# AP Lab 2

Precipitation Reactions and Solution Stoichiometry

Introduction

The idea behind a precipitation reaction is relatively straightforward. If, as a result of interchanging the cations and anions of two aqueous solutions one produces a salt that is insoluble in water, then the result is a precipitate. This is exactly what happens in the reaction to make chalk:

$$Na_2CO_3(aq) + CaCl_2(aq) ® CaCO_3(s) + 2NaCl(aq)$$
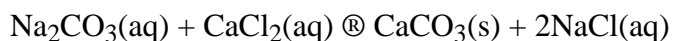
The products are simply the result of interchanging the cations and anions of the reactants. From solubility guidelines, we know that most metal carbonates are insoluble in water. Next time you have a piece off chalk, test this for yourself.

If we know the balanced chemical equation and the quantity of one of the reactants added or of a product produced, we can evaluate the quantities of the other species produced or needed. In order to determine which of the reactants is the limiting reactant, we must take into account both the amounts present and how they relate stoichiometrically in the balanced equation.

Materials

KNO_3	NaCl	$Pb(NO_3)_2$	$AgNO_3$	KI	$CuSO_4$
$CaCl_2$	Na_3PO_4	Na_2CO_3	$FeCl_2$	$CuCO_3$	NH_4Cl
$SrCl_2$	$Fe(NO_3)_3$	$CuCl_2$	$Cd(NO_3)_2$	$MgSO_4$	$Cu(NO_3)_2$
$(NH_4)_3PO_4$	$MnCl_2$	CuS	NaS		
Distilled water					

Equipment

2-100mL volumetric flasks	250mL beaker	glass rod
filter paper	weighing dishes	magnetic stirrer
wash bottle		

Procedure   Be sure to organize all of your information and show all work.

Ø   Choose 2 of the salts from the list of available materials. Make sure that you choose two that you believe will produce a precipitate based on the solubility rules you have learned
   o   Write the balanced molecular and net ionic equations for your reaction.
Ø   Prepare a 100.0mL solution with 5.000g of solute to make standard solutions of your chosen salts in 2 volumetric flasks. (Use magnetic stirrers if necessary)
   o   Show all calculations in the preparation of your solutions and the theoretical yield for the reaction. (be aware of salts which are hydrates – you need to calculate % of salt)
Ø   Carry out the reaction in a 250mL beaker and allow the precipitate to settle. Write any observations concerning the reaction. Make a data table to organize your information.
   o   Filter the solution, washing the beaker thoroughly and place the precipitate in the drying oven overnight.

- Ø   Clean all your glassware thoroughly and repeat the procedure and label your sample as trial 2.
- Ø   Weigh the precipitate and calculate the percent yield for both trials. Calculate the average for your results and determine the percent yield and write a conclusion for your experiment.