

Alkalinity Lab Procedures

Carol Snaith, 1998

In Lab:

Equipment:

A small beaker for each sample
pH meter and buffers (4 and 7)
10% Hydrochloric Acid
Microburette
Pipette (25mL)
Deionized water

- 1) Using the pipette, remove 25mL of the sample and transfer it into a small beaker.
- 2) Find the pH of the sample and record it as the lab pH (this should be close to the field pH).
- 3) Once the pH is stable, add .1mL of hydrochloric acid with the microburette.
* you will be adding incremental amounts of acid. You may start with a couple increments of larger additions (.1mL) but then an addition of .01mL is recommended.
- 4) Record the pH once it has stabilized.
- 5) Repeat steps 3 and 4 until the pH drops suddenly with only one addition of acid.
* this drop will be substantial, such as a drop of 1 pH unit as opposed to prior drops of .3 of pH unit per equivalent additions of acid.
- 6) With each addition of acid record the pH of the sample.
- 7) After you notice the significant drop in pH, add five more acid additions—this assures that you have passed the end point of the sample.

In a spreadsheet program:

- 1) Make a table of three columns, one for sample pH, one for mL of acid added, and one for a variable Psi.
- 2) Enter in the data from the lab with corresponding acid additions and sample pH.
- 3) Now calculate Psi. You do this using the formula:

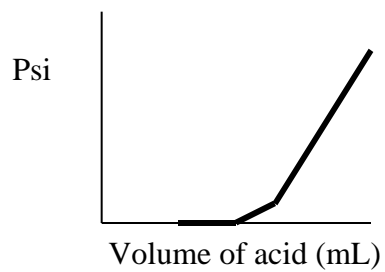
$$= (v_o + v) * 10^{(-\text{pH})}$$

v_o = Volume of sample (25mL)

pH = pH at the time of each addition

v = Volume of titrant (acid) added at a particular addition

- 4) Now graph the Psi value versus the pH. The graph should look like this:



- 5) Where the line intersects the x-axis is the end point of the sample. Record this number.
- 6) Now calculate the normality that will give the alkalinity of the sample.

$$N = (V_t * N_t) / V_s$$

N = Normality of the sample

V_t = Volume of the titrant at the end point (intersection at the x-axis)

N_t = Normality of the titrant (.1 for 10% acid)

V_s = Volume of sample (25 mL)