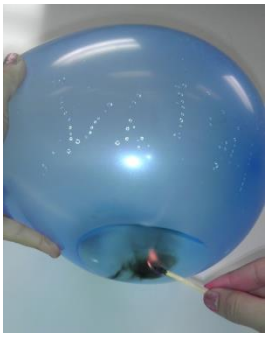
California State University of Bakersfield, Department of Chemistry

The Fireproof Balloon



Standards:

8th: 5c- Chemical reactions usually liberate heat or absorb heat.

6th: 3a, b, c- Heat moves in a predictable form.

Introduction:

Have you ever imagined what it would be like to have a balloon that is fireproof? Well now you can try it yourself at home with a little help from your parents. All you need is a few simple materials, and be careful to not get burned!

Balloons are rather fragile things and must be kept away from sharp objects and flames. Fire can weaken the rubber and cause it to burst; however, in this experiment you will find out how to hold a balloon directly on a flame without breaking it. The secret is to put water inside of the balloon before inflating it. This will prevent the balloon from bursting once we expose it to the flame. The flame must be beneath the water in the balloon, this way the water will absorb most of the heat and the rubber won't get as hot. Water has a really large specific heat, meaning that it takes a lot of heat to make water boil. Eventually the water will get hot enough to break the rubber. So be careful and enjoy this great experiment!

Materials:

- Balloons (not inflated)
- Several matches
- Water

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. Place ¼ cup of water in a balloon, inflate it, and tie it shut.
2. Light a match and hold it under the balloon. Make sure you are holding it directly over the part that contains water. Allow the flame to touch the balloon and record your observations in this handout.
3. Watch as the balloon stays fire-resistant. You may even see a black patch of soot form on the outside of the balloon above the flame. Soot is formed through incomplete combustion and it is normal to see it on the balloon as you burn the match.
4. Try this experiment with different amounts of water inside the balloon and record your observations.

Data and Observations:

Record your observations in this space

What did you see? Anything you were not expecting? Describe it here.

Questions:

1. Why is it that the balloon does not pop?

2. Does the amount of water have an effect on the experiment?

3. What happens when you use less water and more fire? Explain.

References:

1. Scifun.chem.wisc.edu
http://scifun.chem.wisc.edu/homeexpts/FIREBALLOON.html
(accessed July 17, 2012)**.**