

## Alka Seltzer and Gas Solubility

Name: \_\_\_\_\_

Purpose: To test gas solubility at different temperatures.

### Materials:

Alka-Seltzer	3- 250 mL beakers
Bromothymol blue indicator	Hot plate
1 M sodium hydroxide solution	stirring rod
Weighing paper	3 test tubes
Thin stem pipettes	

### Procedure:

1. Put on your goggles. Add 200 ml of water to each of three 250 ml beakers. Place one beaker in an ice bath, heat the second beaker on a hot plate, and allow the third beaker to equilibrate at room temperature.
2. Obtain two 1.0 g samples of Alka-Seltzer tablets in a weighing dish.
3. When the water on the hot plate has reached a temperature of 75-80° C, remove it from the heat. Remove the cold water from the ice bath at this time also.
4. Add 3 mL of bromothymol blue to each beaker. (The water should be blue-green, indicating a neutral pH.)
5. Simultaneously drop the Alka-Seltzer samples into the hot and cold beakers. Observe and compare evidence of physical and chemical changes in the beaker. Enter your observations in the observation area.
6. When the Alka-Seltzer tablets have fully dissolved, note the color and appearance of the solution in each beaker. (Write in observation area)
7. Measure the temperature of each solution, including the room temperature control, and label three large test tubes with the corresponding temperature.
8. Using a graduated cylinder, remove a 25 mL sample from each beaker including the room temperature control, and place the sample in the appropriately labeled test tube.
9. Using a thin stem pipet add 1 M NaOH solution dropwise to the cold water mixture. Count the number of drops of NaOH that must be added to match the color of the room temperature control solution. Stir or swirl between drops to ensure thorough mixing. Enter the number of drops in the observation area.
10. Repeat step 9 using the hot water mixture, again comparing the color with that of the room temperature control. Enter the number of drops in observation area.
11. When you are finished pour everything down the sink, clean all the glassware and your table top.

Observations:

Observations from step 5:

Observations from step 6:

Number of drops from step 9:

Number of drops from step 10:

Analysis and Conclusions:

1. When Alka-Seltzer reacts with water  $\text{CO}_2$  gas is one of the products. The  $\text{CO}_2$  dissolves in the water to form a weakly acidic solution. The NaOH reacts with the acid to form a neutral solution. The more  $\text{CO}_2$  is dissolved the more acidic the water solution. Which water solution had the most  $\text{CO}_2$  dissolved in it?
2. Give reasons for your answer from number 1.
3. Do gases have a greater solubility in hot or cold water.
4. Do some research on thermal pollution and explain what implications your findings in this lab have to do with this topic and the environment.