

CHEMISTRY DAILY PLAN

Class:

Date:

Subject: Ion Concentrations

Time:

Soluble salts, acids and bases separate into ions in a solution.

$\text{CaCl}_2 \rightarrow \text{Ca}^{+2} + 2\text{Cl}^-$ The molarity of ions can be
 1M 1M 2M different from its compound.

$$M_{\text{ions}} = \frac{N_{\text{ion}}}{V_{\text{ion}}}$$

Problems in Class

1. What are the molarities of the ions Ca^{+2} and NO_3^- produced by the dissociation of 0.2 M of $\text{Ca}(\text{NO}_3)_2$?
2. If the concentration of SO_4^{-2} ions in a solution of $\text{Al}_2(\text{SO}_4)_3$ is 0.6 M, find the concentration of Al^{+3} ?
3. 0.4 mol of NaCl crystals is added and dissolved in 400 ml 0.3 M NaCl solution. What are the concentration of NaCl, Na^+ and Cl^- after addition?

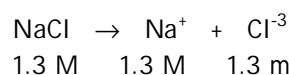
Firstly total mol # of NaCl

$$n = M \times V = 0.3 \times 0.4 = 0.12 \text{ mol}$$

$$n_{\text{total}} = 0.4 + 0.12 = 0.52 \text{ mol NaCl}$$

$$M_{\text{final}} = n/V = 0.52/0.4 = 1.3 \text{ M}$$

Dissociation reaction is:



4. What will be the concentration of Cl^- ion, if 300 ml of 2 M KCl and 900 ml of 0.5 M MgCl_2 solutions are mixed?

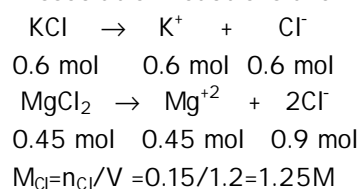
Mol numbers of KCl and MgCl_2

$$n_{\text{KCl}} = M \times V = 2 \times 0.3 = 0.6 \text{ mol}$$

$$n_{\text{MgCl}_2} = 0.5 \times 0.9 = 0.45 \text{ mol}$$

$$V_{\text{final}} = 0.3 + 0.9 = 1.2 \text{ L}$$

Dissociation reactions are:



5. 500 ml of 0.4 M $\text{Ca}(\text{NO}_3)_2$ solution is mixed with a 500 ml solution of $\text{Al}(\text{NO}_3)_3$. The concentration of NO_3^- will be 0.7 M in the final solution. What is the initial concentration of $\text{Al}(\text{NO}_3)_3$?

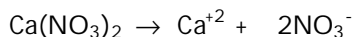
mol # of $\text{Ca}(\text{NO}_3)_2$ is:

$$n = M \times V = 0.4 \times 0.5 = 0.2 \text{ mol}$$

If M of $\text{Al}(\text{NO}_3)_3$ is a M.

$$n = M \times V = a \times 0.5 = 0.5a \text{ mol}$$

Dissociation reactions are:



$$0.2 \text{ mol} \quad 0.2 \text{ mol} \quad 0.4 \text{ mol}$$



$$0.5a \text{ mol} \quad 0.5a \text{ mol} \quad 1.5a \text{ mol}$$

Volume after mixed is 1 L.

Mol number of NO_3^- ion is:

$$n_{\text{NO}_3} = (0.4 + 1.5a) \text{ mol}$$

Molarity of NO_3^- ion is

$$M_{\text{NO}_3} = n_{\text{NO}_3} / V = (0.4 + 1.5a) / 1$$

$$0.7 = 0.4 + 1.5a$$

$$1.5a = 0.3$$

$$a = 0.2 \text{ M}$$