

# RING POLYMERS

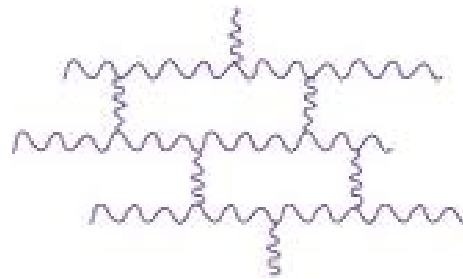
Background Information



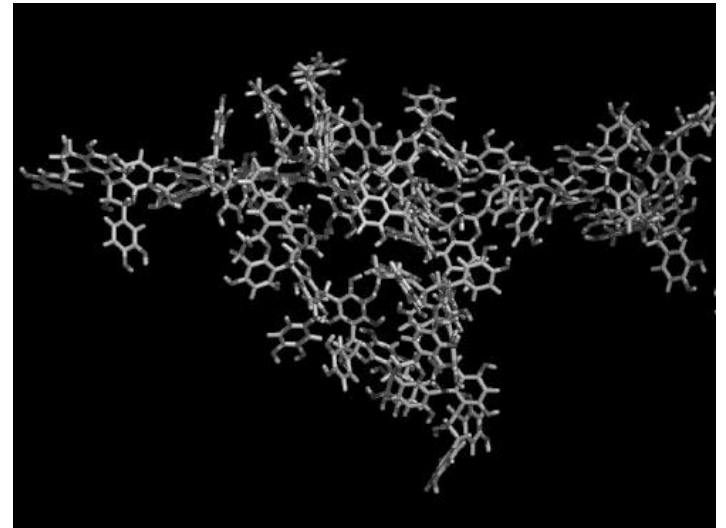
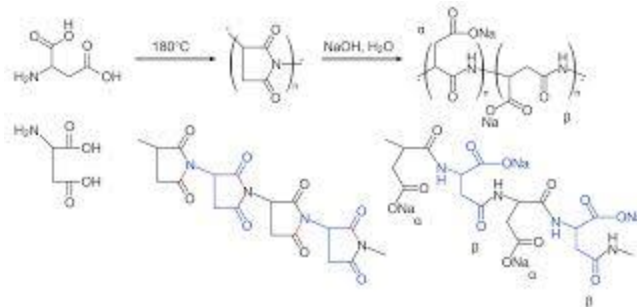
# POLYMERS

## Two Variations on a Theme

- Cross-linked

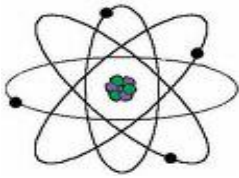


- Ringed

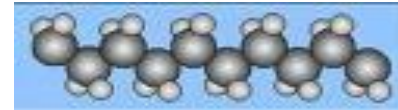
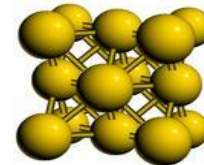


# Why is understanding the molecular or atomic level structure of a material important?

Atomic (electronic) structure



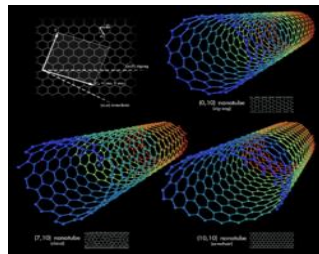
Molecular structure



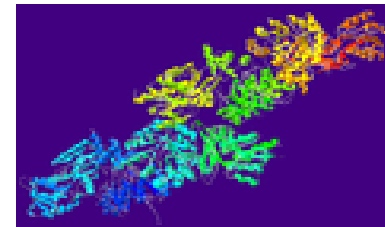
Physical characteristics



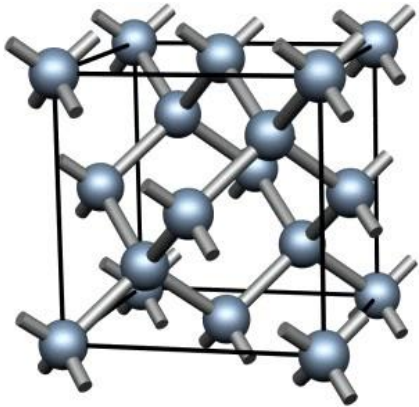
Electrical characteristics



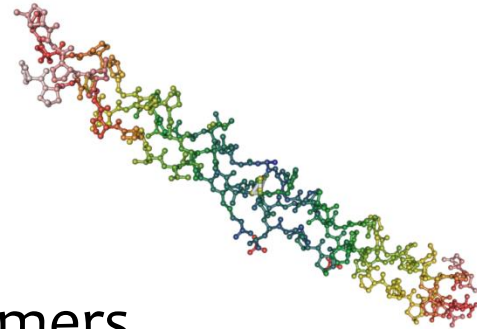
Biological characteristics



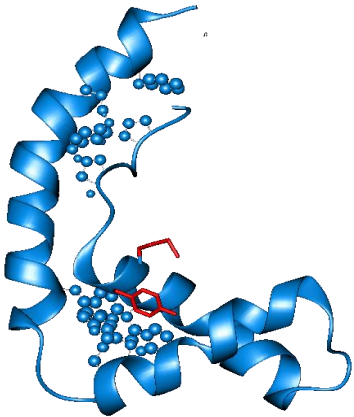
# MOLECULAR STRUCTURES



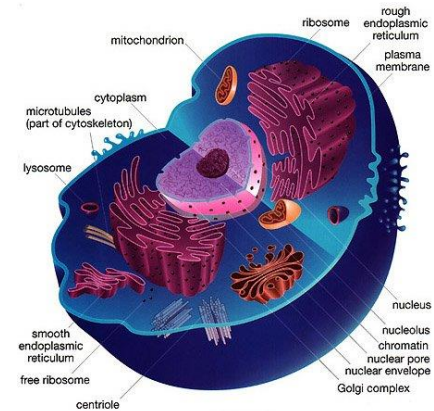
Crystals



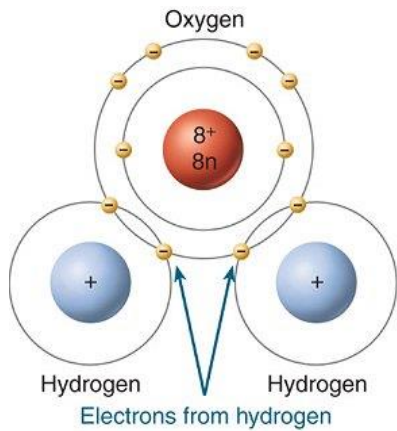
Polymers



Proteins

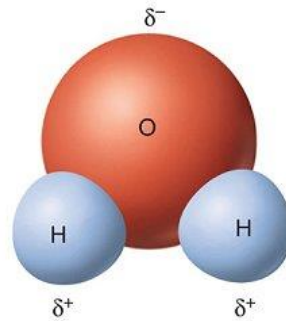


Cells

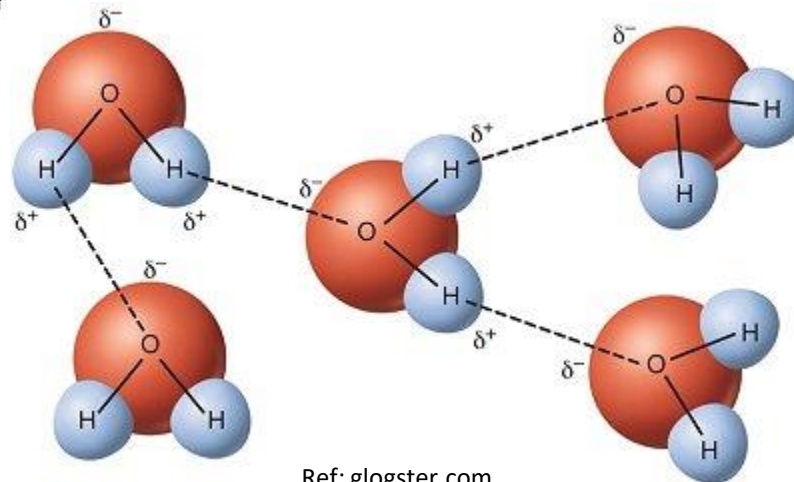


(a) Electron shells in a water molecule

Ref: alevelnotes.com



(b) Distribution of partial charges in a water molecule



Ref: glogster.com

Discussion or Student Inquiry:

- Ionic, covalent, hydrogen chemical bonds
- Water as a dipole molecule
- Cohesive and adhesive forces

Observe and describe

Ring Polymer

Water

Petri Dish

Observe and describe

Ring Polymer

Petri Dish

Other Liquids:

- Oil
- Alcohols
- Detergent
- Syrup
- Salt Water
- Sugar Water

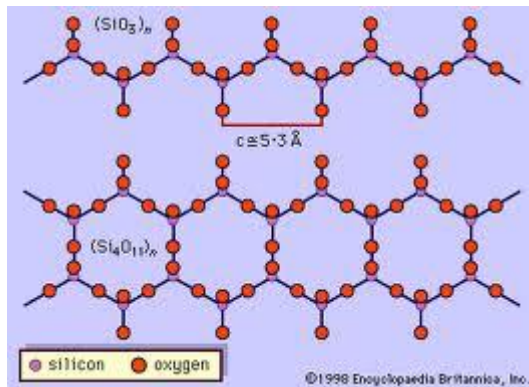
Discussion or Student Inquiry

- Charge distribution on different

STEM:

- Careful measurement of the quantities of polymer and liquids
- Calculate the number of molecules
- Forces and interactions
- Possible applications
- Cost/benefit analysis

# Super Absorbing Polymers (Found in diapers) are ringed type polymers



Surface tension  
(balanced cohesive and adhesive forces)  
“traps” moisture in the ring structure.  
Similar to the ring blower shape for soap bubbles

Cut a small area of diaper

Add water until saturated

Measure the amount of water (volume or weight)

Determine number of water molecules in the amount absorbed

Determine surface area that could be covered by a 1 atom thick layer

i.e. assuming a water molecule has a vol. of .4 nm x .4 nm x .3nm

5 cc of water would cover 130m x 130m