Polymerizace a polymery

Polymerization

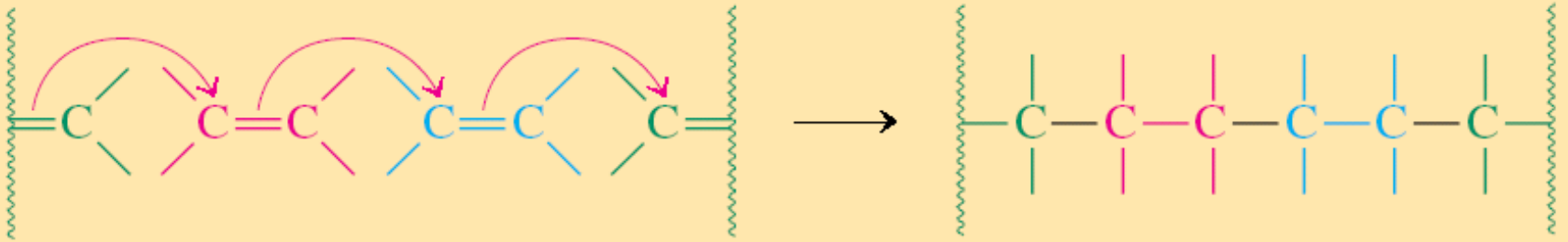
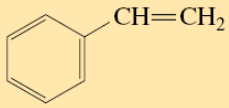
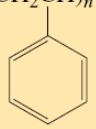
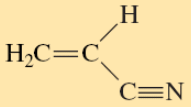
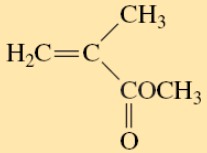
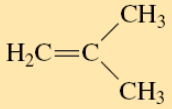
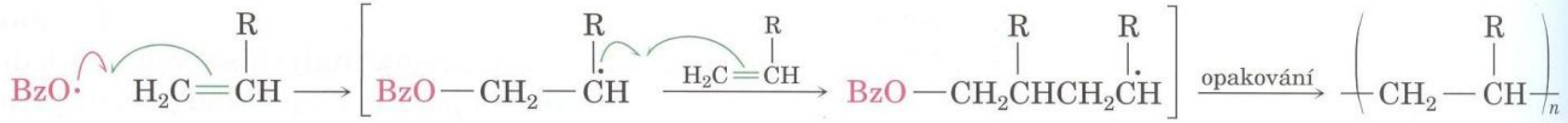


TABLE 12-3 Common Polymers and Their Monomers

Monomer	Structure	Polymer (common name)	Structure	Uses
Ethene	$H_2C{=}CH_2$	Polyethylene	$-(CH_2CH_2)_n-$	Food storage bags, containers
Chloroethene (vinyl chloride)	$H_2C{=}CHCl$	Poly(vinyl chloride) (PVC)	$-(CH_2CH)_n-$ Cl	Pipes, vinyl fabrics
Tetrafluoroethene	$F_2C{=}CF_2$	Teflon	$-(CF_2CF_2)_n-$	Nonstick cookware
Ethenylbenzene (styrene)		Polystyrene	$-(CH_2CH)_n-$ 	Foam packing material
Propenenitrile (acrylonitrile)		Orlon	$-(CH_2CH)_n-$ CN	Clothing, synthetic fabrics
Methyl 2-methylpropenoate (methyl methacrylate)		Plexiglass	$-(CH_2C)_n-$ CO_2CH_3	Impact-resistant paneling
2-Methylpropene (isobutylene)		Elastol	$-(CH_2C)_n-$ CH_3	Oil-spill clean-up

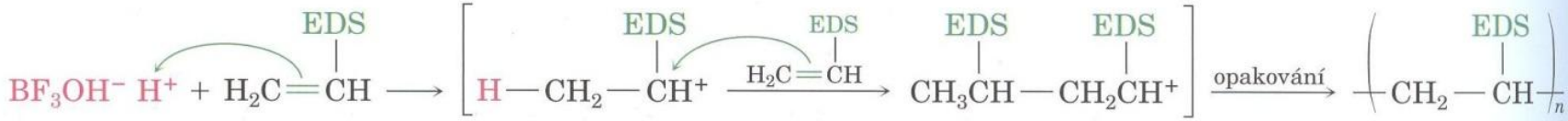
Polymery s řetězovým růstem

Radikálová polymerace



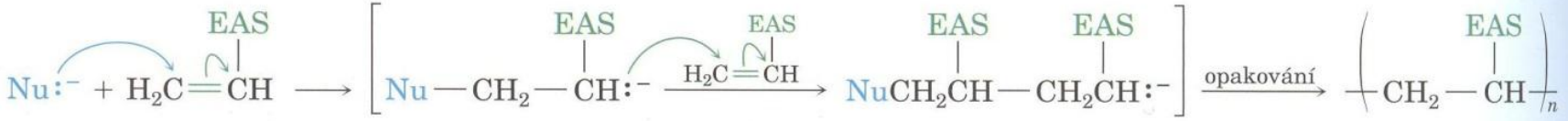
kde BzO· = benzoyloxy, PhCOO·

Kationtová polymerace



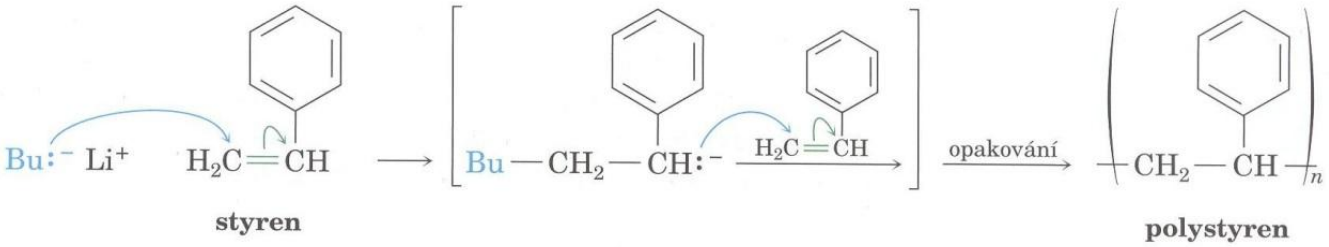
kde EDS = elektrondonorní skupina

Aniontová polymerace

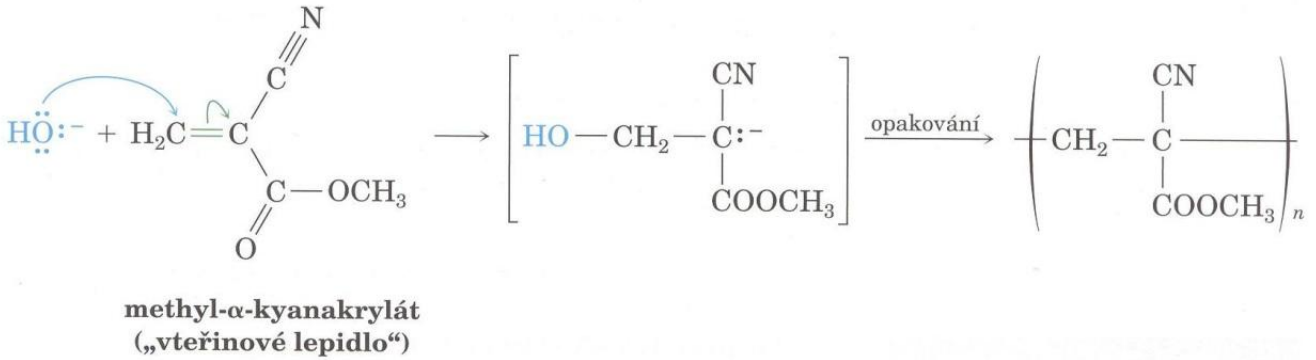


kde EAS = elektronakceptorní skupina

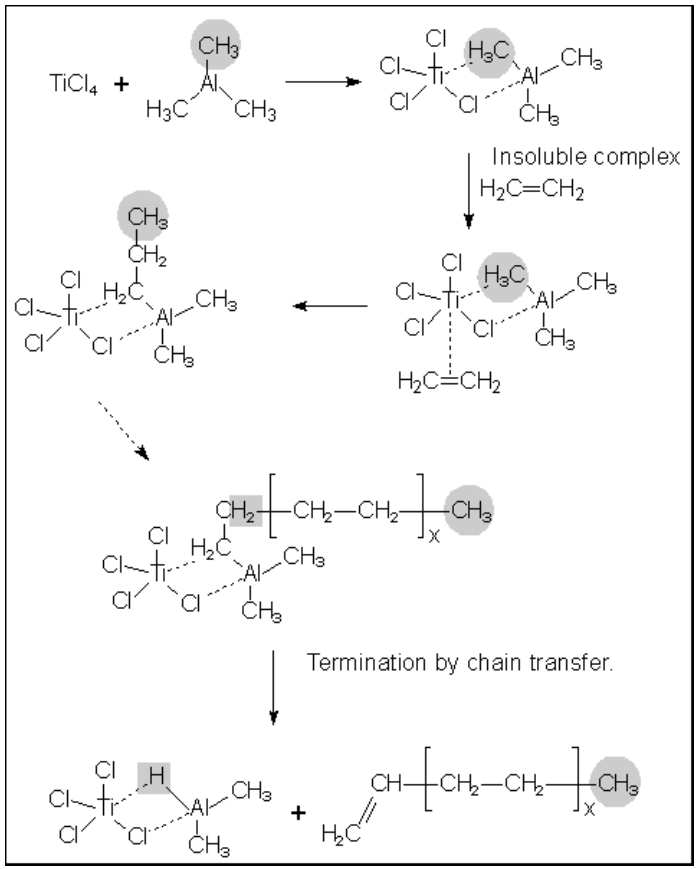
Polystyren

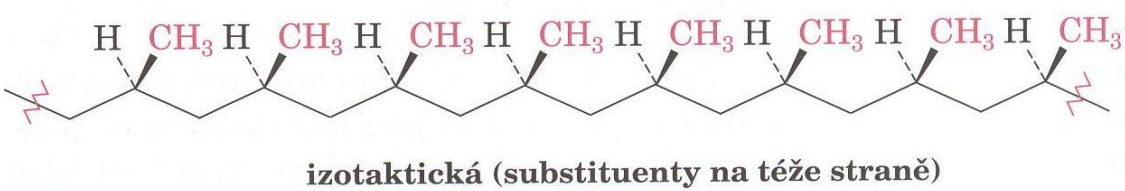


Polyakryláty – vteřinové lepidlo

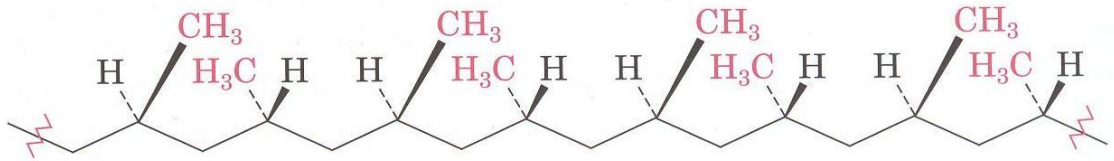


Ziegler-Natta katalyzátor

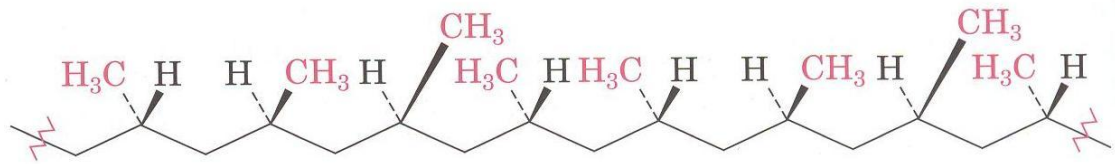




izotaktická (substituenty na téže straně)

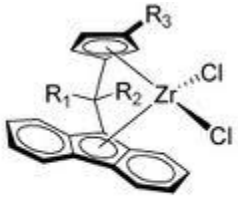


syndiotaktická (substituenty střídavě na obou stranách)



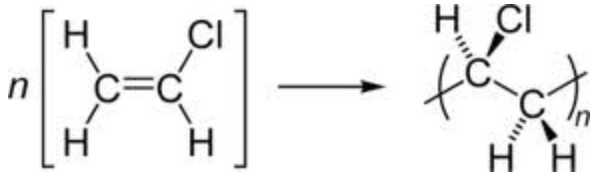
ataktická (substituenty náhodně rozložené)

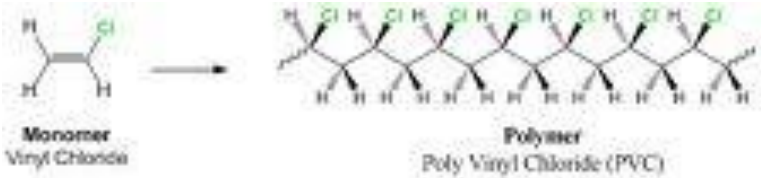
Moderní generace katalyzátorů na bázi zirkonocenů nebo titanocenů s methylaluminoxanem

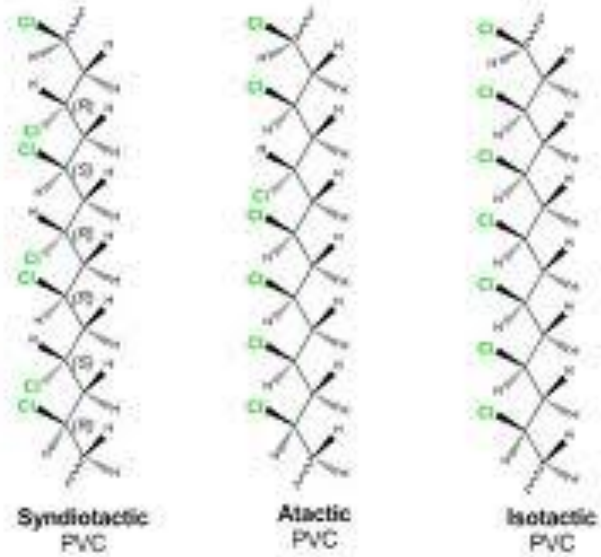


1-5	$R_1 = R_2 =$ Me	R_3 = H, Me, *t*Bu, cHex, Ph
6	$R_1 = R_2 =$ Ph	R_3 = H
7	R_1 = Me, R_2 = Ph	R_3 = H

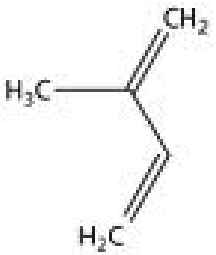
Polyvinylchlorid - PVC



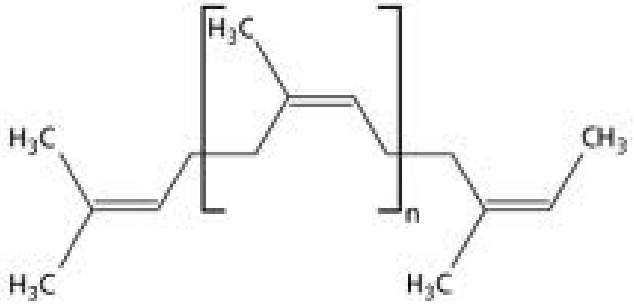




Polyisopren - kaučuk

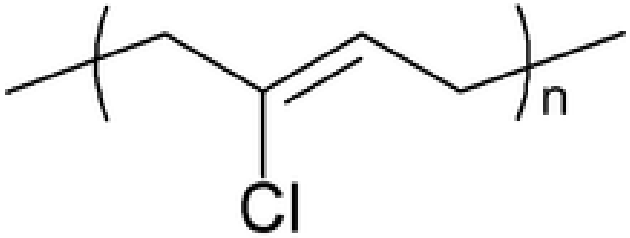


Isopren



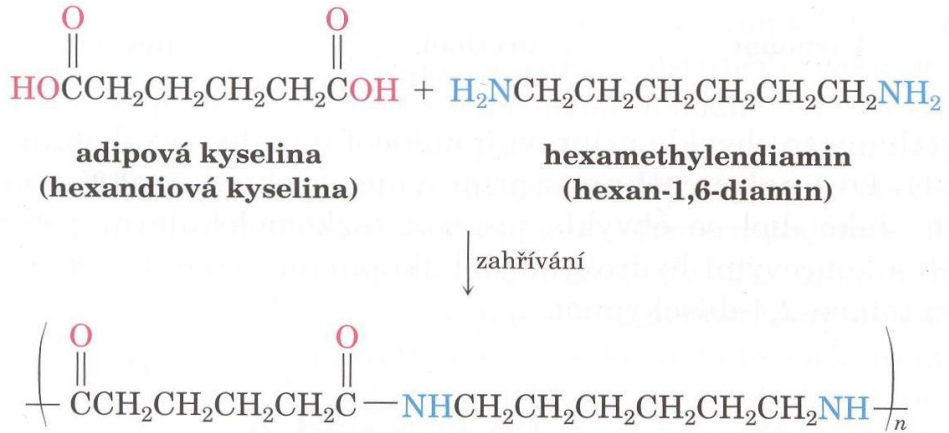
cis-1,4-Polyisopren

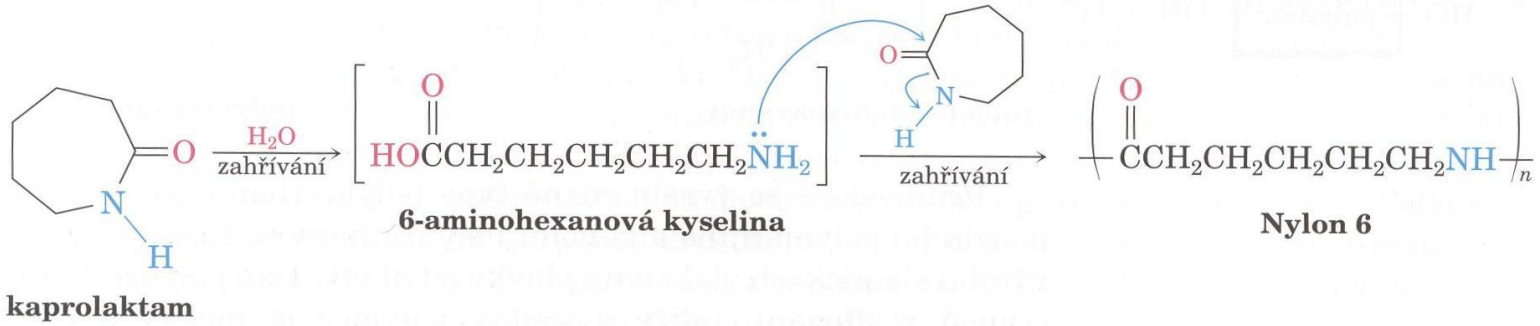
Polychloropen - neopren



Polymery se stupňovitým růstem

Polyamidy

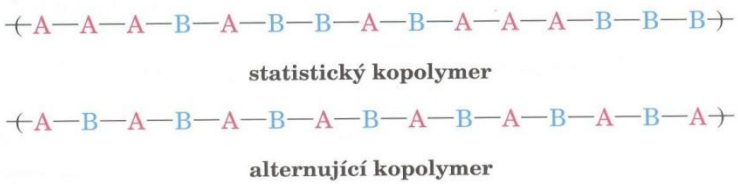


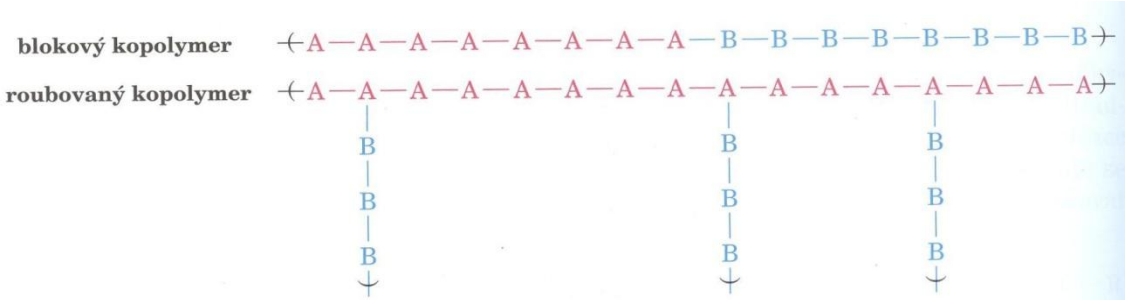


Kopolymerace a kopolymery

TABULKA 31.1 Některé běžné kopolymery a jejich použití

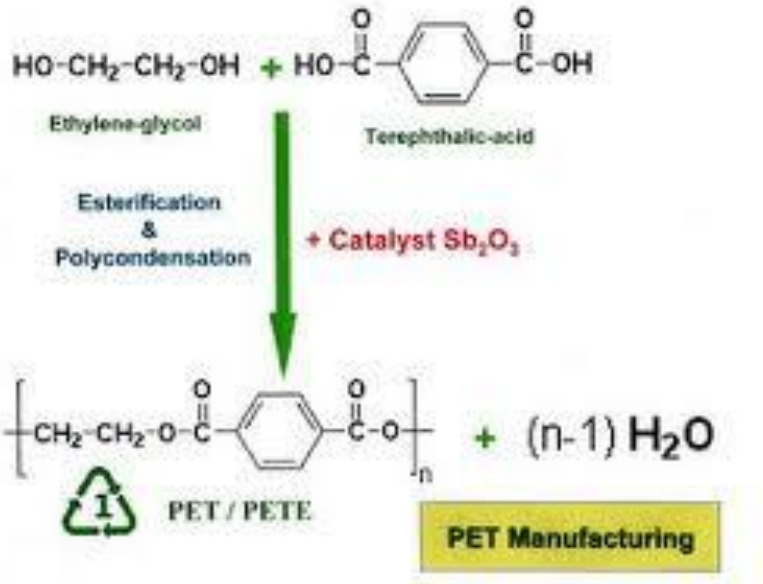
Monomery	Struktura	Název polymeru	Použití
vinylchlorid (20 %) vinylidenchlorid (80 %)	$H_2C{=}CHCl$ $H_2C{=}CCl_2$	Saran	obaly na potraviny vlákna
styren (25 %) buta-1,3-dien (75 %)	$H_2C{=}CHC_6H_5$ $H_2C{=}CHCH{=}CH_2$	butadien-styrenový kaučuk	pneumatiky, gumárenské zboží
hexafluorpropen vinylidenfluorid	$F_2C{=}CFCF_3$ $H_2C{=}CF_2$	Viton	těsnění, tmely
akrylonitril buta-1,3-dien	$H_2C{=}CHCN$ $H_2C{=}CHCH{=}CH_2$	nitrilový kaučuk	lepidla, hadice na benzín
isobutylen isopren	$H_2C{=}C(CH_3)_2$ $H_2C{=}C(CH_3)CH{=}CH_2$	butylkaučuk	duše do pneumatik
akrylonitril buta-1,3-dien styren	$H_2C{=}CHCN$ $H_2C{=}CHCH{=}CH_2$ $H_2C{=}CHC_6H_5$	ABS (iniciály monomerů)	potrubí, nárazuvzdorné materiály



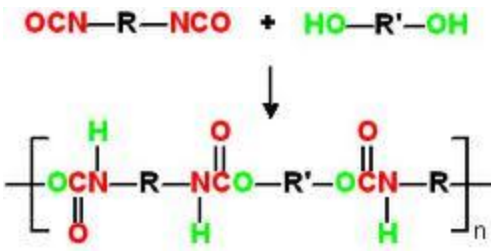


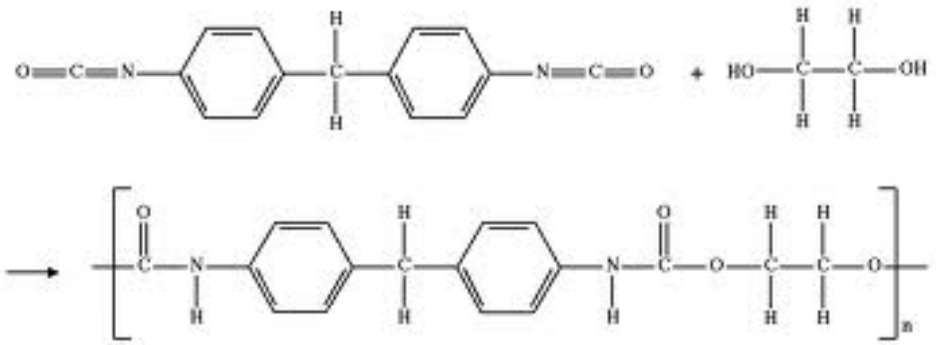
Polyestery

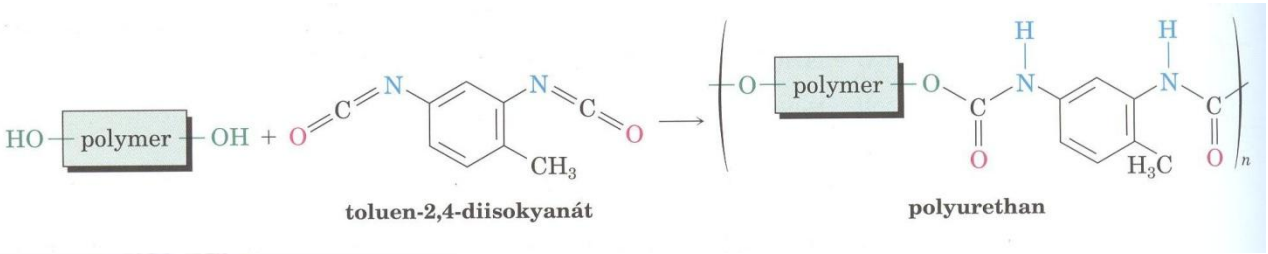
Polyethylenglykol-tereftalát (PET)

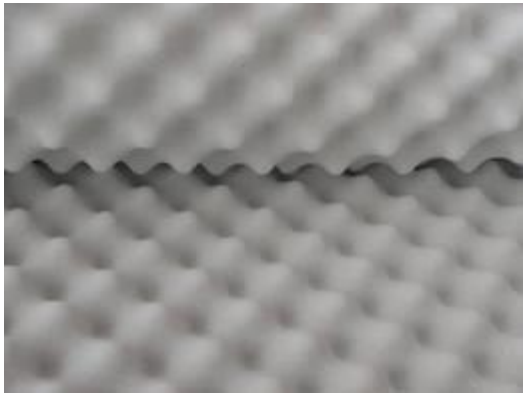


Polyurethany

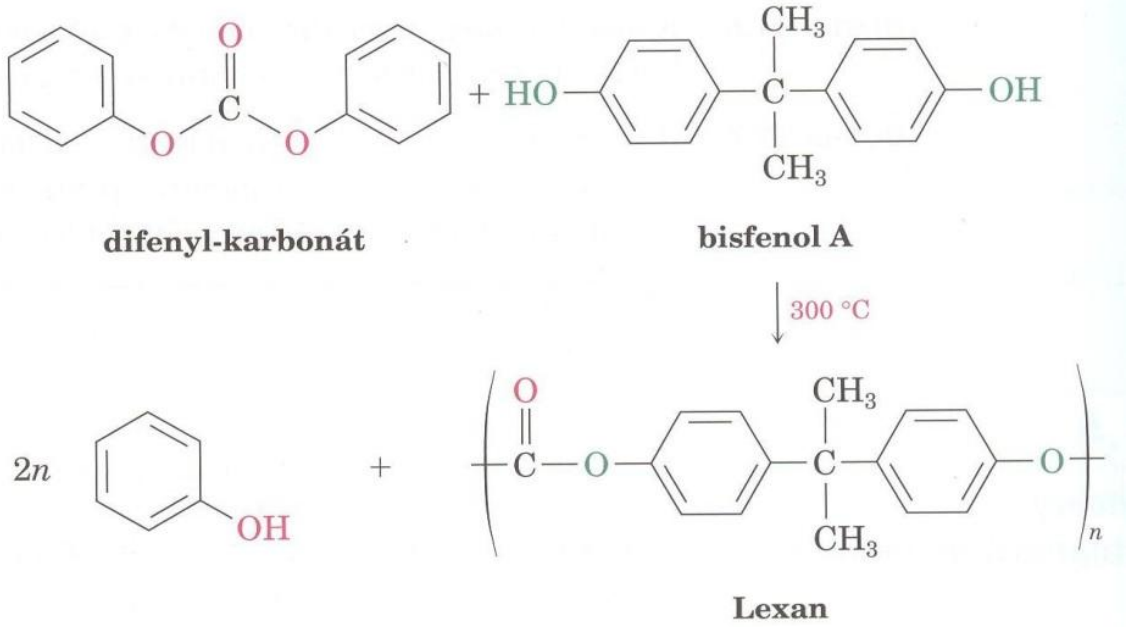








Polykarbonáty



Fenol-formaldehydové pryskyřice - bakelit