# Lesson 159: Nuclear Science Notes

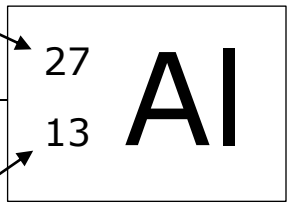


Nucleons:

- are particles occupying the _____
- consist of ___ charged _____ and _____ _____
- have almost 2000 times the _____ of _____
- are made up of _____ and _____

Nuclear Notation: atomic _____ (__)

= _____ + _____




Atomic _____ (__)

= no. of _____ (=_____)

$^{27}_{13}$Al has _____ protons and _____ neutrons, for a total of _____ nucleons.

$^{28}_{13}$Al has _____ protons and _____ neutrons, for a total of _____ nucleons.

<u>isotopes</u>: atoms of _____ element with different numbers of

_____ (different _____)

Forces acting on nucleons:

strong forces –

- forces of _____ between nucleons
- are independent of the _____ of the nucleon
- are short range (exist only between _____ neighbors)

electrical force –

- force of _____ between _____ charged protons
- are long range

When are nuclei **unstable**?

a. large nuclei (Z>82) – electrical forces of _____ are greater than strong forces of _____

b. wrong neutron: proton _____

A radioactive isotope:

- has an _____ nucleus
- spontaneously emits a _____ and _____ into another _____

transmutation – changing into another _____ through radioactive _____

Types of Radioactive Emission:

| | Symbol | Composition | Stopped by - |
|---|---|---|---|
| alpha | | | |
| beta | | | |
| gamma | | | |

Nuclear Equations:

alpha decay:

$$^{214}_{84}Po \rightarrow \quad He +$$

beta decay:

$$^{209}_{82}Pb \rightarrow \quad e +$$

During beta decay, a neutron changes into a proton and an _____

$$^{1}_{0}n \rightarrow \quad ^{1}_{1}p +$$

half-life:

- the _____ it takes for _____ the _____ of a radioactive sample to _____
- ranges from a fraction of a _____ to billions of _____
- is _____ affected by _____ conditions

**The Chemistry Quiz**

CR1. _____ CR2. _____ 1. _____ 2. _____ 3. _____

4. _____ 5. _____