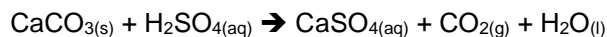


AP WORKSHEET 04F: Titration Calculations

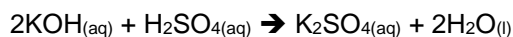
1. Limestone can be considered to be essentially pure calcium carbonate. Acid rain can be considered to be sulfuric acid. When limestone buildings are eroded by acid rain the reaction can be summarized by the chemical equation below.



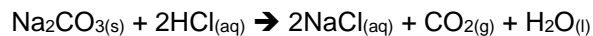
- (a) This reaction can be replicated in the lab by performing a titration. If 7.21 g of CaCO_3 solid is added to 1.20 L of 0.211 mol L^{-1} sulfuric acid, how many moles of acid will remain after reaction? (2)



- (b) What volume of 0.411 mol L^{-1} KOH must be added to neutralize this excess acid?
(2)



2. In a very similar reaction to the one carried out in question #1, some pure magnesium carbonate was added to 145. mL of 1.00 mol L⁻¹ HCl. When the reaction had finished, the solution was acidic. 25.0 mL of 0.500 mol L⁻¹ Na₂CO₃ solution was required to neutralize the **excess** acid. What mass of magnesium carbonate was originally used? (4)



3. 5.00 g of a mixture of sodium carbonate and potassium bromide was dissolved and made up to the mark in a 250. mL volumetric flask. 25.0 mL portions of this solution were neutralized by an average of 24.7 mL of 0.200 mol L⁻¹ HCl. Find the percentage of sodium carbonate in the original 5.00 g sample of the mixture. (4)

(Potassium bromide does not react with HCl)

