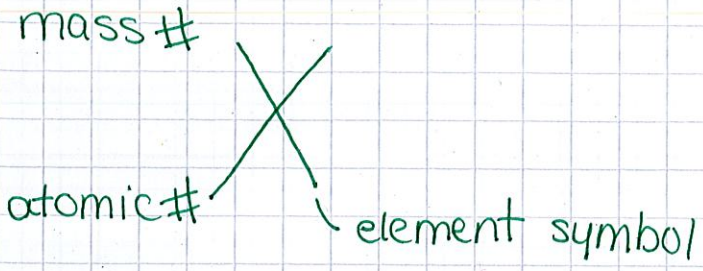
$\#p^+ = 42$
$\#n^0 = 54$

Atomic # ? 42
Name? molybdenum
Symbol? Mo
# $e^-$ ? 42
Mass # ? 42 + 54 = 96

## Isotopic Symbol




$^{96}_{42}Mo$

Ex) atomic # 63
mass # 152

isotopic symbol? $^{152}_{63}Eu$

name? europium
$\#p^+$? 63
# $e^-$? 63
$\#n^0$? 152 − 63 = 89

Isotopes - atoms that come from the same element (same $\#p^+$) BUT they have different $\#n^0$ (mass #)

(Ex) Hydrogen has 3 isotopes.

$^{1}_{1}H$ protium
$\#p^+ = 1$
$\#e^- = 1$
$\#n^0 = 0$
99.97%

$^{2}_{1}H$ deuterium
$\#p^+ = 1$
$\#e^- = 1$
$\#n^0 = 1$
.025%

$^{3}_{1}H$ tritium (radioactive)
$\#p^+ = 1$
$\#e^- = 1$
$\#n^0 = 2$
.005% - relative abundance

(Ex) Silver has 2 isotopes

$^{107}_{47}Ag$
51.839%

$^{109}_{47}Ag$
48.161%

# Atomic Mass (AM)

weighted average mass of all the isotope's masses.

$$A.M. = \left(\text{mass}_{\text{isotope}_1} \cdot \%_{\text{isotope}_1}\right) + \left(\text{mass}_{\text{isotope}_2} \cdot \%_{\text{isotope}_2}\right) + \left(\text{mass}_{\text{isotope}_3} \cdot \%_{\text{isotope}_3}\right) + \ldots$$

(Ex) Gallium has 2 isotopes, the first has a mass of 68.925581 g & an abundance of .60,108%. The second has a mass of 70.924705g and an abundance of .39,892%. Calculate the A.M.

$$A.M. = (68.925581g \cdot .60108) + (70.924705g \cdot .39892)$$

$$= 69.723075\,5\,g = 69.723\,g$$

(Ex) Neon has 3 isotopes. Find the A.M.

| Isotope | Mass | Abundance |
|---|---|---|
| $^{20}_{10}Ne$ | 19.992440 g | 90,48% |
| $^{21}_{10}Ne$ | 20.993847 g | .00,27% |
| $^{22}_{10}Ne$ | 21.991386 g | .09,25% |

$$A.M. = (19.992440g \cdot .9048) + (20.993847g \cdot .0027) + (21.991386g \cdot .0925)$$

$$A.M. = 20.\,g$$

Copper has an atomic mass of 63.546g.

| isotope | mass | abundance |
|---|---|---|
| $^{63}_{29}Cu$ | 62.9298 g | 69.09% |
| $^{65}_{29}Cu$ | ? | 30.91% |

What is the mass of the $^{65}Cu$ isotope?

$$63.546g = (62.9298g \cdot .6909) + (X \cdot .3091)$$

$$63.546g = 43.47819882g + (X \cdot .3091)$$

$$-43.47819882g \quad -43.47819882g$$

$$\frac{20.06780118g}{.3091} = \frac{X \cdot .3091}{.3091}$$

$$64.92332960g = X$$

$$64.92g = X$$