Counting Subatomic Particles

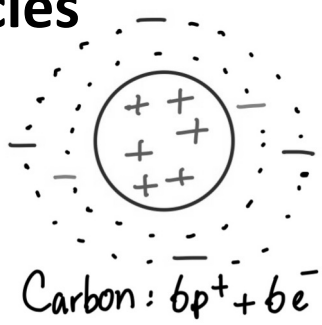
Proton and Electron Relationships

Atoms must remain neutral due to the relationships between electrons (e^-) and protons (p^+)

Carbon: $6p^+$ (+6) and $6e^-$ (-6) = 0

The number of electrons (e^-) or protons (p^+) in an atom is called the **Atomic Number**.

Protons (p^+) = Electrons (e^-) is a **neutral atom**



Neutral Atom $\#p^+ = \#e^-$

Atomic # = $\#p^+ = e^-$

6

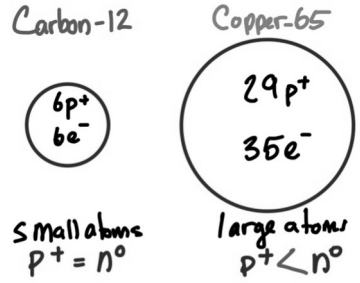
Counting Subatomic Particles

Proton and Neutron Relationships

An atom's nucleus contains both protons (p^+) and neutrons (n^o).

Smaller atoms often have vbeing equal to neutrons (n^o). Larger atoms more neutrons (n^o) than protons (p^+) due to the need to minimize protons (p^+) repulsion

The **Mass Number** is the sum of the protons (p^+) and to neutrons (n^o) in an atom's nucleus



Mass# = $p^+ + n^o$

Atomic Mass = Particles In Nucleus

7

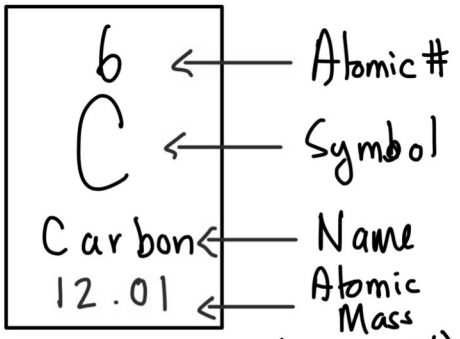
Counting Subatomic Particles

Understanding Periodic Table Squares

The square on the periodic table include the following parts:

- **Atomic Number** (p^+ *and* e^-)
- **Element Symbol**
- **Element Name**
- **Average Atomic Mass**

The **average atomic mass** is the average mass of all forms of an element, the **element isotopes**, and is not the **mass number** ($p^+ + n^o$)



$6p^+$, $6e^-$, C, Carbon

n^o and mass # not given!

8

Counting Subatomic Particles

Determining Atomic Isotope Parts

Elements may contain multiple **isotopes**, the form of an atom based on the protons (p^+) and neutrons (n^o). The number of neutrons (n^o) and mass number (*mass #*) are not on the periodic table

Isotope Notation

Scandium – 45
Element Mass #

$^{45}_{21}Sc$ ← Mass # ← Element Symbol ← Atomic #

Overall Subatomic Particle Relationships:

Atomic # = p^+ = e^-
= Element Name
= Element Symbol

Mass # = $p^+ + n^o$

n^o = Mass # – Atomic #

n^o not on periodic table

9