

## PREPARING AND STANDARDIZING ACIDS AND BASES

### MATERIALS

(1) 100 ml volumetric flask	Concentrated sulfuric acid
(2) 1 L plastic bottle	50% sodium hydroxide
(6) 250 ml flasks	phenolphthalein indicator
(1) di water wash bottle	magnetic stir bar
(1) 50 ml burette	magnetic stirrer
(1) safety goggles, gloves and apron	potassium acid phthalate
(2) 5 ml pipette and bulb	(1) 100 grad. cylinder
(1) 10 ml graduated cylinder	Balance (+/- 0.001 g)

**Note : Goggles, gloves and apron should should be worn at all times when when using strong acids or bases. Know where eyewash showers are located.**

### Method

#### Preparing .1 N sulfuric acid

Note : Do the following in the fume hood. wear safety goggles, gloves, apron and face shield.

1. Add 500 ml of DI water to a 1 liter plastic bottle.
2. Pour 3 ml of concentrated sulfuric acid into a 10 ml graduated cylinder. Pour contents into the plastic bottle and shake with lid on.
3. Add 497 ml of water to the plastic bottle, and shake with lid on.  
Label container 0.1 N sulfuric acid (aprox.)

#### Preparing .1 N Sodium Hydroxide

1. Pour 6 ml of 50% NaOH into a 10 ml graduated cylinder. Pour the NaOH into a 1 liter plastic bottle.
2. Add 500 ml of water and shake with lid on. Add 494 ml of water and shake with lid on. Label container 0.1 N sodium hydroxide (aprox.)

#### Preparing .1 N Potassium Acid Phthalate

1. Dry potassium acid phthalate in oven at 105 °C for 2 hours. Let cool in desiccator for at least 15 minutes.
2. Weigh 2.04 grams of potassium acid phthalate into a 100 ml volumetric flask. fill half way with di water and swirl until dissolved.

3. Fill to line with DI water, cover with parafilm and invert 20 times.

4. Pour into plastic bottle and label.

Calculate normality : normality = (weight of acid/2.04)\*0.1

### **Standardizing .1 N Sodium Hydroxide**

1. Pour .1 N NaOH into a 50 ml burette.

2. Pipette 5 ml of .1 N potassium acid phthalate into 250 ml flask and add 25 ml of DI water.

3. Add 2-3 drops of phenolphthalein.

4. While stirring, titrate with .1 N NaOH until solution is light pink.

5. Record ml used. repeat steps 1-4, three times and calculate the average.

Use the following calculation to determine normality of NaOH

$$\text{Normality of NaOH} = (\text{ml of acid} \times \text{normality of acid}) / \text{ml of NaOH}$$

Note: NaOH should be standardized weekly. It loses strength with time.

### **Standardizing .1N Sulfuric acid**

1. Pour standardized 0.1 N NaOH into a 50 ml burette.

2. Pipette 5 ml of approximately .1 N sulfuric acid into 250 ml flask and add 25 ml of di water..

3. Add 2-3 drops of phenolphthalein.

4. While stirring, titrate with 0.1 N NaOH until solution is pink.

5. Record ml used. Repeat steps 1-4, three times and calculate the average.

Use the following calculation to determine normality of sulfuric acid.

$$\text{Normality of H}_2\text{SO}_4 = (\text{ml of NaOH} \times \text{normality of NaOH}) / \text{ml of H}_2\text{SO}_4$$

**Note:** Sulfuric acid will not lose strength with time.

Editted: 1/30/06 DJB