

Title: Titration Curve of a Weak Acid with a Strong Base

Time: 2.5 hrs

Equipment Needed:

pH meters - get them down from the wall cabinet. When putting them away, place a drop of pH 7 buffer in the rubber cap for the electrode before storage.

burets - 2 per student

2 mL pipets - 1 per student

pipet bulbs - 1 per student

Solutions Needed:

STOCK SOLUTIONS:

0.5 L 1 M Acetic Acid - Labeled

0.5 L 1 M Sodium acetate - Labeled

0.5 L 1 M Ammonia - Labeled

0.5 L 1 M Ammonium Chloride - Labeled

Student Solutions:

1L 0.10 M Acetic Acid - Labeled

1L 0.10 M Sodium acetate - Labeled

1L 0.10 M Ammonia - Labeled

1L 0.10 M Ammonium Chloride - Labeled

10 L 0.100 M HCl - Harriman - on the superstructure

10 L 0.100 M NaOH - Harriman - on the superstructure

Vinegar 1 gal bottle - Harriman - on the superstructure

5% Phenolphthalein solution - solvent ethanol

Special Solutions Needed:

pH 4 buffer and pH 10 buffer for calibration. pH 7 buffer for electrode storage.

Special Preparation Instructions:

Check the batteries in the portable pH meters. If weak replace with batteries stored in refrigerator (if any there) and recheck.

Check the electrode by adjusting the pH meter with pH 4 buffer (make sure the temperature compensator is set properly). Then check with pH of 10 buffer. If the latter reading is below 9.5, replace the electrode. Discard the old electrode.

Special Instructor Instructions

Go to each pH meter and calibrate with pH 4 buffer.

Tell the students not to change the calibrations of the pH meters. Tell them if they

inadvertently move the calibration knobs to ask for a recalibration.

Buffers:

Have them make up their own buffers by mixing the acetic acid/ammonia with its salt.

Phenolphthalein is optional - I have been having them do a titration curve with HCl also in order to see the contrast.

Labels:

**Titration Curve Experiment
Vinegar**

Prepared on / / By_____

**Titration Curve Experiment
Acetic Acid
CH₃COOH
0.1 M**

Prepared on / / By_____

**Titration Curve Experiment
Sodium Acetate
NaCH₃COO
0.1 M**

Prepared on / / By_____

Titration Curve Experiment
Ammonia
 $\text{NH}_3(\text{aq})$
0.1 M

Prepared on / / By_____

Titration Curve Experiment
Ammonium Nitrate
 NH_4NO_3
0.1 M

Prepared on / / By_____

Hydrochloric Acid
 $\text{HCl}(\text{aq})$
0.1 M

Prepared on / / By_____

Sodium Hydroxide
NaOH(aq)
0.1 M

Prepared on / / By_____

Titration Curve Experiment
STOCK
Acetic Acid
CH₃COOH
1 M

Prepared on / / By_____

Titration Curve Experiment
STOCK
Sodium Acetate
NaCH₃COO
1 M

Prepared on / / By_____

**Titration Curve Experiment
STOCK
Ammonia
 $\text{NH}_3(\text{aq})$
1 M**

Prepared on / / By_____

**Titration Curve Experiment
STOCK
Ammonium Nitrate
 NH_4NO_3
1 M**

Prepared on / / By_____