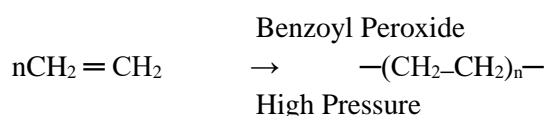




Polyethylene (PE):

It is obtained by the polymerization of ethylene. Low Density Polyethylene (LDPE) and High Density Polyethylene (HDPE) are the homopolymers of ethylene

LDPE: It is a linear polymer with branching. It is manufactured under high pressure (1000-3000 atm) and in the temperature range of 80-350 C using benzoyl peroxide as catalyst.

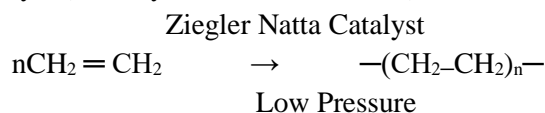


Ethylene

Polyethylene

Polymer molecules have lots of branching and molecules unable to pack closely

HDPE: It is a linear polymer with little or no branching. It is produced under low pressure using Ziegler-Natta catalyst (Tri ethyl aluminium & TiCl₄)



Ethylene

Polyethylene

Polymer molecules have little or no branching and are able to arrange closely

Properties

Property	Density	Temp Range	Tensile Strength	Flexibility
LDPE	0.92	107-120 C	85-136	Flexible
HDPE	0.95	130-178 C	204-313	More Rigidity

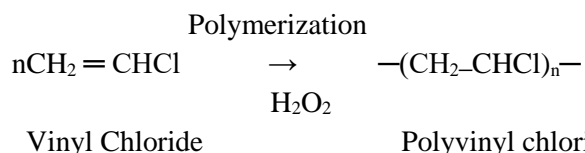
Uses: LDPE- Food, Garment packing, squeeze bottle, sheet, wire insulations

HDPE- Dustbins, milk bottles, drums, containers, cable insulations



Polyvinyl Chloride (PVC):

It is obtained by heating a water emulsion of vinyl chloride in the presence of a small amount of benzoyl peroxide or hydrogen peroxide in an autoclave under pressure.



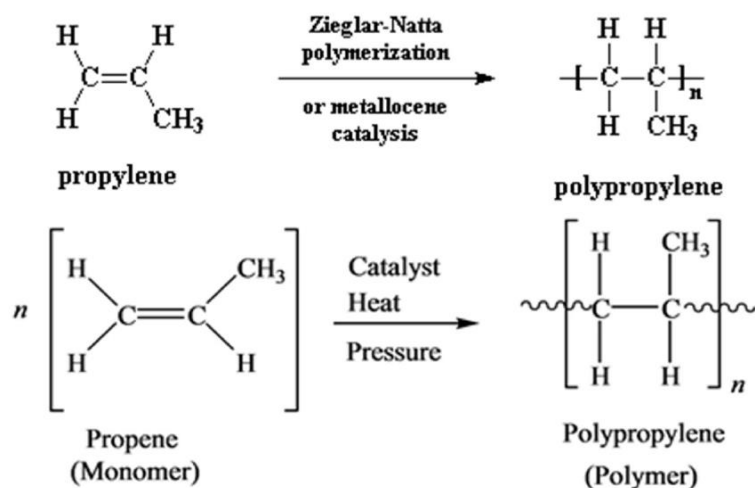
Properties: PVC is non flammable, chemically inert powder. It is colourless and odourless. It shows resistance to light and atmospheric oxygen. It undergoes degradation in the presence of heat and light.

Uses: It is used for making sheets which are employed for tank lining, light fitting, safety helmets, refrigerator components, mudguards etc.,

It is used in the production of pipes, cable insulators, table covers, and rain coats etc.,



Polypropylene



Properties:

- Lightweight with a density of $\sim 0.91 \text{ g/cm}^3$.
- Semi-crystalline structure with a melting point around 160°C .
- High clarity (in certain grades) and smooth finish.
- High tensile strength and rigidity.
- Excellent impact resistance, especially in copolymer grades.
- High thermal stability and melting temperature.
- Low thermal conductivity, making it a good insulator.
- Resistant to most chemicals, acids, alkalis, and organic solvents.
- Low water absorption (hydrophobic).
- Excellent electrical insulating properties.

Uses:

- Used in food containers, beverage bottles, caps, and films due to its non-toxic and moisture-resistant properties.
- Used in carpets, upholstery, ropes, and geotextiles.
- Battery cases, and dashboards due to its toughness and lightweight.
- Syringes, vials, and medical instruments due to its sterilizability and chemical resistance.
- Furniture, storage boxes, and kitchenware.
- Pipes, sheets, and tanks because of its resistance to corrosion and chemicals.