

Goodie bag #1: Atoms + Reactions

Handed out on 9.5.18 | Quiz #1 on 9.13.18

3.91



Do yourself a solid.

Please treat all contents of every Goodie Bag with care, and be cognizant that any item may be dangerous if improperly used. You are responsible for your own actions. Make sure to carry out any activities with items in this bag in an appropriate environment.

This bag contains:

- 5 strips of metals
- A vial with vinegar
- A pipette
- 2 pairs of gloves
- A plastic cup
- A cool ruler



What to bring to the quiz: the cool ruler

Introduction

This goodie bag will explore the relationships between the position of elements in the periodic table and some of their properties. Core knowledge and practice: balanced reactions, limiting reagents, Avogadro's number, mole, density, atomic mass.

Instructions & Questions

You have been given 5 strips of metals (Al, Cu, Fe, Mg, Sn).

WEAR GLOVES WHEN HANDLING METALS AND CHEMICALS.

WASH HANDS AND IMMEDIATE AREA THOROUGHLY AFTER EXPERIMENTS.

Question 1: Identifying elements (old school)

Identify which strip corresponds to which element, using the following properties: relative weight, color, stiffness, and reactivity with vinegar (place each strip in the cup and pour a few drops of vinegar onto it). No precise measurement is needed – qualitative, relative relations are sufficient.

Explain how you identified the different metals.

Question 2a: Balancing a reaction

You may have noticed that one of the strips reacted with the vinegar. This was Mg. Write the balanced reaction for Mg reacting with vinegar to produce magnesium acetate $\text{Mg}(\text{C}_2\text{H}_3\text{O}_2)_2$ and hydrogen H_2 .

Question 2b: Limiting reagent and mass of reaction

If 10g of solid magnesium is reacted with 100g of vinegar (which in turn contains 9% by weight acetic acid), what is the limiting reagent? How much magnesium acetate is produced?

Question 3: Counting atoms

Let's take the copper strip. It has a thickness of 0.005". The density of copper is 8.94 grams / cm^3 . Measure the length and width of the strip and then estimate the number of copper atoms in it.

Question 4: Isotopes

Out of the 29 isotopes of copper, only two are stable: ^{63}Cu and ^{65}Cu . Calculate the number of atoms of ^{63}Cu in your strip of copper.

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