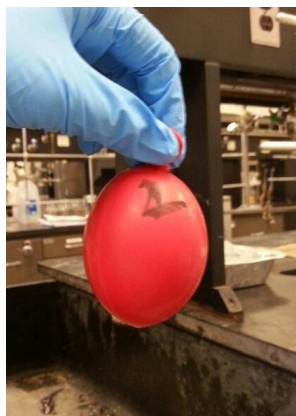




California State University of Bakersfield, Department of Chemistry

Gassy Balloons



Standards:

HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

KE23 C.1 - Define enthalpy and entropy and explain the relationship to exothermic and endothermic reactions:

- $\Delta H < 0$ = exothermic reaction
- $\Delta H > 0$ = endothermic reaction

Introduction:

Are you tired of blowing up balloons? If so, you should try using simple chemistry to satisfy all your ballooning needs. With just a little bit of baking soda and vinegar, you can create a chemical reaction that will actually do all the blowing you need. This is also a good way to measure the molarity (moles per liter) of a substance.

Materials:

- Balloon
- Vinegar
- Baking Soda
- Paper
- Beaker
- Graduated Cylinder

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Safety:

- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments

Procedure:

1. Weigh the empty beaker and record mass. Then measure 6g of NaHCO_3 into beaker.
2. Measure 15 mL of acetic acid using a graduated cylinder.
3. Make a small square of paper.
4. Place the NaHCO_3 into a square of paper.
5. Pour acid into balloon.
6. Now place paper square into balloon, and tie quickly.
7. Shake balloon for 2 min.
8. After 2 min measure the circumference of the balloon and record.
9. The temperature and barometric pressure are on the board. Record these.
10. Complete calculations.

Data and Observations:

Circumference(c) of balloon in cm	
Radius ($\frac{1}{2}d = r$)	
Volume of sphere($\frac{4}{3}\pi r^3$)	
Number of moles CO_2	
Mass of CO_2	
Theoretical volume	
Percent error	

*For mole calculations use $PV = nRT$, $R = 0.0821$, measure P in atm, change T to Kelvin.

**Theoretical check with instructor. Use % error equation below.

$$\frac{\text{theo} - \text{exp}}{\text{theo}} \times 100 = \underline{\hspace{2cm}}$$

References:

1. http://www.sciencebob.com/experiments/videos/video-fizz_inflator.php (Date Accessed: July 28, 2014).