

Name: Key  
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**Chemistry 12**  
**ACID BASE PART II Lesson # 16**  
**ACID-BASE TITRATIONS**

**Recall from Chemistry 11:**

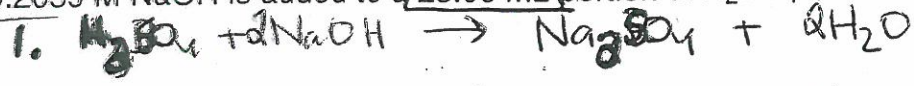
A titration is a process in which a measured amount of a solution is reacted with a volume of another solution (one of the solution has a unknown concentration) until a desired **EQUIVALENCE POINT** is reached (generally indicated by a colour change).

The **EQUIVALENCE POINT** is also known as the STOICHIOMETRIC POINT as it is reached when the mole to mole ration is equivalent to the ration in the **BALANCED EQUATION!!!**

All TITRATION problems have FIVE MAIN PARAMETERS:

- a. concentration of acid
  - b. Volume of acid
  - c. concentration of base
  - d. volume of base
  - e. base/acid mole ratio!
- **balanced eqn.**

**Example 1. A GENERIC TITRATION PROBLEM:** In the reaction between sulphuric acid and sodium hydroxide an equivalence point is reached when 23.10 mL of 0.2055 M NaOH is added to a 25.00 mL portion of H<sub>2</sub>SO<sub>4</sub>. What is the [H<sub>2</sub>SO<sub>4</sub>]?                     



$$\frac{0.2055 \text{ mol NaOH}}{1} \times 0.02310 \text{ L} = 4.747 \times 10^{-3} \text{ mol NaOH}$$

$$4.747 \times 10^{-3} \text{ mol NaOH} \times \frac{1 \text{ mol } H_2SO_4}{2 \text{ mol NaOH}} \Rightarrow \frac{2.374 \times 10^{-3} \text{ mol } H_2SO_4}{0.02500 \text{ L}}$$

$[H_2SO_4] = \boxed{9.494 \times 10^{-2} \text{ M}}$

**Experimental Note:** When performing a titration in the lab it must be repeated to check for accuracy of the results. If the following volumes were collected by a student:

- 1st titration = 21.55 mL
- 2nd titration = 21.82 mL
- 3rd titration = 21.81 mL

The student would DISCARD the volume from the first titration and take the AVERAGE of the closest TWO values.  $(21.82 + 21.81) / 2 = 21.815 \text{ mL} \Rightarrow 21.82 \text{ mL}$

**SEATWORK/HOMEWORK:** Exercises 95-107 (odd numbers) pgs 158-159  
**PLO's:** P2-P3