

Alkanen en cycloalkanen

2

Alkanen (alleen σ-binding)

Isomeren

zelfde brutoformule, ≠ structuur → andere eigenschappen

Naamgeving

- aan

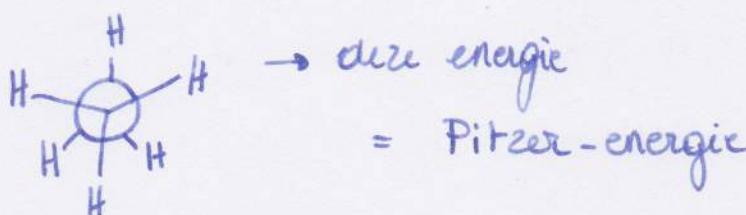
Conformatieën

Newman-projectie → bekijken langs de C-C as

C₂H₆



of

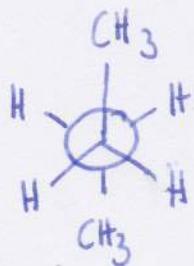


→ deze energie

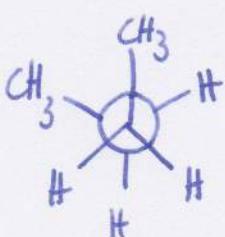
= Pitzer-energie

↑ stabielst

C₃H₈



anti



gauche

(halve eclips)



volledige
eclips

E
[kJ]

14

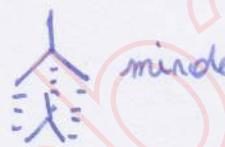
22

Fysische eigenschappen

- kook- en smeltemp. stijgen als het # C id keren toeneemt
- vertakt alkaren lager kookpunt.
- apotair oplossen in apotair
- $\rho \nearrow$ met keren lengte



Van der
Waals krachten



minder VdW krachten

Chemische eigenschappen

'enkel' onderhevig aan reacties met O_2 en de halogenen.

Verbranding

Door de reactie met O_2 → de koolstoffen tot hun hoogste oxidatietrap (+IV) geoxideerd.

Reactie met halogenen: homolytische substitutiereactie

UV of hoge temp → homolytische splitsing
↓
halogenradicalen

- Initiatie: $Cl_2 \rightleftharpoons 2Cl^\cdot$
- Propagatie: $Cl^\cdot + CH_4 \rightleftharpoons HCl + CH_3^\cdot$
 $CH_3^\cdot + Cl \rightleftharpoons CH_3Cl + Cl^\cdot$
- Terminatie: $2Cl^\cdot \rightleftharpoons Cl_2$
 $2CH_3^\cdot \rightleftharpoons CH_3 - CH_3$

⇒ mengsel van producten.

Cycloalkanen

Naamgeving

cyclo - - aan

Stabiliteit

alle C's in sp^3 -hybr. $\rightarrow 109,5^\circ$

kan niet bereikt worden voor C_5 = cyclopentaan

\Rightarrow overlappen de orbitalen niet max. \rightarrow inwendige energie
vh molecule ↑

\rightarrow bij verbranding ~~CO₂~~ \rightarrow grotere verbrandingswarmte
dan zijn alkenen.

Conformaties in cycloalkanen

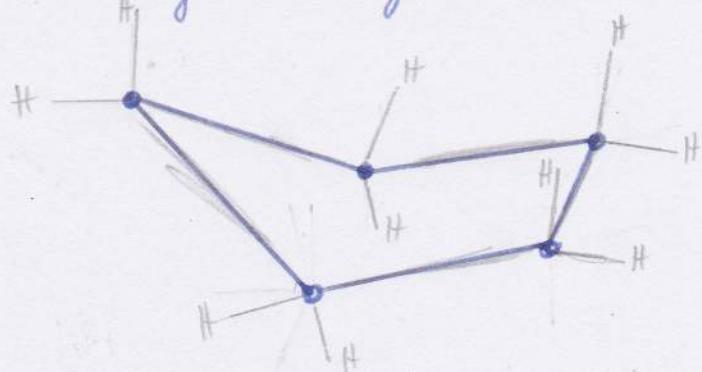
Cyclopentaan

hoeken voldoen goed ad. sp^3 hybr.

alle H's staan verstooken \rightarrow veel Pitzer-energie

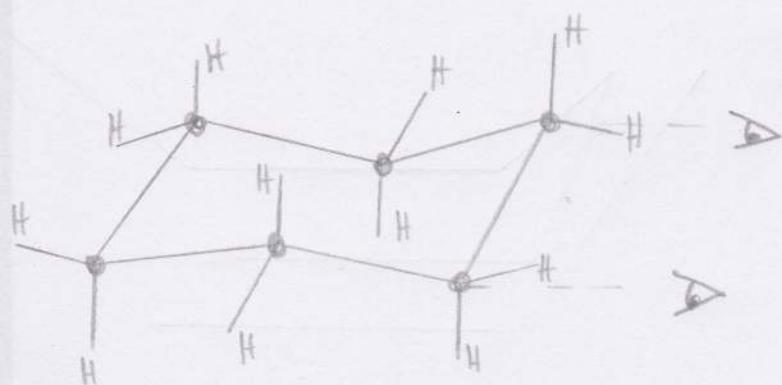
\Rightarrow één hoek omklossen \rightarrow 4 H's verstooken

drie 5 conformeren gaan voortdurend in elkaar over

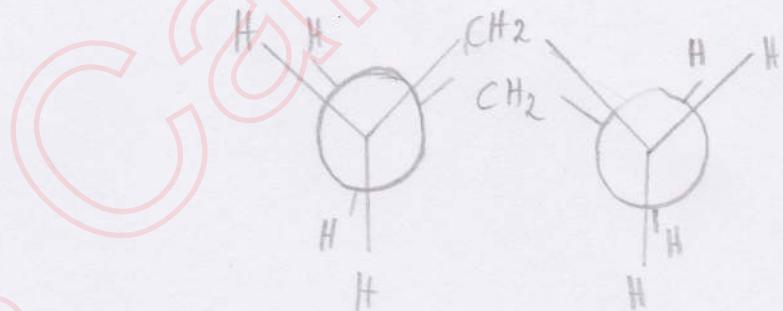
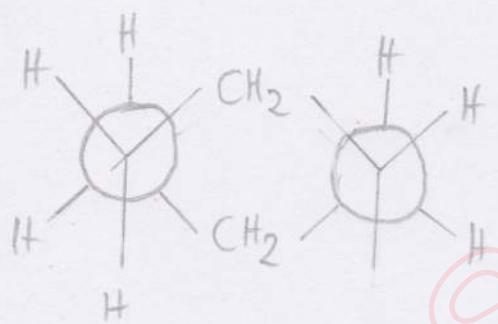
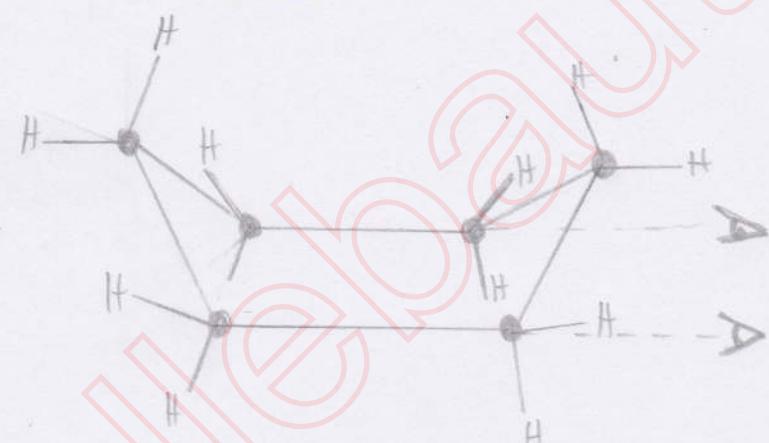


cyclohexaan

stoel
(stabilist)



boot



Mono substitutie in cyclohexaan

H vervangen door substituent

↳ conformatie met de subs.
equatoriaal meest stabiel
(minst sterische hindering)

H3

Stereochemie

Enantiomeren

↳ spiegelbeeld isomeren

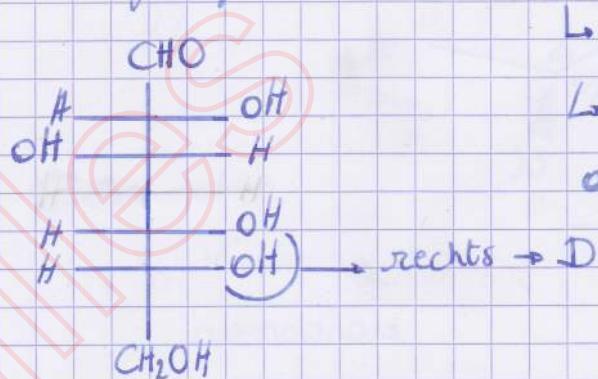
De polarimeteren

↳ optische isomeren (lus p3)

Fischer projectie (D/L)

We ordenen via de rangorde van funcie-groepen.

De hoogste groep zit men boven aan



- ↳ ^{funcie} groep links → L
- ↳ ^{funcie} groep rechts → D
- onderste ~~OH~~ groep

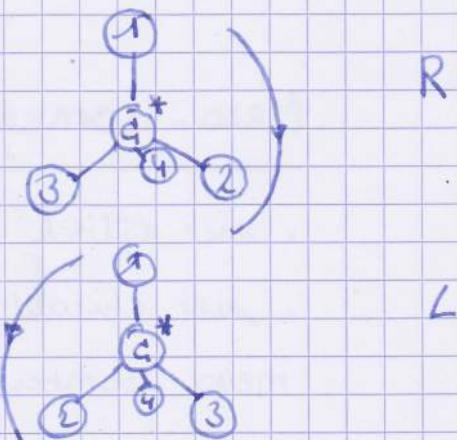
Cahn - Ingold - Prelog (R/S)

1. atoommassa vd. gebonden groep aan chiraal C (atoom)

als dubbele / drievalige binding, nemen we het betrekken atoom twee- lg driemal.

2. draaien rechtsom

draaien linksom



Racemische Mengsels

2 enantiomeren, evenveel aanwezig

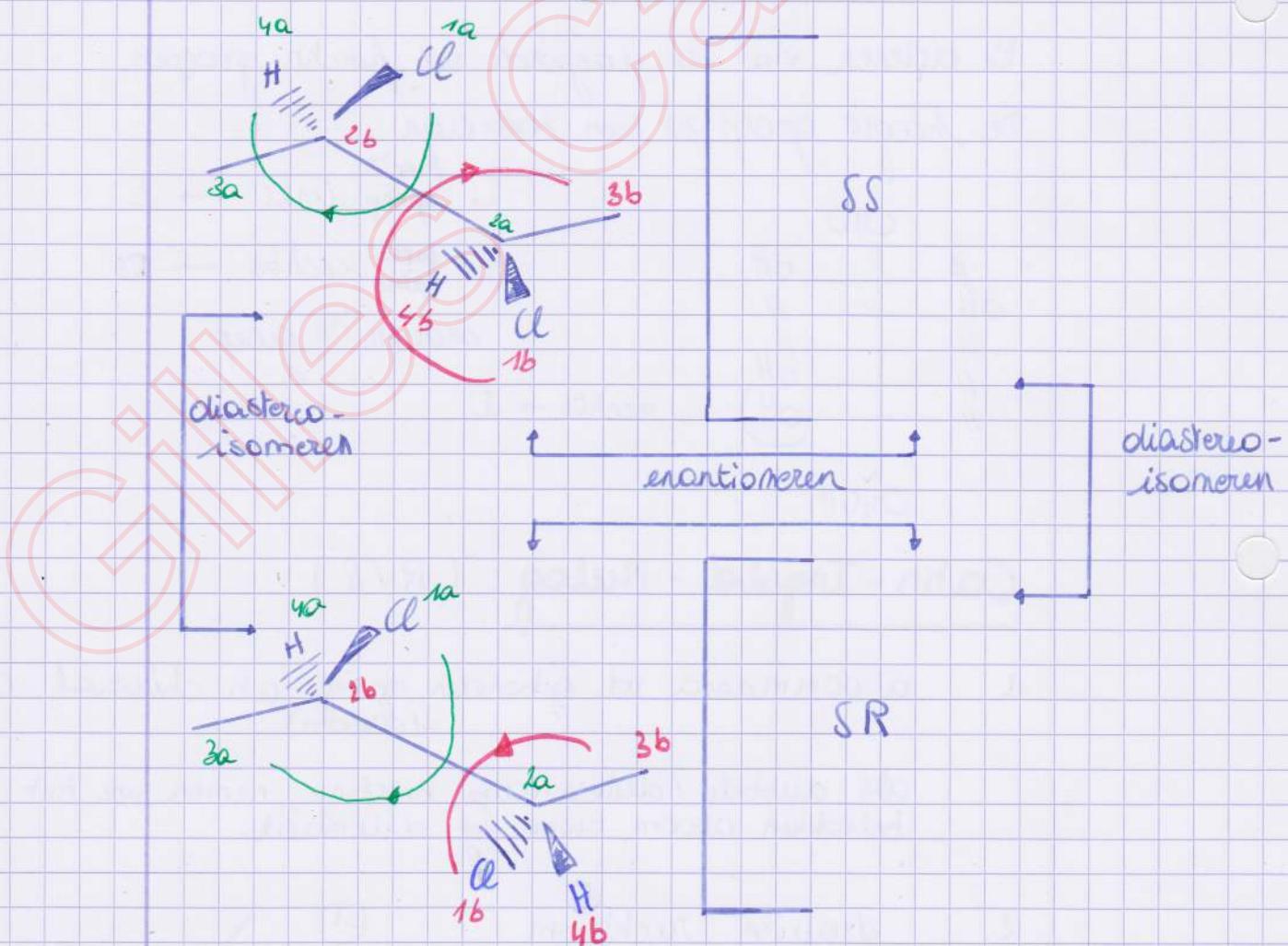
↳ polarimeter → nul
gedraagt zich als zuivere stof

Diastereoïsomeren

voor n chirale C'en $\rightarrow 2^n$ enantiomeren

↳ enkel verschillen in orientatie vd verschillende groepen
 \rightarrow gedeeltelijk spiegelbeeld, gedeeltelijk identiek

onderlinge verschillen veel groter, houtpunt, smelpunt etc.
maar chemische eig. bijna identiek



Meso-isomeer

- niet optisch actief
 - niet chiraal
- } \rightarrow wel chiraal centra

meso-isomeer = zijn spiegelbeeld (bevat een sym. vlak)

H4

Haloogenalkanen en alcoholen

Haloogenalkanen

Namening

achtervoegsel: fluori-, chloori-, broomi-, iodo-

Alkyleradicalen en halogeennatoren in alfabetische volgorde.

Fysische eigenschappen

Vluchtigheid

hoger kookpunt → polariteit

doch hier vertraagd, lager dan onvertrakte.

Oplosbaarheid

niet polair genoeg → onoplosbaar in water

Alcoholen

Namening

achtervoegsel: -ol

of

voorvoegsel: hydroxy-

- ↳ int. de hoofdketen
- ↳ op andere de nieuwe hoofdketen in

Fysische eigenschappen

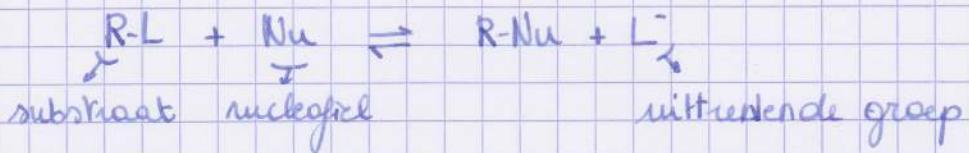
Vluchtigheid

waterstofbruggen → veel hoger kookpunt

Oplosbaarheid

in water en apolare stoffen, dankzij apolare alkylgroep

Nucleofiele substitutie (δ_N)



Inloed op de snelheid.

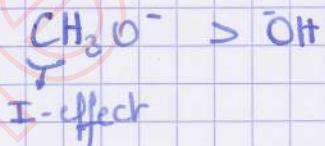
- sterkte v.h. nucleofiel
- aard en sterkte vd leaving group
- koolstofstrekkt
- solvent

Nucleofiel

↳ elektronenrijk reagens

sterk als:

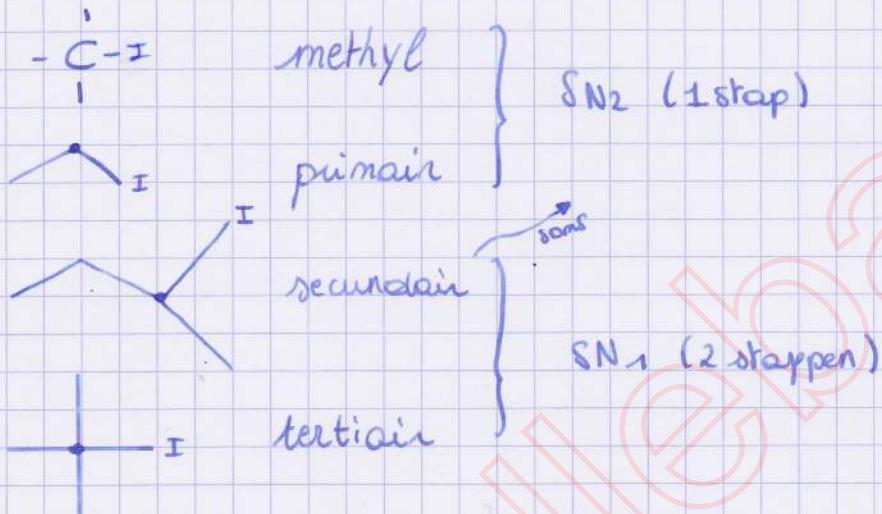
- geladen deeltje sterker dan gelijkwaardig nt gedaan deeltje
↳ uit derzelfde periode
- nucleofiele sterkte daalt $L \rightarrow K$ (derzelfde periode)
- nucleofiele sterkte stijgt \downarrow (derzelfde groep)



leaving group

↳ zwakke nucleofielen

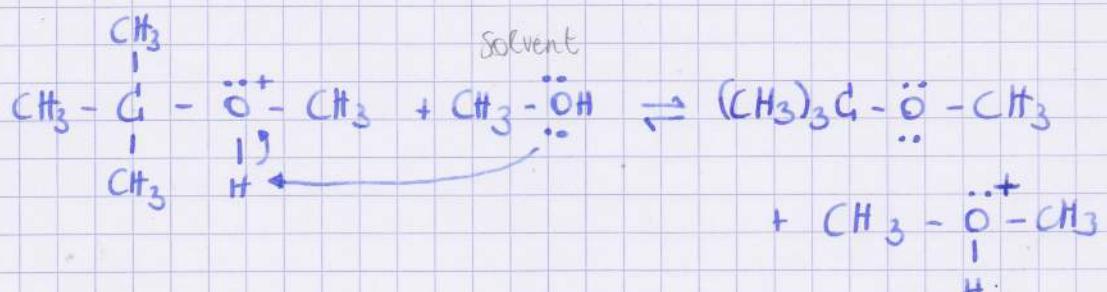
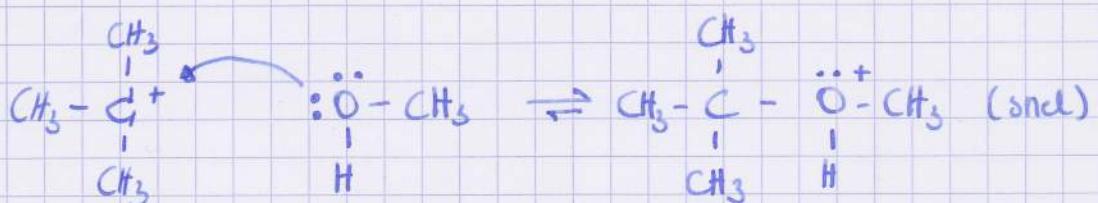
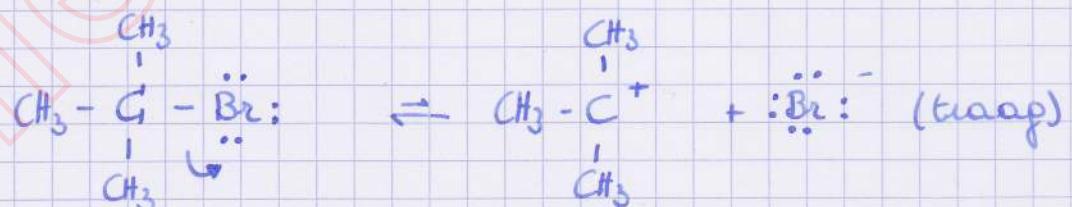
Mechanismus von nucleophiler Subs.



$\text{S}_{\text{N}}2 \rightarrow 2^{\text{de}} \text{ Ordn}$

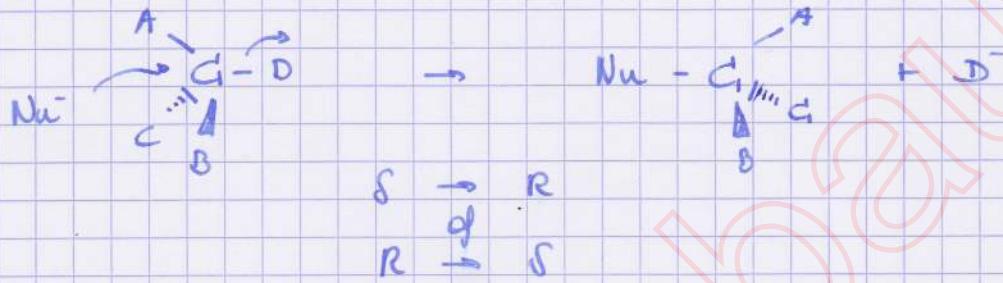


$\text{S}_{\text{N}}1 \rightarrow 1^{\text{de}} \text{ Ordn}$



Stereochemische veranderingen

$\text{SN}_2 \rightarrow \text{Walden inversie}$



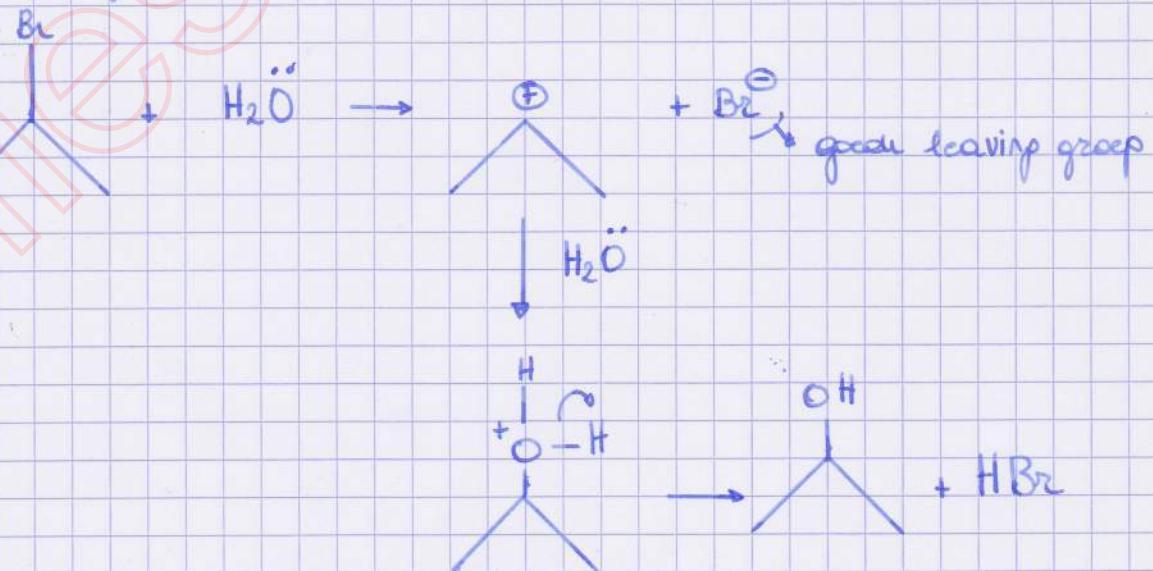
$\text{SN}_1 \rightarrow \text{veel carbokation}$



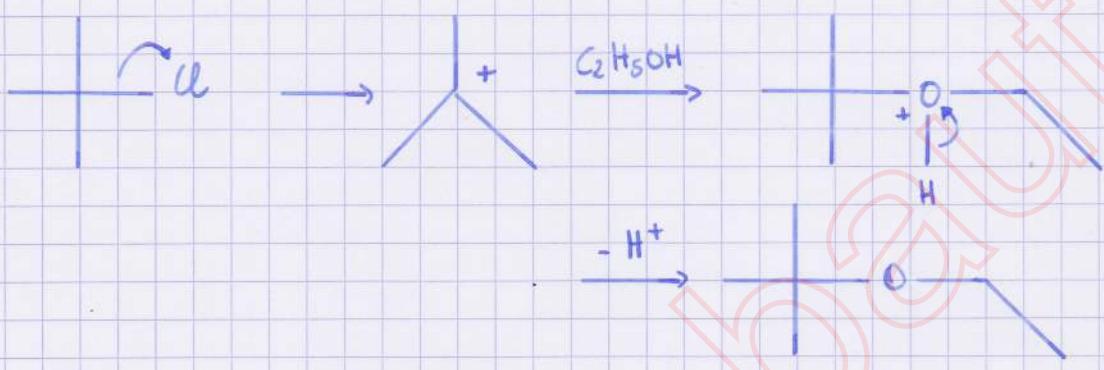
De solvolysen

Hydrolyse

\rightarrow lage reactiviteit goede uittrekende groepen



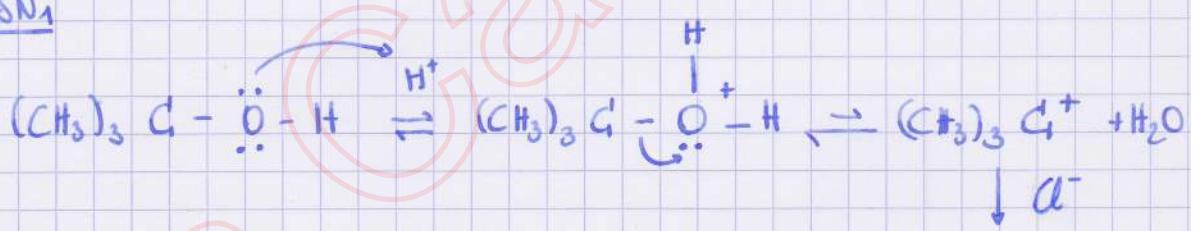
Ethanolyse



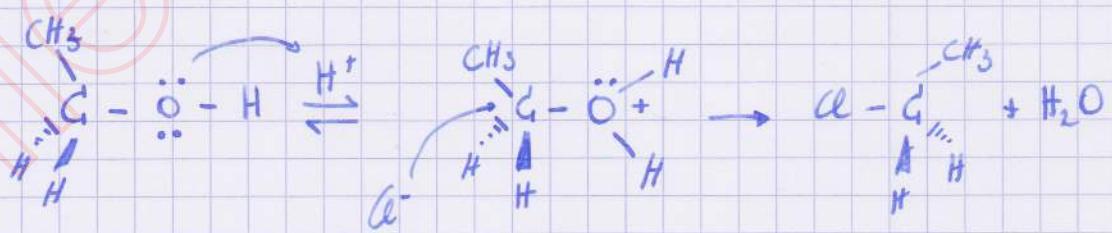
De vorming van halogenalkaren uit alkoholen

+ HCl

SN₁



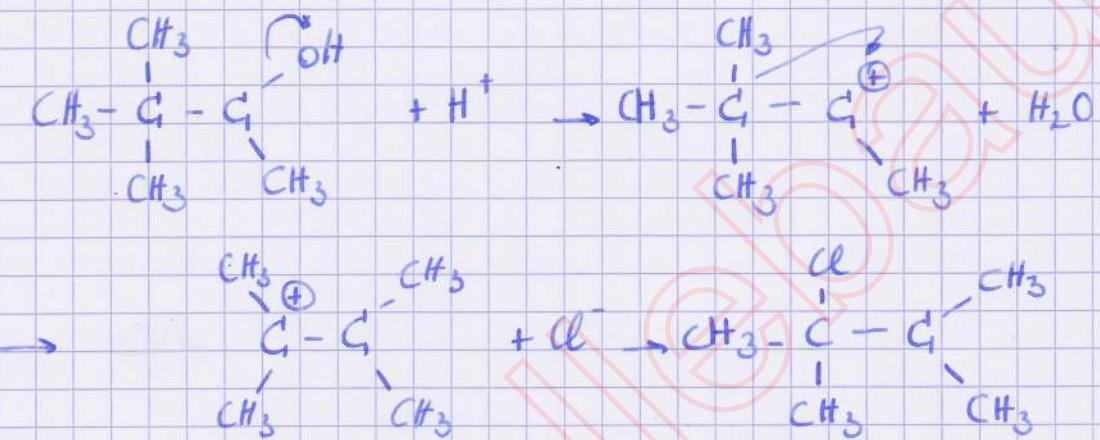
SN₂



OH⁻ slechte leavingsgroep

Herschikking vd koolstofketen

bij SN1-reacties , want bij $\text{CN}_2 \rightarrow \text{C}^+$ carbokationen



H 5

Alkenen

Struktuur en naamgeving

uitgang: -aan

radicalen: alkylgroepen

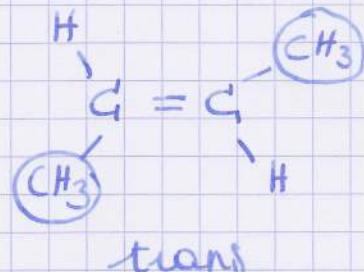
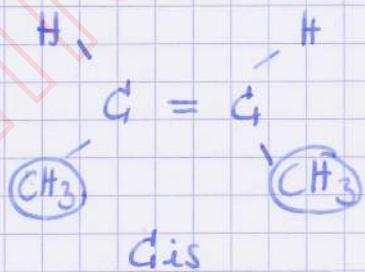
uitgang: -enyl

Isomerie

Plaatsisomerie

- # isomeren hoog, zeker bij de meer verharde alkenen
meerdere dubbele bindingen → -dien, -trien, -tetraen
- cyclische producten = plaats 1
- andere groepen nummeren ook // -binding

Stereo-isomerie



Fysische eigenschappen

- apolar
- lagere kookpunten (lagere moleculmassa)
- t.c.m. buten → gevoelig

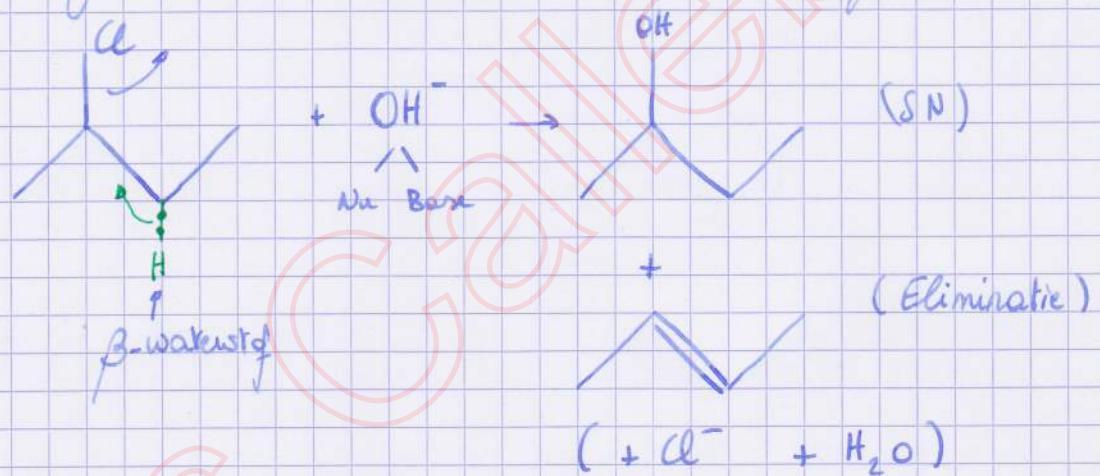
Bereiding van alknen

↳ substitutie + eliminatie reacties

Dehydrohalogenatie (halogeenalkaan)

E₂- Mechanisme

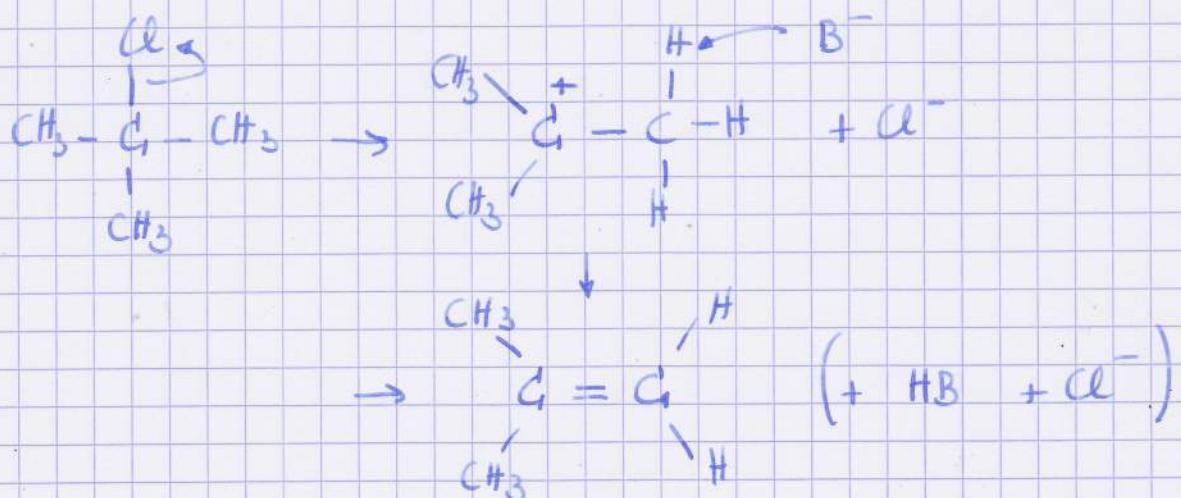
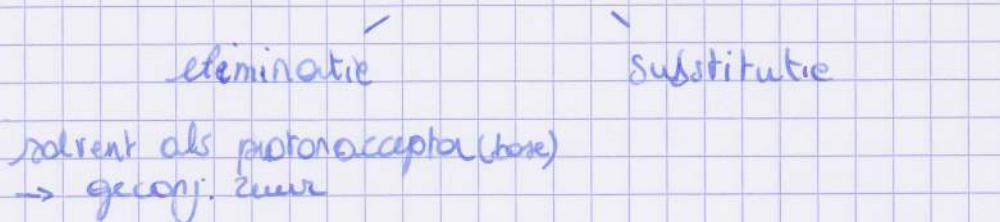
halogeenalkaan + sterke base (sterk nucleofoel)



E₁- Mechanisme

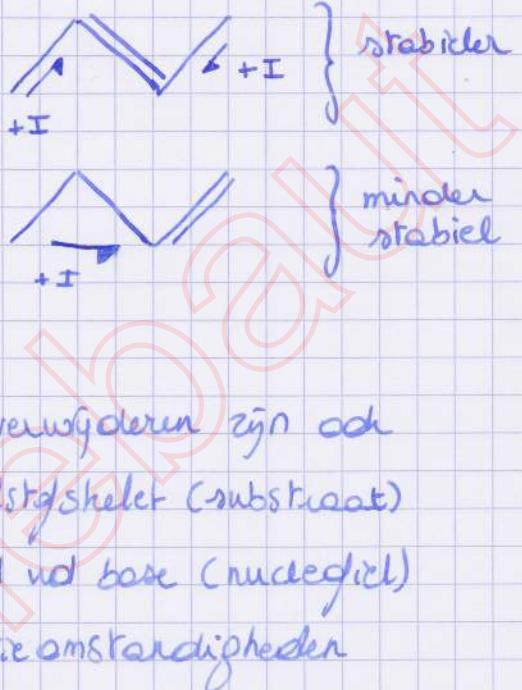
substituaten met sec. of tert. d.
minde sterke basen

→ carbokation → base, proton verwijderen.



De Zaitsev-regel

- meerdere alkenen vormen
- meest gesubstitueerde
↳ stabielst



Subs vs Elim.

De basen die de β -waterstoffen verwijderen zijn ook goede nucleofieLEN.

Meer subs. of meer elim.

koolstofketen (substraat)

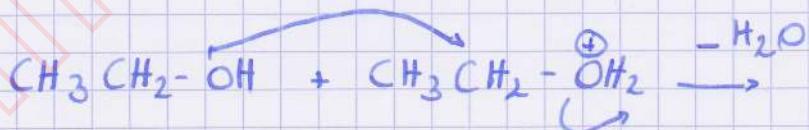
aard van base (nucleofiel)

reactieomstandigheden

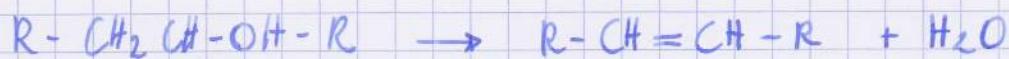
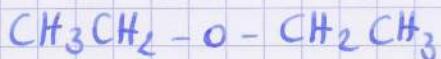
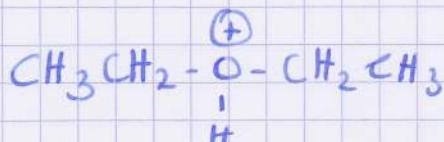
Dehydratatie (van alcoholen)

↳ in zuur milieu ↳ volgens E₁-mech.

- snel: zuur + alcohol $\rightarrow \dots +$ water (goede uitwendige groep)
- traagste: vorming carbokation
- aanwezige base \rightarrow proton opnemen
- zuur is een katalysator



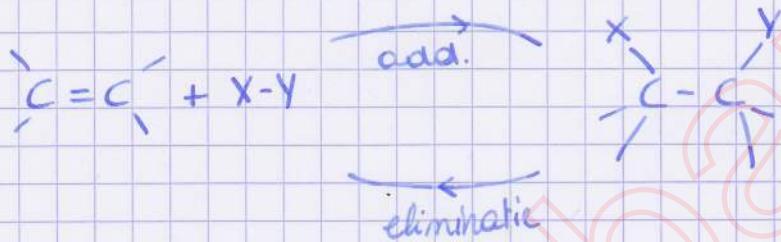
Substitutie



Eliminatie

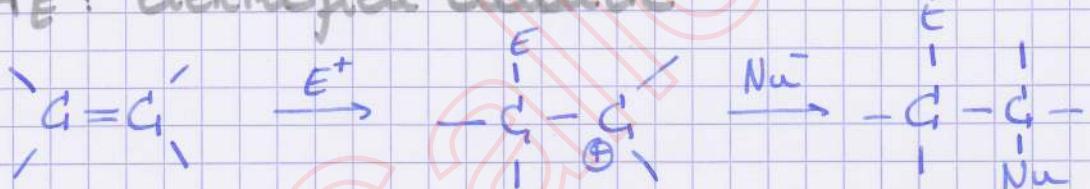
Reacties van alkenen: additiereacties

↳ bij alkenen → elektrofiele additie



Add. → nooit een nevenproduct.

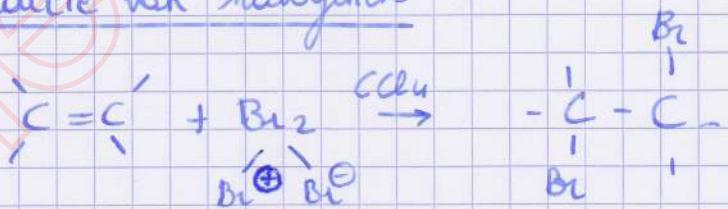
A_E: elektrofiele additie



Additie van binair zuur

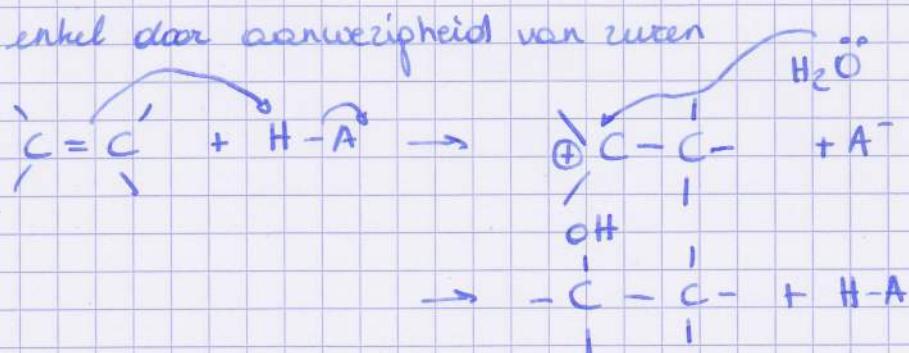
halogenide (bv HBr) + alkeen → halogenalkaan
of waterige oplossing → condensat. add. van water

Additie van halogenen



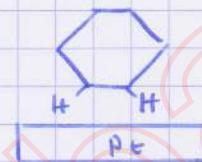
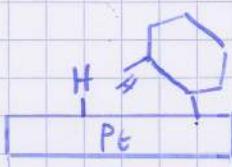
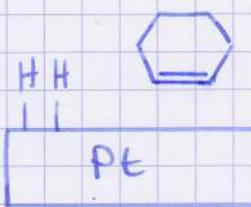
Additie van water

↳ enkel door aanwezigheid van zuur



Hydrogenatie (add. van H₂)

↳ + katalysator



Alkynen

↳ veel π tussen $C \equiv C$ \Rightarrow gemakkelijk reageren

→ plaatsisomeren, gtn cis-trans-isomeren

Voor de rest idem

H6

Aromaten

Het aromatisch karakter

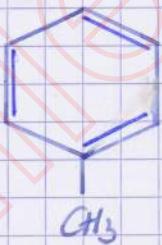
⇒ grote stabiliteit vd ringstructuur
karakter ve dubbele binding

De ruimtelijke structuren van benzeen

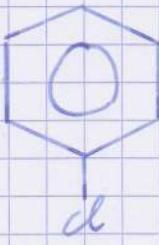
Regel van Hückel:
- vlah & cyclisch
- enkel sp^2 -hybridisat \circ
L \Rightarrow $(4n+2)$ π -elektroen

Naamgeving van enkele aromatische stoffen

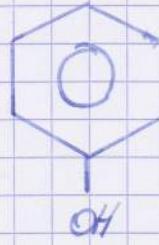
Monocyclische aromaten



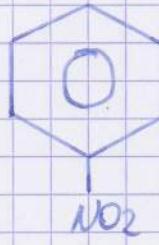
toluuen



chlorobenzen



fenol



nitrobenzen

⇒ digesubstitueerde producten:

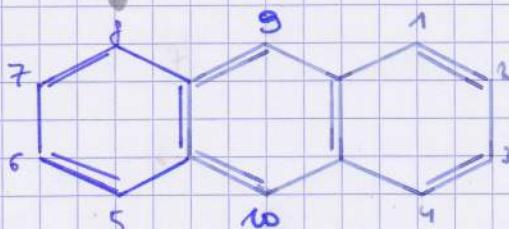
positie

1,2 ortho

1,3 meta

1,4 para

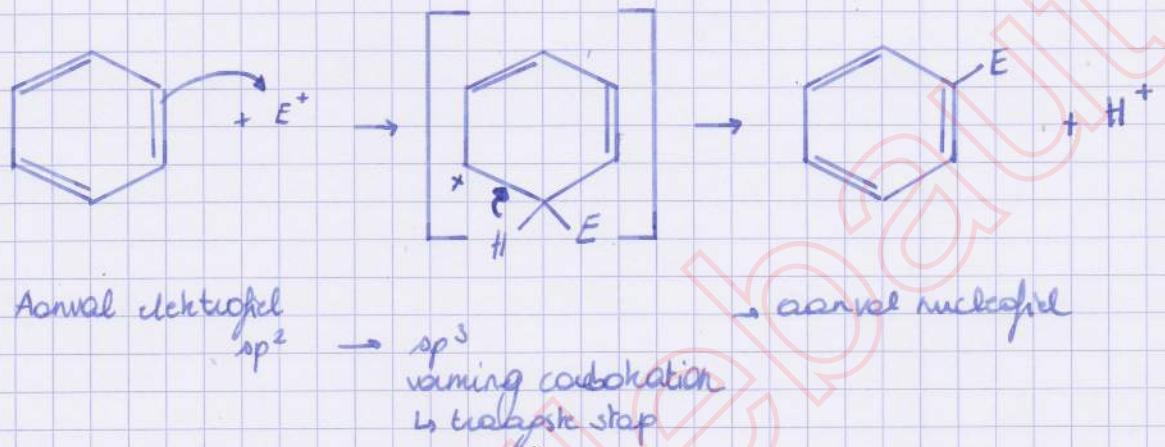
Polycyclische aromaten



buitenkant eerst beret → hogere
benummering

G zonder verwisselbaar H
→ geen apart nummer.

De elektrofiele substitutie (Se)



Stabiliteit van carbokationen

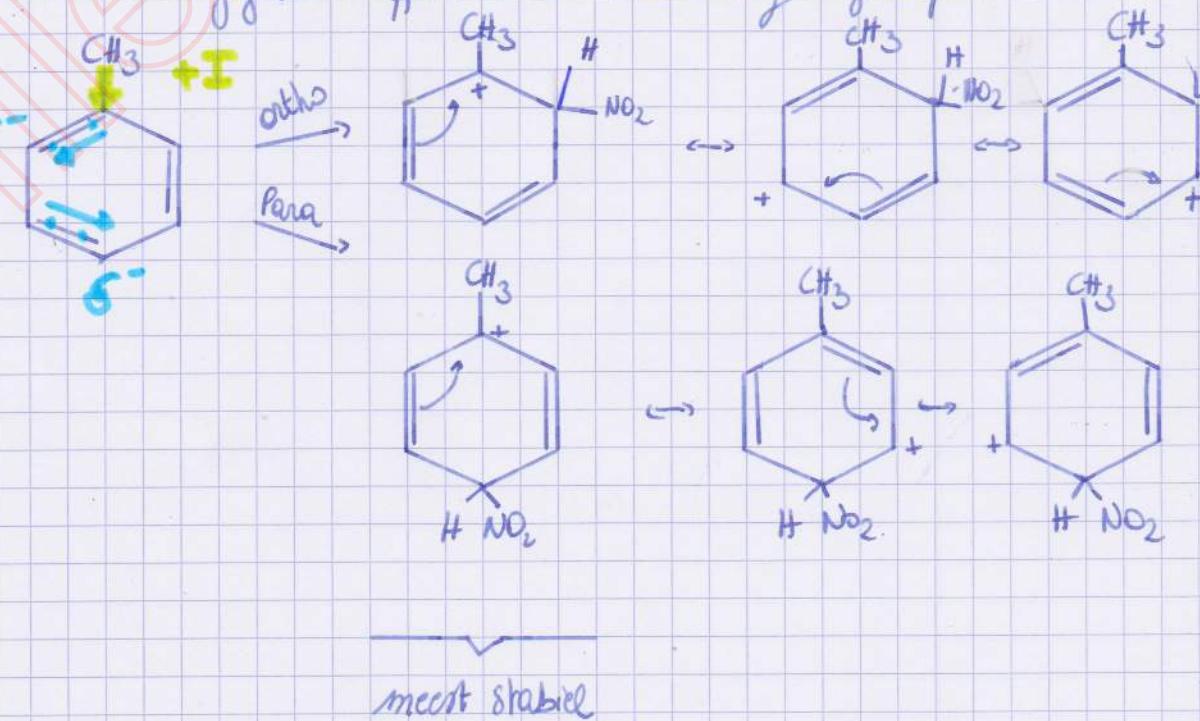
Keeds aanwezige groepen \rightarrow invloed reactiesnelheid.

\rightarrow elektrodonor groepen $\text{SE} \leftarrow$

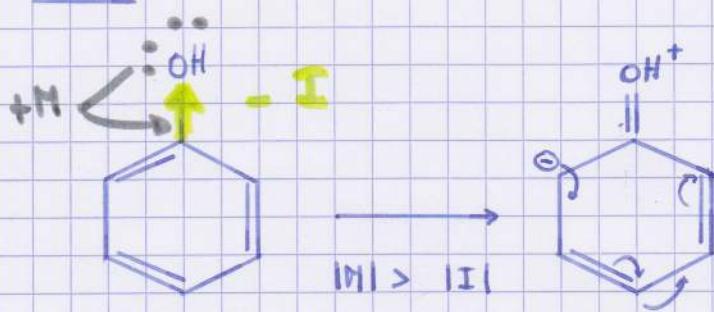
\rightarrow elektroacceptor groepen $\text{SE} \rightarrow$

Ortho- en para - richters

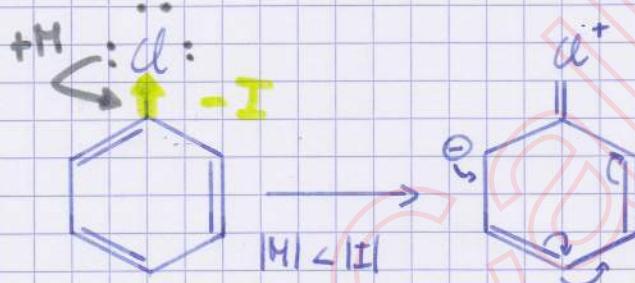
\rightarrow richtinggevend effect door aanwezige groepen.



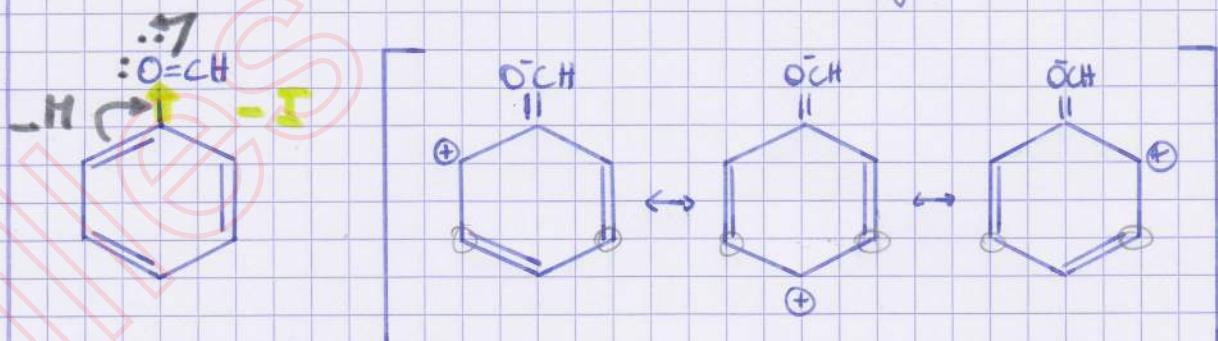
Fend



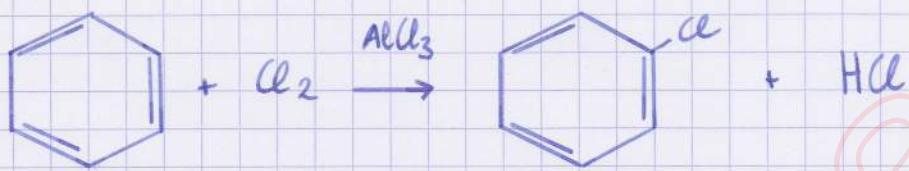
Chlorbenzen



Metarichter (desaktivative vd ring)



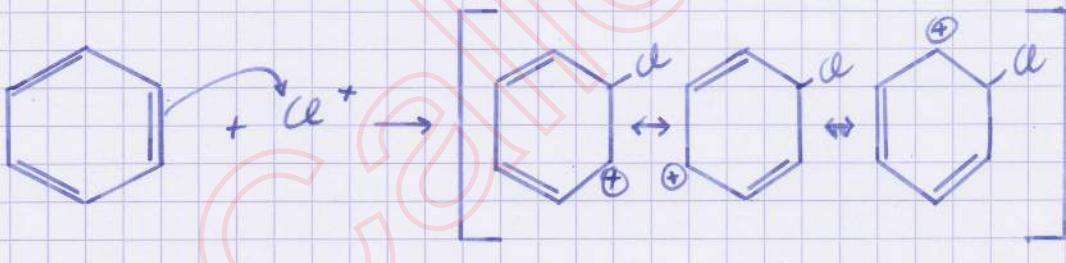
Halogening



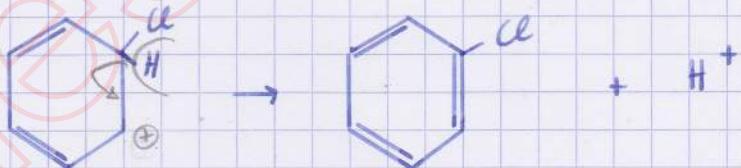
① Vermin E⁺



②



③

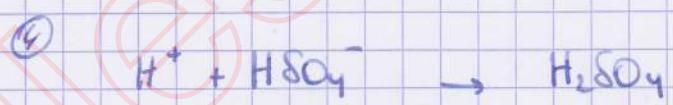
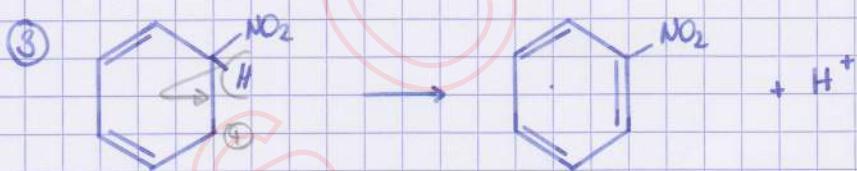
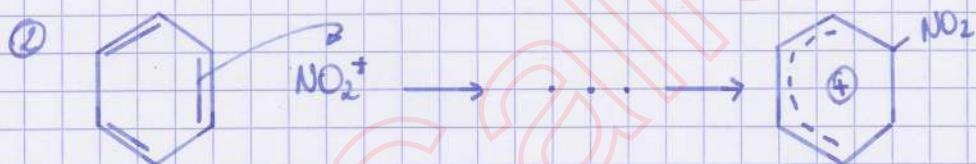
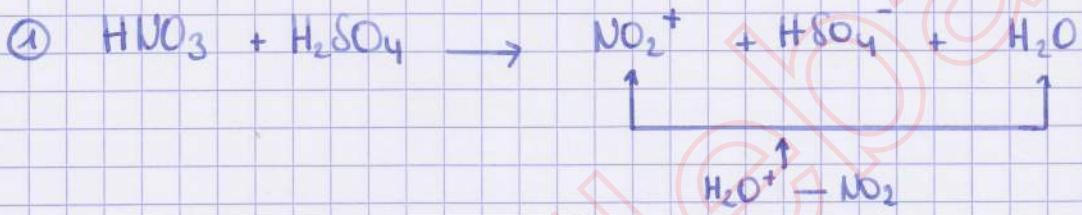
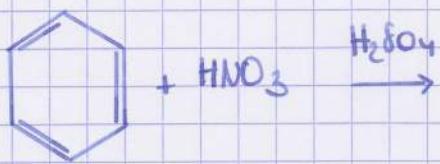


④

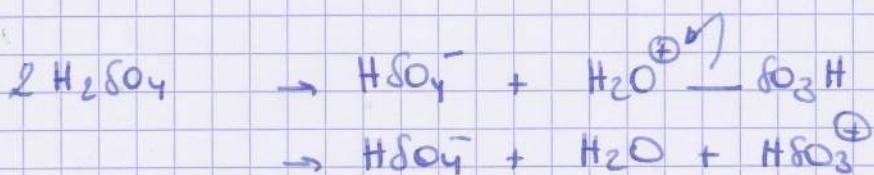


(Katalysatoren: AlCl_3 (Cl_2) H_2SO_4 (...))
 FeBr_3 (Br_2)

Nitueren

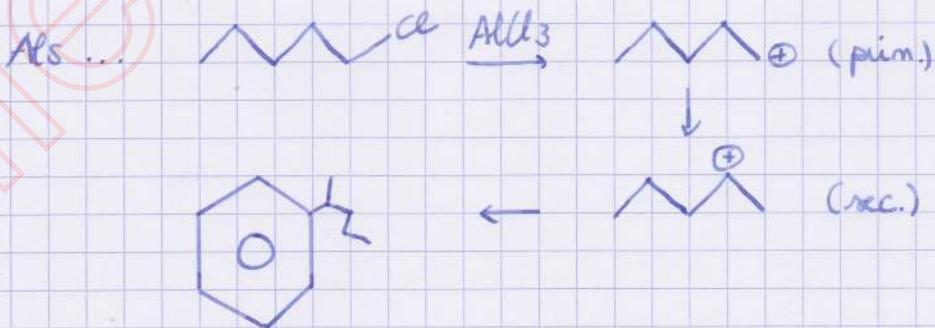
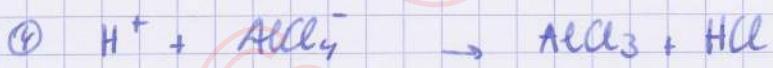
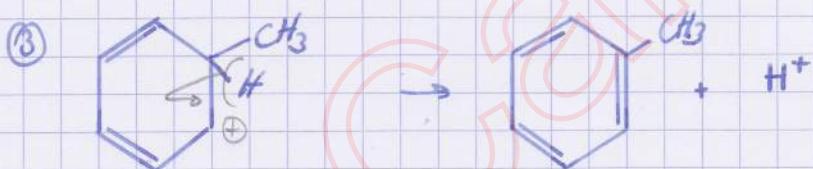
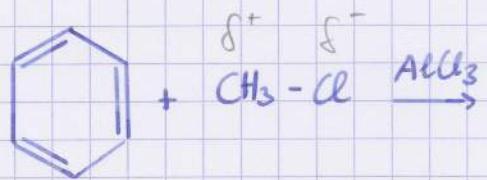


Sulfueren

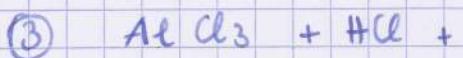
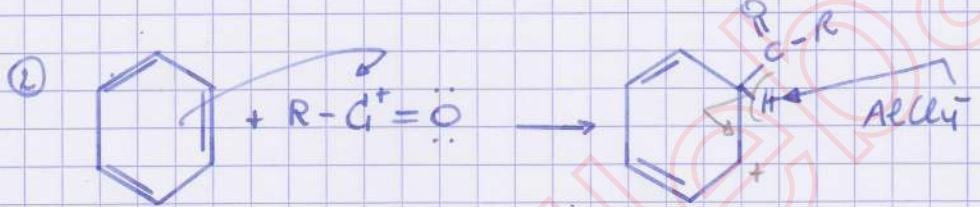
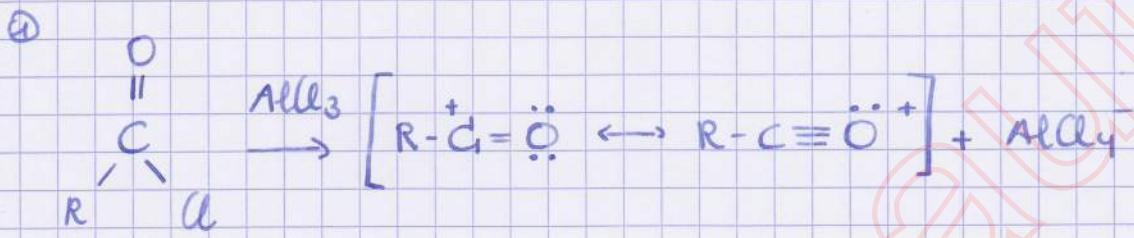


zelfde werkwijze als nitueren.

Alkyllierung



Acylation

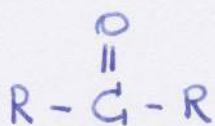


H7: Aldehyden en ketonen

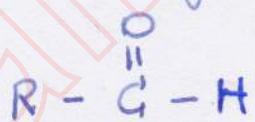
Structuur

$C=O$ → carbonylgroep

Keton



Aldehyde

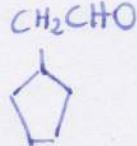


Naamgeving

- on

- al

cyclische aldehyden:



cyclopentanecarbaldehyde

2-cyclopentylethanal

voorvoegsel:

- OXO

(excl. carbonyle)

- OXO

(excl. carbonyl)

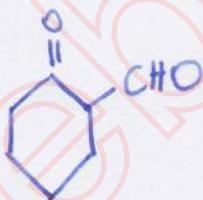
Indien s keter beide carbonyl groepen:

keten \Rightarrow aldehyde

keton \Rightarrow - OXO



2,2-dimethyl-4-oxopentanal



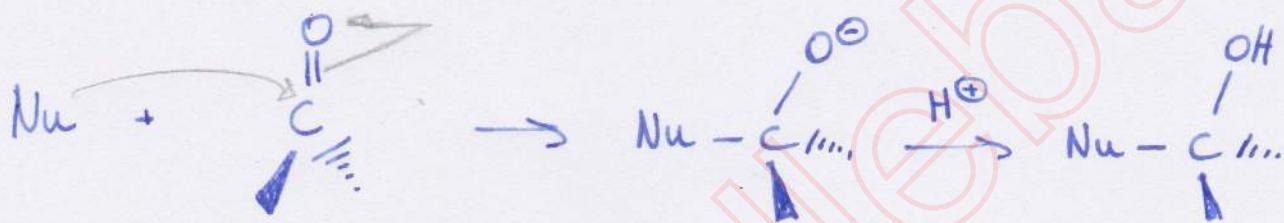
2-oxocyclohexanecarbaldehyde

Fysische eigenschappen en belang van ketonen en aldehyden

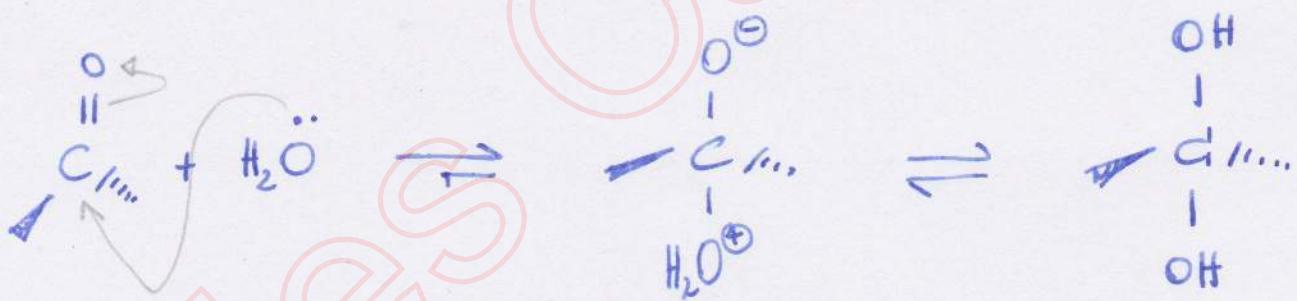
- carbonylgroep \rightarrow polair
 \hookrightarrow hoger kookpunt
- waterstof + zuurstof rechthoekjes hebben zuur \rightarrow lager kookpunt dan alcoholen door juiste vorming waterstofbruggen onderling
- lagere ketonen/aldehyden \rightarrow goed opwater \rightarrow waterstofbruggen met water

Chemische eigenschappen

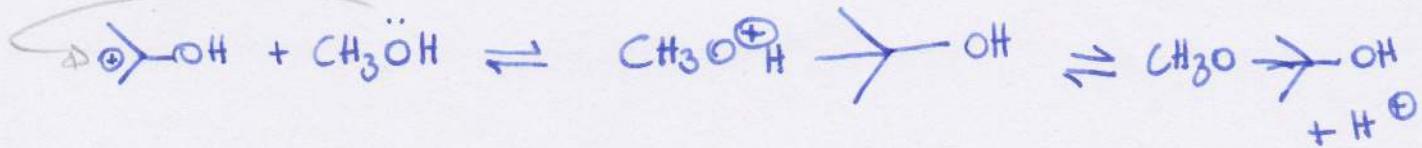
Nucleïlek additie A_N



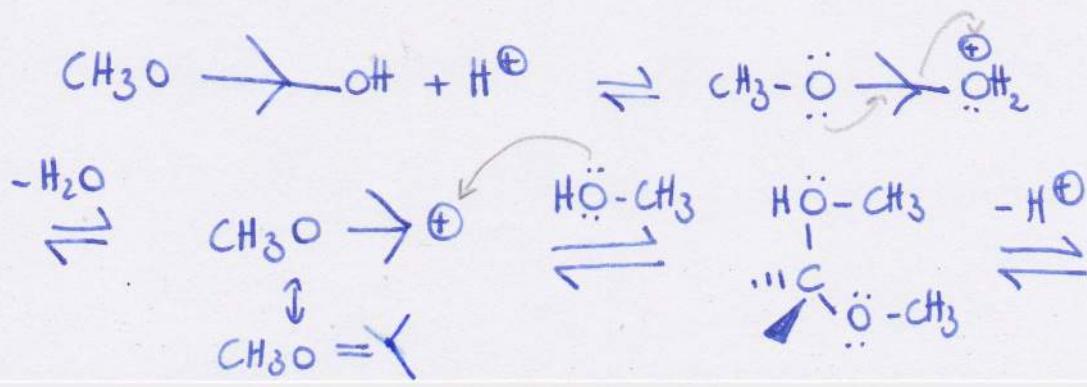
Additie van water



Additie van alcoholen

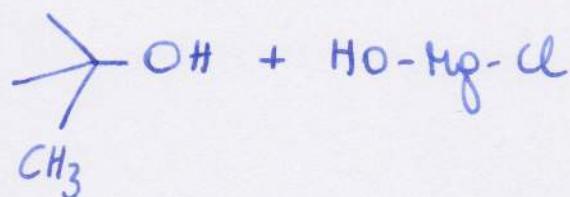
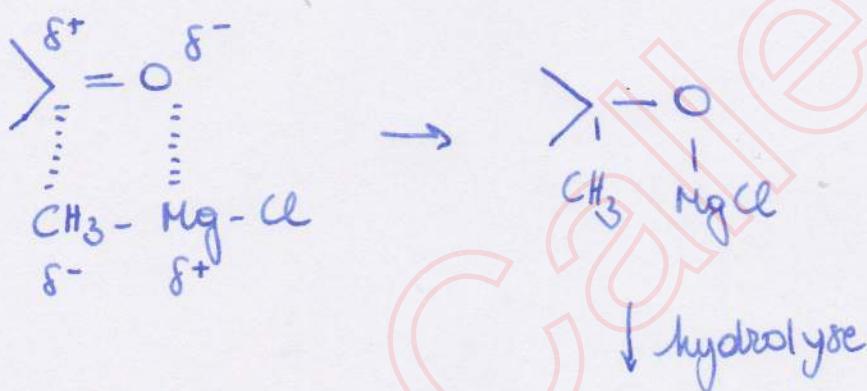
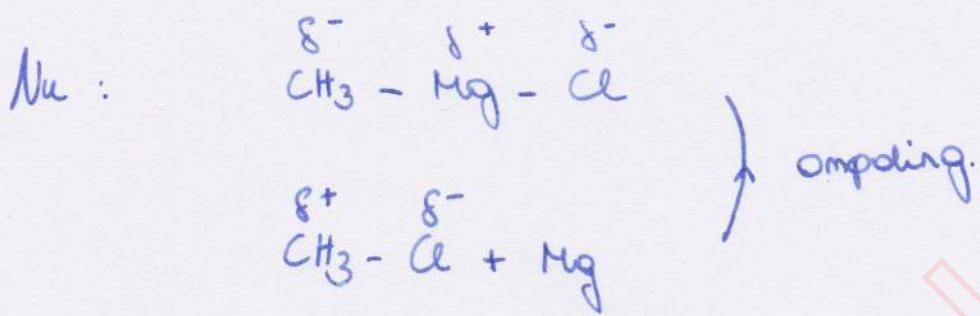


halfactaalk
hemiacetal

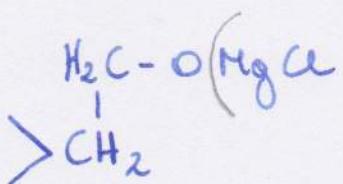


:O-CH₃
||
C
||
O-CH₃
Acetal

Additie van Grignard reagens

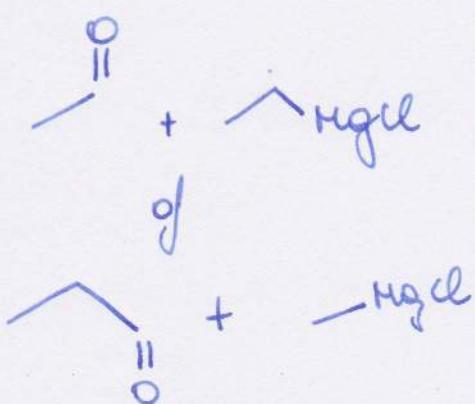


tertiair
alcohol zout



$\text{CH}_3\text{CH}_2\text{OH}$ vormen?
prim alcohol

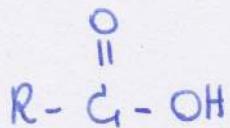
$\text{CH}_3\text{CH}_2\text{OH}$ vormen?



H8: Carbozuren & Carbozuurderivaten

Carbozuren

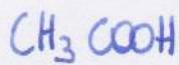
Struktur



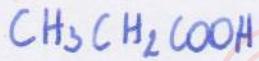
Naamgeving



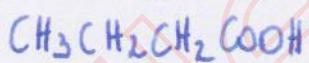
mierenzuur



azijnzuur



propionzuur

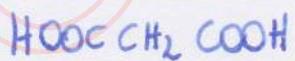


boterzuur

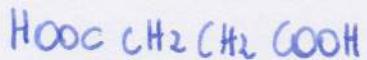
dizuren:



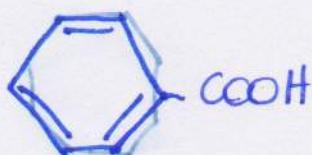
oxaalzuur



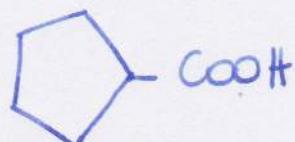
malonzuur



barnsteenzuur



benzoëzuur



cyclopentancarbonzuur

Fysische eigenschappen

- sterke waterstofbindingen onderling
- ↳ hoogste kookpunt
- korte carbonzuren: goed op. water
 - ↳ koolwaterstofdelen ↑, → gel water ↓

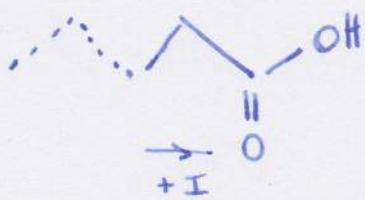
Chemische eigenschappen

pK_z factoren:

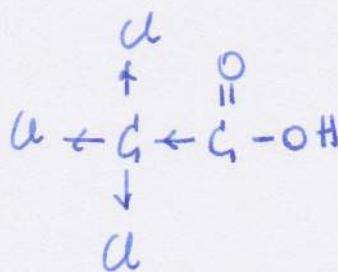
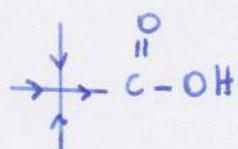
- aard vr atoom waarop het H-atoom staat
 - ↳ H op O in geval carbonzuren
- stabilitéit vol. gedissocieerde t.o.v. de $\bar{N}F$ -gediss. vorm

carbonzuren:

stabilitéit anion ↑ → zuurtekte ↑



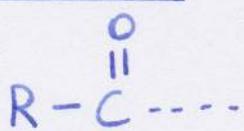
sterke zuren



zwak zure door
inductieve zingen

Carbonzuurderivaten

Structuur



- NH₂, - NHR, - NR₂

amide

- OR

ester

- OCOR

zuurhydride

- X

zuurhalogenide

Naamgeving

Amiden

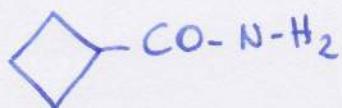
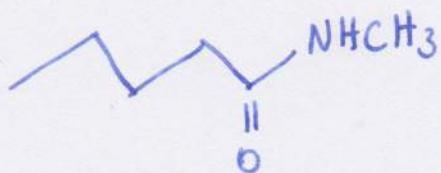
- zuur vervangen door - amide

cyclische koolwaterstof: - carbonamide

alkylgroep op N: voorvoegsel: N-

N-methylpentanamide

cyclobutaencarbonamide

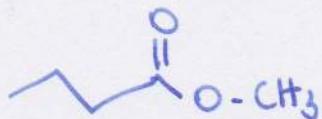


Esters

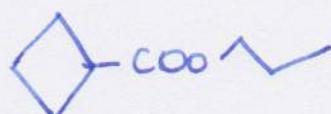
- zuur vervangen door -oaat

cyclisch: -carboxylaat

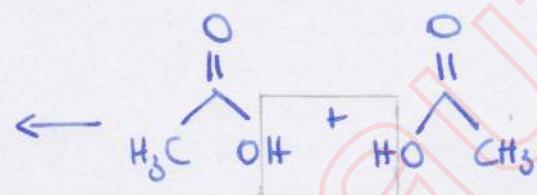
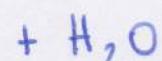
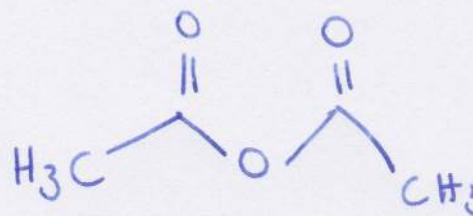
methylbutanoaat



propylcyclobutaencarboxylaat



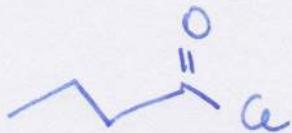
Anhydriiden



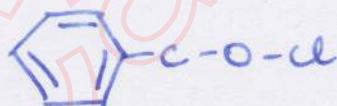
ethaanzuur anhydride

Zuurhalogeniden

acyle + halogen



butanoylchloride



benzeencarbonylchloride

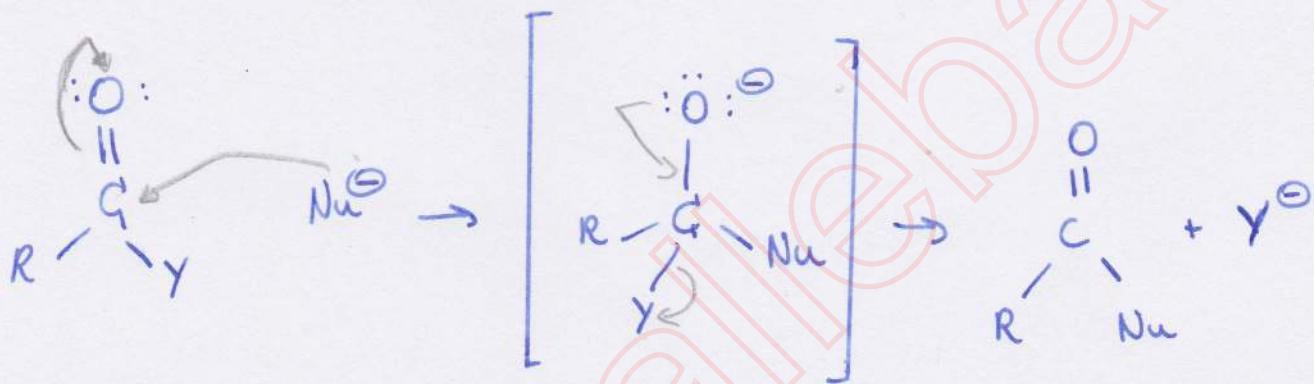
Fysische eigenschappen

carbonyl groep → sterk polair

↳ waterstofbindingen vooral bij amiden → hoog kookpunt

Chemische eigenschappen

Nucleofiele subs.



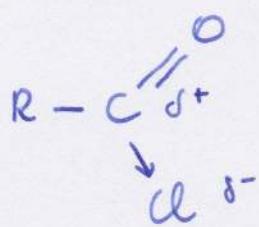
Verbinding	leaving groep	geconj. zuur	ρK_z
Aldehyd	H ⁻	H ₂	zeer groot
Keton	R ⁻	RH	45
amide	NH ₂ ⁻	NH ₃	35
ester	RO ⁻	ROH	16
carbonzuur	HO ⁻	H ₂ O	15,7
zuuranhidride	R-COO ⁻	R-COO ⁺	5
zuurhalogenide	X ⁻	HX	-6

hoe stabielder Y → hoe zuurder. → spreidingslaagje bestaat
bij opp I

H⁻ & R⁻ → onstabiel → $\bar{S}N$, alleen AN

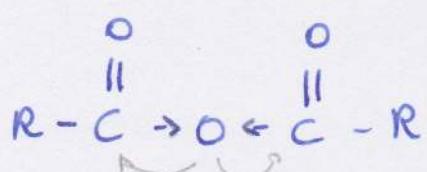
$\text{RCO}^{\ominus} \leftrightarrow \text{RC}=\overset{\overset{\text{O}}{\parallel}}{\text{O}}^{\ominus}$ → kanonieken → gestabiliseerder

Zuurhalogeniden:



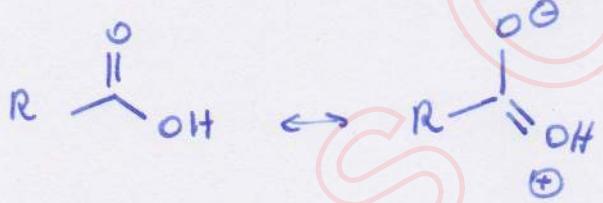
weinig stabiel \rightarrow erg reactiv

Zuuranhydride:



inductief zwijgend \rightarrow meromeer gevormd v. O
 \downarrow
 reactiv

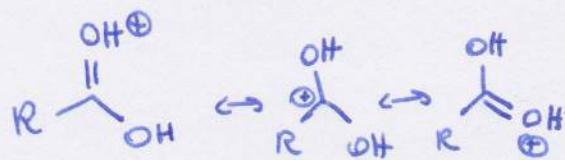
carbozuren:



meromere eig. vd O in Olt
 \hookrightarrow stabilisatie
 \rightarrow minder gewenst Na-aanval

\rightarrow reactie taken doorgaan

\hookrightarrow protoneren met sterke zuur :



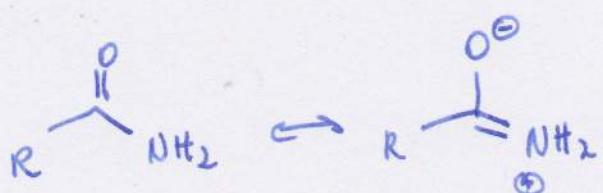
Esters:



(\rightarrow ook hier protoneren.)

Amiden:

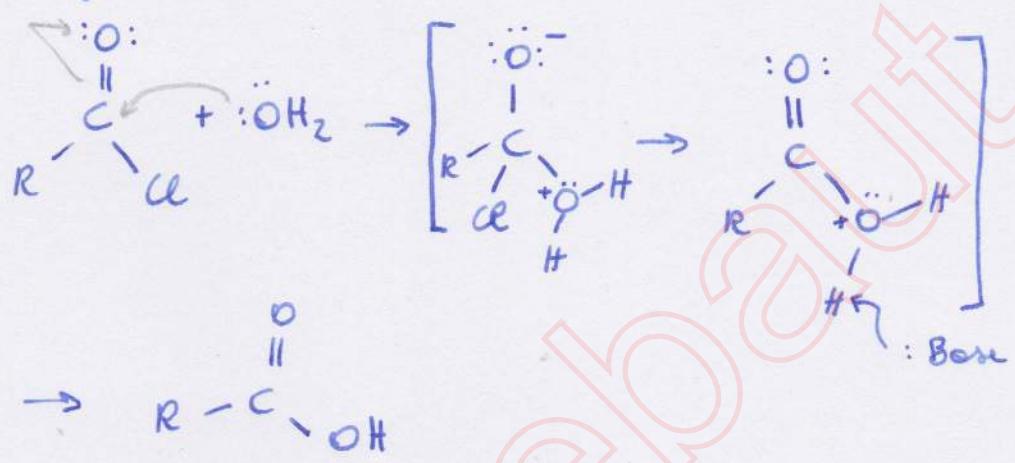
N \rightarrow nog betere meromere gevormd dan O



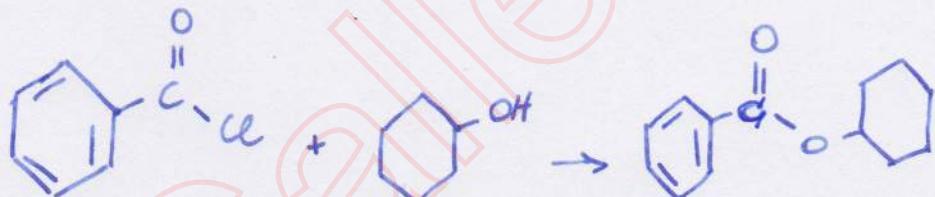
grote stabiliteit
 \downarrow
 zeer protoneren

Reacties van zuurhalogeniden:

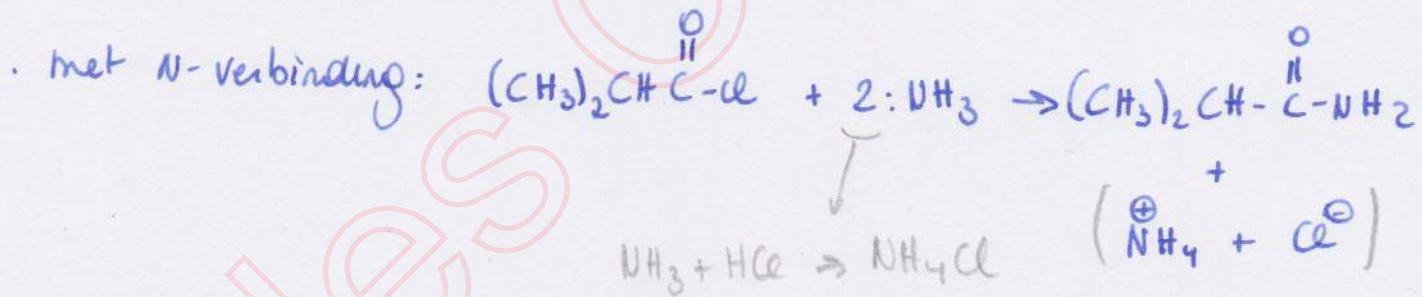
met water:



met alcohol:

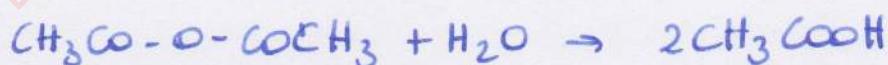


met N-verbinding:

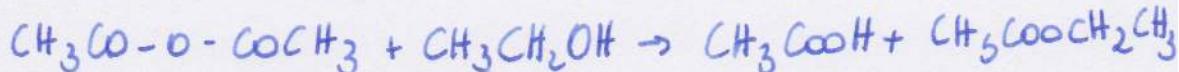


Reacties van zuuranhydriiden:

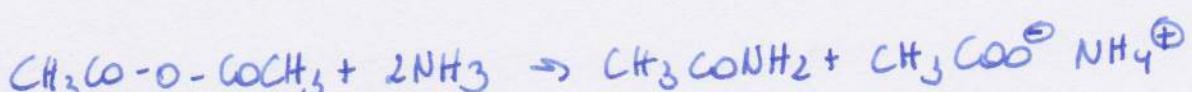
water:



alcohol:



N:



Reacties van esters en carbozuuren:

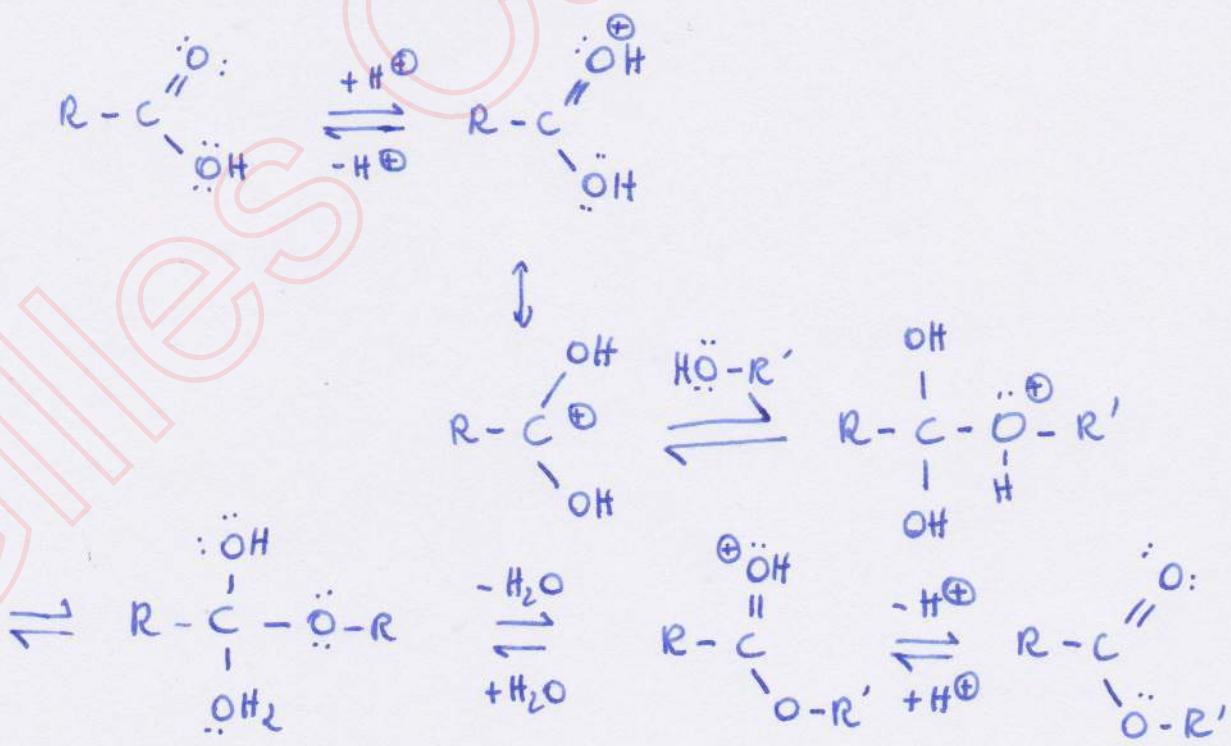
↳ geactiveerd door protoneren/
activeren Nu

water: esters & carbozuuren (zure hydrolyse)

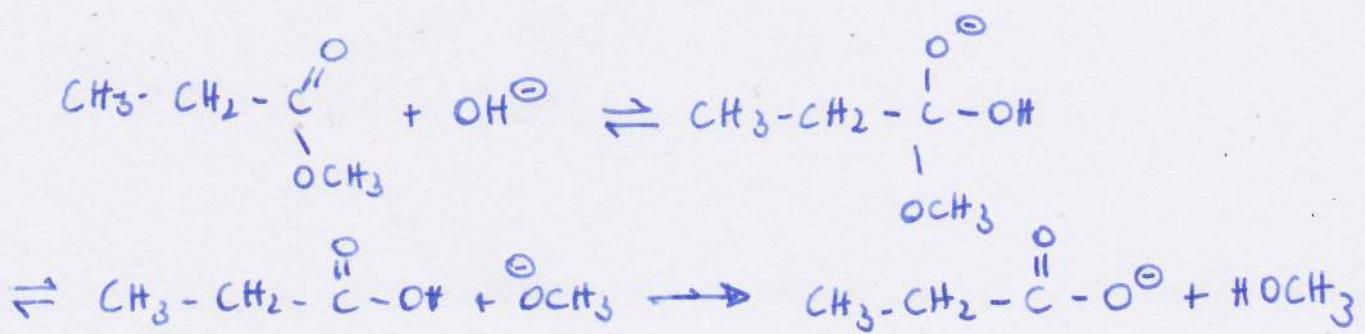


evenwicht instellen.

principe van de Châtelier:



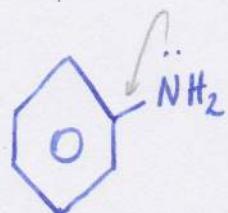
basische hydrolyse: (verzeping) + sterke nucleofiel (OH^-)



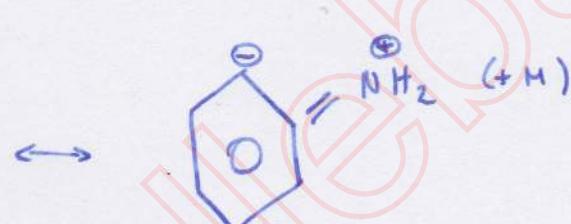
H9: Aminen

basisch karakter

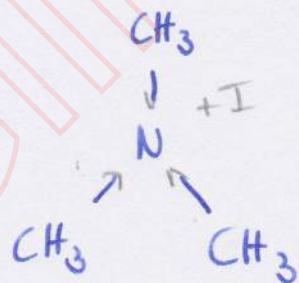
slechts



aniline

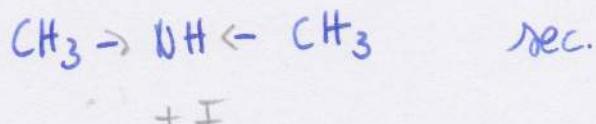


prim



tert. door sterische hinder
 laag dan sec.

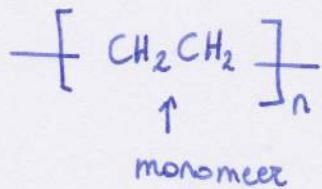
best



H10: Polymeren & Kunststoffen

Monomeer en polymeren

polymer



n = polymerisatiegraad

Eigenschaften

bepaald door:

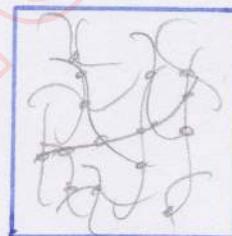
- aard vd monomeren
- poly. graad of heterolengte
- macro-structuur:
 - 1 of meerdere monomeren
 - volgorde versch. mono.
 - lengte, vorm & beweegelijkheid
 - ondulante schikking
 - aanwezigheid tovergingen

Thermo - plastic; harders & elastomeren



Thermoplasten

verwarming → week & plastisch verformbaar
↳ uit elkaar, kletsen

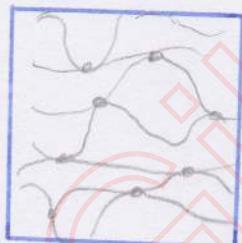


Thermoharders

onderling gebonden → sterk netwerk met kleine mazen

verwarming → ontbinden (sterke ^{verhitting} verhitting)

chemische verknoping → uitharding



Elastomeren / rubbers

onderling verbonden → grote mazen
↳ elastisch
zwavelbruggen vormen br.

Synthese van polymeren

→ polymerisering → min. bifunctioneel

Additive polymerisation

↳ radicalen



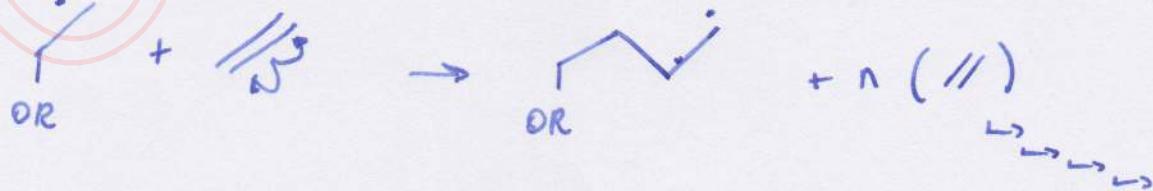
Initiative



probleem: radicalen reageren met monomeren
+ exotherm \rightarrow niet onder controle



- Propagatie



Terminative



↳ speelt zijn rol door grote herten.

Polypropyleen

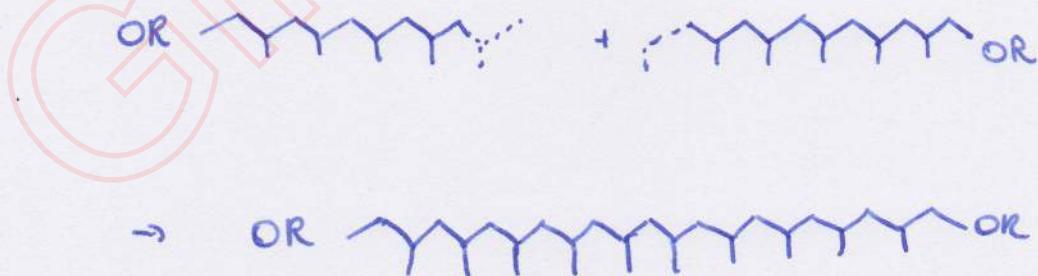
Initiatie



Propagatieve



Terminatie

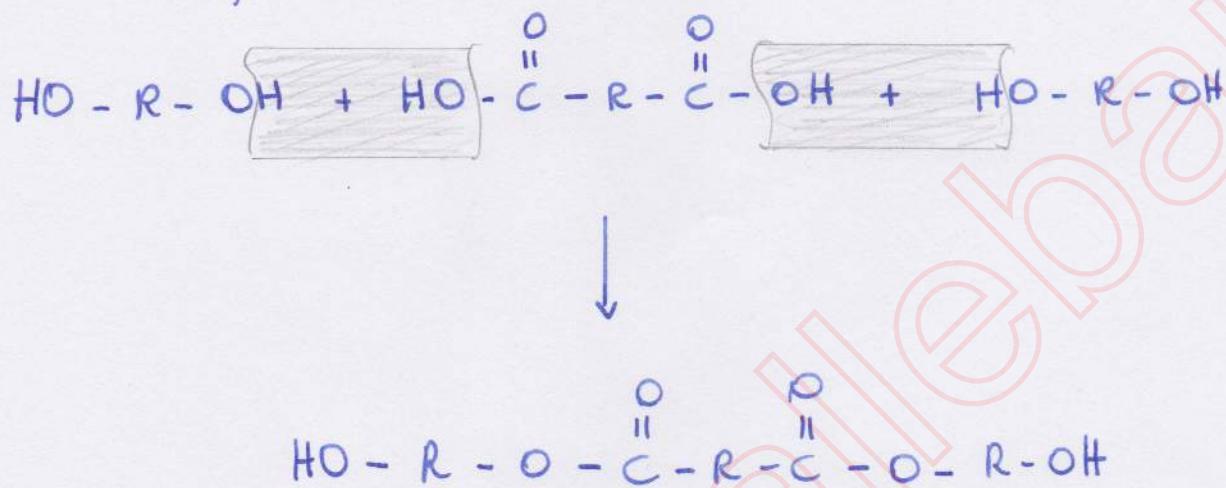


idem voor monomeer $\text{CH}_2=\text{CHCl} \rightarrow$ polyvinylchloride

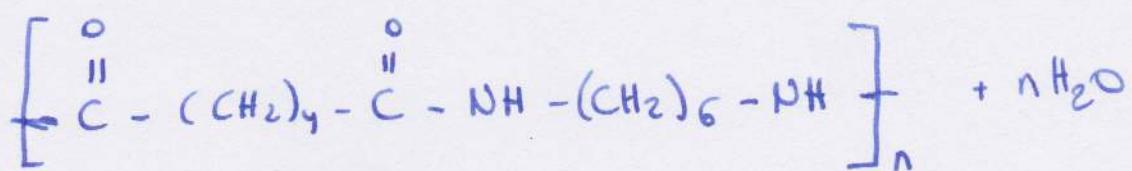
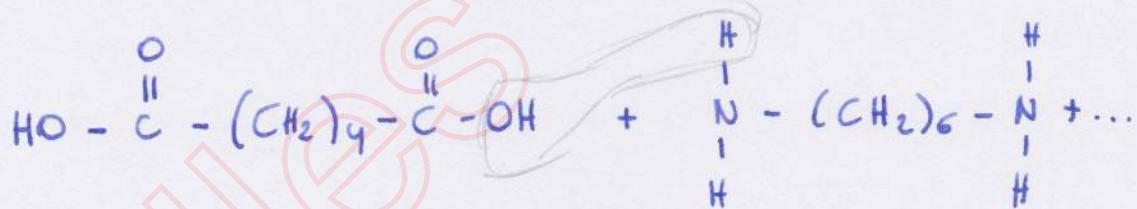
monomeer $\text{CH}_2=\text{C}_6\text{H}_5\text{O} \rightarrow$ polystyreen

Condensatiepolymerisatie → nooit dubbele binding

↳ 2 bifunctionele monomeren



Vorming nylon 6,6



Structuurkenmerken van polymeerketens

De hoofdketen

verzadigde ketens \rightarrow rotatie rond elke σ -binding

dubbele binding \rightarrow flexibiliteit \uparrow

\rightarrow cis- en trans-isomerie

Zijgroepen

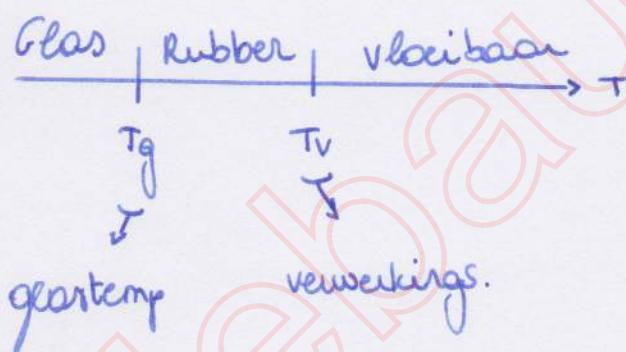
inbringen van grote groepen \rightarrow stijfheid \uparrow

Keteninteracties

- dipoolkrachten
- Van der Waals - krachten

Aggregatie toestanden

- glastoestand
- rubbertoestand
- vloeibare toestand
- opgedroogde toestand

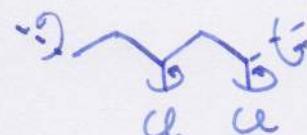


① Glas toestand

ketensegmenten \rightarrow niet vrij bewegen \rightarrow moeilijk verformbaar

\rightarrow zeer hard & broos

PVC \rightarrow verhoogde bewegelijkhed Cl-atomen



② Glas - rubberovergang

einde glas toest. \rightarrow rotaties om de hoofdbinding

T_g

polyethéen < polypropéen < polystyreen

\rightarrow grotere zijgroep hindert rotatie $\rightarrow T_g \uparrow$

\rightarrow $CH_3 < Cl < CN$ \rightarrow polariteit

\hookrightarrow krachten tussen de ketens \uparrow

\rightarrow inwendige weekmaking \rightarrow lange flexibele zijketens
uitwendige weekmaking \Rightarrow + laagmoleculaire stoffen

③ Rubber toestand

- keten streven naar een zo groot mogelijk aantal configuraties → verzetter tegen de toename van orde die optreedt bij het uitrekken.
(entropie afname)
- terugveren ↗ loslaten
(entropie + veel)
- moleculmassa $\rightarrow \rightarrow T_v \downarrow$
 - vernetting \rightarrow de bindingen tussen de ketens blijven intact bij temp. T
 \hookrightarrow daar br. vulkanisering
 - lichte vernetting $\rightarrow T_o$ ontbindingstemp.

④ Vloeibare toestand

- grote viscoiteit

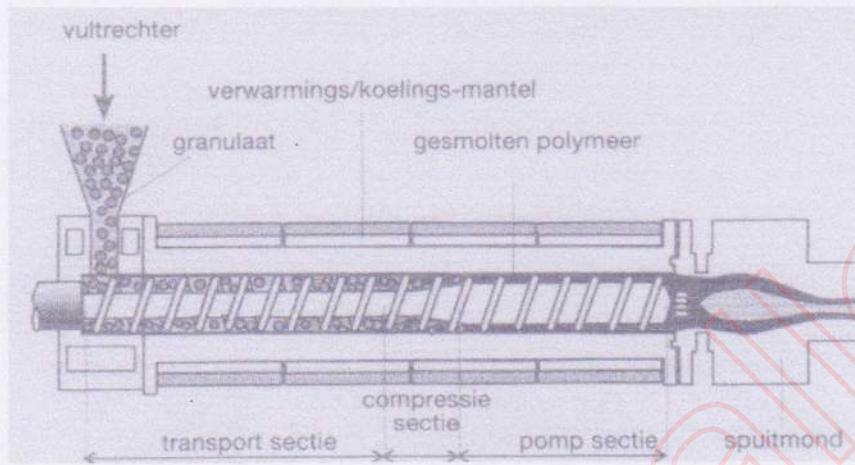
Kristallijne polymeren

$T_m \rightarrow$ smelttemp.

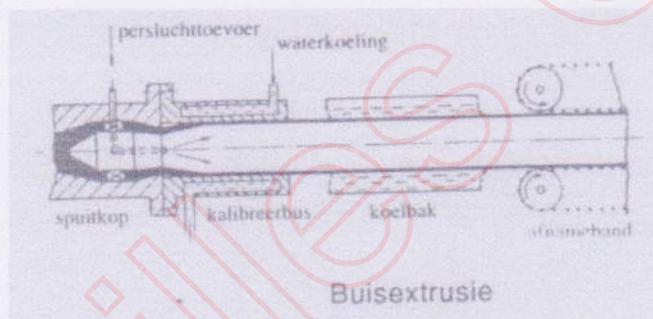
- $T_v > T_m \rightarrow$ grote keten \rightarrow melt punt, \rightarrow rubber fase
- $T_v < T_m \rightarrow$ korte " \rightarrow geen rubber fase na melt punt

Verwerking

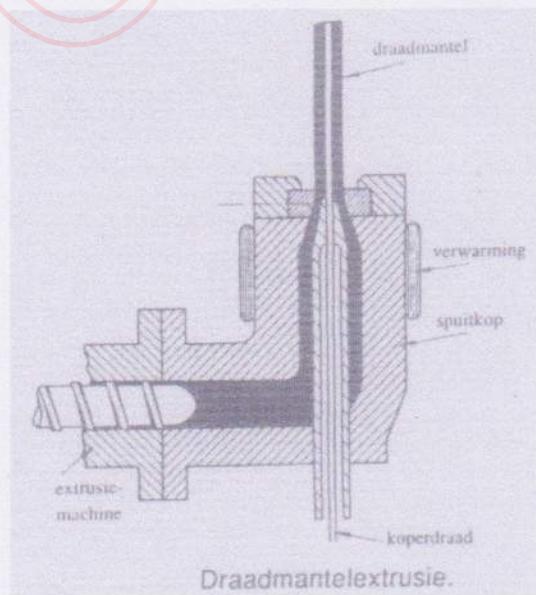
Extruderen



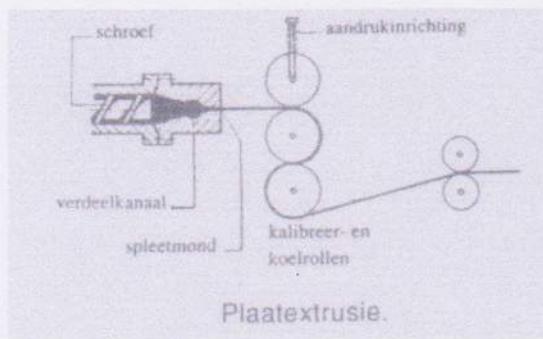
thermoplasten
onder de vorm
van korrels of poeder



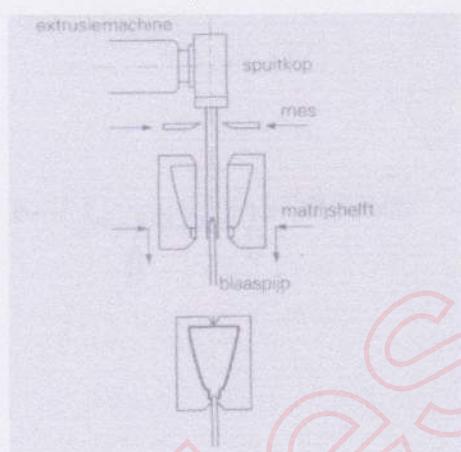
ringvormige gaten



blanke metalen draaden
→ plastic / rubber isolatiemantel

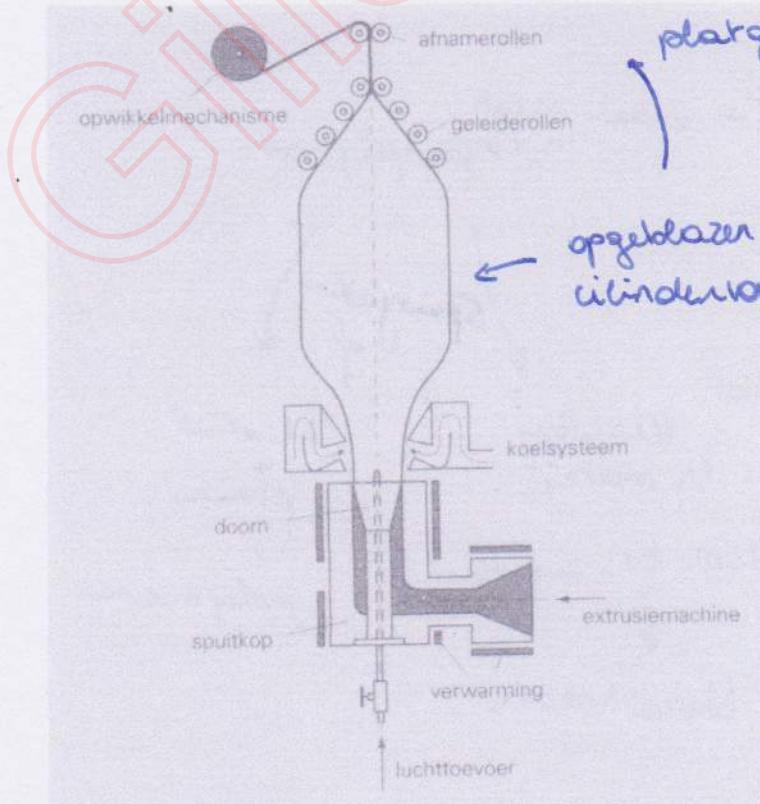


spleetvormige opening \rightarrow folie



alternatieve techniek

\downarrow
fibres / films



platgedrukt
 \times opgerold

opgeblazen tot
cilindervormige ballon

\rightarrow film heeft gehangen

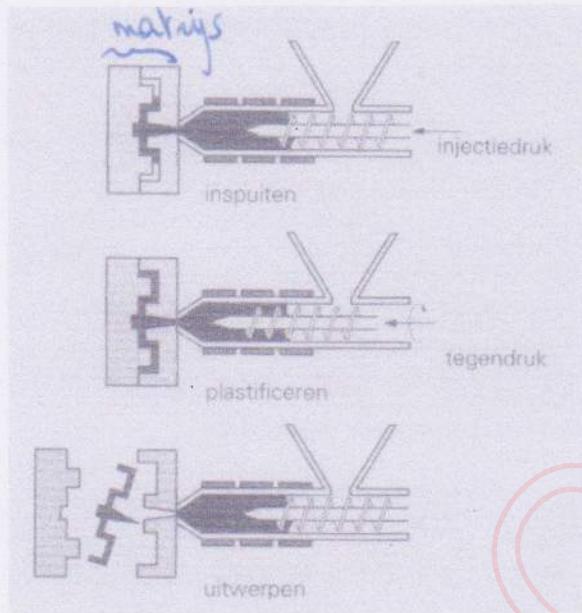
\downarrow
snelle afkoeling
 \hookrightarrow orientatie toest. ingeweven

$\hookrightarrow t \downarrow \rightarrow$ terug oorspr.
toestand

\downarrow
krimpen

\rightarrow max. entworp

Spuitgieten



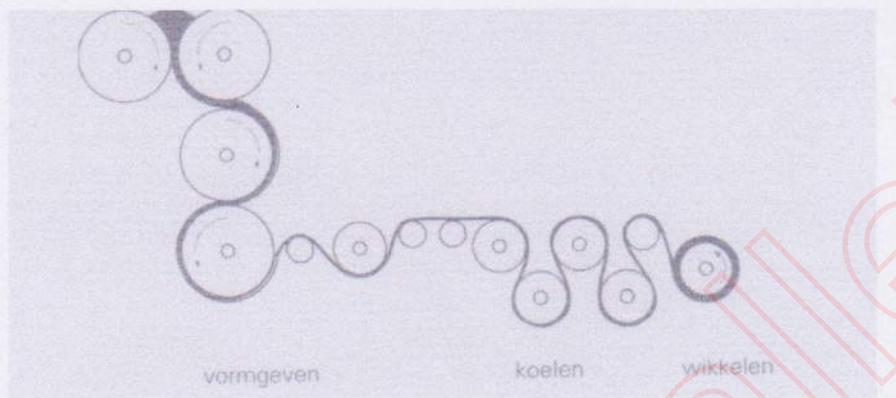
grate nauwkeurigheid
zeer ingewikkelde vormen

→ vl. polymermassa
of
→ monomeren → polymeriseren in
matrijs

als polymer: thermoplast → matrijs afkoelen
↳ materiaal stollen

thermoharden → matrijs warmer aan spuitinstallatie
↳ vernetting enkel in matrijs!

Kalanderen



↳ meer verwarmde walsen → gewenste homogeniteit
dikte

Schuimen

- ↳ roeren
- ↳ glas-in-blazing
- ↳ chemische blaasmiddelen

} → lucht in polymermassa

H11: Koolhydraten

Inleiding & nomenclatuur

koolhydraten : $C_n(H_2O)_m$

Sacchariden:

monosacchariden:	glucose fructose
di - :	sucrose
	lactose
	maltoze
poly- :	zetmeel cellulose

Mono sacchariden

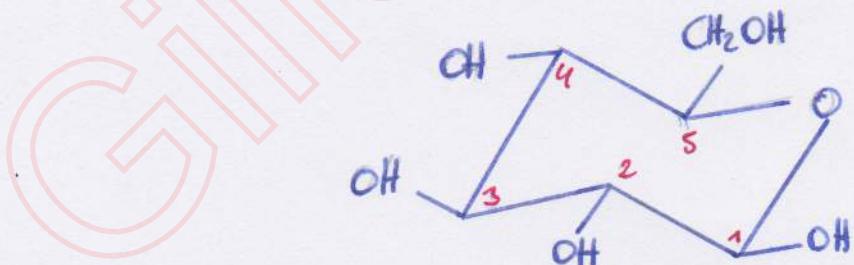
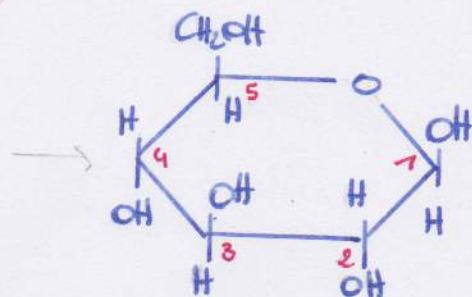
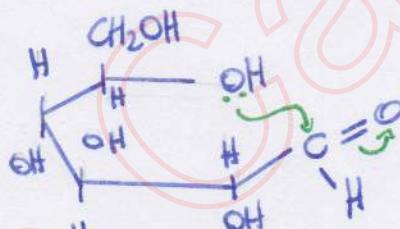
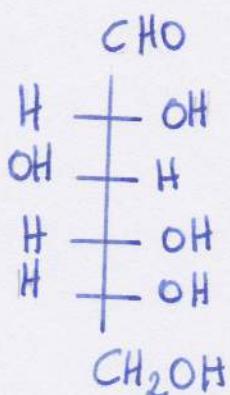
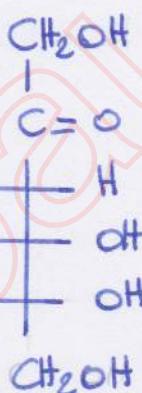
aldo - #C - Ose

→ glucose

keto - #C - Ose

→ fructose

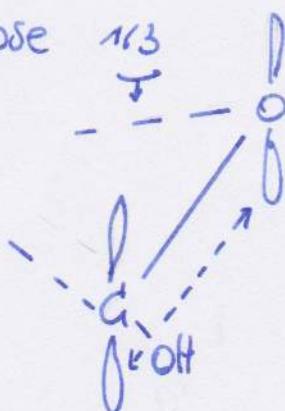
D-glucose



$\text{OH}_1 \rightarrow \text{eq.} \rightarrow \beta-\text{D-glucose}$ 2/3

$\rightarrow \text{ax.} \rightarrow \alpha-\text{D-glucose}$ 1/3

diastereoisomeren



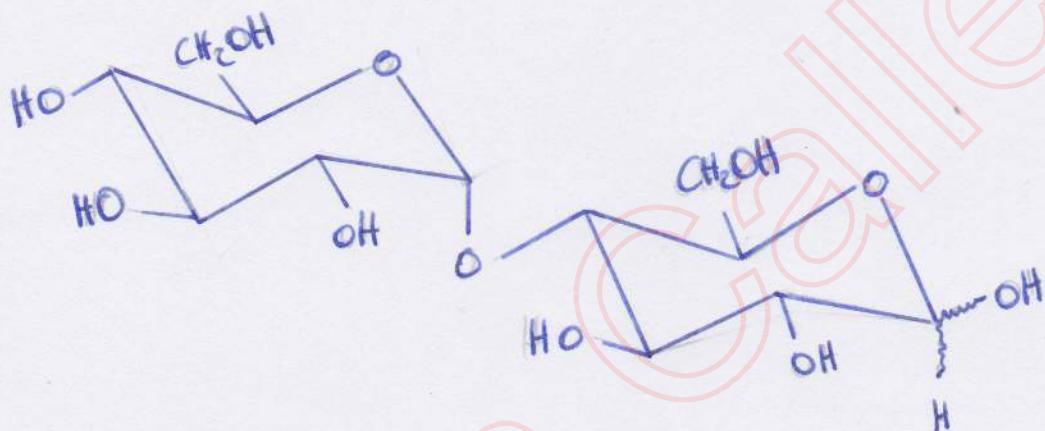
verhoogde stabilitéit

Disacchariden

2 monosacchariden verbonden door een glycoside binding.

Maltose

2 D-glucose-eenheden; α -1,4-binding



Cellobiose

2 D-glucose-eenheden; β -1,4-binding



Poly sacchariden

Cellulose

D-glucose-eenheden ; $\beta\ 1,4$ -bindingen
→ waterstofbruggen onderling → sterke vezels

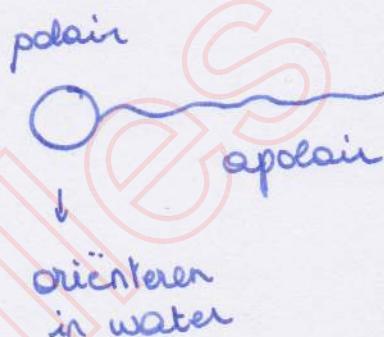
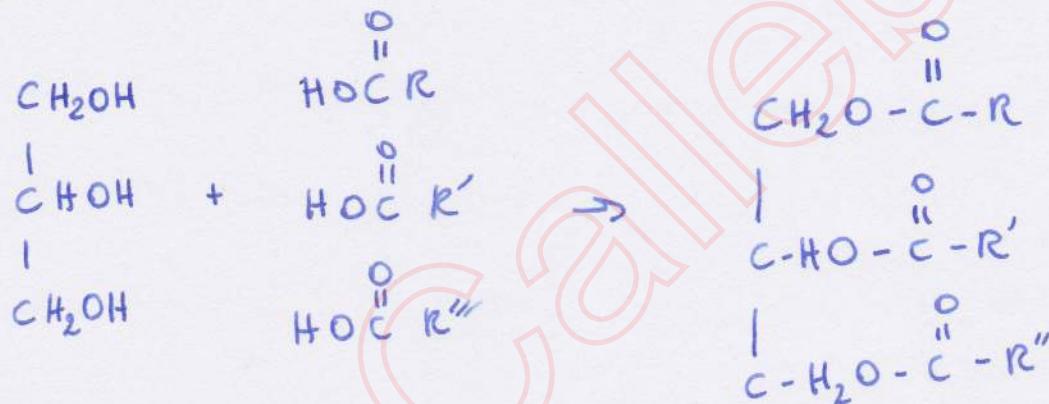
Zetmeel

amyllose ; glucose-eenheden ; $\alpha, 1,4$ -bindingen
+ vertakte amylopectine

H12: alipiden

vlieën & vetten

glycerol + vetzuren \rightarrow glyceride (vetten/dieren)



vet \leftrightarrow die

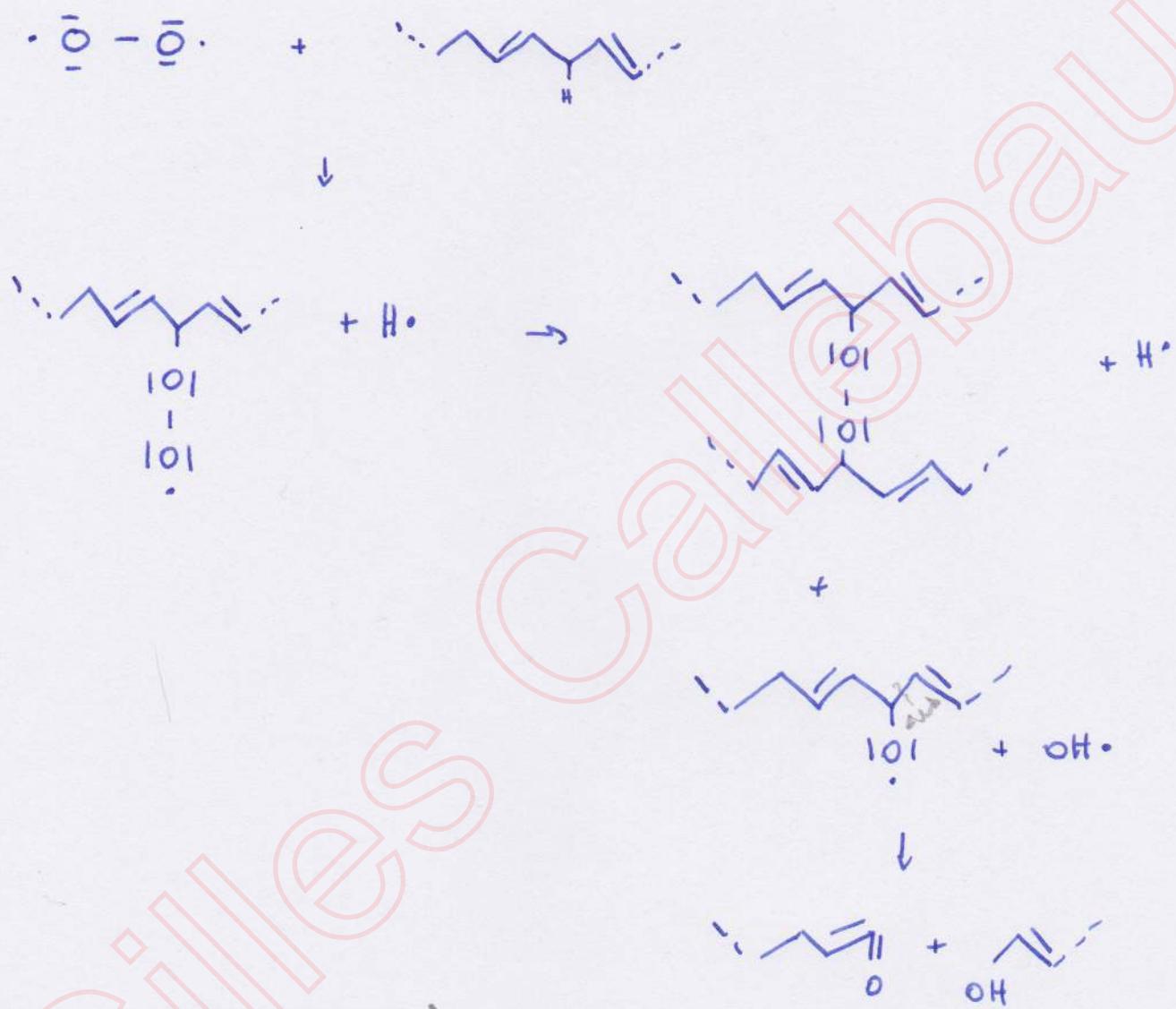
- vast
- diepelijk
- verzedigd

\downarrow
gr. dubbele
bindingen

- vloeibaar
- plantzaadig
- onverzedigd

\downarrow
dubbele
bindingen

oxidatie van oliën



Zepen & detergentia



→ glas en vet, olie