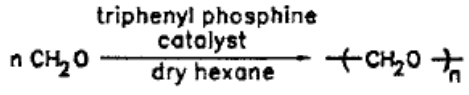
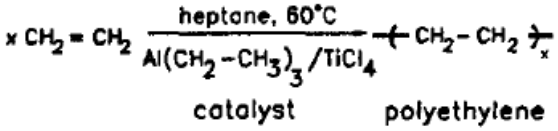
B.01) TABLA de HOMOPOLÍMEROS LINEALES con sus MONÓMEROS

Funcionalidad de los Monómeros

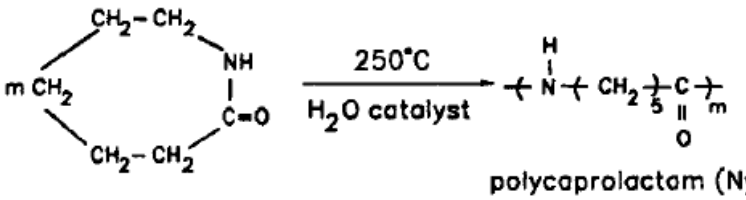
Los polímeros lineales se obtienen con monómeros de funcionalidad 2.
Ejs:



(1-3)

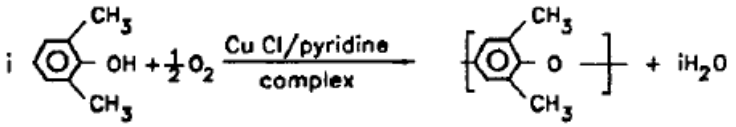


(1-4)



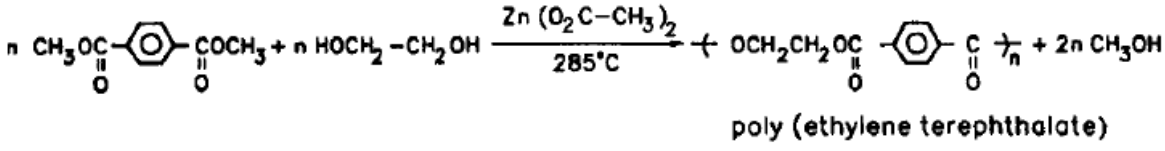
(1-5)

1-13



(1-6)

1-14



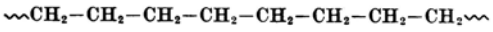
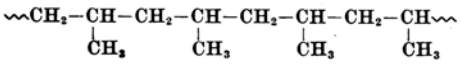
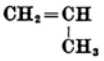
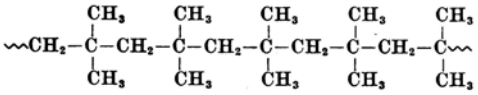
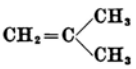
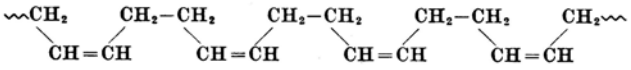
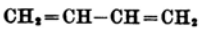
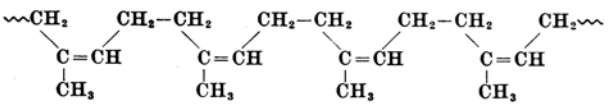
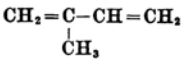
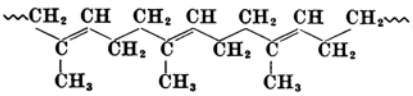
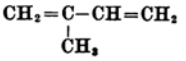
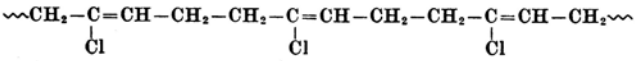
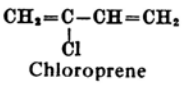
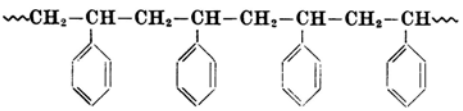
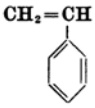
(1-7)

Para formar polímeros ramificados y/o redes infinitas se requieren monómeros de funcionalidad 3 ó mas.

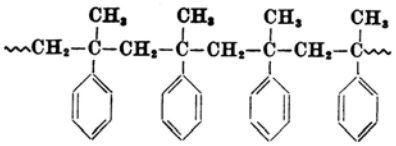
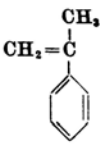
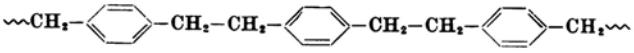
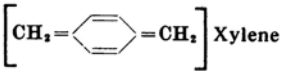
1) Polímeros conteniendo sólo átomos de C en la Cadena Principal (Crecimiento de Cadena)

a) Monómeros Vinílicos (R-HC=CH_2) y Diénicos (H_2C=CR–HC=CH_2):

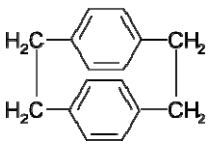
TABLE 12. Structural Formulas of Macromolecular Compounds

Name	Chain Structure	Monomers
1. Polymers with C–C-Chains		
Polyethylene (Alathon, Hostalen, Marlex)		
Polypropylene		
Polyisobutylene (Vistanex)		
Poly-cis-1,4-butadiene		
Poly-cis-1,4-isoprene (Natural Rubber)		
Poly-trans-1,4-isoprene (Guttapercha, Balata)		
Poly-chlorobutadiene (Polychloroprene, Neoprene)		 Chloroprene
Polystyrene		

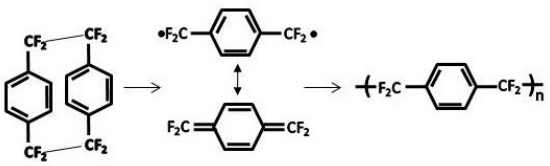
Goma Butílica: copolímero de isobutileno con 2-4% de isopreno (uso en tuberías y cámaras de neumáticos)

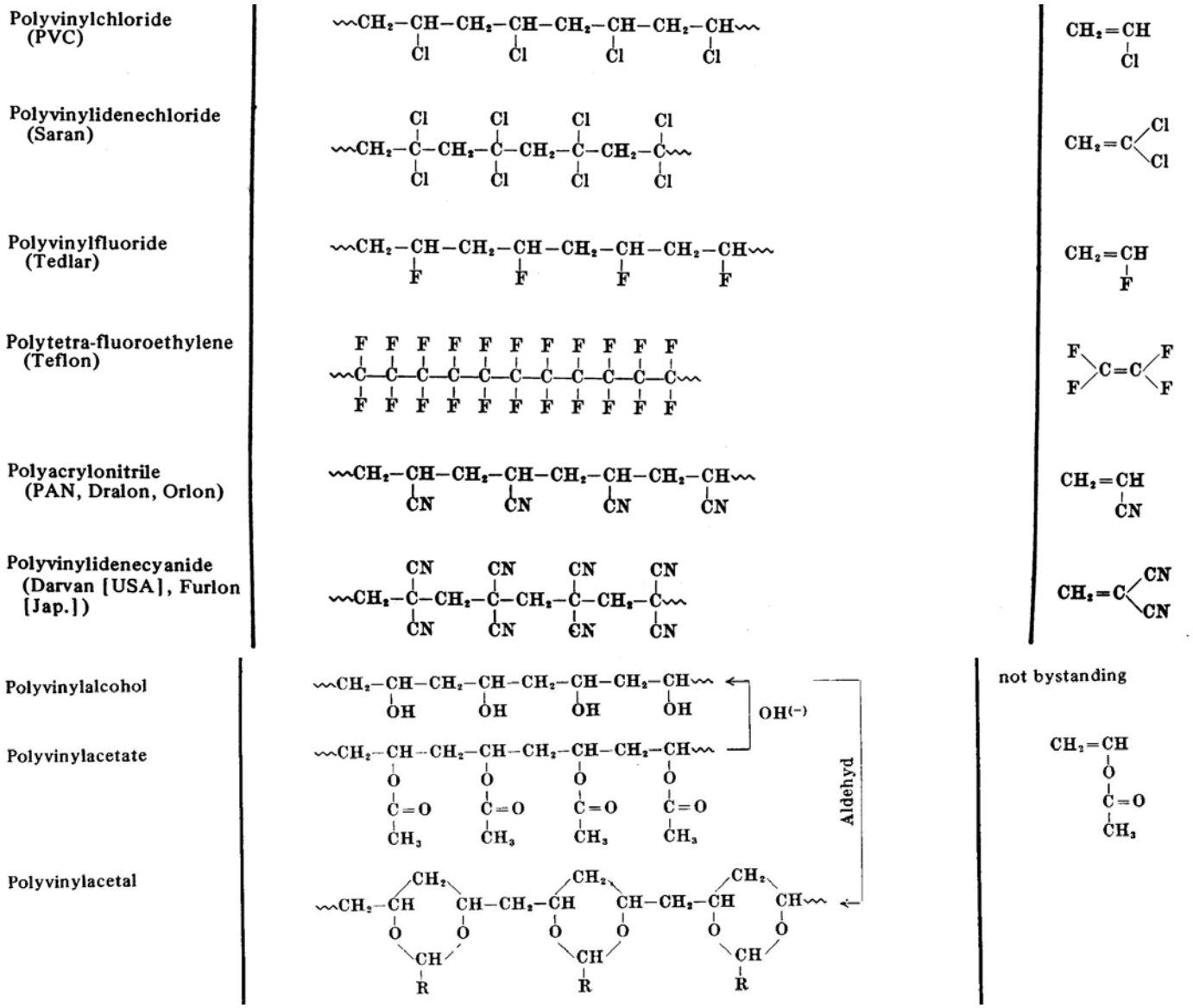
Poly-α-methylstyrene		
Poly-p-xylene		 Xylene

Poli(p-xyleno) o **Parylene®:** es hidrofóbico y se usa para recubrir circuitos electrónicos, stents coronarios, etc. El "**xilene"** es un intermediario que polimeriza espontáneamente a T ambiente sin necesidad de iniciador, de catalizador o de solvente (química verde). El polímero se obtiene a partir del "dímero":

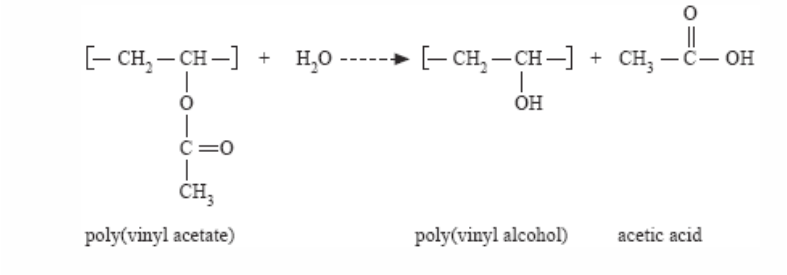


Parylene fluorinado: Como el PTFE, es muy resistente a agentes oxidantes. Se usa como protector de LEDs, luces, etc. a la intemperie.

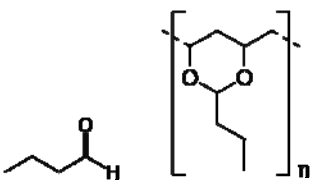




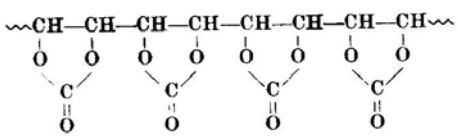
Poli(alcohol vinílico) se obtiene por alcohólisis del **poliacetato de vinilo** (con alcohol etílico). La razón es que no existe el monómero alcohol vinílico CH_2=CH_2OH (tautómero inestable del acetaldehído).

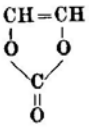


Poli(vinil acetal) más importante: **Poli(vinil butiral**) o **PVB**, que se obtiene por reacción del poliol con butiraldehído. Se usa en aplicaciones que requieran gran poder adhesivo, claridad óptica, tenacidad y flexibilidad (p.ej., en vidrios laminados para parabrisas).

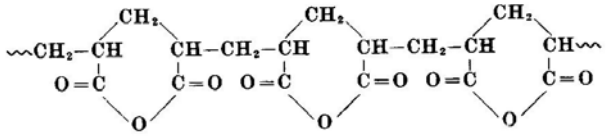


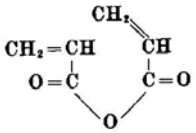
Polyvinylenecarbonate



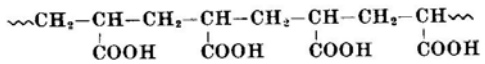


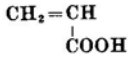
Polyacrylicanhydride



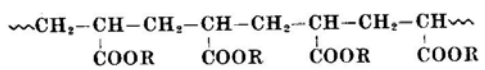


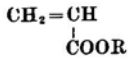
Polyacrylicacid



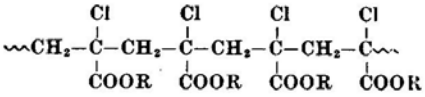


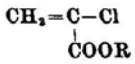
Polyacrylates



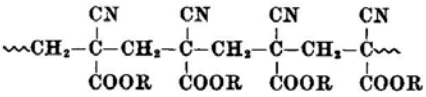


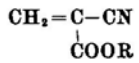
Poly-α-chloracrylate



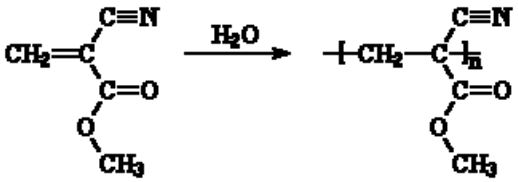


Poly-α-cyanoacrylate

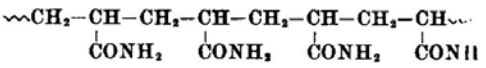


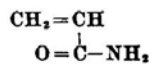


Poli(ciano acrilato): es un adhesivo (“la gotita”) no tóxico, que se usa para pegar piel. El monómero es un líquido que polimeriza en presencia de trazas de agua.

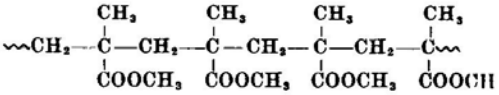


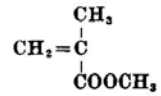
Polacrylamide



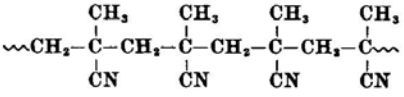


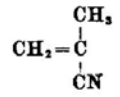
Polymethylmethacrylate (Plexiglas, Lucite)



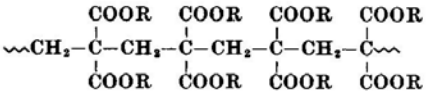


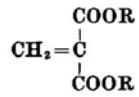
Polymethacrylonitrile



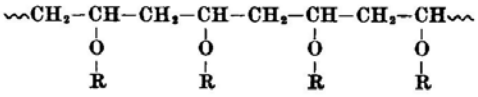


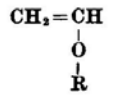
Polymethylenemalonate



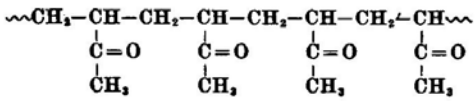


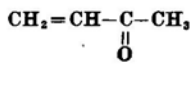
Polyvinylethers



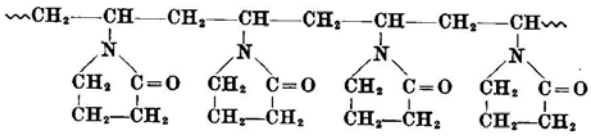


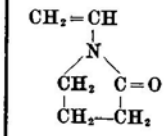
Polyvinylmethylketone



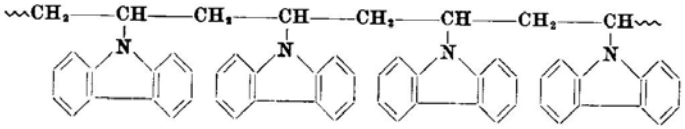


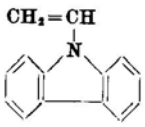
Polyvinyl-pyrrolidone





Polyvinyl-carbazole

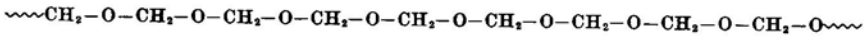


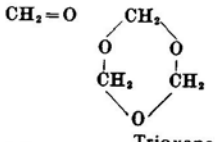


2) Polímeros con Heteroátomos en la Cadena Principal

a) Polimerizaciones por Apertura de Anillo

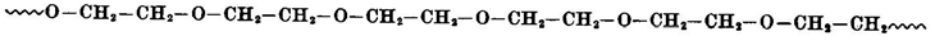
Polyformal-dehyde or Poly-oxy-methylene (Delrin, Celcon)

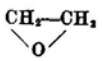




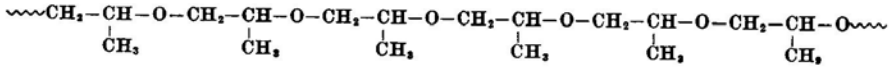
Trioxane

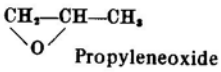
Polyethylene oxide





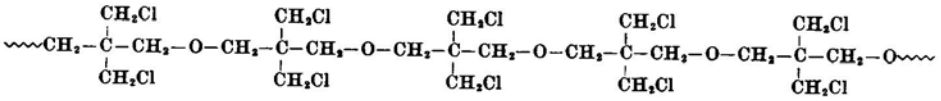
Polypropylene-oxide

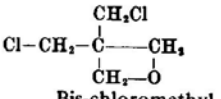




Propyleneoxide

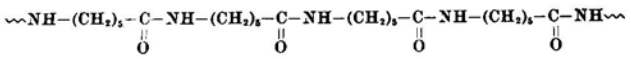
Poly-di-chloro-methyloxa-cyclobutane (Penton)

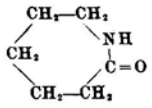




Bis-chloromethyl-oxacyclobutane

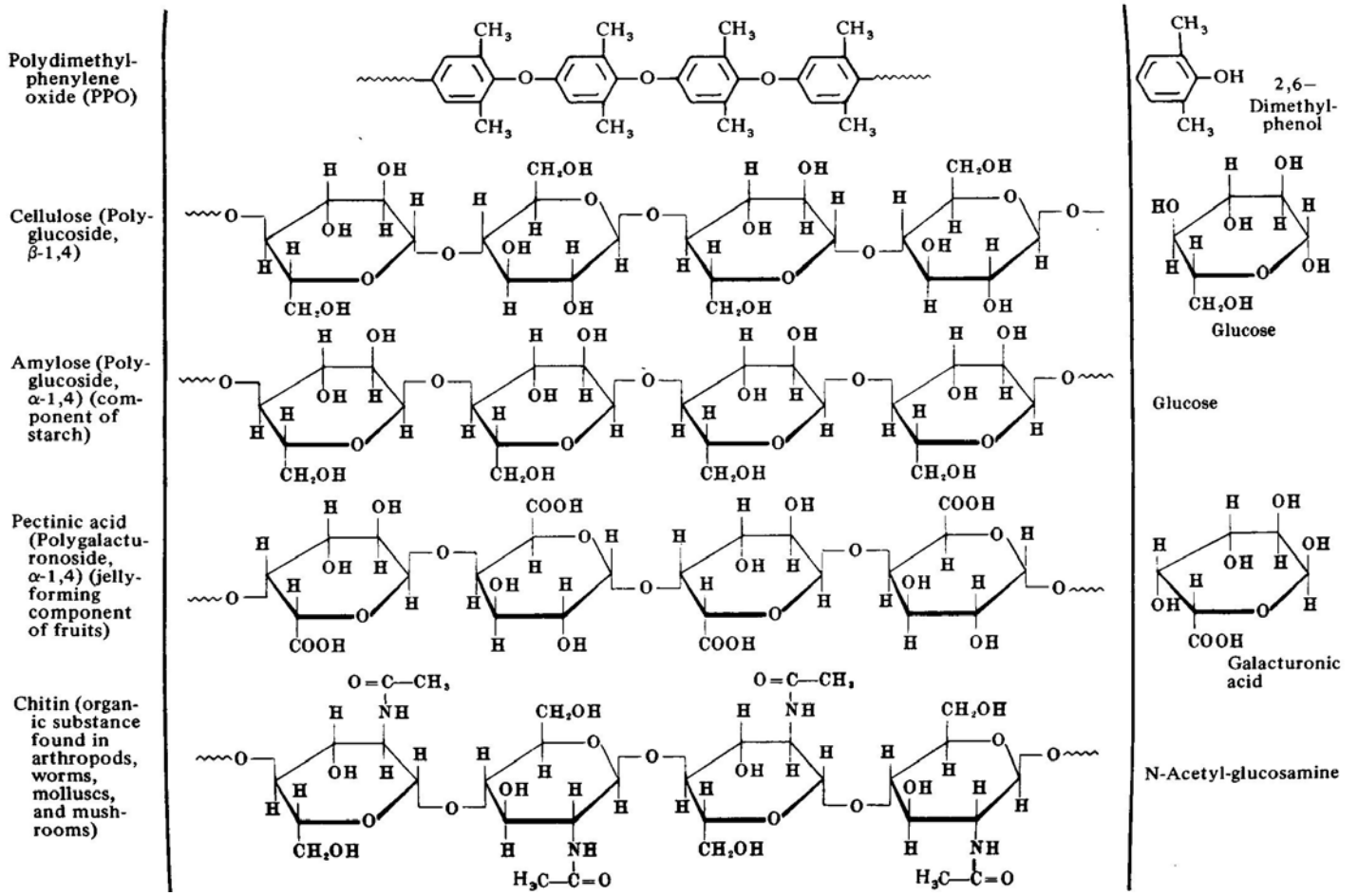
Polycaprolactam = = Nylon 6 (Perlon, Caprolan)



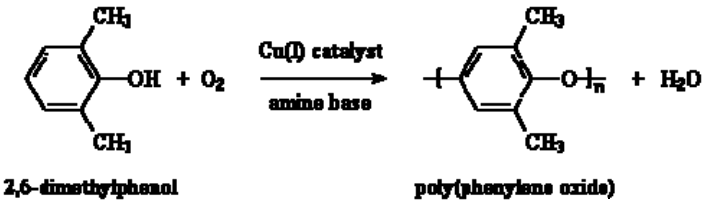


ε-Caprolactam

b1) Polimerizaciones por Pasos con 1 Monómero



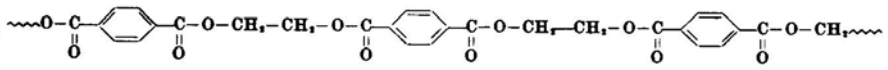
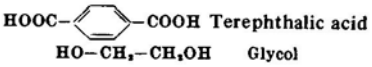
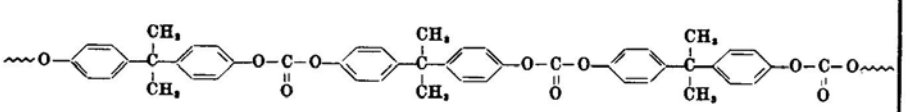
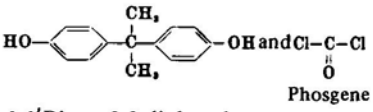
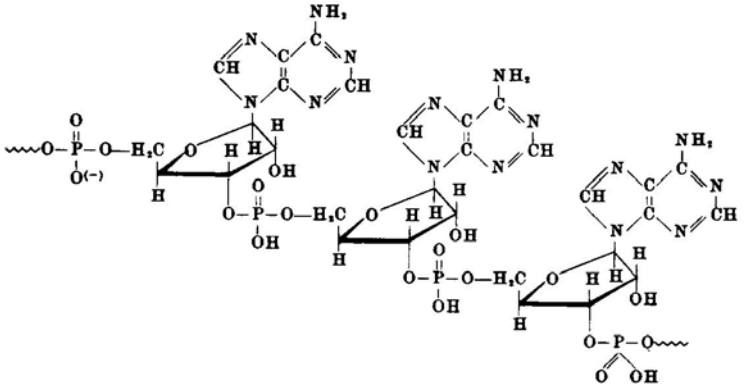
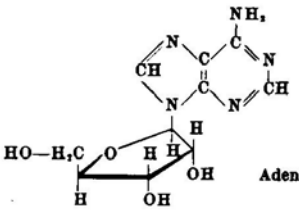
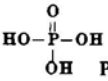
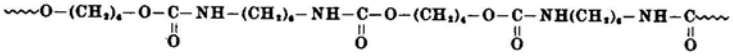
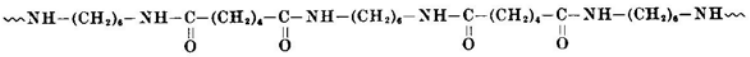
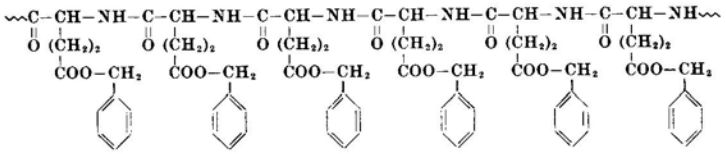
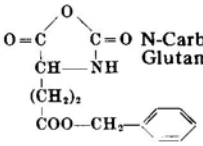
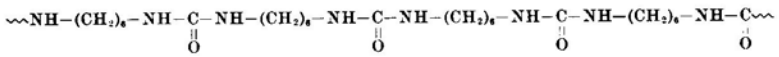
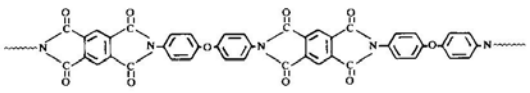
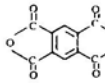
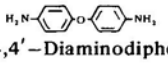
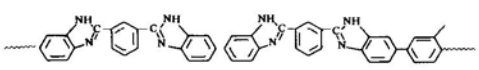
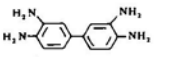
PPO: Tg = 210 ºC. Se usa en mezclas con HIPS.
Es una policondensación oxidativa del 2,6 dimetil fenol.

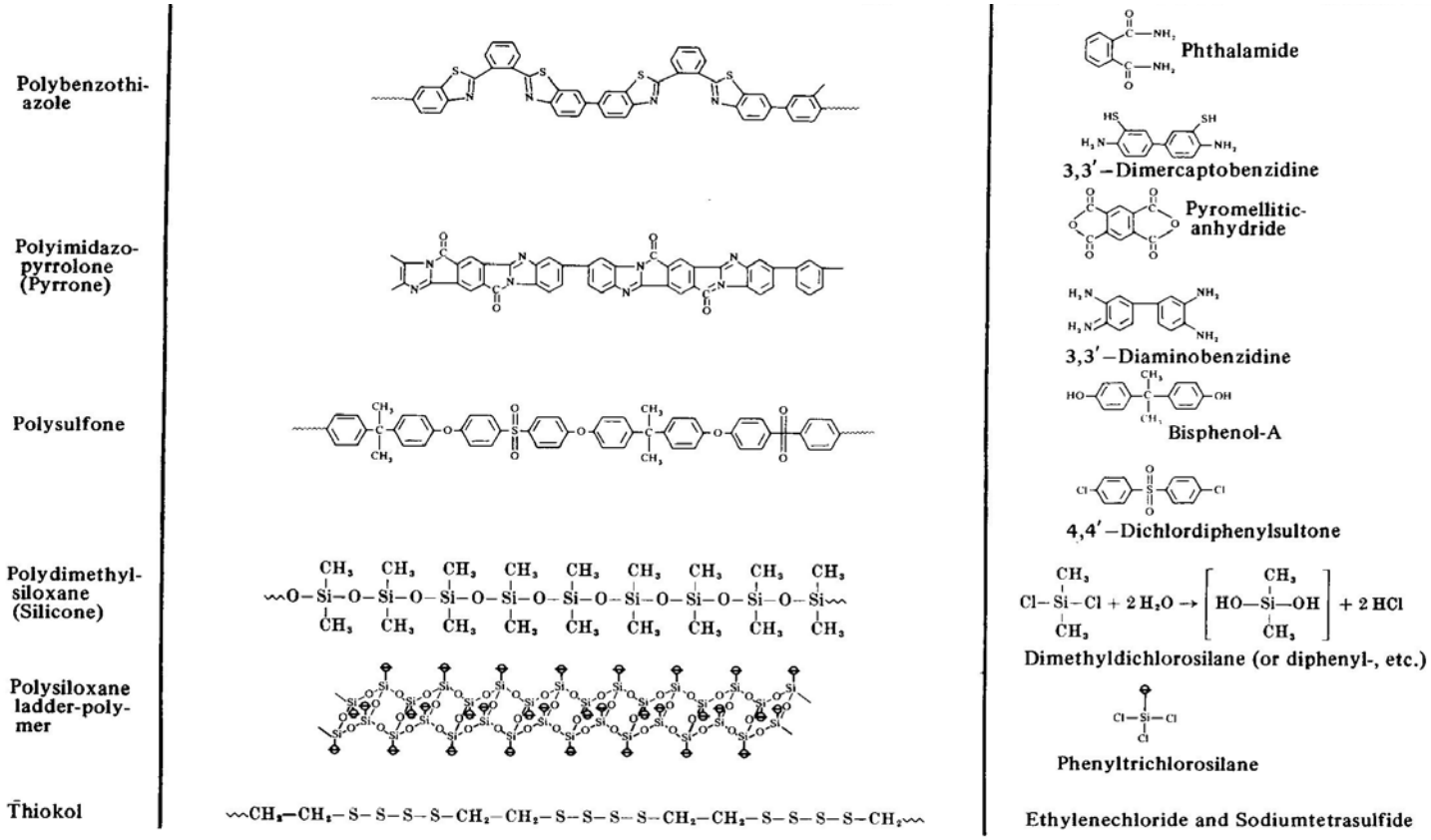


Celulosa (algodón, papel): presenta cadenas extendidas que forman cristales unidos por puentes H.

Amilosa (un constituyente del almidón): su conformación helicoidal generada por las uniones –O– impide la cristalinidad, y es hidrosoluble.

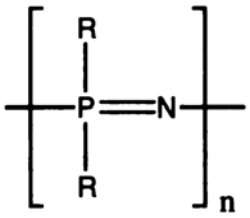
b2) Polimerización por Pasos con 2 Monómeros

Polyethylene-glycol-terephthalate (Dacron, Terylene, Trevira, Mylar)		 HOOC–C₆H₄–COOH Terephthalic acid HO–CH₂–CH₂OH Glycol
Poly-dioxy-diphenylpropane-carbonate (Polycarbonate of Bisphenol-A) (Lexan, Makrolon)		 and Phosgene 4,4′Dioxy-2,2-diphenylpropane (Bisphenol-A)
Poly-adenyl-ribose-phosphate (with RNA, in addition to adenine, there are 3 other bases: cytosine, guanine and uracil; with DNA, thymine replaces uracil among the 4 bases and the OH-group on the C_2 of the ribose is missing)		 Adenylribose and  Phosphoric acid
Polyurethane from hexamethylene-diisocyanate and butane-diol		O=C=N–(CH₂)₆–N=C=O Hexamethylenediisocyanate and HO–(CH₂)₄–OH
Nylon-6,6		Hexamethylenediamine and Adipic acid
Polybenzyl-glutamate		 N-Carboxyanhydride of Glutamic acid-benzylester
Polyurea		Hexamethylenediisocyanate and Hexamethylenediamine
Aromatic Polyimide (Kapton-Film, Pyre-ML-Coating)		 Pyromellitic anhydride (PMDA)  4,4′–Diaminodiphenylether
Polybenzimi-dazole (Imidite)		 Isophthalic acid  3-3′–Diaminobenzidin

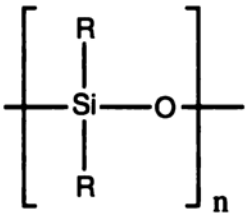


Principales clases de polímeros inorgánicos

Polifosfacenos



Polisiloxanos
(mal llamadas siliconas)



Polisilanos