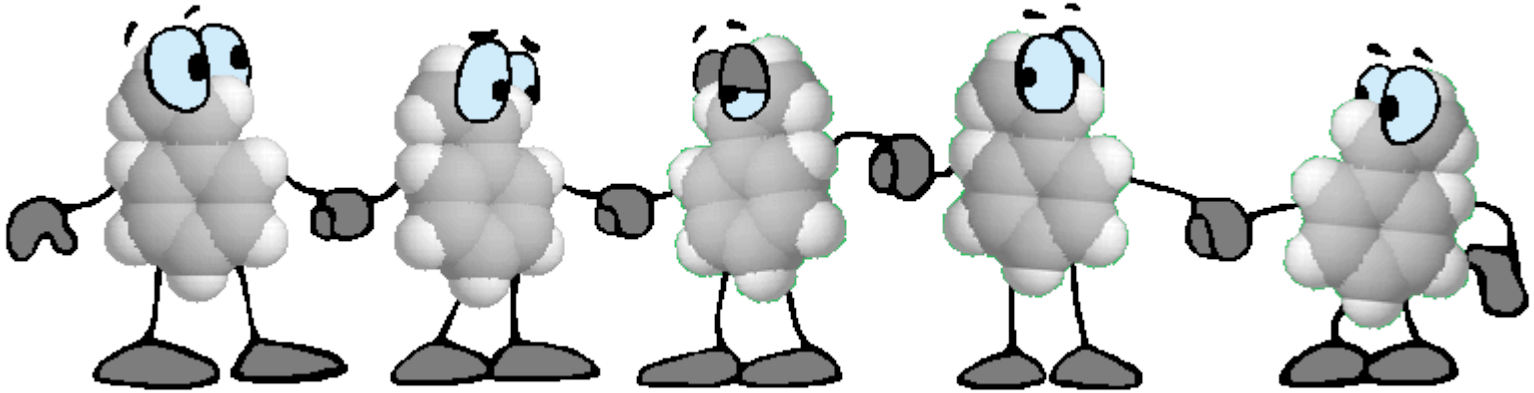
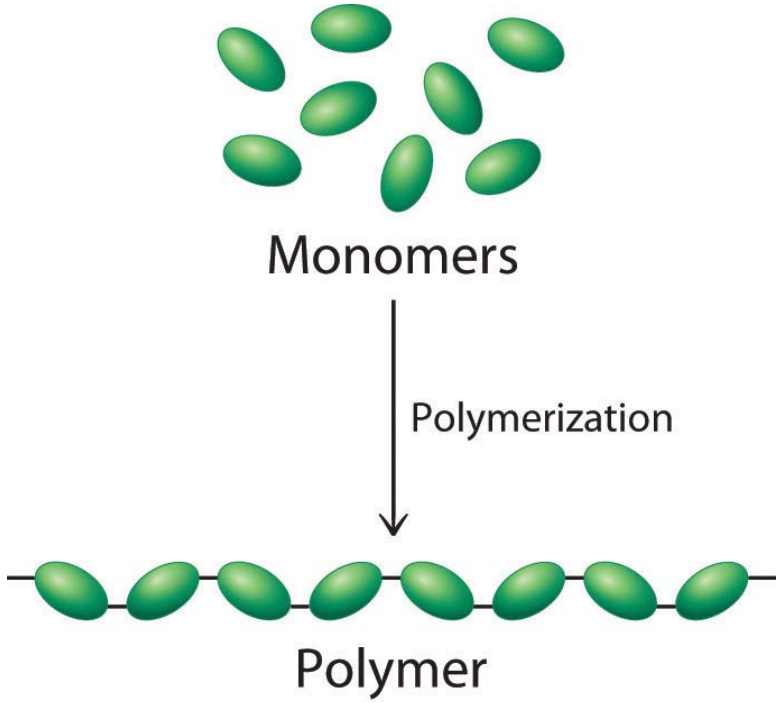
What is a Polymer?



A chemical compound that is made of small molecules that are arranged in a simple repeating structure to form a large molecule

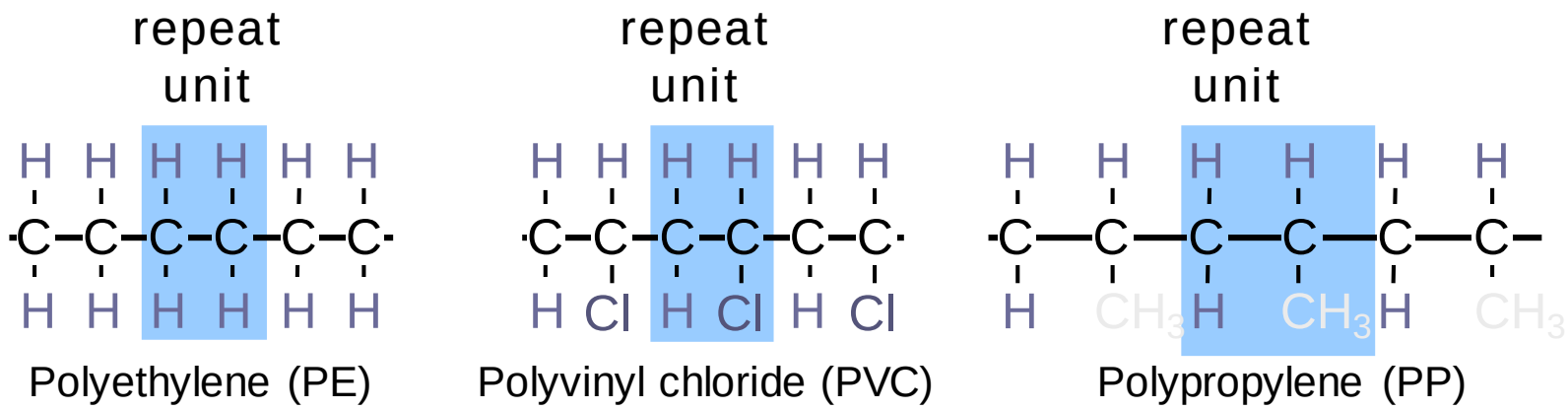


What is a polymer?

Very Large molecules structures chain-like in nature.

Poly — many

mer — repeat unit



Polyethylene (PE)

Polyvinyl chloride (PVC)

Polypropylene (PP)

Ancient Polymer History

- Originally natural polymers were used

  - Wood – Rubber
  - Cotton – Wool
  - Leather – Silk

Synthetic and Biological Polymers

Polymers: Macromolecules formed by the covalent attachment of a set of small molecules termed monomers.

Polymers are classified as:

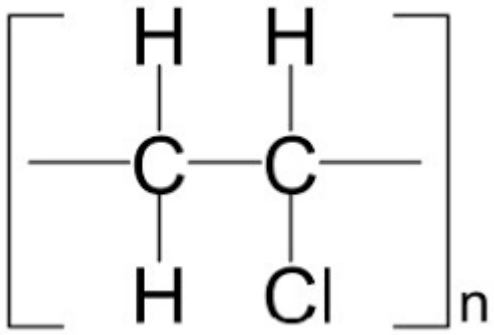
(1) Man-made or synthetic polymers that are synthesized in the laboratory;

(2) Biological polymer that are found in nature.

Synthetic polymers: nylon, poly-ethylene, poly-styrene

Biological polymers: DNA, proteins, carbohydrates

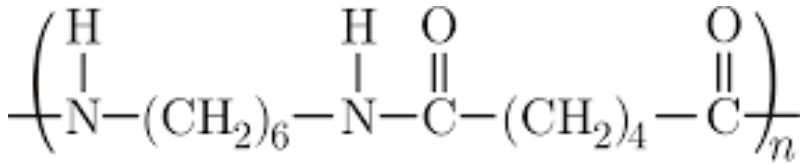
Pipe / Credit Cards



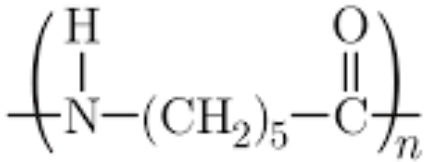
- Poly(vinyl chloride) (PVC) is used to make credit cards and pipes.
- PVC sheets are thin, so to make a credit card, two or three layers are glued together.
- This includes a layer with the printed information on it plus one or two clear ones.

Parachutes

- Polyamide, trade name nylon
- PA is specially useful because it is not only strong and durable, but it is also moisture resistant
- PA has an ample temperature resistance too, making it ideal for use in engineering components

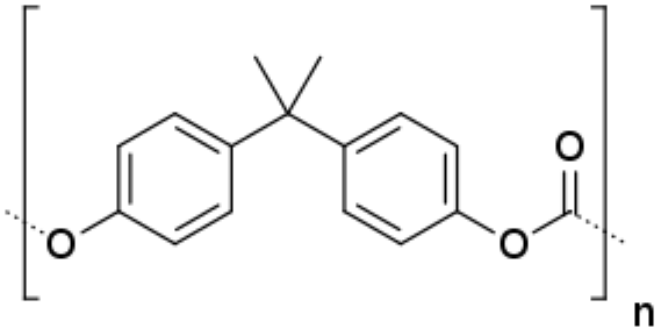


Nylon 66



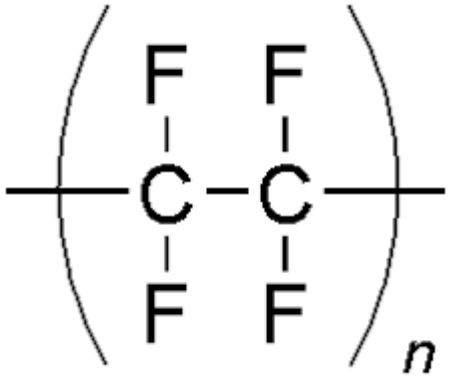
Nylon 6

Spectacles



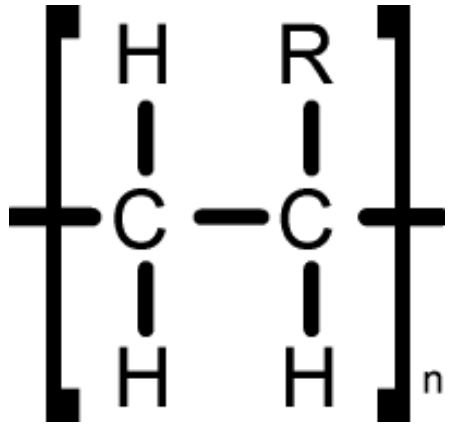
- Polycarbonate is one of the most versatile polymers
- It has been used to make high quality eyeglass lenses These lenses offer advantages over glass because they are lighter and thinner, and they offer UV protection
- They are also impact resistant, so you don’t have to worry about cracking or scratching them
- In fact the material is so strong that it is basically bullet proof

Cookwares



- Polytetrafluoroethylene, PTFE is used in making Teflon® and other nonstick cookwares
- It is a waxy, thermally stable, tough, corrosion resistant and non-flammable
- It can resist temperatures of up to 260 degree C.
- PTFE generates no smoke when exposed to high temperatures, a great asset in the kitchen

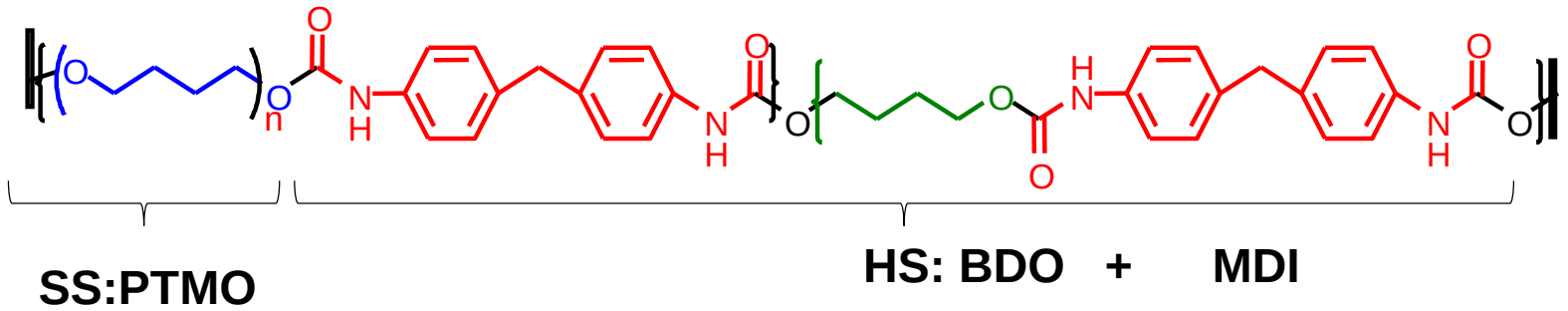
Construction and Remodelling



- Polyolefin (polyalkene) is widely used in the construction industry
- It is often used in the car to make it lighter
- This material is much more malleable than metal, designers can use plastic to come up with more aerodynamic and better-looking cars

Spandex Clothing Fibre

Pellethane® (Lubrizol)

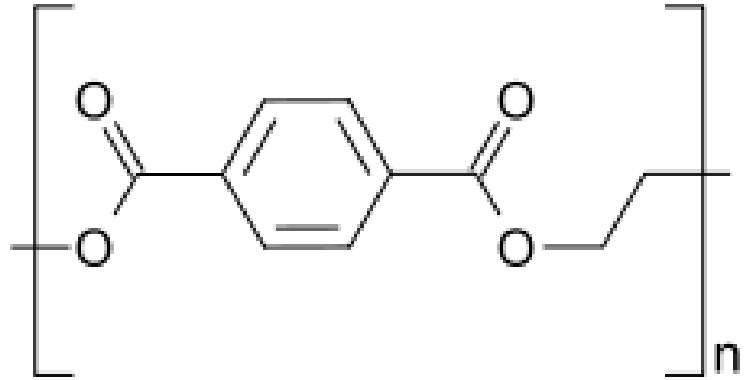


SS:PTMO

HS: BDO + MDI

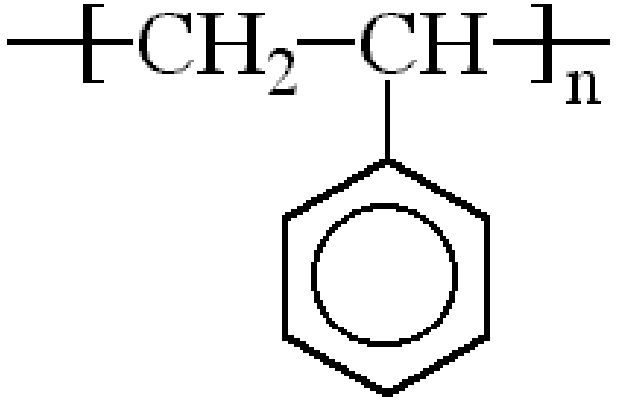
- Polyurethane, PU is a quick drying, highly elastic polymer, used to make apparel that stretches
- Spandex Clothing Fibre, like Lycra®, is made of PU and is used in a number of clothing items, including bathing suits, exercise clothing, leggins, skinny jeans, socks and wet suits
- Disposable diapers are made using spandex polymers

Water Bottles



- From peanut butter jars to soft drink bottles to milk containers, polyethylene terephthalate (PET) can be found in pretty much any container in your refrigerator
- This material is the most recyclable of all plastics, PET bottles collected for recycling never come back into the market as bottles. Instead the bottles are separated according to colors, crushed and shreded

Storage Containers



- Polystyrene, PS with limited flexibility is used
- It is often seen as the base material for packing peanuts Styrofoam® cups, takeout food containers, craft metals and more.