Name Key Date 18-19

Average Atomic Mass Practice

Overview

The average atomic mass of an element can be determined from the relative amounts of each isotope. This is the mass used in most chemical calculations.

In a naturally occurring element, the **percent abundance** of each isotope is the percentage of how many of the total atoms are like that particular isotope.

To calculate average atomic mass of an element:

Average atomic mass = (fractional abundance of isotope 1)(atomic mass of isotope 1) + (fractional abundance of isotope 2)(atomic mass of isotope 2) + ...

Practice Problems

1. Chlorine has two isotopes. Chlorine-35 has an actual mass of 34.97 amu and Chlorine-37 has a mass of 36.97 amu. In any sample of chlorine atoms, 75.77% will be Chlorine-35 and 24.23% will be Chlorine-37. Calculate the average atomic mass of chlorine.

35.45 amu

2. Copper has two isotopes. Copper-63, which has an atomic mass of 62.93 amu and Copper-65, which has an atomic mass of 64.93 amu. In any sample of copper atoms, 69.1% will be Copper-63 and 30.9% will be Copper-65. Calculate the average atomic mass of naturally occurring copper.

63.55 amu

3. One atom has 20 protons and a mass of 44. Another atom has 20 protons and a mass number of 40. What is the identity of these atoms? How do you account for the difference in mass numbers?

Calcium-44
Calcium-40 > Diff # of neutrons

Calculate the average atomic masses using the following data for #5-9. SHOW YOUR WORK!

4.

Isotope	Mass (amu)	Percent abundance
Mg-24	23.985	78.7%
Mg-25	24.986	10.13%
Mg-26	25.983	11.17%

Average atomic mass of Magnesium = 24.31 amu

5.

Isotope	Mass (amu)	Percent abundance
Ir-191	191.0	37.58%
Ir-193	193.0	62.42%

Average atomic mass for Iridium = 192.25

6.

Isotope	Mass (amu)	Percent abundance
Li-6	6.015	7.59%
Li-7	7.016	92.41%

Average atomic mass of Lithium = 6.94

7.

Isotope	Mass (amu)	Percent abundance
Cr-50	49.95	4.35%
Cr-52	51.94	83.8%
Cr-53	52.94	9.5%
Cr-54	53.94	2.35%

Average atomic mass of Chromium = 52.09

8.

Isotope	Mass (amu)	Percent abundance
I-127	127.0	80%
I-126	126.0	17%
I-128	128.0	3%

Average atomic mass of Iodine = 126.86

9.

Isotope	Mass (amu)	Percent abundance
H-1	0.98	99%
H-2	1.97	0.8%
H-3	2.98	0.2%

Average atomic mass of Hydrogen = 0.99