

Atomic Mass and the Atomic Mass Unit

Mass Number

The number of particles in an atom that add to the mass of the atom, the protons (p^+) and neutrons (n^0)

$$\text{Mass #} = p^+ + n^0$$

Atomic Mass

The mass of an atom based on the mass of the protons (p^+) and neutrons (n^0) in **atomic mass units (amu)** or grams (g)

Atomic Mass Unit (amu)

The number of particles in an atom that add to the mass of the atom, the protons (p^+) and neutrons (n^0)

$$1 \text{ amu} = 1.67 \times 10^{-24} \text{ g}$$

Average Atomic Mass

The mass of all isotopes of an atom averaged together based on the **relative abundance**, the % of all atoms each isotope occupies

9

Comparing Atomic Mass (amu and grams)

$^{12}_6 \text{C}$: $6p^+$ and $6n^0$ (Mass # = 12)

Atomic Mass (amu)

$$^{12}_6 \text{C}_{\text{mass}} = \underline{12 \text{ amu}}$$

$$^{13}_6 \text{C}_{\text{mass}} = \underline{13 \text{ amu}}$$

Atomic Mass (g)

$$1 \text{ amu} = 1.67 \times 10^{-24} \text{ g}$$

$$^{12}_6 \text{C}_{\text{mass}} = \underline{2.004 \times 10^{-23} \text{ g}}$$

$$^{13}_6 \text{C}_{\text{mass}} = \underline{2.171 \times 10^{-23} \text{ g}}$$

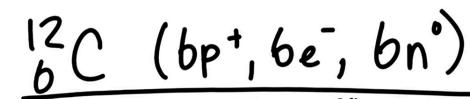
10

Atomic Mass and the Electron

$$p^+ \text{ mass} = 1.67 \times 10^{-24} \text{ g}$$

$$n^0 \text{ mass} = 1.67 \times 10^{-24} \text{ g}$$

$$e^- \text{ mass} = 9.11 \times 10^{-28} \text{ g}$$



$$\begin{array}{|c|c|c|} \hline \text{With} & 6 \cdot 1.67 \times 10^{-24} & \\ \text{electrons} & 6 \cdot 1.67 \times 10^{-24} & 2.0043 \times 10^{-24} \\ \hline \end{array} \text{g}$$

$$\begin{array}{|c|c|c|} \hline \text{Without} & 6 \cdot 1.67 \times 10^{-24} & \\ \text{electrons} & 6 \cdot 1.67 \times 10^{-24} & = 2.004 \times 10^{-24} \\ \hline \end{array} \text{g}$$

e^- only add mass at $\pm 0.0003 \text{ g}$