



Chemistry

Name: _____

Section _____

ISOTOPES – ATOMIC MASS WS

Date: _____

Isotopes and Average Atomic Mass

Isotopes are atoms of the same element (they have the same number of protons) but with different numbers of neutrons. The atomic mass reported in the Periodic Table is the weighted average of the naturally occurring isotopes.

Example: A sample of cesium is 20% ^{132}Cs , 75% ^{133}Cs , and 5% ^{134}Cs . Find the atomic mass of Cs.

Answer: $(0.20 \times 132) + (0.75 \times 133) + (0.05 \times 134) = 132.85 \text{ u}$

Determine the weighted average atomic mass of the following elements.

1. 17% ^{126}I , 80% ^{127}I , and 3% ^{128}I

$$126 \text{ u} \times 0.17 + 127 \text{ u} \times 0.80 + 128 \text{ u} \times 0.03 = 126.9 \text{ u}$$

2. 50% ^{197}Au and 50% ^{198}Au

$$197 \text{ u} \times 0.50 + 198 \text{ u} \times 0.50 = 197.5 \text{ u}$$

3. 15% ^{55}Fe and 85% ^{56}Fe

$$55 \text{ u} \times 0.15 + 56 \text{ u} \times 0.85 = 55.85 \text{ u}$$

4. 99% ^1H , 0.8% ^2H , and 0.2% ^3H

$$1 \text{ u} \times 0.99 + 2 \text{ u} \times 0.008 + 3 \text{ u} \times 0.002 = 1.01 \text{ u}$$

5. 95% ^{14}N , 3% ^{15}N , and 2% ^{16}N

$$14 \text{ u} \times 0.95 + 15 \text{ u} \times 0.03 + 16 \text{ u} \times 0.02 = 14.07 \text{ u}$$

6. 98% ^{12}C and 2% ^{14}C

$$12 \text{ u} \times 0.98 + 14 \text{ u} \times 0.02 = 12.0 \text{ u}$$

Atomic Structure Practice

Provide the missing term or the definition.

1. Tells the number of protons in a nucleus atomic number
 2. An atom has this charge neutral
 3. Mass number is the total number of protons plus neutrons
 4. Subatomic particle with no charge neutron
 5. Same number of protons, different number of neutrons isotope
 6. Weighted average of naturally occurring isotopes atomic mass
 7. Total number of protons plus neutrons mass number
 8. All electrons are in the lowest energy levels ground state
 9. 1/12 the mass of a carbon-12 atom atomic mass unit (u)
 10. How to solve for the number of neutrons mass number – atomic number
 11. Atom The smallest particle of an element with all the element's properties.
 12. Proton Subatomic nucleon with a mass of 1 u and a positive charge
 13. Electron Subatomic particle found outside the nucleus with 1/1836th amu mass and –1 charge
 14. Neutron Subatomic nucleon with a mass of 1 u and a neutral charge
 15. Ion A charged atom formed when electrons are gained (–) or lost (+).
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16. Isotope Atoms with the same number of protons (of the same element) with differing numbers of neutrons
 17. Atomic mass The weighted average of the naturally occurring isotopes of an element.
 18. Mass number The total number of protons plus neutrons in an isotope.
 19. Orbital The most probable location of an electron (from the wave mechanical model).
 20. Excited state Occurs when electrons gain energy and move outward from the nucleus.
There will be electrons in higher electron shells before lower shells are filled.