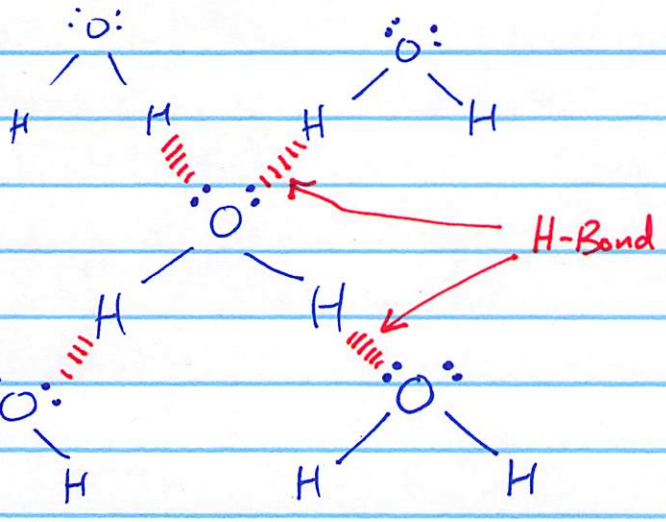
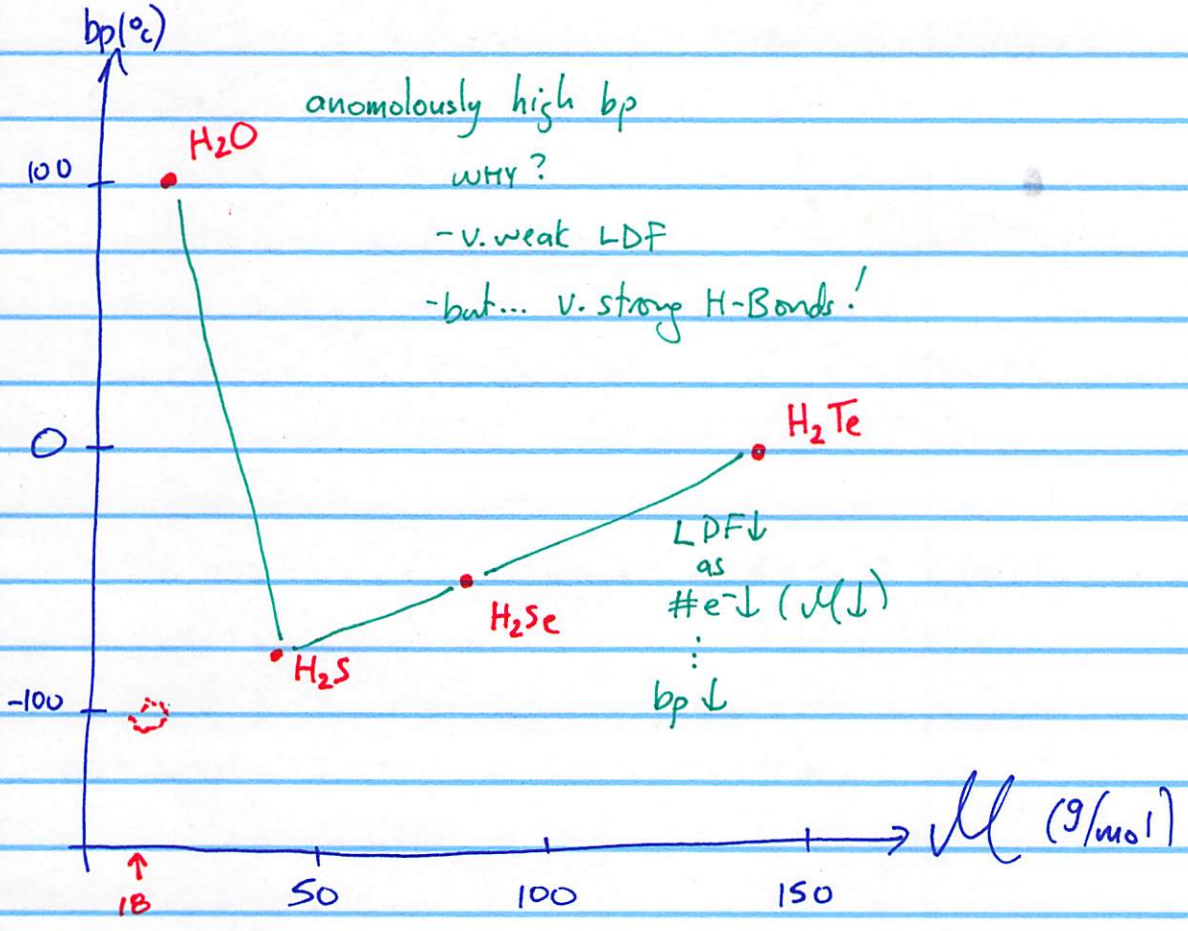
1/18/2019

water: H_2O

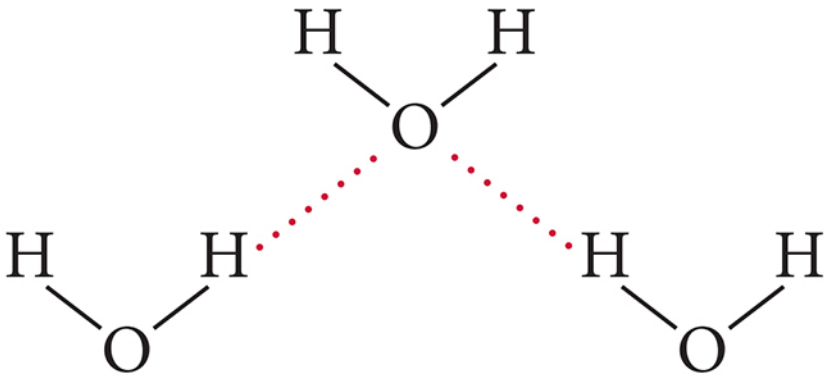


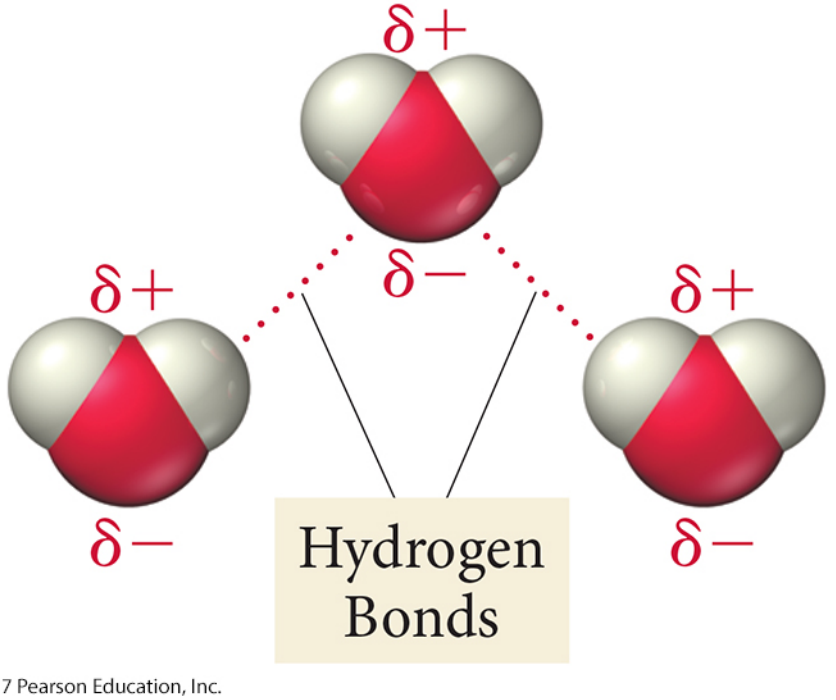
v. strong H-Bonds!

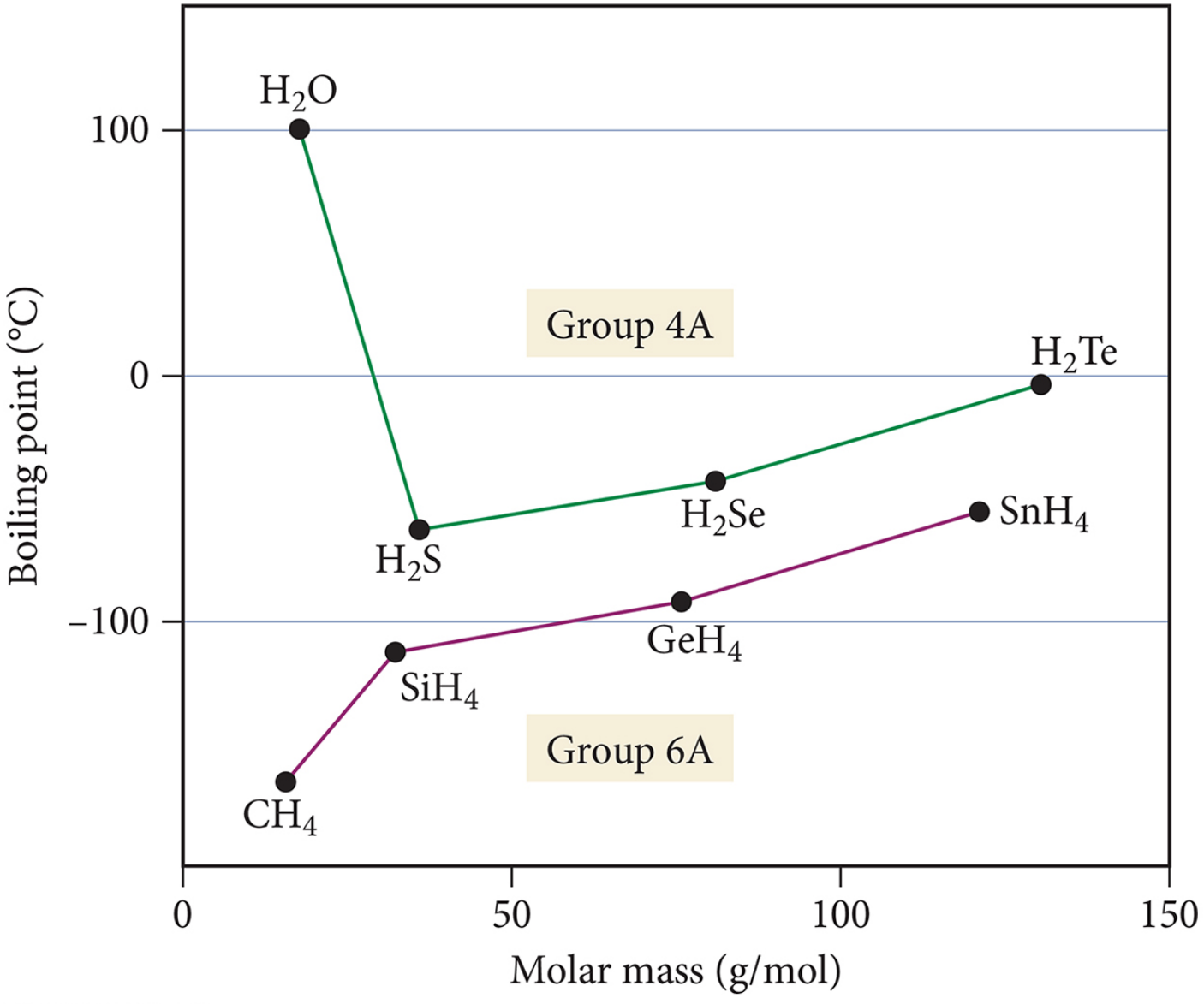
Weird ?!



Hydrogen Bonding in Water





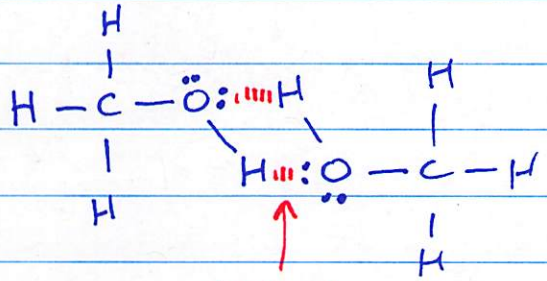


consider: CH_3OH vs. CH_3F

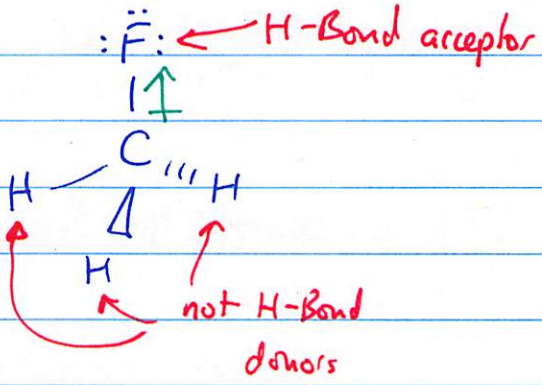
$\mathcal{M} = 32\,g/mol$ $\mathcal{M} = 34\,g/mol$

* $bp = 65°C$ $bp = -78°C$ *

v. strong IMF weaker IMF



H-Bonds



O – H :N-

F – H :O-

N – H :F-

LDF

d-d

H-Bonds

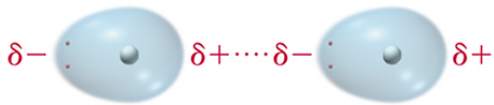
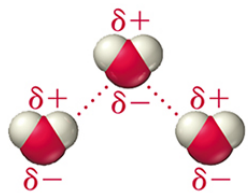
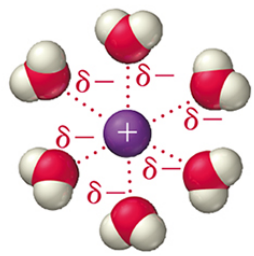
strong IMFs

LDF

d-d

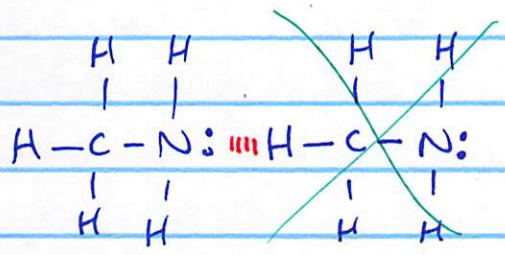
weaker IMFs

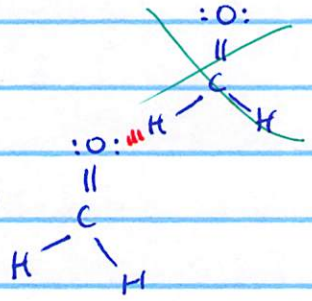
TABLE 11.4 Types of Intermolecular Forces

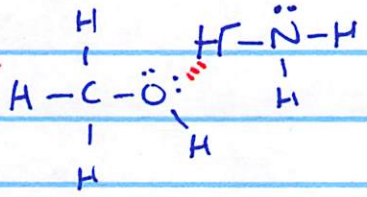
Type	Present In	Molecular Perspective	Strength
Dispersion*	All molecules and atoms		0.05–20+ kJ/mol
Dipole–dipole	Polar molecules		3–20+ kJ/mol
Hydrogen bonding	Molecules containing H bonded to F, O, or N		10–40 kJ/mol
Ion–dipole	Mixtures of ionic compounds and polar compounds		30–100+ kJ/mol

*The dispersion force can become very strong (as strong and even stronger than the others) for molecules of high molar mass.

Q: Which of the following best represents an H-Bond?

(A) 

(B) 

(C) 

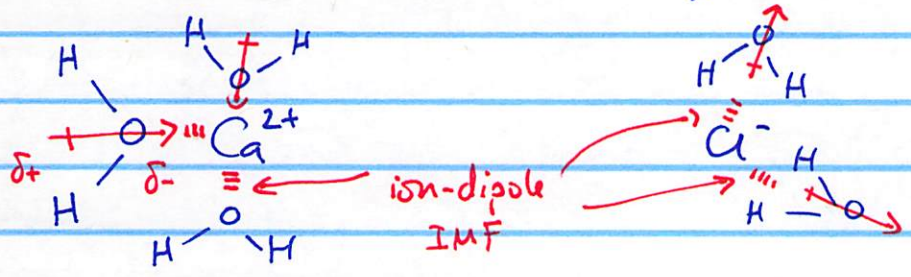
□ Ion-dipole

force $\propto$ |charge on ion|

$\propto$ dipole moment of molecule.

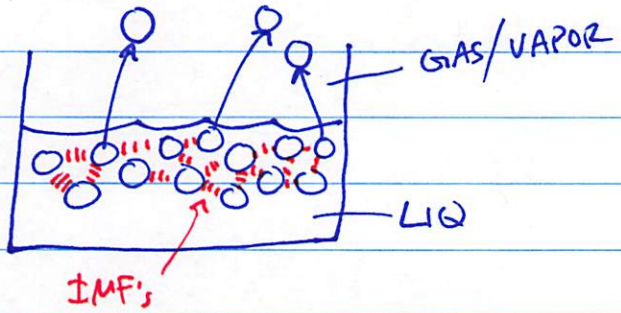
} ex: ionic cpds dissolve in H_2O

ex: $CaCl_2(s) \xrightarrow{H_2O} Ca^{2+}(aq) + 2Cl^-(aq)$



Read 11.4 (surface tension, viscosity, + capillary action)

11.5 Vaporization + Vapor Pressure (vp)



- molecules in liq v const motion!
  - @ surface, can break free + form vapor.

- ENDOTHERMIC!