

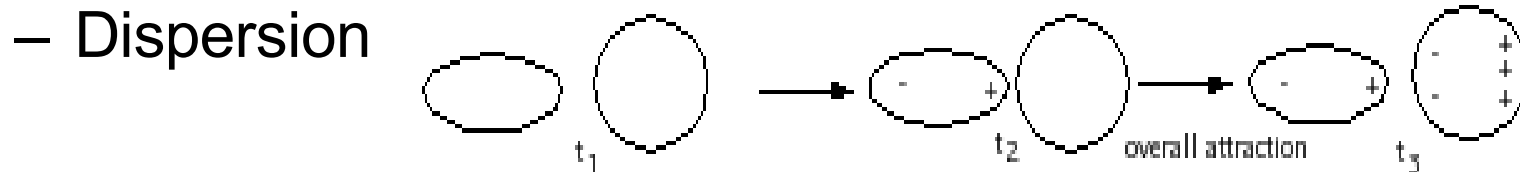
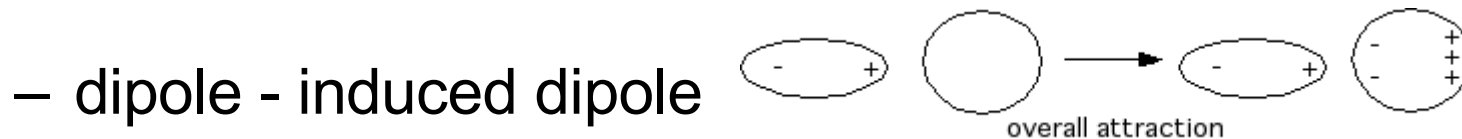
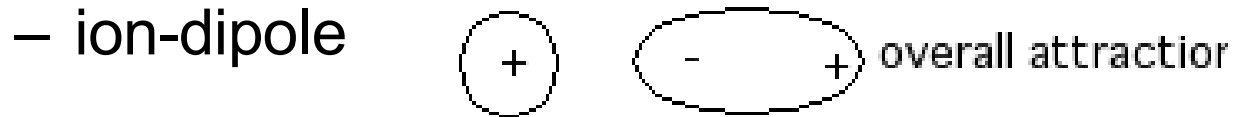
Announcements

To join clicker to class today (Clickers with LCD display joins automatically):

- Turn on the Clicker (the red LED comes on).
- Push “Join” button followed by “20” followed by the “Send” button (switches to flashing green LED if successful).
- Just got exam data back from scoring, I will try to process it later today.
- Even if the weather is nice do not forget to wear appropriate clothing to lab!
- Will start next section sometime during Thursday class. Suggested reading and problems will be e-mailed to you and put on class web site.
- Quiz in discussion on hybridization and intermolecular forces.

Summary of Intermolecular Interactions

- attractive interactions among molecules:



- Hydrogen bonding (directional partial bond, an H bonded to N, O or F). $\text{H}-\text{F} \cdots \text{H}-\text{F} \cdots \text{H}-\text{F}$ and $\begin{array}{c} \text{O}-\text{H} \cdots \text{O}-\text{H} \\ | \qquad \quad | \\ \text{H} \qquad \quad \text{H} \end{array}$

Solvation/Hydration of Ions

Chang Fig 4.2

What's Dissolved in the Water?

(a small selection)

Solute	Lake Water (ppm)	Drinking Water (ppm)	Deionized Water (ppm)
Ca ²⁺ (makes water hard)	~160 mg/kg	~160 mg/kg	~0 mg/kg
Na ⁺	~10 mg/kg	~10 mg/kg	~0 mg/kg
Ni ²⁺	~4 mg/kg	~4 mg/kg	~0 mg/kg
O ₂	~9 mg/kg	~9 mg/kg	~9 mg/kg
SO ₄ ²⁻	~25 mg/kg	~31 mg/kg	~0 mg/kg
F ⁻ (for teeth)	~0 mg/kg	~1 mg/kg	~0 mg/kg
CHCl ₃ (disinfection by product)	~0 mg/kg	~0.002 mg/kg (~ 2 μg/kg)	~0 mg/kg

% by mass, ppm, ppb, ppt units

- % by mass or % w/w
 - $= (100\%) (\text{mass solute}) / (\text{mass of sol'n})$
- ppm = parts per million
 - $= (10^6 \text{ ppm}) (\text{mass solute}) / (\text{mass of sol'n})$
 - Equivalent to $(\text{mg solute}) / (\text{kg sol'n})$
- ppb = parts per billion
 - $= (10^9 \text{ ppb}) (\text{mass of solute}) / (\text{mass of sol'n})$
- ppt = parts per trillion
 - $= (10^{12} \text{ ppt}) (\text{mass of solute}) / (\text{mass of sol'n})$

Molarity

- Molarity (M) = (moles of solute)/(L sol'n)
- Ex: What is the molarity of the solution made from 35. g of NaCl to make 170 mL of solution.
 - $MM(\text{NaCl}) = 22.990 + 35.453 = 58.443$ g/mole