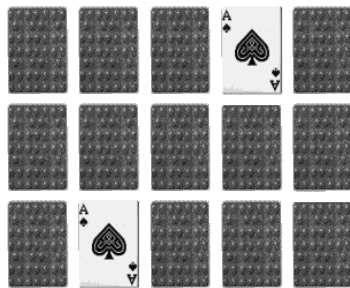


Concentration



Solution Concentration

Read 281 – 283. Try questions 1 – 8 (show work)

Concentration = $\frac{\text{quantity of solute}}{\text{quantity of solution}}$ (not solvent)

There are 3 basic ways to express concentration:

1) percentages, 2) very low concentrations, and 3) molar concentrations

1) % concentration can be in V/V, W/W, or W/V

- Like most %s, V/V and W/W need to have the same units on top and bottom.

- W/V is sort of in the same units; V is mostly water and water's density is 1 g/mL or 1 kg/L

$3\text{ g H}_2\text{O}_2/100\text{ mL solution} \approx 3\text{ g H}_2\text{O}_2/100\text{ g solution}$

Solution Concentration

2) Expressing concentrations in parts per million (ppm) requires the unit on top to be 1,000,000 times smaller than the unit on the bottom

E.g. 1 mg/kg or $\mu\text{g/g}$

- Multiples of 1000 are expressed in this order μ _, m_, _, k_ (“_” is the base unit) (pg.631)
- Notice that any units expressed as a volume must be referring to a water solution (1L = 1kg)
- For parts per billion (ppb), the top unit would have to be 1,000,000,000 times smaller

3) Molar concentration is the most commonly used in chemistry. Ensure that units are mol/L.

More practice

1. What is the % W/W of copper in an alloy when 10 g of Cu is mixed with 250 g of Zn?
2. What is approximate % V/V if 30 mL of pure ethanol is added to 250 mL of water?
3. What is the % W/W if 8.0 g copper is added to enough zinc to produce 100 g of an alloy?

Read 284 – 287. Do Q 11 – 17 (show work)