Purpose: Evaluate the temperature dependence of the Ksp for the solubility of calcium hydroxide and from that data determine $\Delta H^\circ$, $\Delta S^\circ$, and $\Delta G^\circ$ for the solubility reaction.

In this experiment students will work in pairs

Part A. Determination of the $K_{sp}$ of Ca(OH)$_2$ at room temperature (75 minutes)

- Obtain 100 mL of the standardized HCl solution. **Record** the concentration of the acid. Carefully fill the buret with your acid solution.
- Retrieve 50 mL of room temperature Ca(OH)$_2$ solution. **Record** the temperature of your solution and carefully filter out the excess solid.
- Add 10 mL of the filtered Ca(OH)$_2$ solution to an Erlenmeyer flask and add 25 mL of distilled water. Add 1-2 drops of bromothymol blue indicator and titrate the solution.
- Titrate until the neutralization reaction is complete (determined by the anticipated color change) and record the volume of HCl added to perform the titration.
- Repeat two (2) more times – your results for all trials should agree to within ±0.5%.

Part B. Determination of the $K_{sp}$ of Ca(OH)$_2$ at higher temperatures

- Heat 100 mL of distilled water to boiling. Add approximately 2 grams of solid Ca(OH)$_2$ to the boiling water and continue to boil for 2 minutes with gentle stirring. Record the mass of Ca(OH)$_2$ used even though the value will not appear in any calculations.
- Record the temperature of the hot solution, and decant 50 mL of the solution and filter while hot to remove excess out solid immediately. Record the temperature of the solution while filtering as well (there will be error in temperatures due to this part).
- Add 10 mL of the filtered solution to an Erlenmeyer flask and add 25 mL of distilled water with 1-2 drops of bromothymol blue indicator.
- Titrate until the neutralization reaction is complete (determined by the anticipated color change) and record the volume of HCl added to perform the titration.
- Prepare two (2) more samples for titration from the sample while the solution is hot.
- Repeat the titration for each sample – your results for all trials should agree to within ±1-2%.