

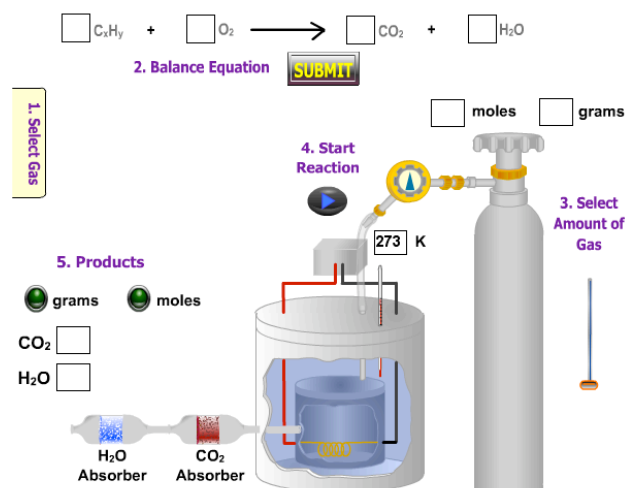
Burning a Hydrocarbon I

Name _____ Lab Section _____

Problem Statement: How are the masses of reactants and products related?

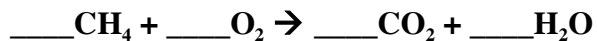
I. Data Collection:

- A. Go to <http://cheminfo.chem.ou.edu/~mra/home.html> and open the Burning a Hydrocarbon I Simulation. Your screen should look like the figure.



The apparatus represents a reaction container that can be filled with different amounts of hydrocarbon gases from a gas cylinder. A hydrocarbon is a chemical substance containing only hydrogen and carbon. When hydrocarbons combine with oxygen, (i.e. burn), they produce carbon dioxide and water as products. The reaction container will also hold oxygen gas to react with the hydrocarbon. To use the simulation you must (1) select a gas by clicking on the select tab, (2) balance the chemical equation and submit it, (3) specify the amount of gas with a slide bar, (4) start the reaction, and (5) examine the amount of products. These steps are numbered in the simulation.

- B. Click on the Select Gas tab and pick CH₄, methane. Balance the equation using the lowest ratio of whole numbers and submit the equation. Add 10.0g of CH₄ to the reaction container and start the reaction. The simulation will burn the gas and pass the products through filters that will absorb the product molecules so that they can be weighed. Click on the product buttons. Record the data you collected in the following tables.



Initial Amount (moles) – I	_____	_____	_____	_____
Change (moles) – C	_____	_____	_____	_____
Ending Amount (moles) – E	_____	_____	_____	_____
Initial Amount (grams) – I	_____	_____	_____	_____
Change (grams) – C	_____	_____	_____	_____
Ending Amount (grams) – E	_____	_____	_____	_____

- C. Calculate the change in the number of moles and grams that occurred when the reaction was complete. Record your results in the tables above.

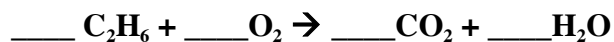
II. Data Analysis and Interpretation

- A. What must you assume about the amount of oxygen present in the reaction container at the beginning of the reaction to account for your observations.

- B. How do you know that all of the CH_4 reacted when the reaction was complete?
- C. Compare the total mass of the compounds that reacted with the total mass of the products that was formed.
- D. Compare the balanced equation to the data in the tables. Which data best describes the relationships represented by the balanced equation?

III. Data Collection

- A. Click on the Select Gas tab and pick C_2H_6 , ethane. Balance the equation using the lowest ratio of whole numbers and submit the equation. Add 10.0g of C_2H_6 to the reaction container and start the reaction. Click on the product buttons. Record the data you collected in the following tables.



Initial Amount (moles) – I	<u> </u>	<u> </u>	<u> </u>
Change (moles) – C	<u> </u>	<u> </u>	<u> </u>
Ending Amount (moles) – E	<u> </u>	<u> </u>	<u> </u>

Initial Amount (grams) – I _____ _____ _____

Change (grams) – C _____ _____ _____

Ending Amount (grams) – E _____ _____ _____

D. Calculate the change in the number of moles and grams that occurred when the reaction was complete. Record your results in the tables above.

III. Data Analysis and Interpretation

A. Compare the total mass of the compounds that reacted with the total mass of the products that was formed. Is mass conserved?

B. Compare the total number of moles of the compounds that reacted with the total number of moles of the products that was formed. Is number of moles conserved?

IV. Data Collection:

A. Consider burning 10.0g C₃H₈, propane. Balance the following equation using the lowest ratio of whole numbers. Before trying the experiment, predict the amounts of reactants and products and fill in the tables below.



Initial Amount (moles) – I _____ _____ _____

Change (moles) – C _____ _____ _____

Ending Amount (moles) – E _____ _____ _____

Initial Amount (grams) – I	_____	_____	_____
Change (grams) – C	_____	_____	_____
Ending Amount (grams) – E	_____	_____	_____

B. Test your predictions using the simulation. Correct any values in the table.

VII. Conclusions:

A. Compare the total mass of the compounds that reacted with the total mass of the products that was formed. Is mass conserved?

B. Compare the total number of moles of the compounds that reacted with the total number of moles of the products that was formed. Is number of moles conserved?

C. Click on the Select Gas tab and pick unknown hydrocarbon C_xH_y . Add 10.0g of C_xH_y to the reaction container and start the reaction. Click on the product buttons. Record the data you collected in the following tables.



Initial Amount (grams) – I	_____	_____	_____
Change (grams) – C	_____	_____	_____
Ending Amount (grams) – E	_____	_____	_____

Initial Amount (moles) – I	_____	_____	_____
Change (moles) – C	_____	_____	_____
Ending Amount (moles) – E	_____	_____	_____

D. Determine possible values for x and y. Balance the equation using the resulting hydrocarbon.

