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POLYMERS

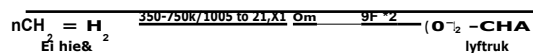
Important Addition Polymers

Polyolefins

1. Polythene

Polymer of ethylene or ethene

(a) Low density polythene (LDP)



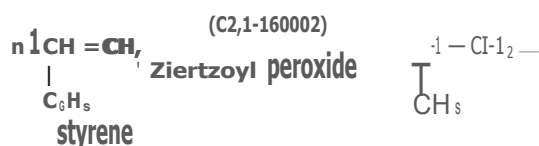
(10 Flizirk density polythene (1-11DP)



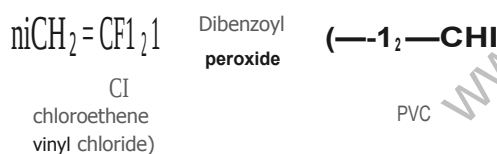
Polyacrylonitrile



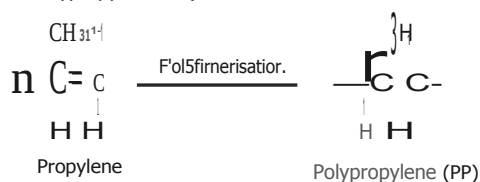
2_ Polystyrene (Styrone)



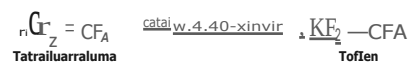
3_ Polyvinylchloride (PVC)



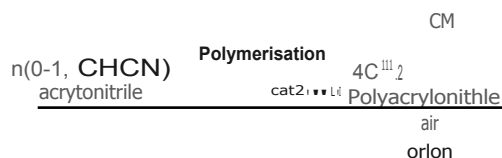
4_ Polypropylene (PP)



5_ Polytetrafluoroethene (Teflon)



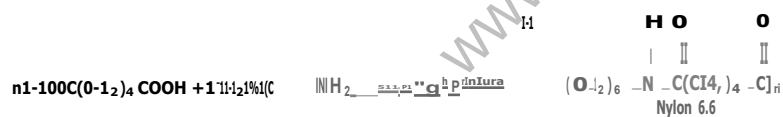
E. Polyacrylonitrile



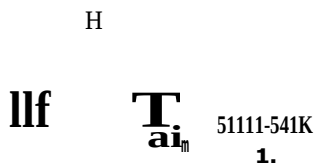
Condensation polymers

Polyamide

(a) Nylon 6, 6 Is prepared by the condensation polymerization of hexamethylenediamine with adipic acid under high pressure and at high temperature.



(b) Nylon 6. It is obtained by heating caprolactam with water at a high temperature.



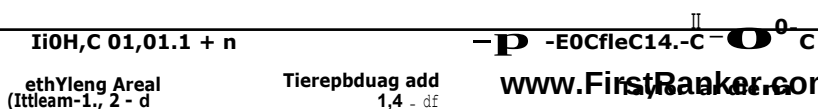
Fig

Ciprolactam

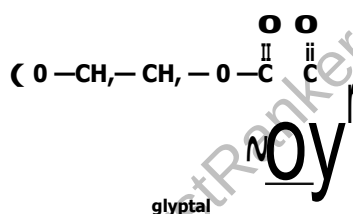
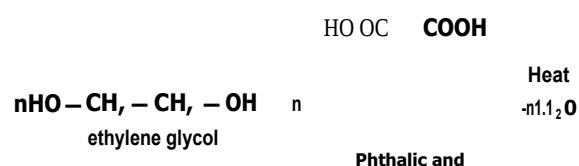
PIYket

Polyesters

(a) Terylene or Dacron : It is manufactured by heating a mixture of ethylene glycol and terephthalic acid at 420 to 450 °C in the presence of zinc acetate-antimony trioxide catalyst.



2. Glyptal



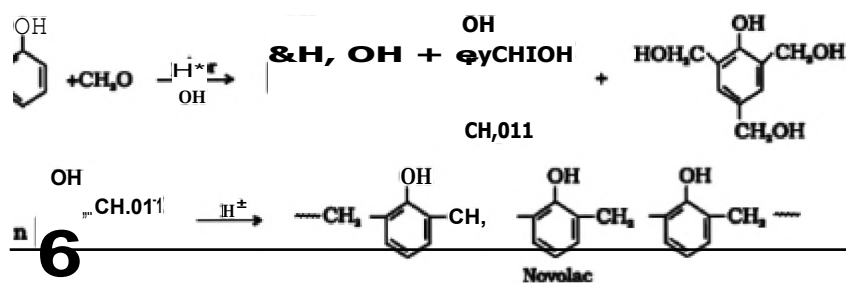
Polymethylmethacrylate

The polymer is known by several commercial names such as lucite, acrylic, plexiglass and perspex.

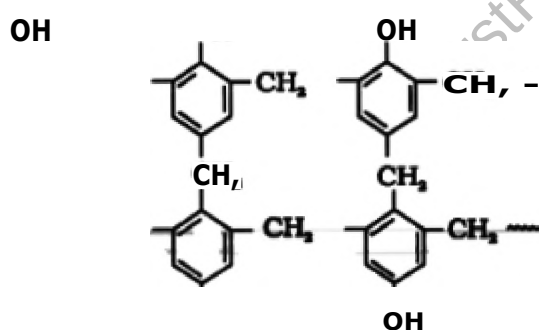
Resins

1. Phenol-Formaldehyde Polymer

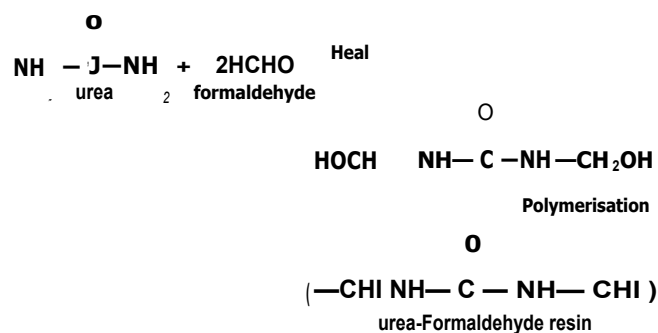
These polymers are obtained by the condensation reaction of phenol with formaldehyde in the presence of either acid or a base catalyst. The reaction involves the formation of methylene bridge at ortho, para or both ortho and para positions. A linear or cross linked material is obtained depending upon the condition of reaction.



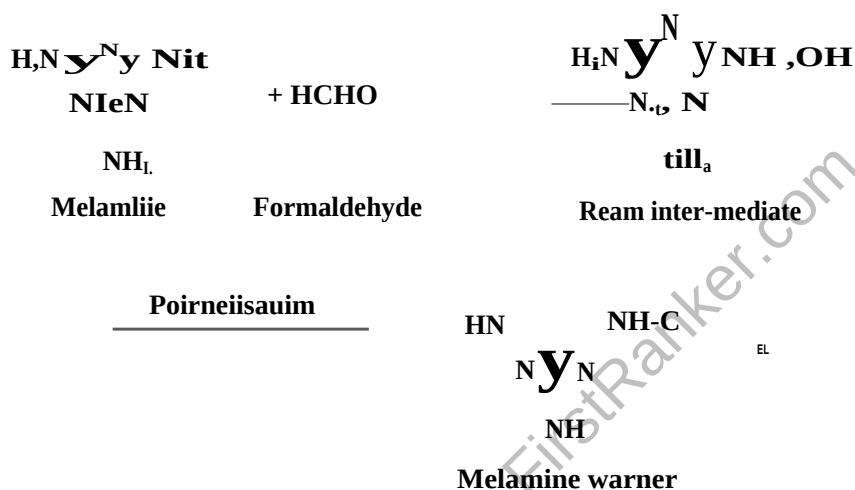
(13) Novolac on heating with formaldehyde forms Bakelite



2_ Urea-Formaldehyde Resin

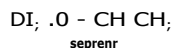


4_ Melamine-formaldehyde polymer : Melamine formaldehyde polymer is formed by the condensation polymerization of melamine and formaldehyde



4. Natural Rubber

Natural rubber is a collect linear 4-polymer of Isoprene.



{a) Natural rubber : Natural rubber is a linear polymer of isepararie (2-methyl-L, 3-butadieriell and is also called as cis-1, 4-polyisoprene.

air

Cit

ICI

Vulcanisation of Rubber

The properties of natural rubber can be modified by introducing -S-S- polysu lphide crasslinik& in its structure.

The process of heating a mixture of raw rubber with sulphur and an appropriate additive in a temperature range between 373K to 415 K to improve upon physical properties like elasticity, strength etc

CFI.

CH.
-C- CEI



Wow from fink' mlcailei elAtter

Synthetic rubber

(10.) Neoprene or polychloroprene

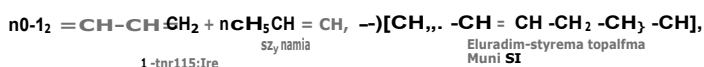


(13) Buna - N



(C) Buta - 5

C₈H₁₅



Biopolymers and Biodegradable Polymers

Aliphatic polyesters are the common examples of biodegradable Polymers.

(a) Poly(11-hydroxybutyrate-co-11-hydroxyvalerate) (PHBV):

It is obtained by the copolymerization of 3-hydroxybutyric acid and 3-hydroxyvaleric acid

OF t CH
 E.11-eII-CK,, -CDOH # CH-Lif_t-C1-1-CI-4-00011

1 •Hydrrayhtitanoin mad 3-1-1ydrucrigegasumic bad

(11)111-C
 1-761-CH

{IA Nylon 2-nylon 6 : It is an alternating polyamide copolymer off glytine - 04₂ - coogj. and amino
 cdprolc acid .0H,¹*C1-id CCxDFI)

n -COOP-I⁺ ,N - (CH₂ -COOH
 Gboine Amino aprovit acid

(CHA

Seine polymers;

S.N	None of polymer	Class of polymer	ridameis of irionomeris	Uses
t.	Dyne!	Copolymer	Vinyl chloride and acrylonitrile	Human hair wigs
	Glyiptal	Copolymer	Ethylene glycol and phthalic acid	In paints
3.	Thiokol	Condensation	Ethylene chloride and sodium (Polysulph hie rubber)	Rubber tetra sulphide
4.	Superglue	Flornopolyrrver	Methyl , -tyarioatrylate	Glue
5.	Keylar	Polya mile condensation	Tereonthalic acid chloride and p-phenylene diamine	Bullet proof vests and helmets
6.	Nlornex	Polyamide condensation	m-phthalic add and m- din itroben zene	Protective clothes for race car drives and fire fighters.
7.	Lexan	Folycarbonate	Ditthylearbonate arid bisphenol Ester condensation	Bullet proof windows. and helmets
- 1)	Polyurethane or Therrnocole	Copolyrrrher glycol	Toluene di Isocyanate LI : ethylene	For padding and building insulation
(ix)	Saran	Copolymer chloride	Vinyl chloride and vinyl idene	Bumpers