Pre-AP Chemistry
Unit #4—Periodicity

Investigation of the Atomic Mass of Candium

INTRODUCTION

Isotopes are different forms of the same element. Therefore, they have the same number of protons and electrons, but they differ in the number of neutrons. As an example, consider the three isotopes of hydrogen. H-1 is regular hydrogen, H-2 is called deuterium, and H-3 is known as tritium. They are all types of hydrogen with only one proton in the nucleus and one electron in an energy level around the nucleus, but all three have different numbers of neutrons in their nuclei.

PURPOSE

In this experiment, the student will analyze the isotopes of Candium and calculate its atomic mass.

PROCEDURE

1. Take a random sample of Candium.
2. Separate the total sample into the individual "isotopes", one pile of each.
3. Find the mass of the whole group of each isotope of Candium.
4. Count how many "atoms" of each isotope you have.

CALCULATIONS

1. Calculate the ***average mass of each isotope*** by dividing the total mass of the isotope by the number of particles of that isotope.

2. Find ***relative abundance***.

   A. **First**: Add up the total number of all the particles of all three isotopes.

   B. **Then*:*** Divide the number of particles of each isotope by the total number of particles.

3. Now find ***percent abundance***. Multiply relative abundance for each isotope by 100.

4. Calculate the ***relative mass of each isotope*** by multiplying its relative abundance from step 2 by its average mass (from step 1).

5. Calculate the ***average mass*** of all Candium particles by adding the relative masses. This average mass is known as the *atomic mass* of Candium.

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	Candy #1	Candy #2	Candy #3	Total Mass (#5)
Total Mass (grams)				
Number of Particles				
Average Mass (grams) ***(#1)***				
Relative Abundance ***(#2)***				
Percent Abundance ***(#3)***				
Relative Mass (grams) **(#4)**				

CONCLUSIONS

1. Explain the difference between percent abundance and relative abundance.

2. What is the result when you total the individual percent abundances?

3. What is the result when you total the individual relative abundances?

4. The percent abundance of each kind of candy tells you how many of each kind of candy there are in every 100 particles. What does the relative abundance tell you?

5. Explain any differences between the atomic mass of your Candium sample and that of your neighbor. Explain why the difference would be smaller if larger samples were used.