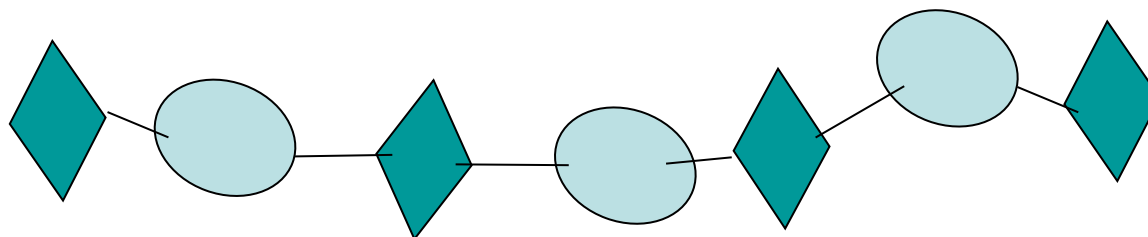


What is a polymer?



Developed by Cherelle Bishop, Department of Chemistry, Colorado State University.
This work is based upon collaborative work supported by a National Science Foundation
Grant No. 0841259; Colorado State University, Thomas Chen, Principal Investigator,
Michael A. de Miranda and Stuart Tobet Co- Principal Investigators. Any opinions,
findings, conclusions or recommendations expressed in this material are those of the
author(s) and do not necessarily reflect the views of the National Science Foundation

Polymers that you know....



Polyethylene



Poly(vinyl chloride)



Polycarbonate



Polystyrene

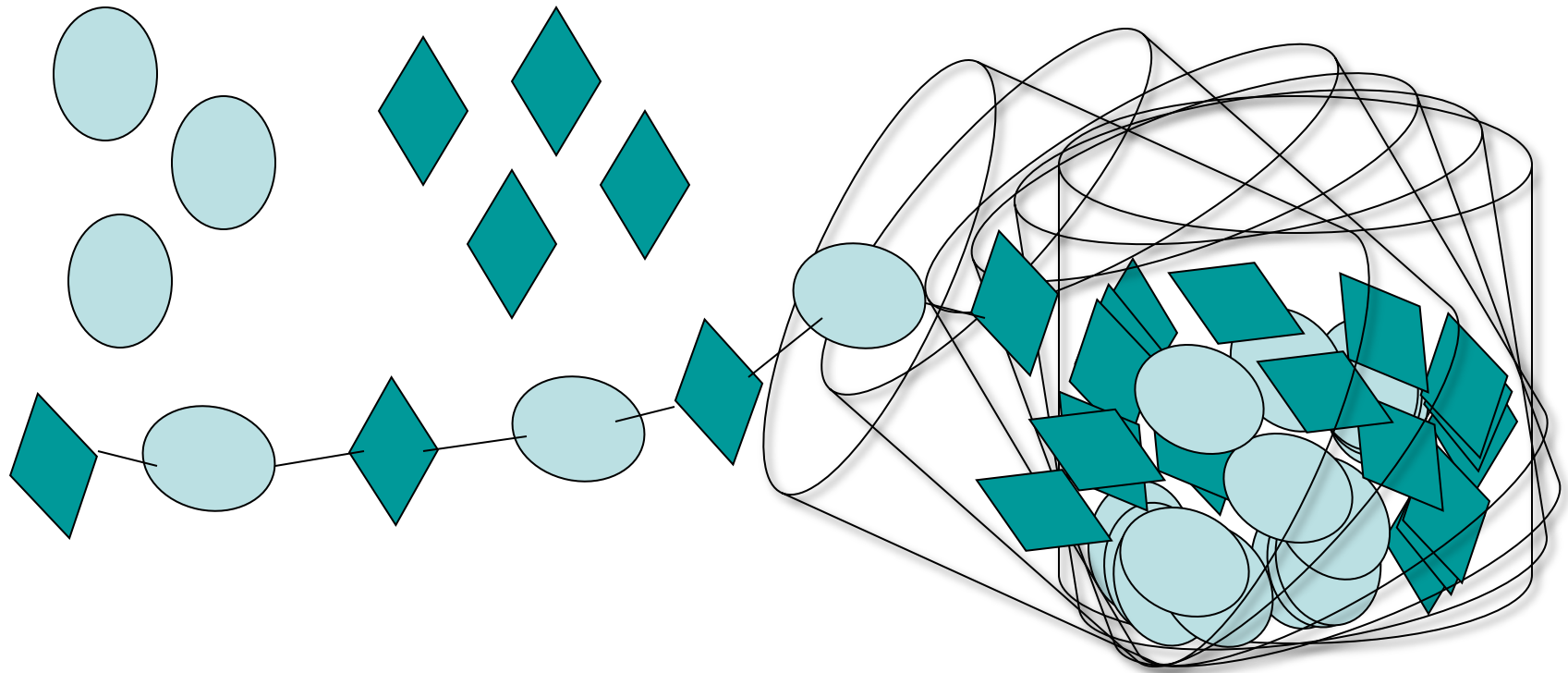


Polyacrylamide

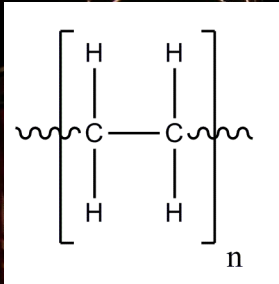
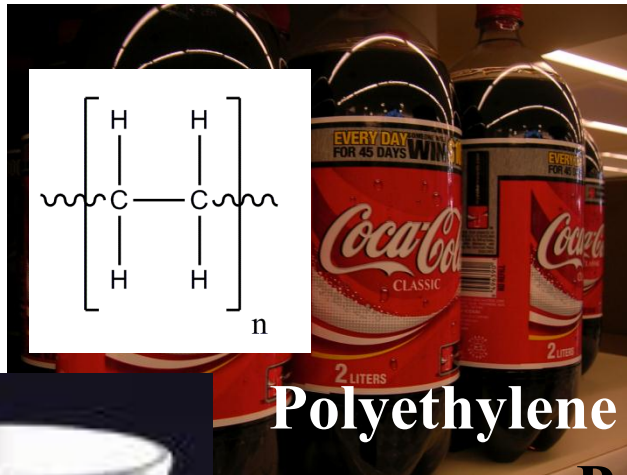


Polyurethane

But what is a polymer....



Polymers that you know....



Polyethylene



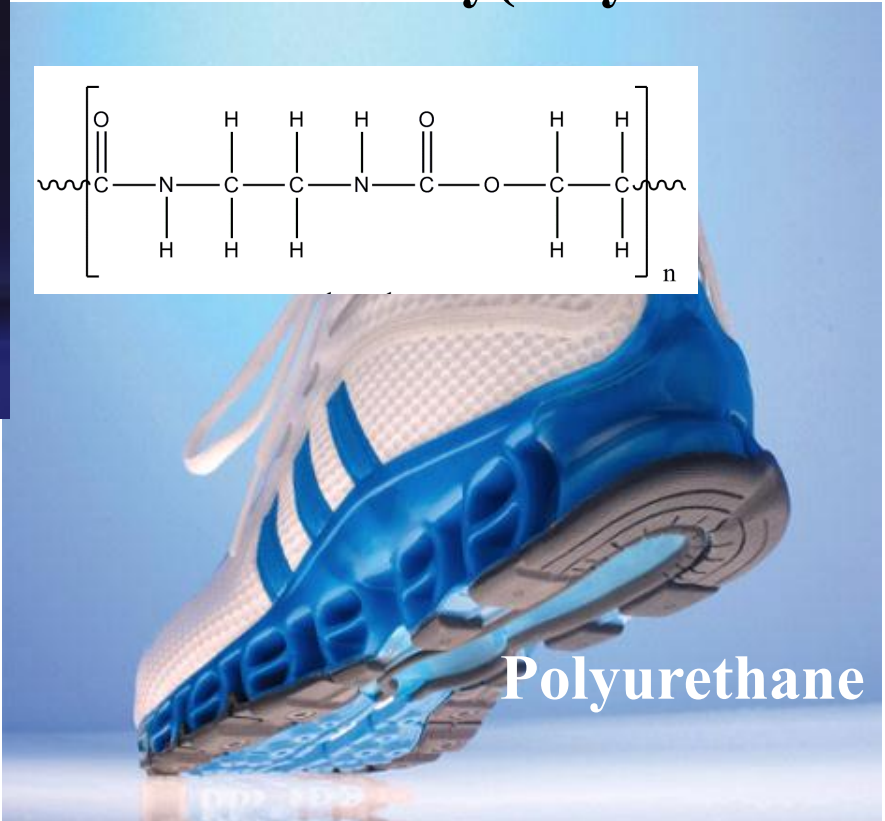
Poly(vinyl chloride)



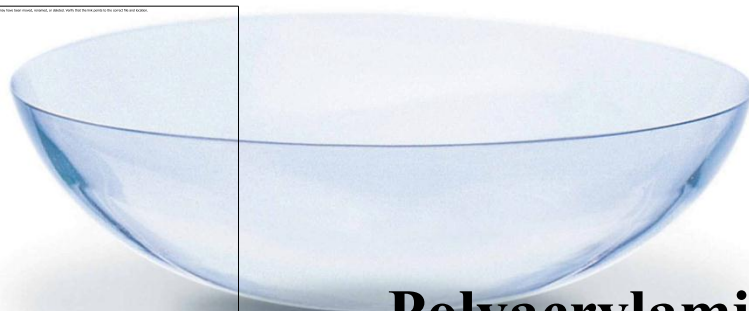
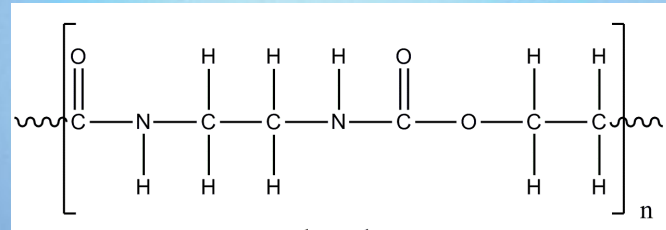
Polycarbonate



Polystyrene

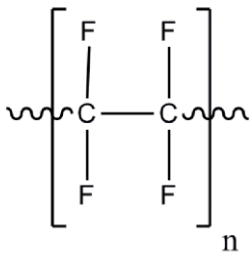
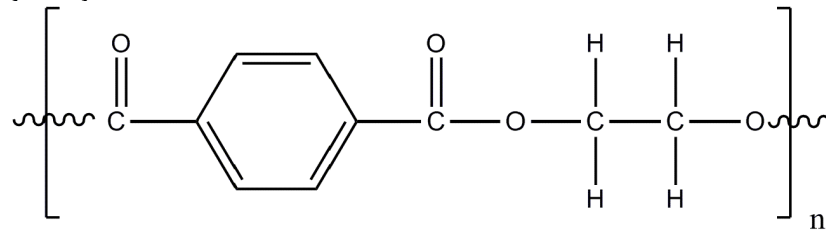
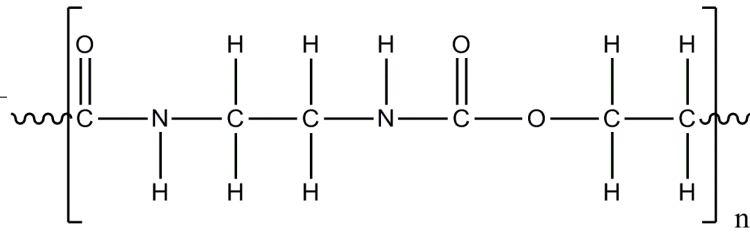
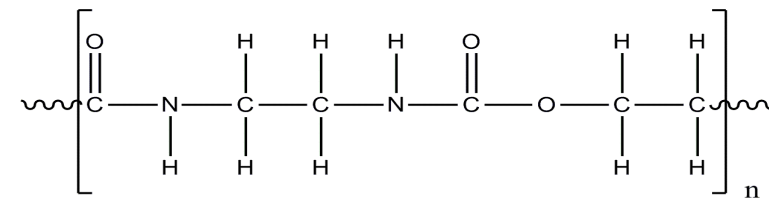


Polyurethane

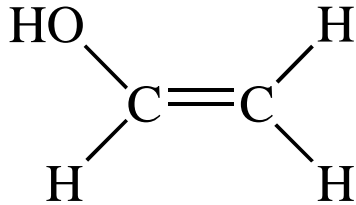


Polyacrylamide

Polymers in medical devices

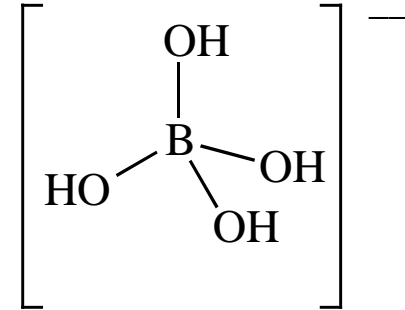


Silly Putty experiment



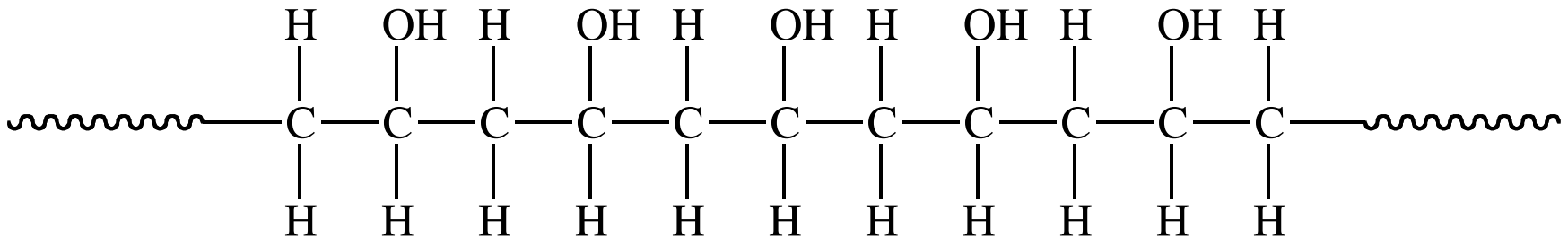
Vinyl alcohol
Monomer

- Basic building block for polymer synthesis



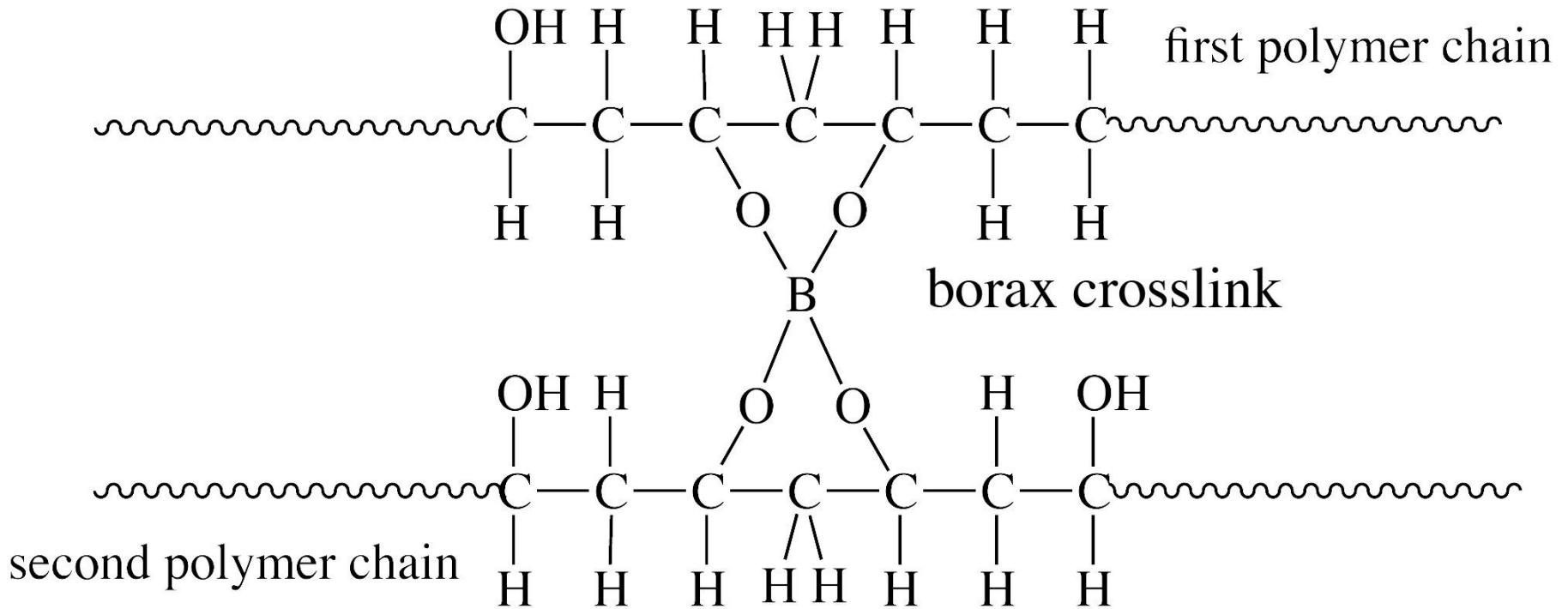
Tetrahydroxyborate anion
Cross-Linking Agent

- Linkers that chemical bond polymer chain together



Poly(vinyl alcohol)
Polymer

How does a cross-linker work?



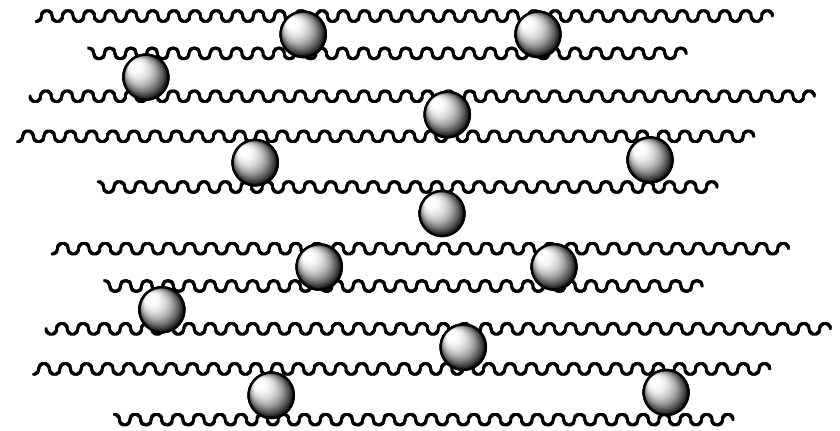
Cross-linker affect on material properties

No Cross-links



- No chains linked together
- Larger range of motion available to some chains → more bouncy

With Cross-links



- More chains linked together
- Increasing stiffness
- Less range of motion available → rigid and stiff