**Friday Worksheet**   **Name: ……………….**

Gravimetric 2

The strength of the eggshell of birds is determined by the calcium carbonate, $CaCO_3$, content of the eggshell.
The percentage of calcium carbonate in the eggshell can be determined by gravimetric analysis.
0.402 g of clean, dry eggshell was completely dissolved in a minimum volume of dilute hydrochloric acid.

$$CaCO_3(s) + 2H^+(aq) \rightarrow Ca^{2+}(aq) + CO_2(g) + H_2O(l)$$
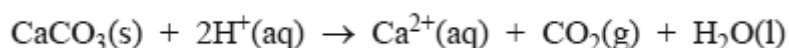
An excess of a basic solution of ammonium oxalate,
$(NH_4)_2C_2O_4$, was then added to form crystals of
calcium oxalate monohydrate, $CaC_2O_4.H_2O$.
The suspension was filtered and the crystals were then dried to constant mass.
0.543 g of $CaC_2O_4.H_2O$ was collected.
a. Write a balanced equation for the formation of the calcium oxalate monohydrate precipitate.

$C_2O_4^{-2}{}_{(aq)} + Ca^{2+}{}_{(aq)} => CaC_2O_{4(s)}$
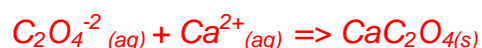
b. Determine the percentage, by mass, of calcium carbonate in the eggshell.

Find the Fm($CaC_2O_4.H_2O$) = 40.1 + 2 X 12.0 + 4 x 16.0 = 146.1

Find the mol of *CaC_2O_4*

0.543 / 146.1 = 3.72 x 10^{-3}

Find the mol of Ca
=> mol of CaC_2O_4 = mol of Ca = mol of $CaCO_3$ = 3.72 x 10^{-3}

Mass of $CaCO_3$ = 3.72 X 10^{-3} X 100.1 = 0.372g

Percentage composition of $CaCO_3$ = (0.372 / 0.402) X 100 = 92.5%