# Chemistry Lab 8 proc

1.
$$\text{KHP molar mass} = 39.1 \text{ g}/\text{mol K} + 1.01 \text{ g}/\text{mol H} + 30.97 \text{ g}/\text{mol P} = 204.22$$

$$KHP_{mol} = \frac{0.134 \text{ mol KHP}}{204.22 \text{ g}} = 6.56 * 10^{-4}$$

$$\text{moles NaOH} = KHP_{mol}$$

$$\frac{6.56 \cdot 10^{-4} \text{ mol}}{0.01252 L} = 0.0524 \text{ M}$$

2.
> i. $$ \pu{0.0485 M \ce{NaOH}} * \pu{0.01084 L} = \pu{5.26 * 10^{-4} mol NaOH} $$

$$5.26 \cdot 10^{-4} \text{ mol NaOH} * \frac{1 \text{ mol H}^+}{1 \text{ mol NaOH}} = 5.26 \cdot 10^{-4} \text{ mol H}^+$$

ii.

$$\frac{5.26 \cdot 10^{-4} \text{ mol H}^+}{0.01 \text{ L}} = 0.0526 \text{ M}$$

iii.

$$pH = -log_{10}(0.0526) = 1.28$$

iv.

$$\frac{5.26 \cdot 10^{-4} \text{ mol}}{3} = 1.75 \cdot 10^{-4} \text{ mol citric}$$

$$\frac{1.75 \cdot 10^{-4}}{0.01 \text{ L}} = 0.0175 \text{ M citric}$$

v.

$$0.0175 \text{ M citric} * 0.236\,59 \text{ L} = 0.004\,15 \text{ moles citric}$$

# Procedure

## Preparing titrant

1. Rinse out a buret twice with the NaOH, ensuring that all sides are rinsed out.
2. Close the stopcock, then add titrant until it is filled to the top mark. Put a waste beaker underneath.

3. Drain the buret until all air bubbles are gone. If a lot of solution was used, feel free to refill it.
4. Record the initial volume of the buret

## Titration

1. Add ~0.2g of potassium hydrogen phtalate (KHP) to a 150mL Erlenmeyer flask (record mass), then add 35 mL of DI water to dissolve.
2. Add 2 drops of indicator to the mix
3. Ensure initial volume of buret is recorded, then begin slowly adding NaOH to the flask, mixing periodically. Slow down when indicator begins to remain in solution for longer periods of time. Stop when the solution becomes a faintly pink color that does not fade.
4. Record the NaOH, then calculate molar concentration, writing values on the board.

|  | Values |
|---|---|
| Mass KHP (g) |  |
| Initial NaOH volume (mL) |  |
| Final volume NaOH (mL) |  |
| Moles KHP |  |
| Volume delivered (mL) |  |
| NaOH concentration (M) |  |
| Average concentration from class data (M) |  |

## Determining acidity and concentration

1. Put about 10 mL of the juice into a 250 mL Erlenmeyer flask, writing down the volume.
   - It helps to use a graduated cylinder to measure
   - Rinse it 3 times into the flask
2. Measure around 25 mL of DI water into the flask. If not sufficiently diluted, add up to 50 mL. Finish it off with 2-4 drops of indicator
3. Ensuring at least 30 mL of NaOH is in the buret, and it is recorded, then begin titration as above.
4. Empty out the flask after retrieving data, then repeat.
5. Calculate the concentration of $H^+$ ions in each trial, then find the percent difference. If your difference is greater than 5%, then repeat the trial until

you are good

$$\% \, \text{difference} = \left( \frac{M_1 - M_2}{M_2} \right) \cdot 100\%$$

|  | Trial 1 | Trial 2 | Trial 3 (optional) |
|---|---|---|---|
| Citrus juice volume (mg) |  |  |  |
| Concentration of NaOH (M) |  |  |  |
| Initial NaOH volume (mL) |  |  |  |
| Final NaOH volume (mL) |  |  |  |
| Total NaOH added (mL) |  |  |  |
| Moles of NaOH added |  |  |  |
| Concentration of $H^+$ in juice sample |  |  |  |
| pH of juice sample |  |  |  |

# Waste

Keep extra titrant in the buret
Everything goes in waste