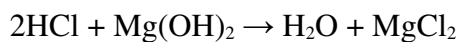


Year 12 Chemistry  
Quick Quiz: Concentrations for samples

1. To determine the concentration of  $\text{Al}^{3+}$  in the soil of a paddock, a 5.6 g sample of soil is dissolved in 150 mL of  $\text{H}_2\text{SO}_4$  solution. The concentration of  $\text{Al}^{3+}$  in this solution is determined by AAS to be 3.2 ppb.

Calculate the concentration of  $\text{Al}^{3+}$  in the paddock soil, in micrograms per gram.

2. To determine the percentage mass of  $\text{Mg}(\text{OH})_2$  in some antacid tablets, two tablets of total mass 2.4 g are crushed and dissolved in 100 mL of  $1.0 \text{ mol L}^{-1}$  HCl.



The concentration of HCl is then determined by AAS to be  $0.79 \text{ mol L}^{-1}$ .

- (a) Calculate the moles of HCl present before the reaction.
- (b) Calculate the moles of HCl remaining after the reaction.
- (c) Hence calculate the moles of HCl that were used up in the reaction.
- (d) Use the reacting mole ratio to determine the number of moles of  $\text{Mg}(\text{OH})_2$  in the two tablets.
- (e) Hence determine the mass of  $\text{Mg}(\text{OH})_2$  in the two tablets.
- (f) Calculate %w/w  $\text{Mg}(\text{OH})_2$  in the antacid tablets.