

## SNS COLLEGE OF TECHNOLOGY



## **COMMERCIAL THERMOPLASTICS:**

## 2.6.1 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 benoyl peroxide as catalyst.

Benzoyl Peroxide  $nCH_2 = CH_2 \qquad \rightarrow \qquad -(CH_2 - CH_2)_n -$  High Pressure

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 & TiCl<sub>4</sub>)

Ziegler Natta Catalyst  $nCH_2 = CH_2$   $\rightarrow$   $-(CH_2-CH_2)_n-$ Low Pressure

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