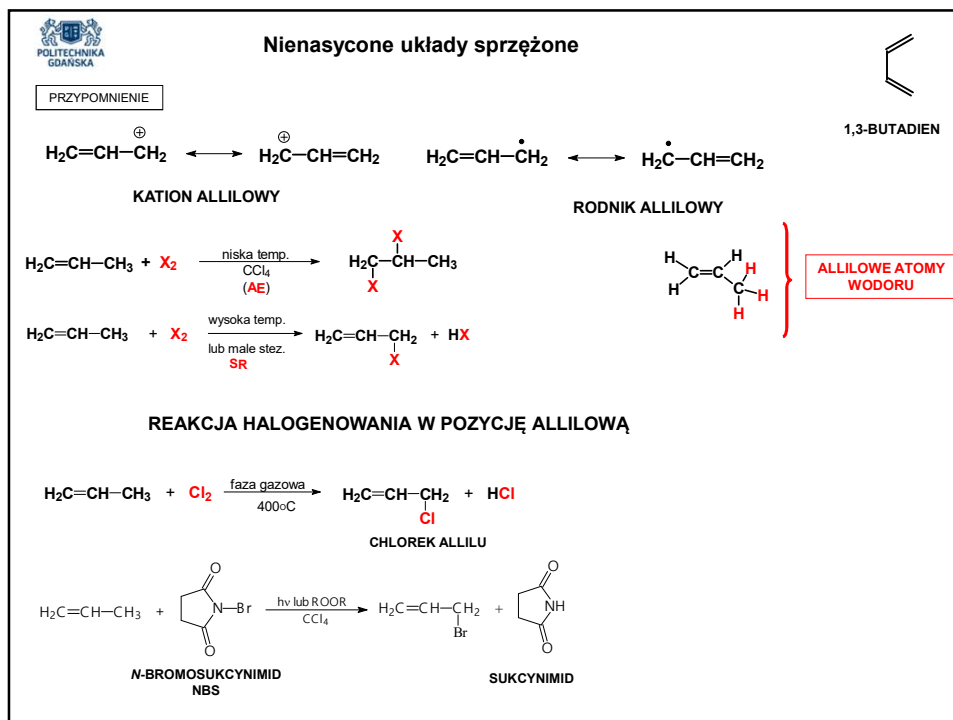


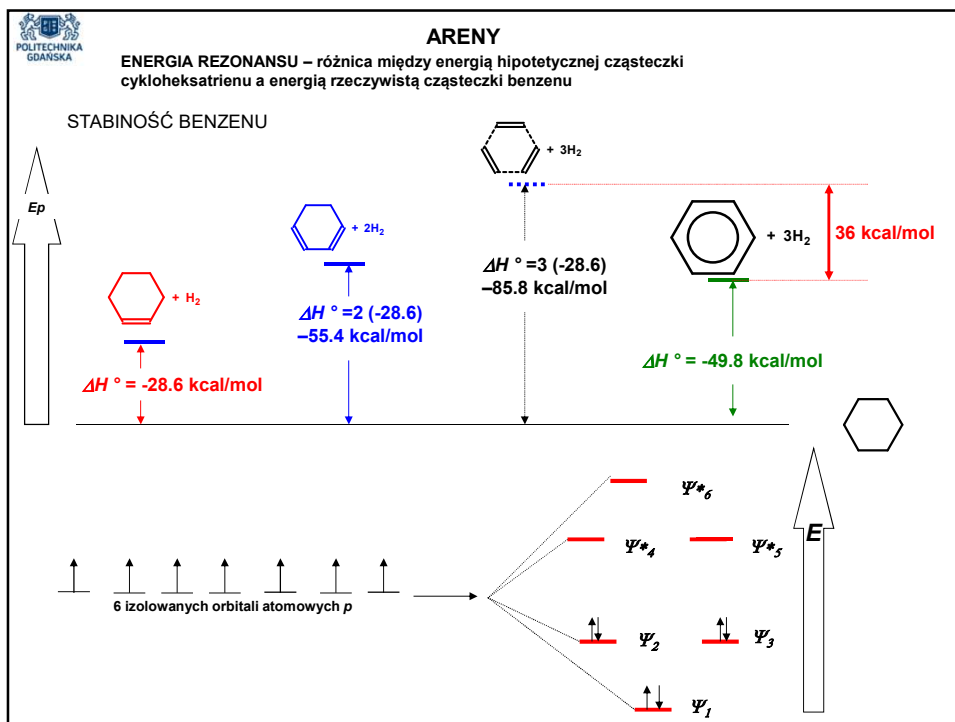
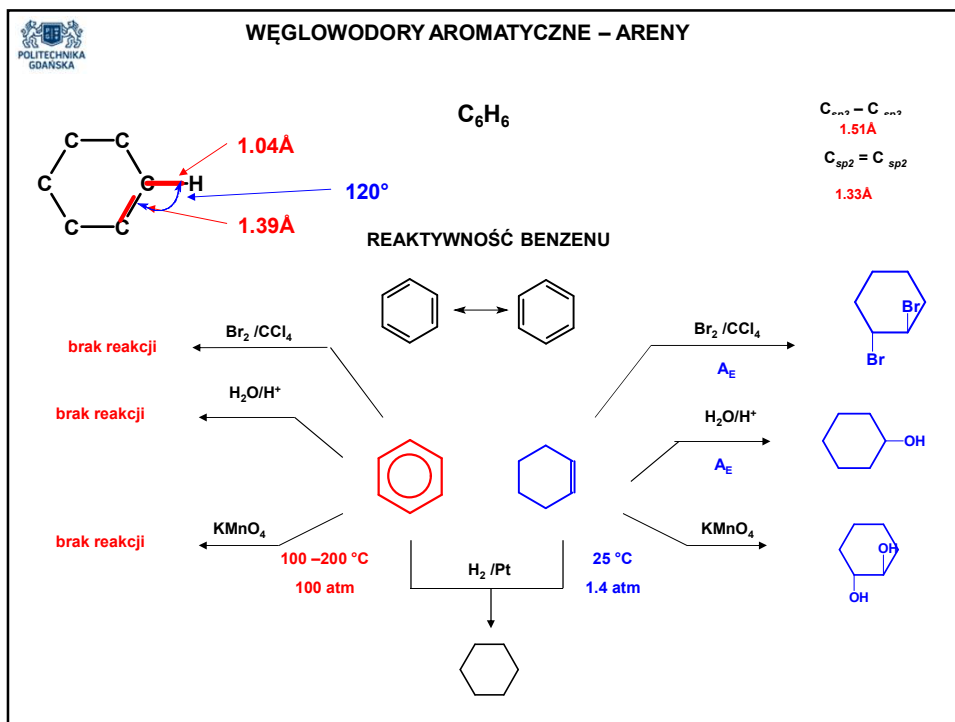


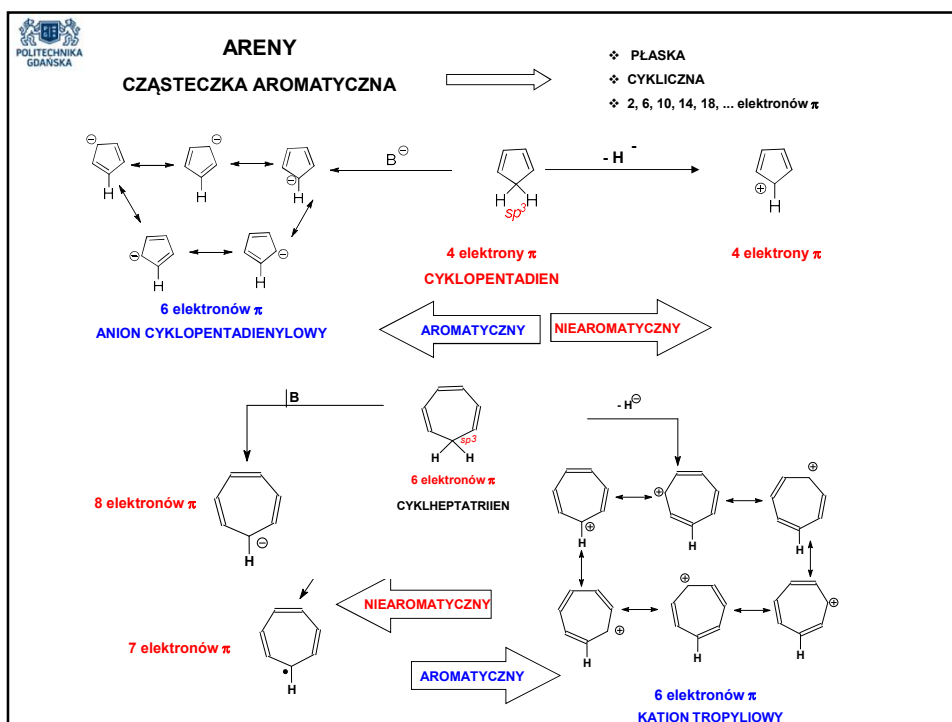
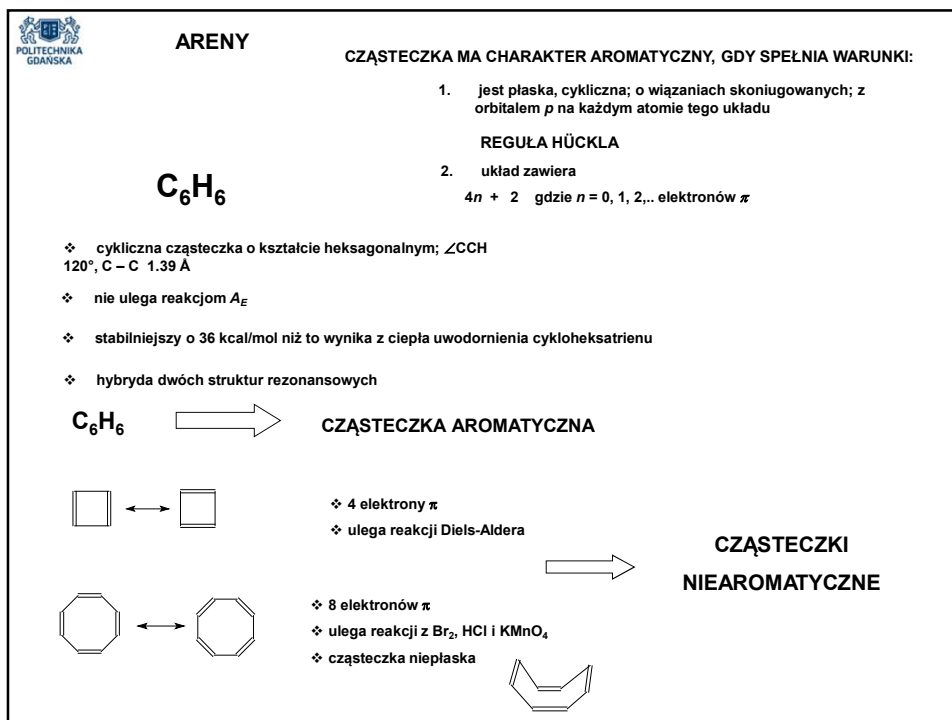


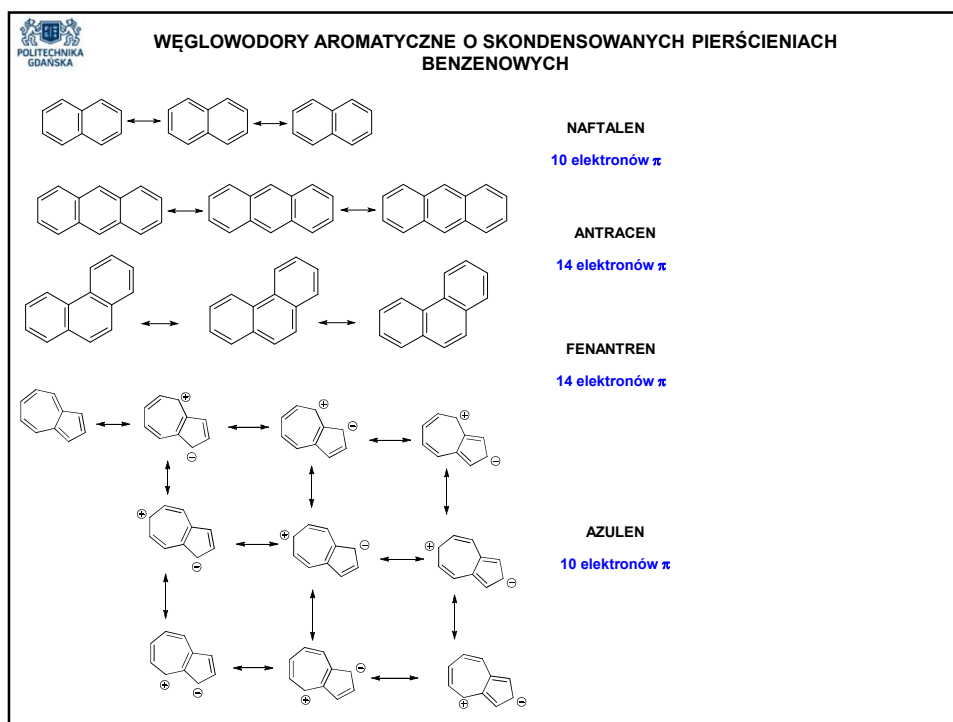
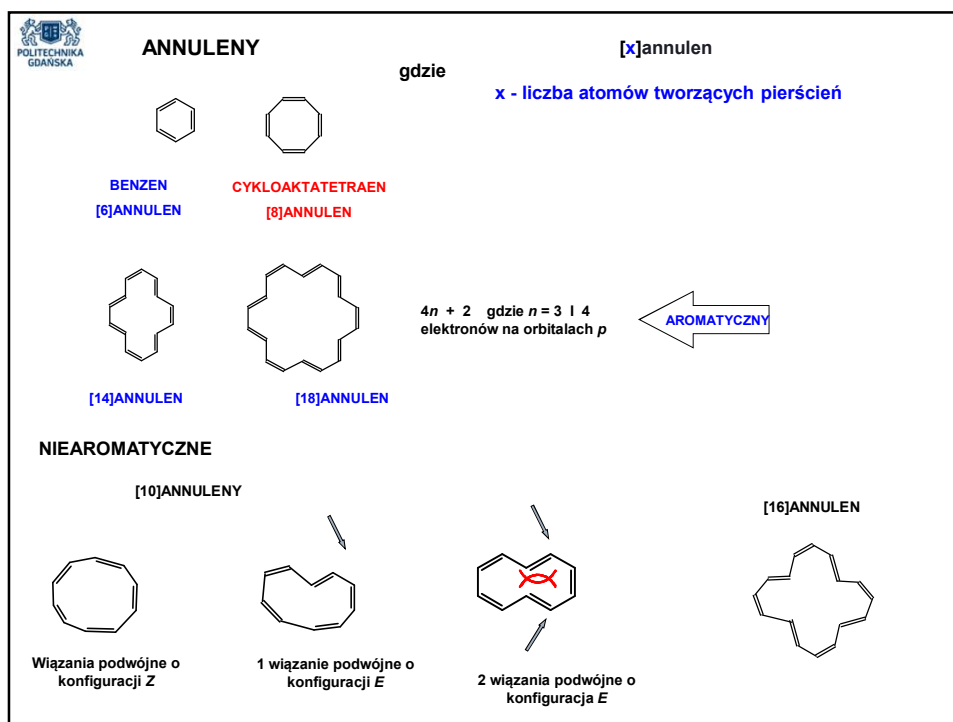


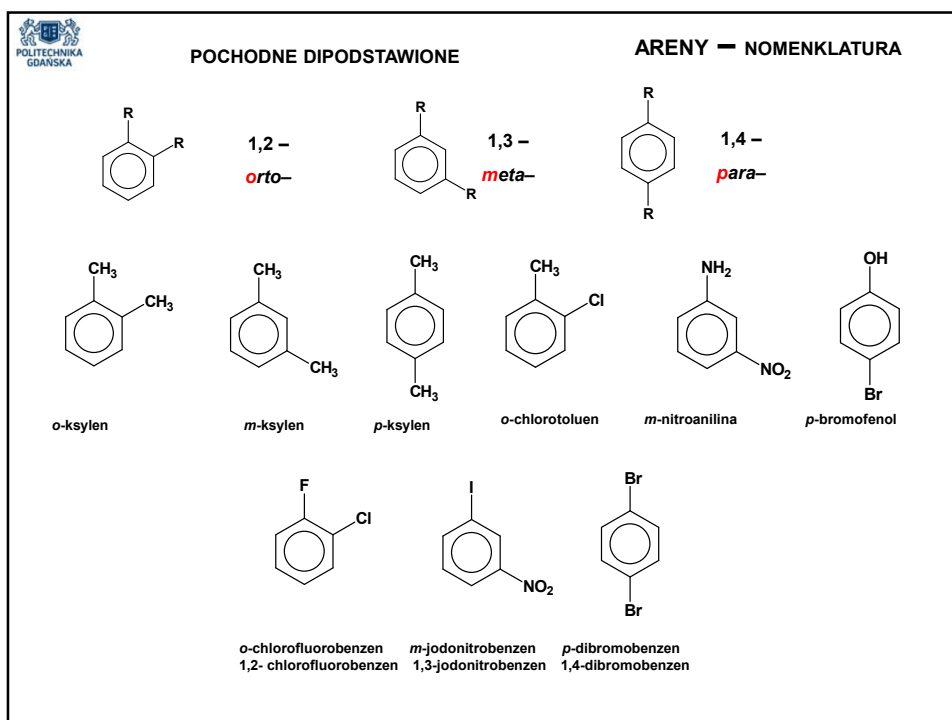
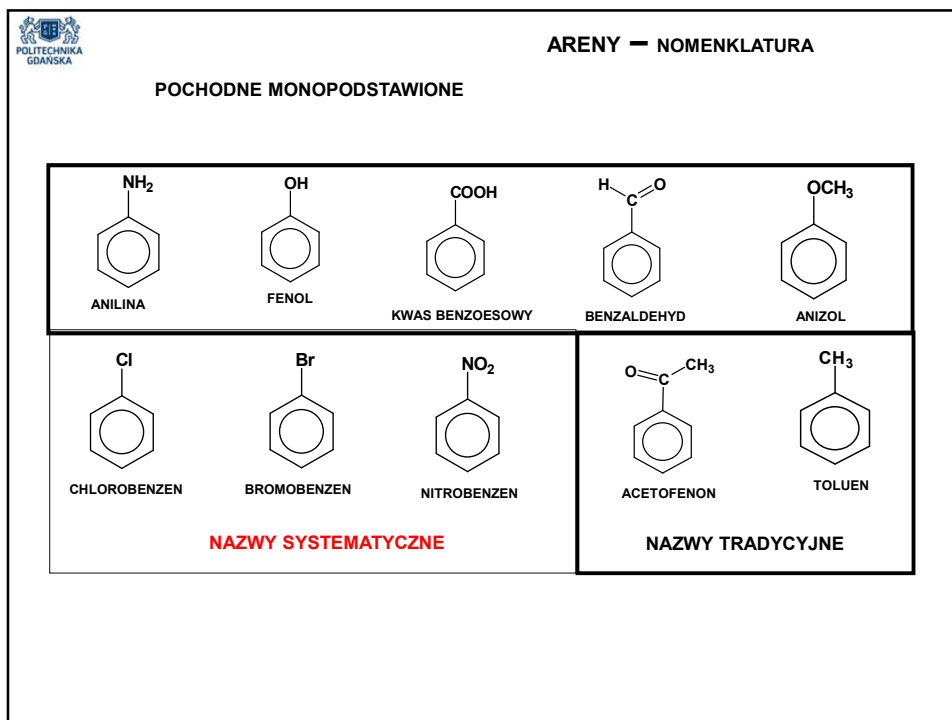


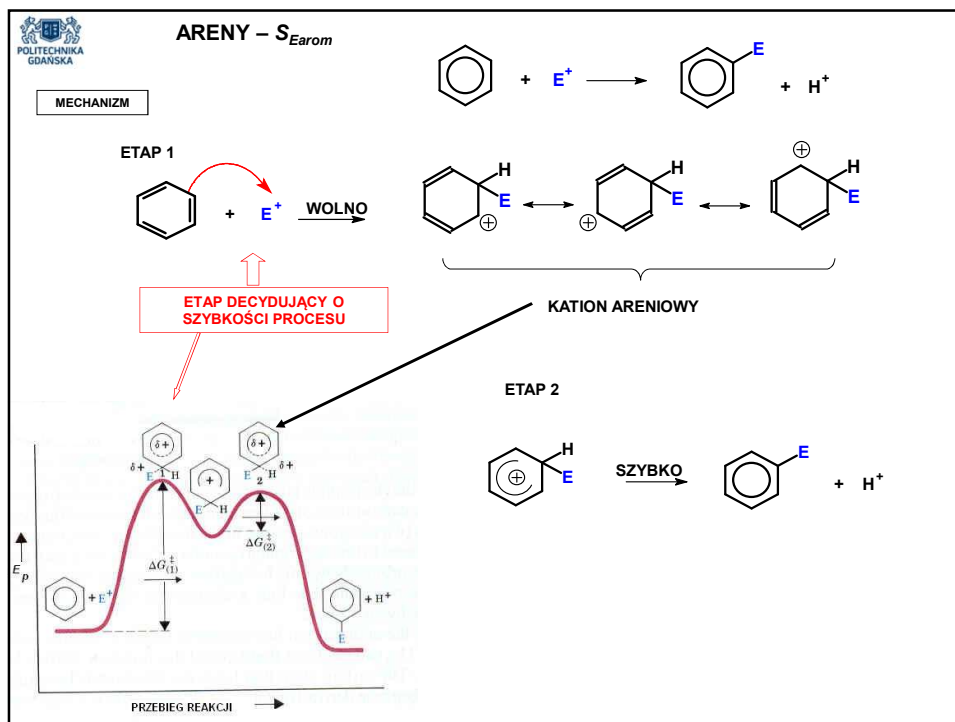
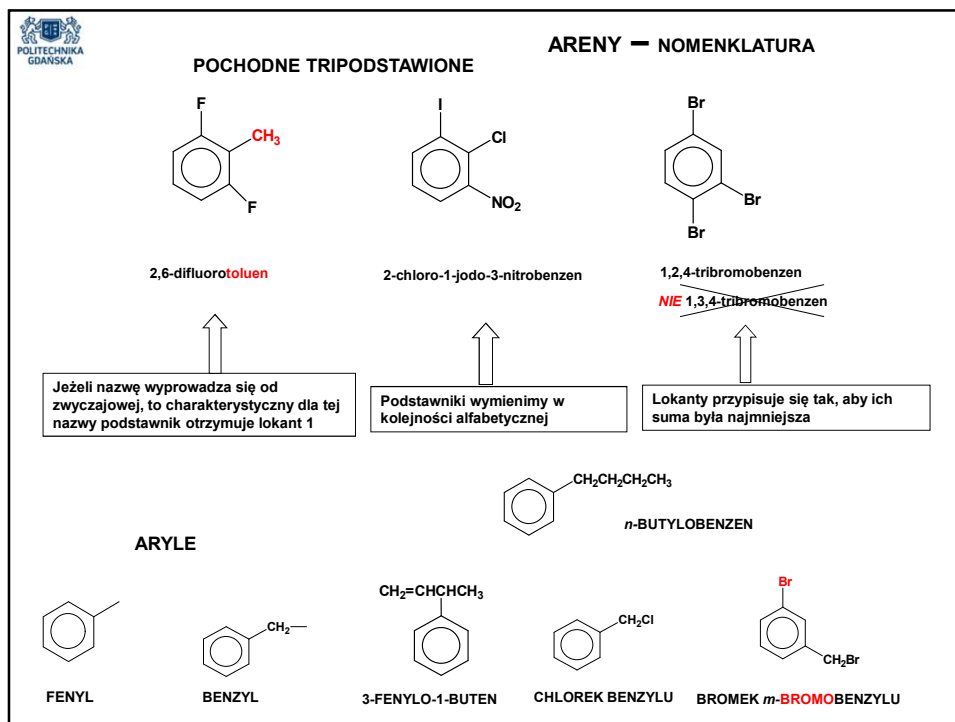


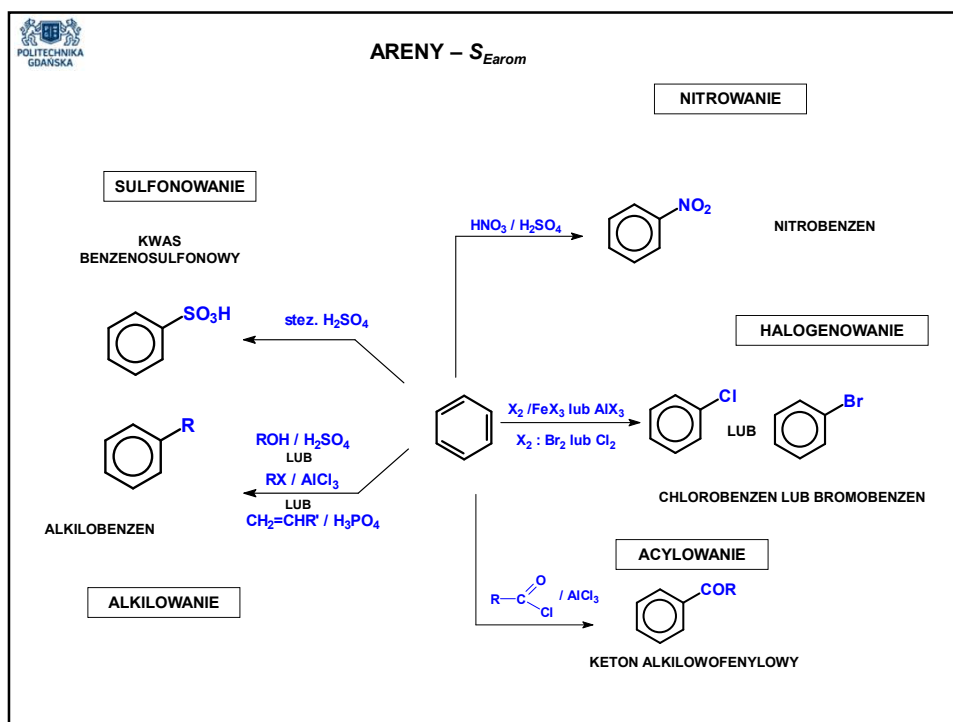
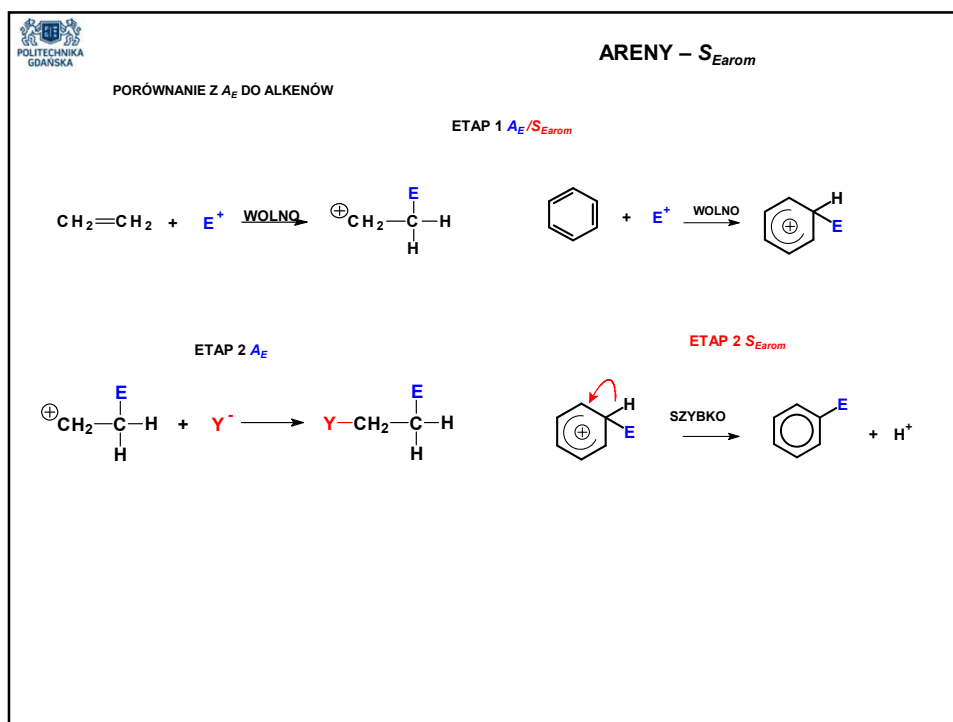


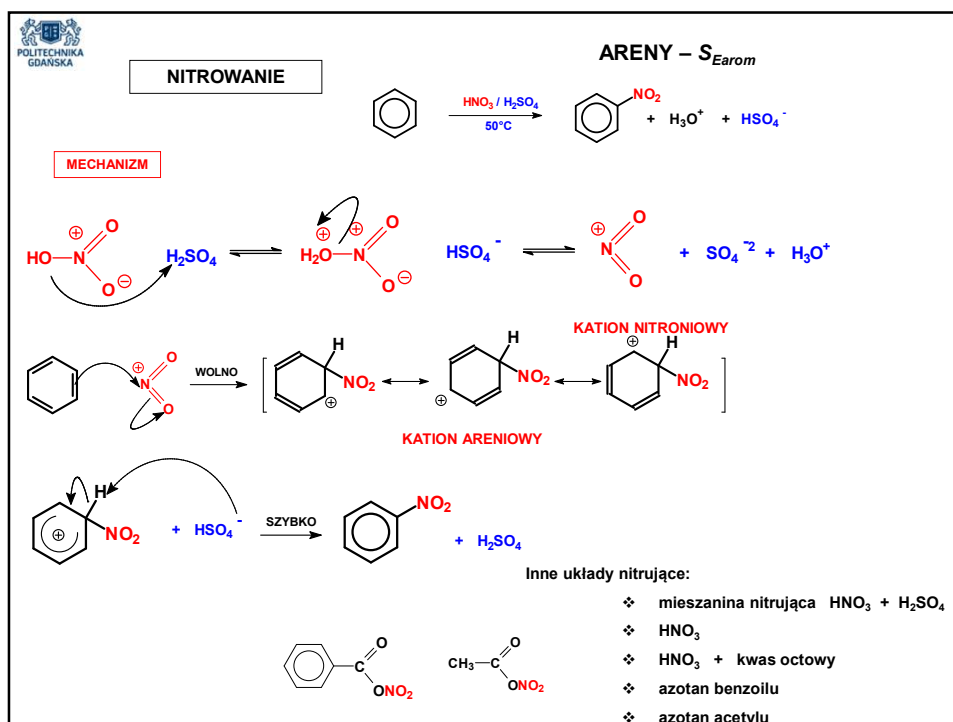
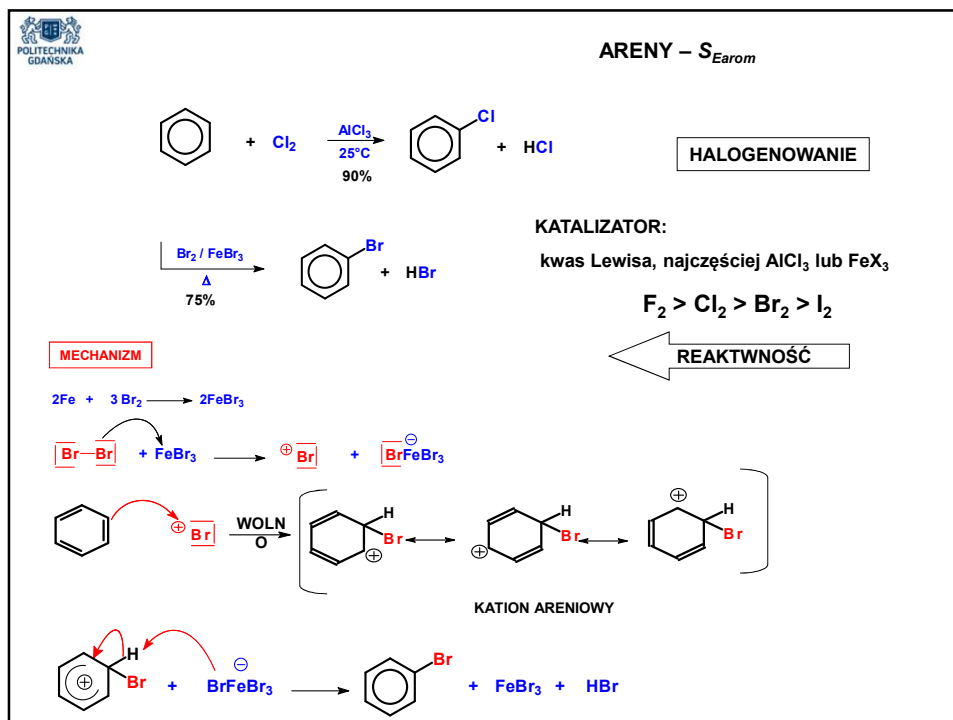


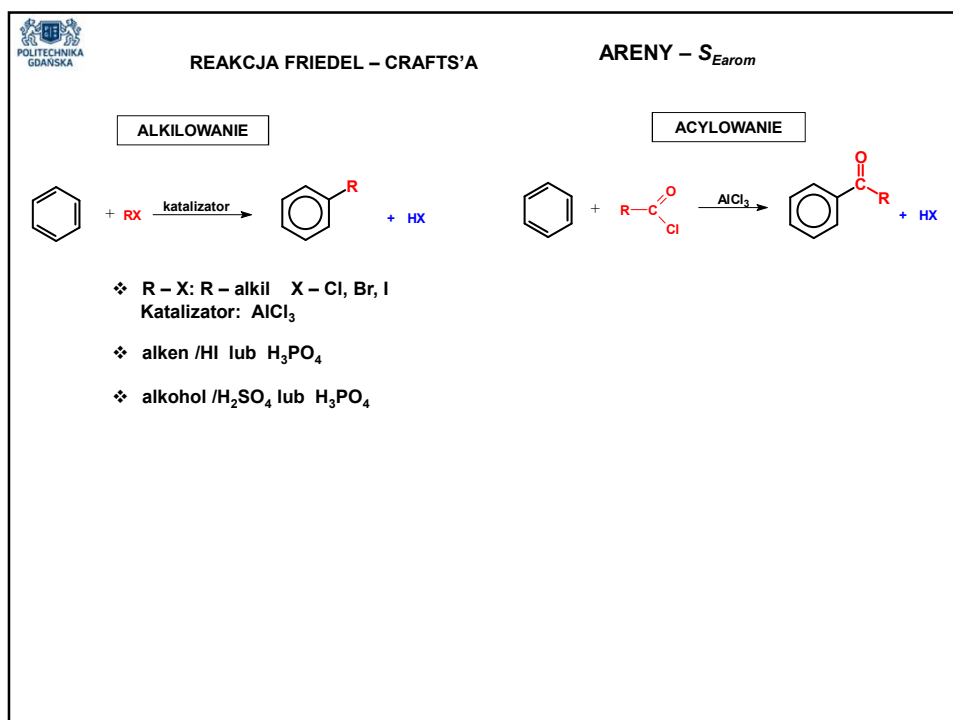
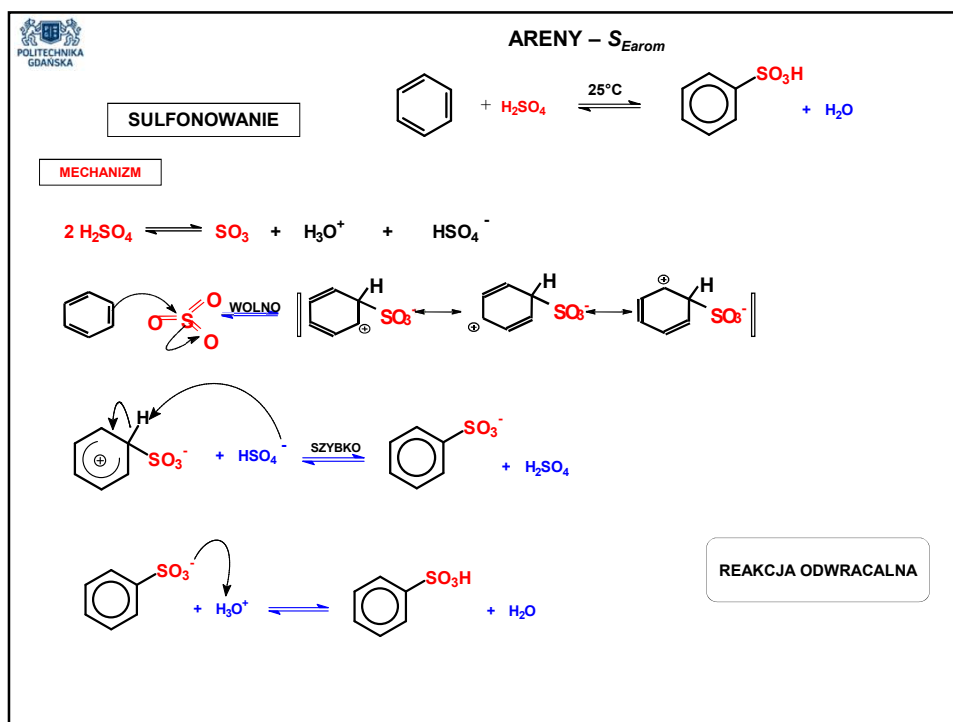


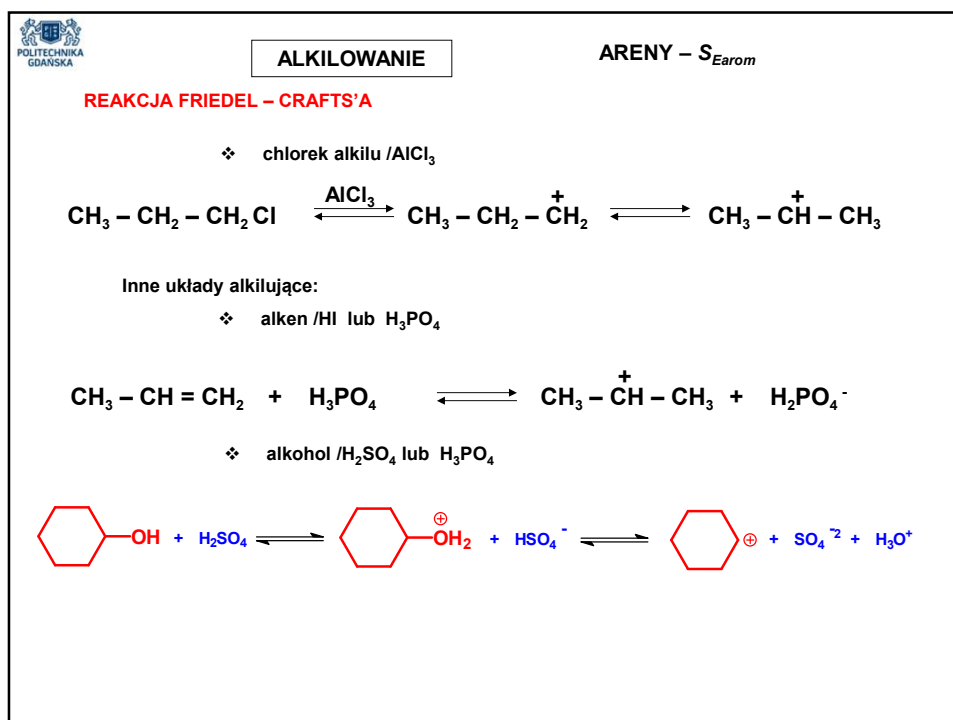
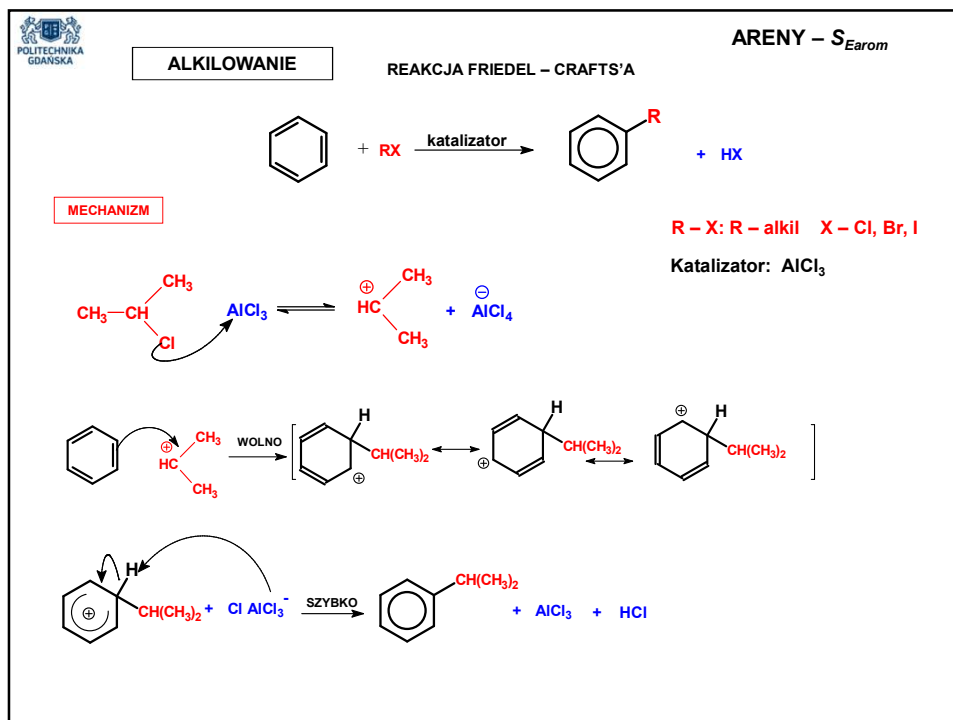


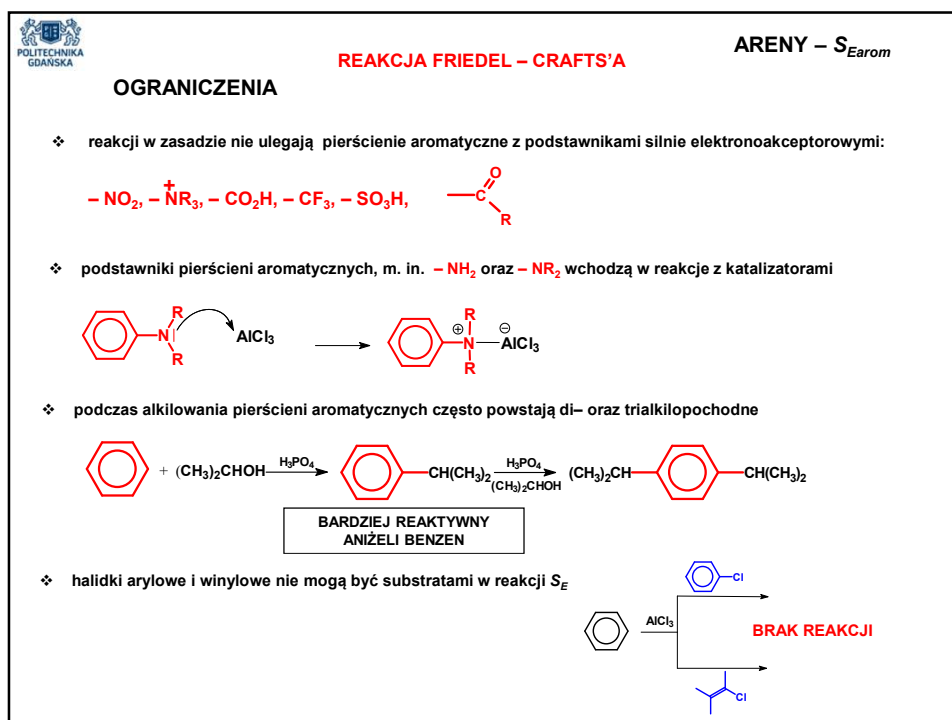
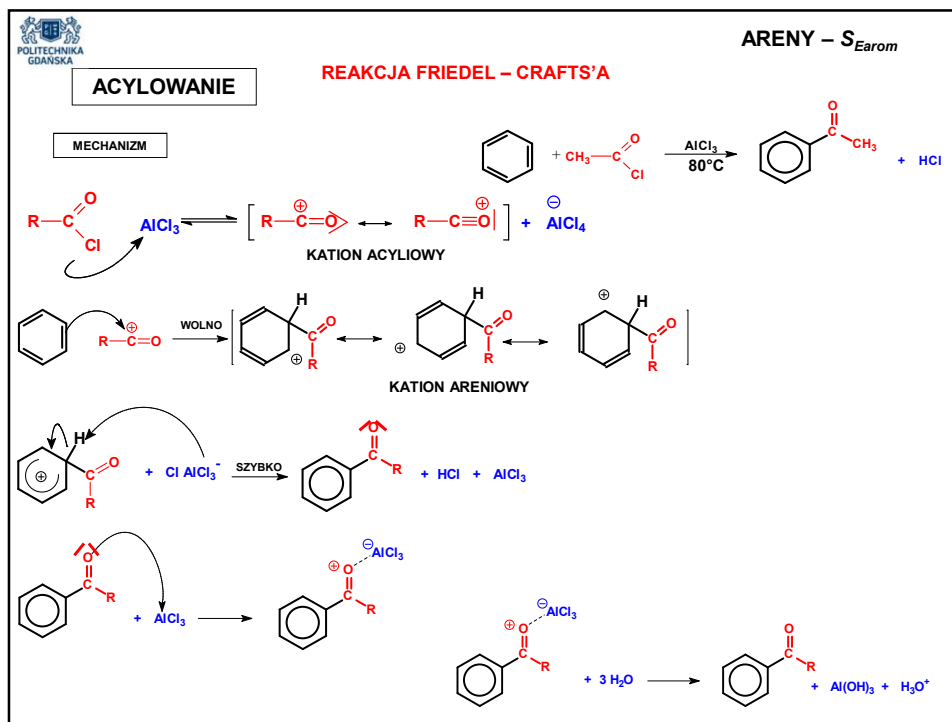


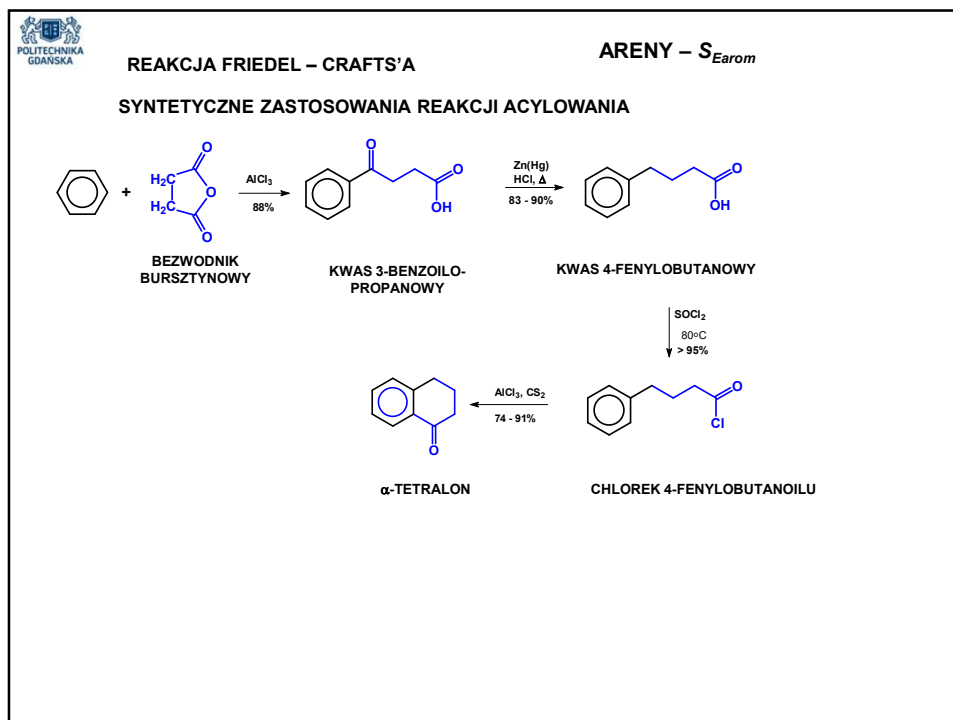
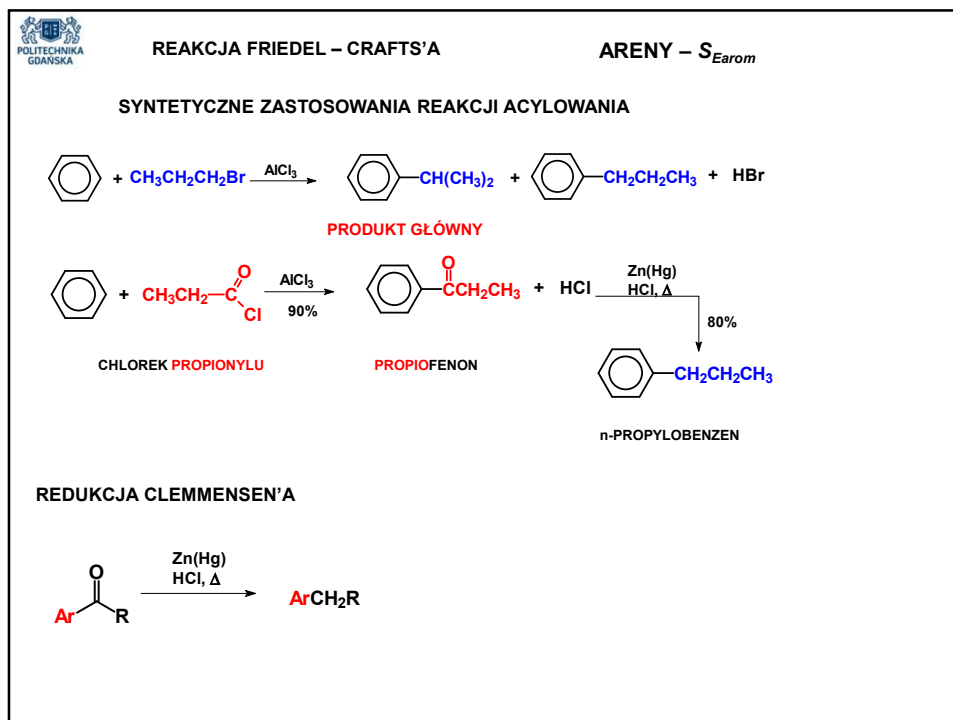


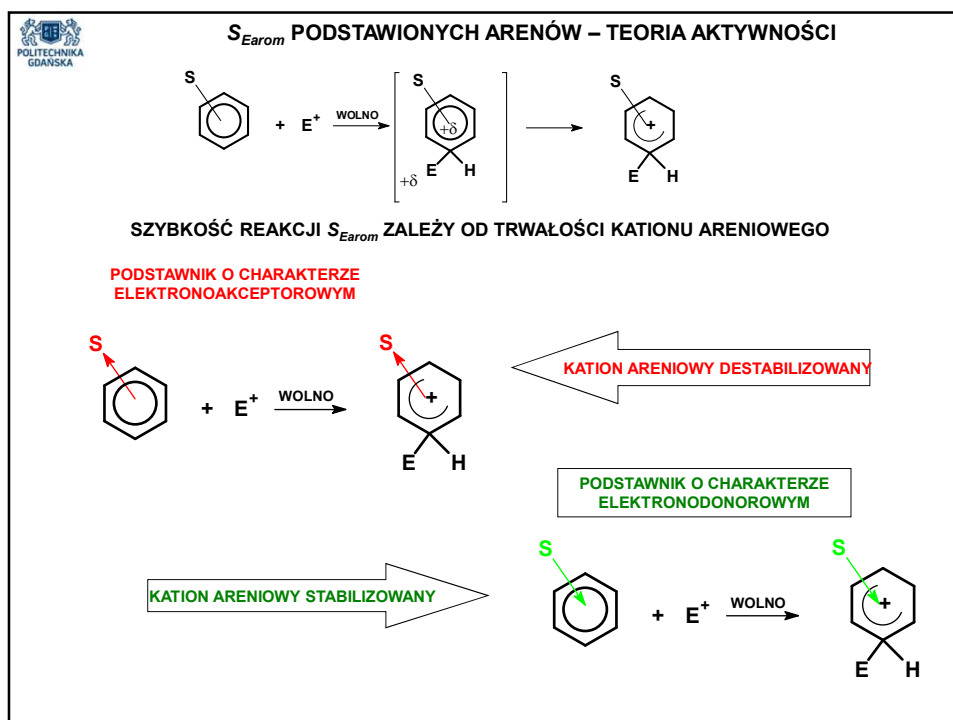
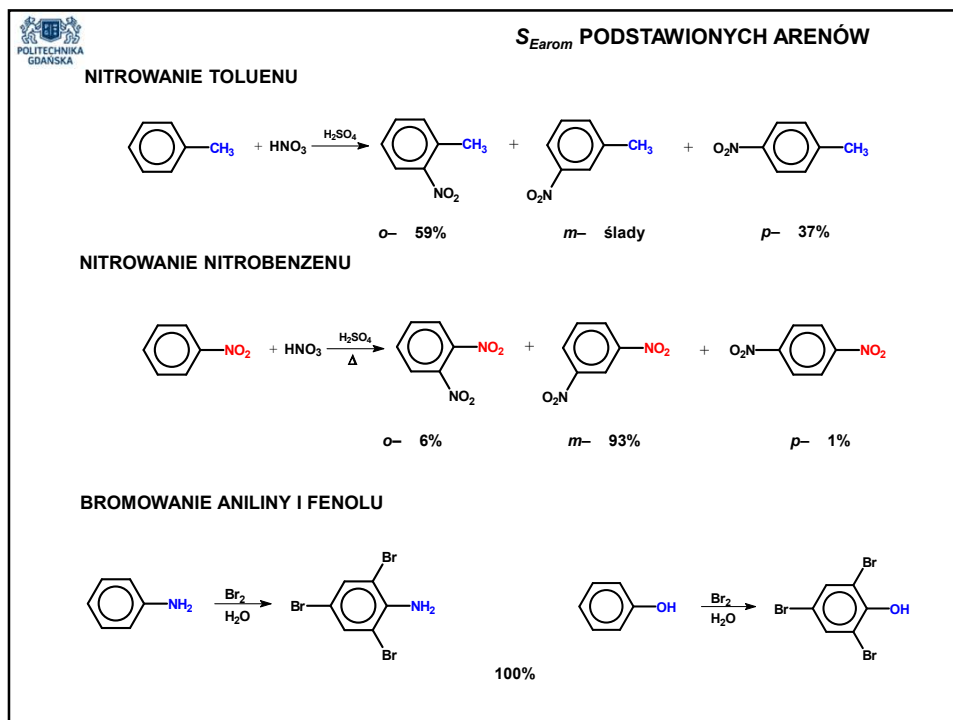


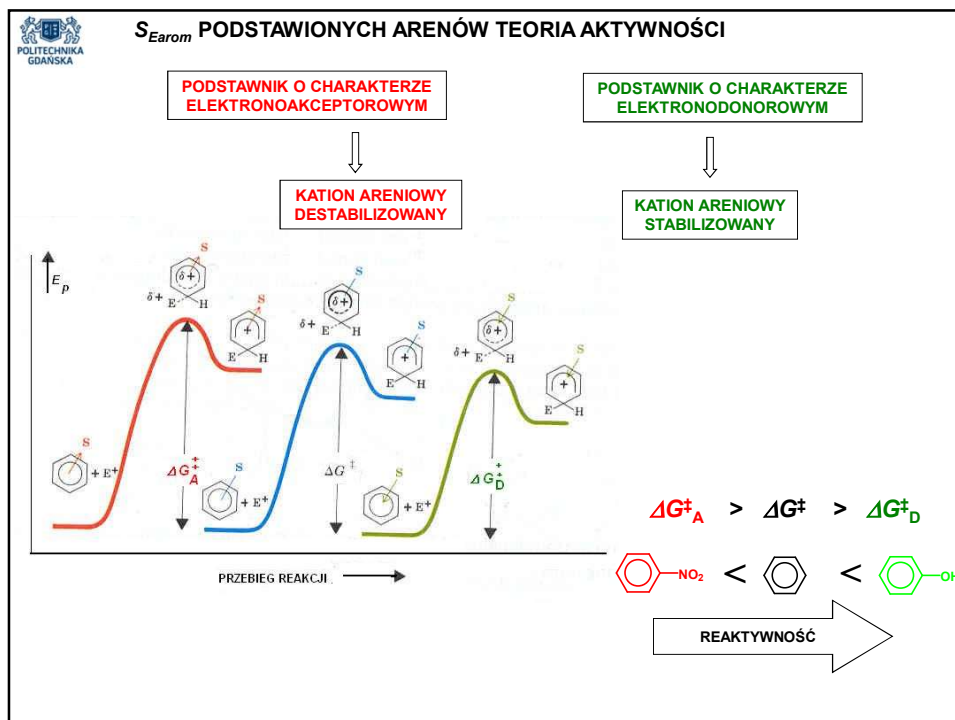












$S_{E_{arom}}$ PODSTAWIONYCH ARENÓW – TEORIA AKTYWNOŚCI

PODSTAWNIKI

AKTYWUJĄCE		DEZAKTYWUJĄCE
silnie aktywujące	słabo dezaktywujące	umiarkowanie dezaktywujące
$-\text{NH}_2, -\text{NHR}, -\text{NR}_2, -\text{OH}, -\text{O}$		$-\text{C}\equiv\text{N}, -\text{SO}_3\text{H}, -\text{COOH}, -\text{COOR},$
umiarkowanie aktywujące	F – Cl – Br – I –	
$-\text{NHCOR}$ oraz $-\text{OR}$ gdzie R – alkil lub aryl		gdzie R – alkil lub aryl
słabo aktywujące		mocno dezaktywujące
R – np. CH_3- , CH_3CH_2- Ar – np. C_6H_5-		$-\text{NO}_2,$ $-\text{NR}_3^+$
		$-\text{CX}_3$ gdzie X – chlor lub fluor gdzie R – alkil lub aryl
ORTO – i PARA –		META –

