

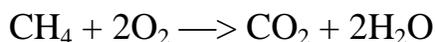
Name: _____ Period: _____ Date: _____

Ms. Randall Regents Chemistry

Lab Activity: The Bunsen Burner and Analyzing Popcorn

Background: The Bunsen burner is used frequently in the laboratory as a source of heat. This burner is designed so that gaseous fuel may be mixed with the correct amount of air to yield the maximum amount of heat. In order to use this burner properly and safely, it is essential that you understand its construction and the adjustments that can be made.

Here is the chemical reaction of the Bunsen burner fuel with oxygen as it burns:



CH₄ is called methane and is the major component of natural gas. This equation is similar to the chemical reaction for the burning of a candle. Notice that carbon dioxide and water are the chemicals that result from the reaction. It is a combustion reaction.

Lab Safety: Goggles must be worn at all times! Please pull all hair back and remove loose clothing such as sweatshirts.

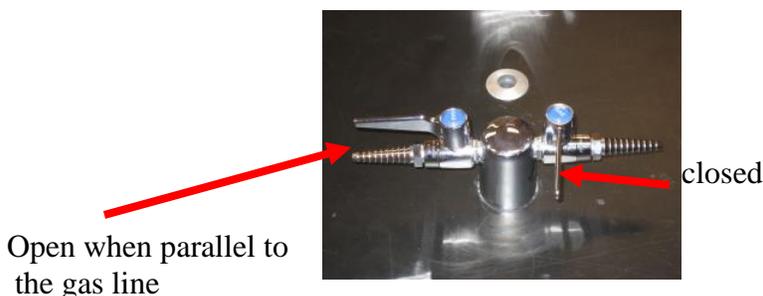
Objective: To demonstrate proper technique in lighting a Bunsen burner

Pre-lab: Draw into your notebook and label the parts of the Bunsen burner. Draw an arrow pointing to the hottest part of the flame.

Part I. Lighting and Maintaining a Bunsen burner Flame

Procedure:

1. Inspect and make sure the fuel tube is securely attached to the bench fuel valve and to the burner.
2. Completely close air inlet (the barrel).
3. Light a match and hold it over edge of the burner's barrel ***before turning on the gas.***
4. Turn on the lab bench fuel valve as shown in the picture; a valve is open if the handle is in line with the outlet—it is closed if it is at right angles to the outlet.



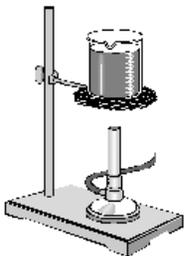
5. You should see a bright yellow flame—the light and color are provided by tiny particles of unburned carbon from the fuel which have been heated to incandescence.

Part II. Analyzing the “POP” in Popcorn

Background: Popping corn involves heating the corn until the pressure inside the kernel is great enough to cause it to burst turning the kernel inside out and releasing trapped moisture.

Objective: To calculate the change in mass between popped and un-popped popcorn

Lab Safety: Goggles must be worn at all times! Please pull all hair back and remove loose clothing such as sweatshirts.



Materials:

Bunsen burner, wire gauze, ring stand, iron ring, hot pad
125 ml Florence flask
10 ml graduated cylinder
Beaker tongs
Transfer pipette
Aluminum foil
oil
Popcorn

Procedure:

1. Record the mass of 16 kernels of popcorn.
2. Using the water displacement method, find the volume of 16 kernels. Dry the kernels.
3. Add $\frac{1}{2}$ pipette full of oil and the 16 kernels to an empty; dry 125-ml Florence flask.
4. Determine the mass of the flask, oil, and 16 kernels of popcorn.
5. Cover the mouth of the flask with Aluminum foil and poke small hole in the foil to allow the moisture to escape but not the popcorn.
6. Turn on the Bunsen burner and place the flask on the wire gauze
7. **Watch** carefully so the popcorn does not burn.
8. Remove the flask using a hot mitt when most of the kernels have popped. **DO NOT LET THE POPCORN BURN OR YOU WILL NEED TO START OVER!**
9. Let the flask cool on the hot pad, remove the foil and reweigh the flask.
10. Clean all glassware. Throw out any uneaten popped corn.

Data:

Starting Volume of water _____ ml
Volume of Water and 16 Popcorn Kernels _____ ml
Volume of 16 Popcorn Kernels _____ ml
Average Volume of One Popcorn Kernel _____ ml

Mass of the 16 kernels of popcorn _____ g
Mass of flask, oil and 16 kernels of un-popped corn _____ g
Mass of flask, oil and 16 kernels of popped corn _____ g

Analysis:

How did the average mass of the popcorn before popping compare to the mass of the popcorn after it was popped? Calculate the change in mass and the percent change in mass(m) using these formulas:

a. Change in Mass (Δm)

$$\Delta m = \text{Mass flask}_{\text{popped}} - \text{Mass flask}_{\text{unpopped}}$$

b. Percent Change in Mass

$$\frac{\Delta m}{\text{Mass}_{\text{unpopped kernels}}} \times 100\%$$

Conclusion question to be answered in Google classroom in addition to your lab summary:

Read the following web page:

<http://www.thenakedscientists.com/HTML/experiments/exp/steam-explosions-the-science-of-popcorn/>

Explain the science behind how a popcorn kernel “pops.”