

Atomic Structure

atom - smallest unit of a substance that retains all the properties of that substance

Inside the atom

- mostly empty space
- protons, neutrons, & electrons

	location	charge	mass (kg)	relative mass
proton	p^+ nucleus	+1	1.673×10^{-27}	1836 x's heavier
neutron	n^0 nucleus	0	1.675×10^{-27}	1839 x's heavier
electron	e^- e-cloud	-1	9.11×10^{-31}	1

Atomic Number (Z)

- the # p^+ in the nucleus
- the # e^- in the e-cloud

Mass Number (A) ~~*~~ is NOT on the Periodic Table

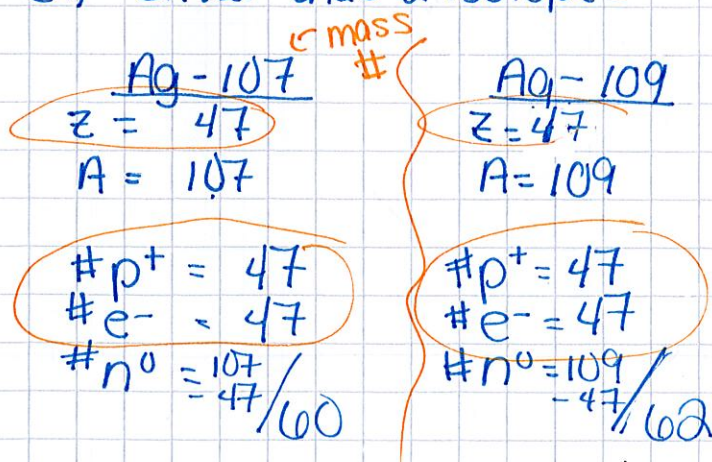
- sum of # p^+ and # n^0

To find the # n^0 , subtract Atomic # from mass # = $A - Z$

Isotopes

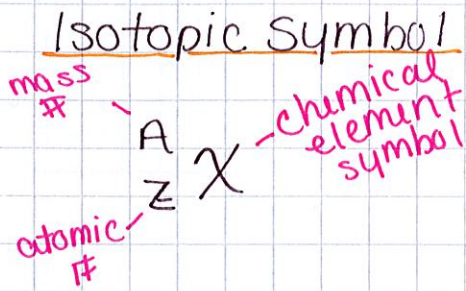
- atoms from the same element (same atomic #) BUT different # n^0 (different mass #)

Ex) Silver has 2 isotopes



&) Magnesium has 3 isotopes

Mg-24 $Z = 12$ $A = 24$ $\#p^+ = 12$ $\#e^- = 12$ $\#n^0 = \frac{24}{12/12}$	Mg-25 $Z = 12$ $A = 25$ $\#p^+ = 12$ $\#e^- = 12$ $\#n^0 = \frac{25}{12/13}$	Mg-26 $Z = 12$ $A = 26$ $\#p^+ = 12$ $\#e^- = 12$ $\#n^0 = \frac{26}{12/14}$
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Practice

isotopic symbol	Z	A	#p ⁺	#e ⁻	#n ⁰	element's name
$\begin{matrix} 59 \\ 27 \end{matrix} \text{Co}$	27	59	27	27	$59 - 27 = 32$	cobalt
$\begin{matrix} 139 \\ 56 \end{matrix} \text{Ba}$	56	$56 + 83 = 139$	56	56	83	barium
$\begin{matrix} 289 \\ 114 \end{matrix} \text{Fl}$	114	289	114	114	$289 - 114 = 175$	flerovium
$\begin{matrix} 250 \\ 98 \end{matrix} \text{Cf}$	98	$152 + 98 = 250$	98	98	152	californium
$\begin{matrix} 95 \\ 41 \end{matrix} \text{Nb}$	41	95	41	41	$95 - 41 = 54$	niobium
isotopic symbol	Z	A	#p ⁺	#e ⁻	#n ⁰	element's name
$\begin{matrix} 70 \\ 31 \end{matrix} \text{Ga}$	31	$31 + 39 = 70$	31	31	39	gallium