Check Homework #14-23

(15) %v/v = 3.0%

V_{solute} = ?

V_{soln} = 400. mL

$$\%v/v = \frac{V_{solute}}{V_{soln}} \times 100\%$$

$$3.0\% = \frac{V_{solute}}{400.\,mL} \times 100\%$$

$$0.030 = \frac{V_{solute}}{400.\,mL}$$

$$V_{solute} = (0.030)(400.\,mL)$$

$$V_{solute} = 12\ mL$$

(19) C = ?

m = 400.g $CuSO_4$

V = 4.00L

$$C = \frac{n}{V}$$

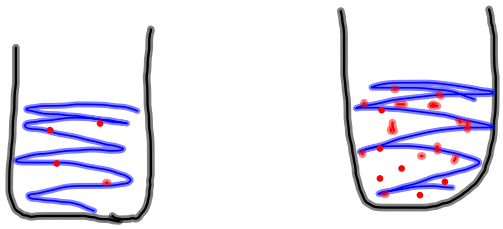
$$C = \frac{2.506\ mol}{4.00\ L}$$ M

$$C = 0.627\ mol/L$$

$$400.g\ CuSO_4 \times \frac{1\ mol\ CuSO_4}{159.61g\ CuSO_4} = 2.506\ mol\ CuSO_4$$

Dilutions

Dilution - process of decreasing the concentration of a solution by adding more solvent (normally water).



Calculating new concentration after a dilution...

Start with 1.00 L of a 0.15 mol/L solution.
100. mL of water is added to dilute the solution.

Which quantity is the same before and after the dilution?

- moles of solute (n) ? no change
- volume of solution (V) ? ↑
- concentration of solution (C) ? ↓

$$n_i = n_F$$

$$V_i C_i = V_F C_F$$

What would be the concentration of a solution after diluting 45.0 mL of 4.2 mol/L KOH to 250 mL?

$V_i = 45.0\text{mL}$
$C_i = 4.2\text{mol/L}$
$V_F = 250\text{mL}$
$C_F = ?$

$V_i C_i = V_F C_F$

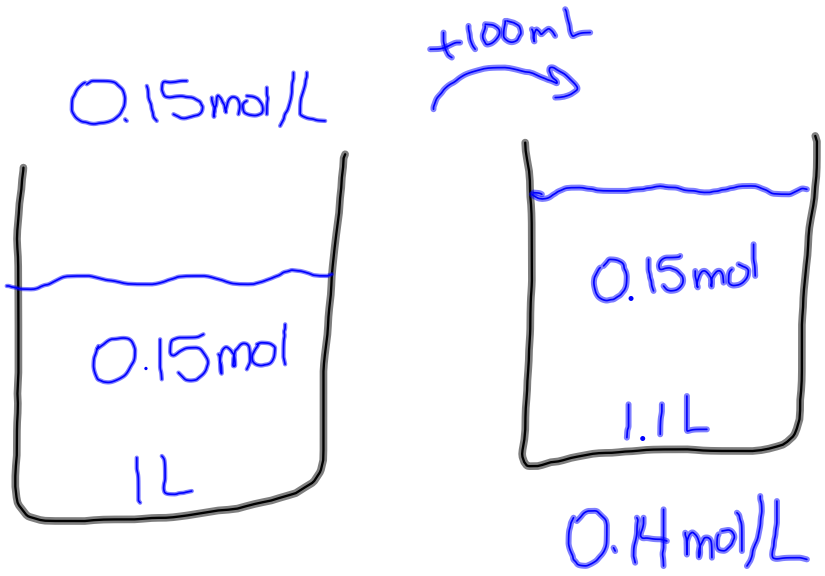
$(45.0\text{mL})(4.2\text{mol/L}) = (250\text{mL})C_F$

$$C_F = \frac{(45.0\text{mL})(4.2\text{mol/L})}{(250\text{mL})}$$

$C_F = 0.76\text{ mol/L}$

$$C = \frac{n}{V}$$

$$n = C \times V$$


+100mL
0.15mol/L
0.15mol
1L
0.15mol
1.1L
0.14mol/L

Sample Problems

What would be the concentration of a solution made by adding 250 mL of water to 45.0 mL of 4.2 mol/L KOH?

$V_i = 45.0\text{mL}$

$C_i = 4.2\text{mol/L}$

$V_F = 295\text{mL}$

$C_F = ?$

$$V_i C_i = V_F C_F$$

$$(45.0\text{mL})(4.2\text{mol/L}) = (295\text{mL})\,C_F$$

$$C_F = \frac{(45.0\text{mL})(4.2\text{mol/L})}{(295\text{mL})}$$

$$C_F = 0.64\text{mol/L}$$

Today's Assignment

p. 484 #12,13

p. 486 #21

p. 499 #52