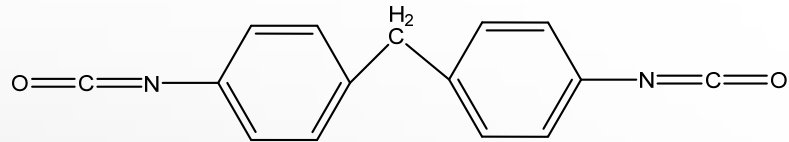




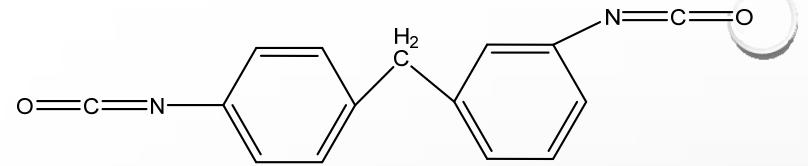
# NON-FORMALDEHYDE ADHESIVES

# Isocyanate resins

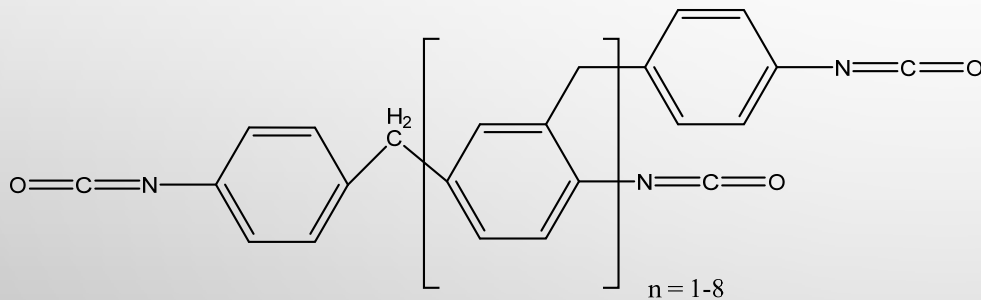


4,4' Methylene diphenyl diisocyanate

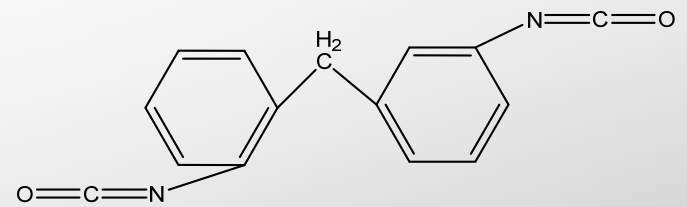
95%



5%

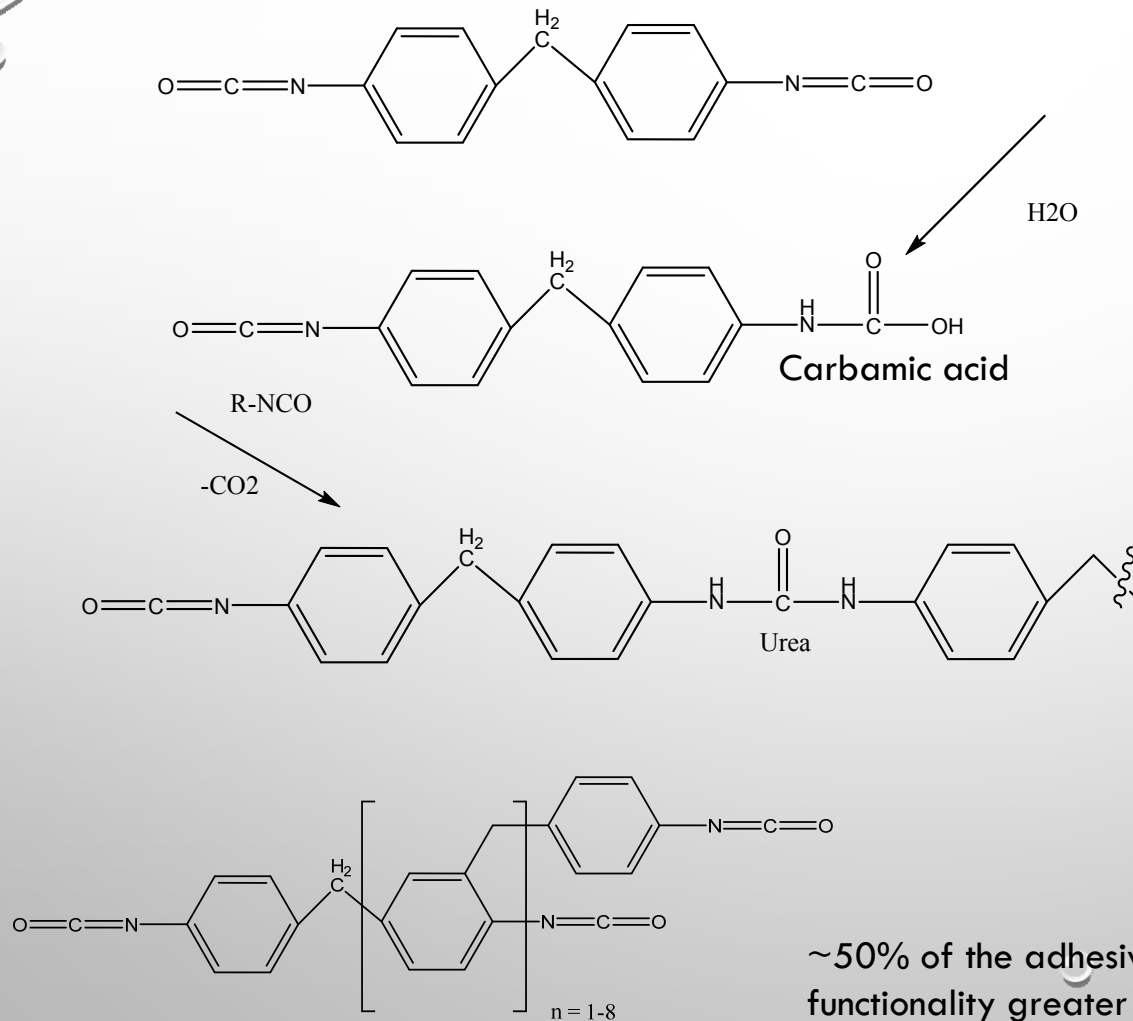


polyisocyanate



pMDI – polymeric methylene diphenyl diisocyanate

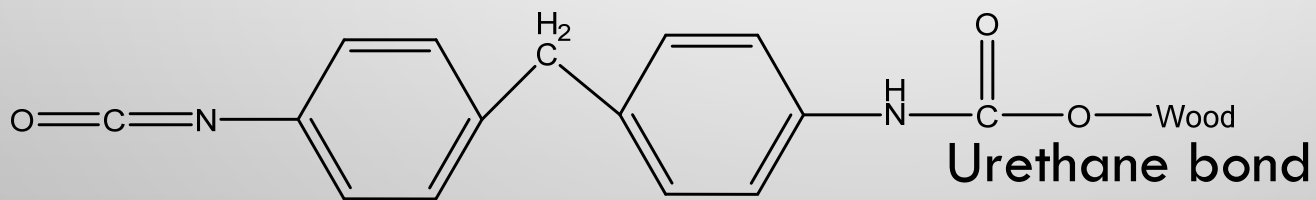
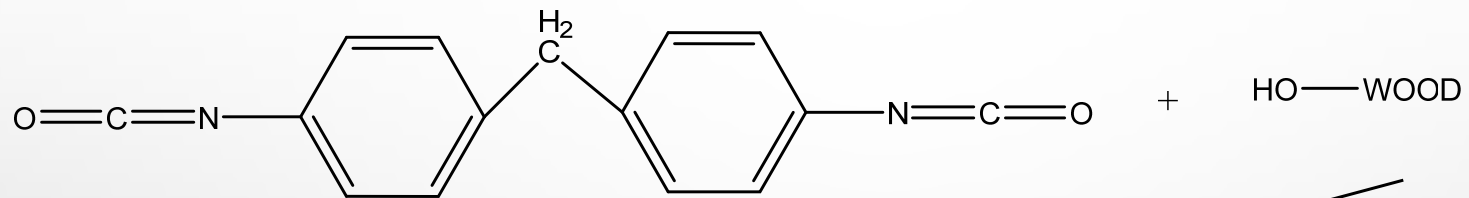
Isocyanate resins are a two part adhesive



What do you notice about this structure? How would the molecules interact with wood?

~50% of the adhesive has a functionality greater than 2

Isocyanate resins have the possibility to react with wood



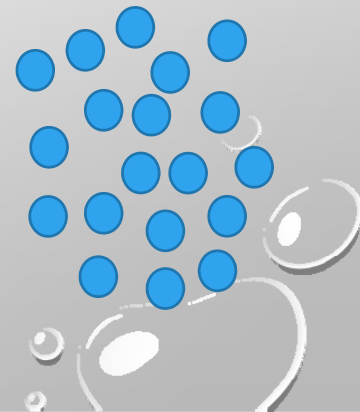
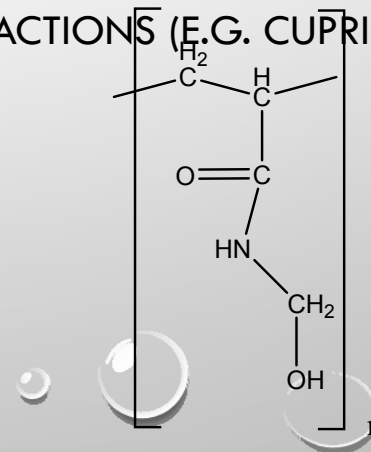
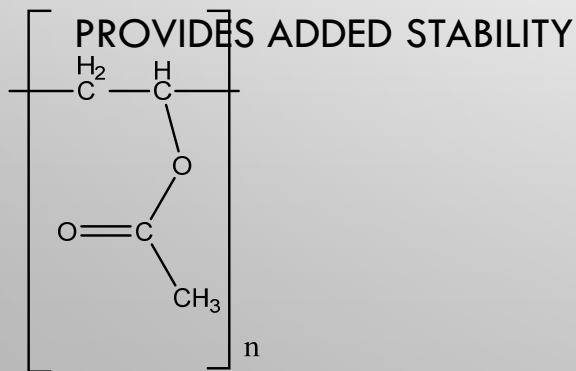
Isocyanate can covalently bond to wood, and many other materials.



# SECONDARY MANUFACTURING ADHESIVES

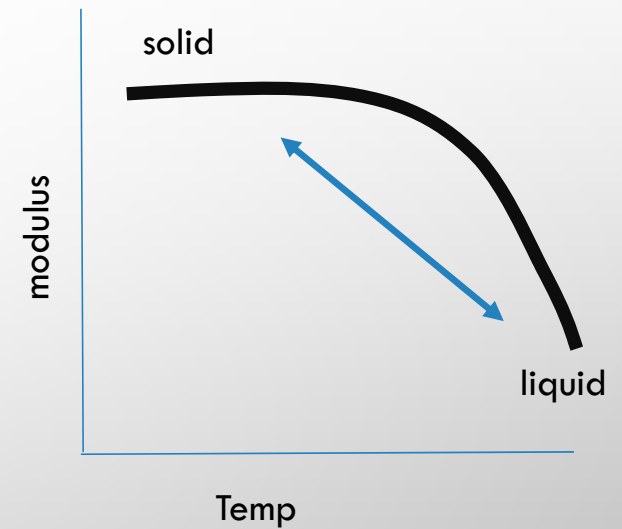
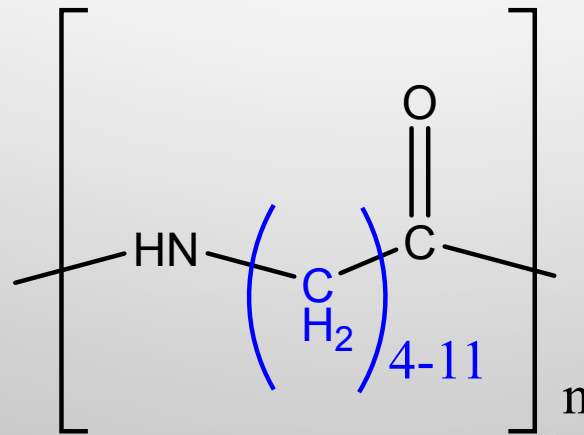
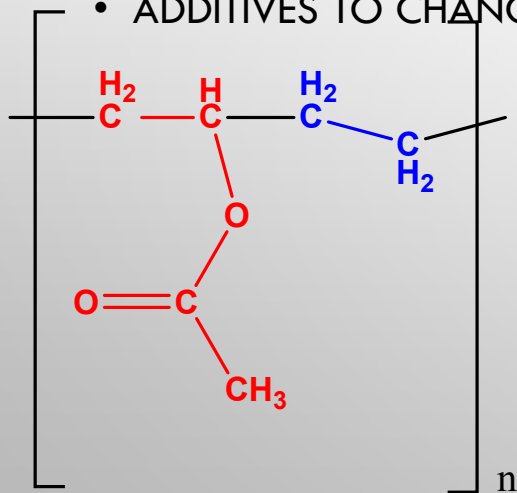
# POLYVINYLACETATE (PVAC)

- **EMULSION ADHESIVE** WHERE DISCRETE PARTICLES (NOT DISCRETE CHAINS) ARE DISPERSED (NOT DISSOLVED) IN WATER
- PVAC CAN BE MODIFIED WITH CROSSLINKABLE GROUPS ( N-METHYLOLACRYLAMIDE, ADDITION OF PHENOLICS)
- ADDED METAL SALTS PROVIDE FOR ION-DIPOLE INTERACTIONS (E.G. CUPRIC AMMONIUM) AND



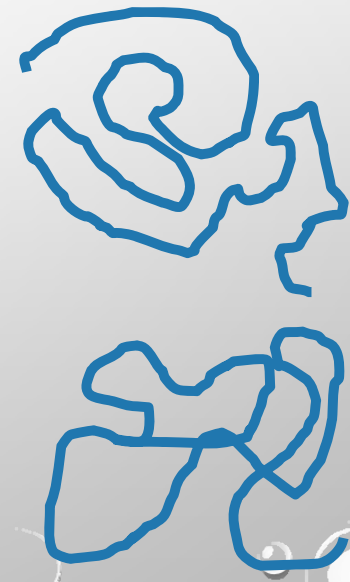
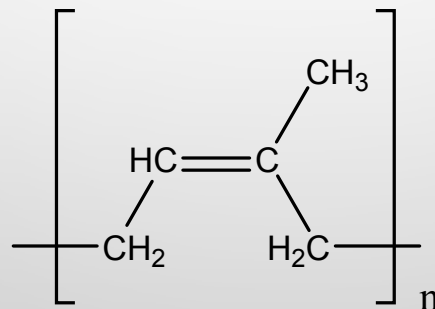
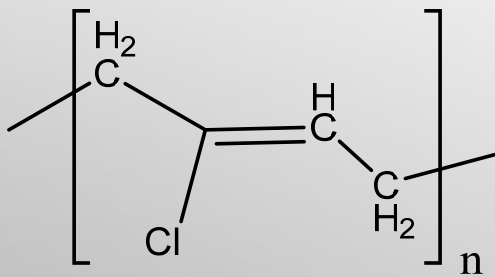
# HOT MELT ADHESIVES ARE PREFORMED POLYMERS

- ETHYLENEVINYL ACETATE (EVAC)
- POLYAMIDES (STEP GROWTH POLYMERIZATION)
- ADDITIVES TO CHANGE VISCOSITY AND TACK



# CONTACT “RUBBER” CEMENT

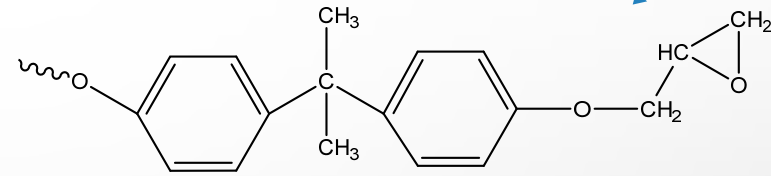
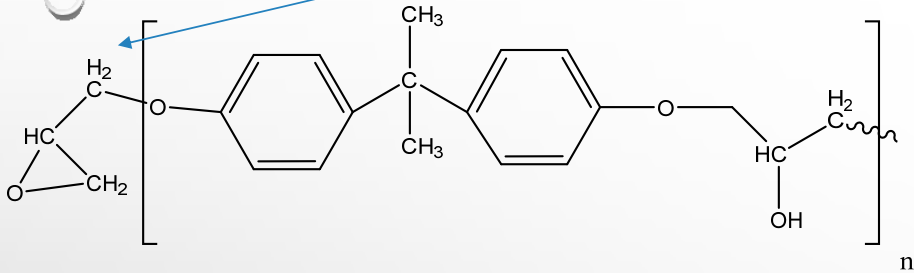
- POLYMER CHAINS DISSOLVED IN ORGANIC SOLVENT, OR EMULSIFIED IN WATER.
- NEOPRENE AND/OR ISOPRENE BASED “RUBBER” POLYMERS
- PLACED ON BOTH SURFACES



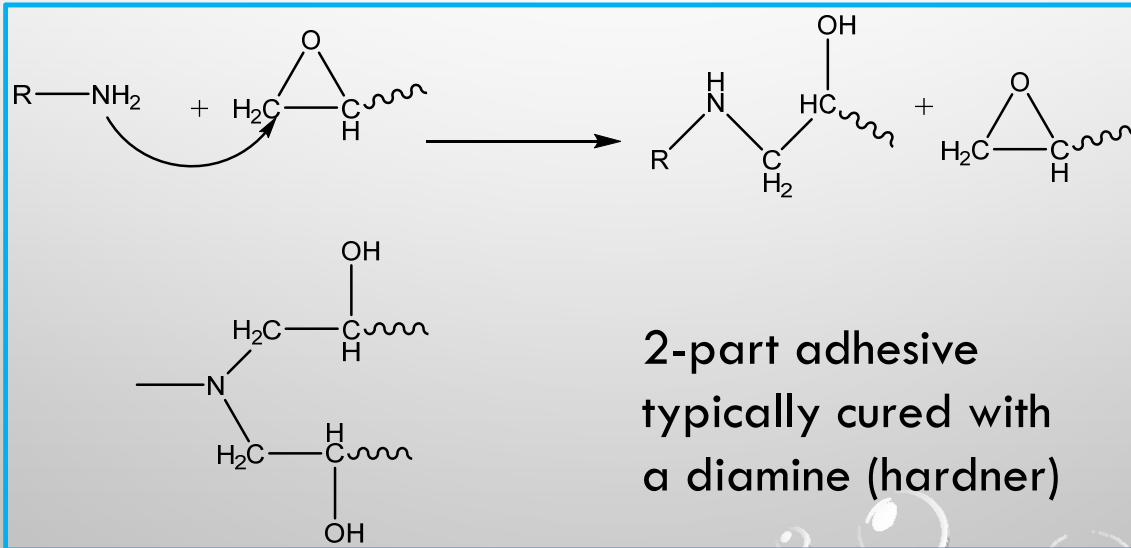


# Epoxy resins

Diglycidyl ether



“epoxy” or  
“oxirane”  
group



2-part adhesive  
typically cured with  
a diamine (hardener)

5min epoxies have  
“thiol” reagents  
R-SH