Definitions

Homogenous

- 1 phase
- Constant composition throughout

Solute

- Substance being dissolved
- Usually present in smaller quantity

Solvent

- Substance doing the dissolving
- Greater amount

Solubility

- Maximum amount of solute that can be dissolved at a given temperature in 100 g of solvent (mol/L)
- Generally solubility increases as temperature increases for solids therefore the definition of solubility must specify temperature
- Solubility decreases as temperature increases in gases

Units of concentration

$$Conc = \frac{n^{o}ofmolofsolute(mol)}{volumeofsolvent(L)}$$

$$Conc = \frac{n}{v}\left(\frac{mol}{L}\right)$$

1 MOLAR

Higher the concentration, higher the molarity

$$mass\% = \frac{massOFsolute}{massOFsolute + massOFsolvent} \bullet 100$$

$$volume\% = \frac{volumeOFsolute}{volumeOFsolution} \bullet 100$$

1. Calculate $conc^n$ of following

(a) 0.2 mol NaOH in 2L

$$Conc = \frac{n}{v} = \frac{0.2mol}{2L} = 0.1mol/L$$

(b) 0.05 mol $NaNO_3$ in 250mL

$$Conc = \frac{n}{v} = \frac{0.05mol}{0.25L} = 0.2mol/L$$

(c) 0.015 mol $K_2Cr_2O_7$ in 1750ml

$$Conc = \frac{n}{v} = \frac{0.015mol}{1.75L} = 8.57 \times 10^{-3} mol/L$$

2. Calculate the n^o of moles:

(a) 0.5 mol/L of $AgNO_3$ in 750mL

$$n = vConc = (0.75\,L)(0.5\,mol/L) = 0.3\,mol$$

(b) 2 M sol^n of KOH in 125mL

$$n = vConc = (0.125L)(2mol/L) = 0.25mol$$

3. Calculate the volume of the following

(a) 0.12 M sol^n containing 0.02 mol of $MgCl_2$

$$v = \frac{n}{Conc} = \frac{0.02mol}{0.12mol/L} = 0.167L$$

(b) 1.15 mol/L sol^n containing 0.3 mol of $CuCO_3$

$$v = \frac{n}{Conc} = \frac{0.3mol}{1.15mol/L} = 0.261L$$

Making of Solutions

$$
\begin{aligned}
n^o\,molNaOH &= C \cdot V \\
&= 0.50mol(0.25L) \\
&= 0.125mol
\end{aligned}
$$

$$
\begin{aligned}
massNaOH &= n \cdot Mr \\
&= 0.125mol \cdot 4.0g/mol \\
&= 5.0g
\end{aligned}
$$