

## Experiment 6

### pH Titration Curves – Acid Content of Soda

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#### TA Evaluations:

There is no pre-lab quiz associated with this experiment. Instead you **must** complete the on-line TA evaluation (in Owl) by Thursday, August 13, 2015. This evaluation is equivalent to one perfect pre-lab quiz.

#### Introduction:

'Believe it or not', the average American consumes on the order of 43 gallons of soda per year. This translates to around 460 12oz cans. How do you compare?

Popular sodas all strive for a somewhat sour ('tart') flavor and manufacturers turn to acids to impart this taste. While there are a vast variety of different brands of sodas on the market, they can be broken into two main categories, dark or clear. This differentiation is not a simple color one but is also one of taste and content. Clear sodas tend to be citrus-fruit like in taste and use citric acid to impart the tart flavor. Dark sodas tend to use caramel for flavoring and phosphoric acid is used to compliment this.

In the previous experiment you explored the above two acids, by following the pH changes that occurred as you added a strong base. In this experiment you will use a similar procedure to determine the acid content of a clear or dark soda and attempt to obtain some evidence that might confirm the above information on soda.

#### Experimental Procedure

1. Using a repipet place 10mL of either the clear or dark soda into a small beaker. If necessary add distilled water such that the tip of the pH probe is covered.
2. Fill your buret with the ~0.02M NaOH solution. Record the exact molarity of this solution. Record the initial buret reading. Remember that this corresponds to 0.00mL of NaOH added.
3. Record the initial pH of the soda.
4. Carefully add the NaOH recording the volume of NaOH required to effect a pH change of 0.2. Continue this process until the pH reaches ~12.
5. Plot a graph of 'pH' versus 'Volume of NaOH' added and from this graph determine:
  - a) The  $K_a$  values for the acid in the soda (assuming that it is either citric or phosphoric acid).
  - b) Determine the exact concentration of the acid in the soda.

#### Write Up:

In the discussion portion of your write up, be sure to address the correlation between the  $K_a$  values that you obtained and those that you obtained in the previous experiment. Do your results collaborate the presence of citric or phosphoric acid.