Molar Mass Lab

Objectives:

1. Measure a pre-determined amount of a substance on the triple beam balance
2. Compare and contrast molar masses of different substances.

Hypothesis:

1. Which substance will have the largest mass in grams?
2. How are molar masses of different substances similar? Different?

Materials:

Samples of: Triple Beam Balance

Aluminum Carbon Petri Dish

Lead Silicon Spoons

Sulfur Copper

Iron Tin

Cadmium Calcium

**Procedure:**

1. Using the balance, petri dish and plastic cubes, practice finding a predetermined amount on the balance. Follow these steps:
2. Find the mass of the petri dish
3. Add the ***mass*** of the cubes to the riders on the balance
4. Add cubes until the balance is level (balanced).
5. For each sample measure out the molar mass of the substance. Follow these steps:
6. Find the mass of the petri dish
7. Using the periodic table, find the atomic mass number
8. Convert this number to grams

(Example: Helium Atomic Mass #=4; Helium molar mass = 4 grams)

1. Add the molar mass to the petri dish mass. Measure out that amount on your balance.
2. Write observations in the table.
3. You must find the mass of at least 3 substances, you may do more if time permits.
4. Take ONE beaker/container at a time back to your table.
5. Be sure to use only clean utensils.
6. CAREFULLY return the substances back to the beaker/container when you are finished measuring.
7. Do ONE comparison of your triple beam balance measurement and weighing the same material on the digital scale.

**DO NOT MIX SUBSTANCES! CLEAN AND DRY ALL MATERIALS!**

**DO NOT USE DIRTY PETRI DISHES! CAREFULLY REPLACE MATERIALS IN CONTAINERS!**

**REPORT ALL PROBLEMS AT ONCE! DO NOT USE SPOONS FOR MORE THAN ONE NO GUESSING! SUBSTANCE!**

**Data:** Mass of petri dish \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_g

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Substance | | Mass | | | Number of atoms in sample | Observations |
| Name | Symbol | Atomic Mass | Molar Mass (g/mol) | Mass of petri dish + sample |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |
| 4 |  |  |  |  |  |  |
| 5 |  |  |  |  |  |  |
| 6 |  |  |  |  |  |  |
| 7 |  |  |  |  |  |  |
| 8 |  |  |  |  |  |  |
| 9 |  |  |  |  |  |  |
| 10 |  |  |  |  |  |  |

**Results:** In a paragraph write about the different substances that you measured. What did you see? Compare and contrast the substances you measured.

Calculate the percent error using data from comparison

|  |  |
| --- | --- |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on Triple Beam Balance | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on digital scale |
| g | g |

**Conclusion Questions:**

1. Using your periodic table, write the molar mass of each of these elements. (How much mass is one mole of each of these elements in grams/mol?)
2. Lithium c. Mercury
3. Cobalt d. Radon
4. Write Avogadro’s number in scientific notation and long notation.
5. Molar mass is equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Which element was first used to define a mole?
7. What is the definition of mole?
8. What is the abbreviation for mole?
9. How many particles are in one mole?
10. What name is given of the number of particles in a mole?
11. Compare and contrast ‘mole’ to ‘dozen’.
12. Compare the sizes of the different elements at the molar weight and their positions on the periodic table.
13. What new things did you learn about in this lab?