

CONCEPT: INTRO TO RADIOACTIVITY

- **Radioactivity:** process of spontaneous _____ by an unstable nucleus.

□ Instability is due to excess _____ or _____ in the nucleus.

- Produces a new _____ and emits radiation.

- Recall Isotope and Subatomic Particle Notations

Isotope and Subatomic Particle Notations			
Mass # A	X	Element Symbol	N (neutron #) = $\underline{\quad}$ - $\underline{\quad}$
Atomic # Z			
Proton particle	Neutron particle	Electron particle	Positron particle
_____	_____	_____	_____

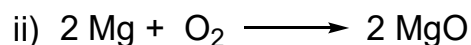
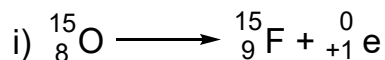
- Differences between Chemical and Nuclear Reactions

□ **Chemical Reactions:** number and type of elements on reactant and product side are _____.

□ **Nuclear Reactions:** identity of the elements changes.

- However, _____ and _____ is conserved between reactants and products.

EXAMPLE: Label each reaction as chemical or nuclear.



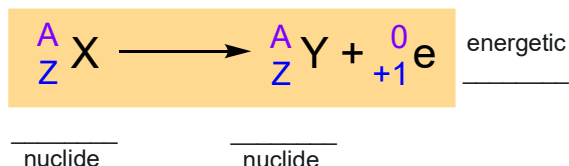
Understanding Nuclear Reactions

- Nuclear reactions consist of a *parent nuclide*, a *daughter nuclide*, and an *energetic particle*.

□ **Nuclide:** radioactive _____ that has an unstable nucleus and emits radiation as it decays.

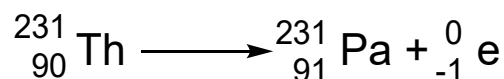
- **Parent nuclide:** an unstable radioisotope, appears on the _____ side.

- **Daughter nuclide:** more stable radioisotope, appears on the _____ side.



□ **Energetic particle:** subatomic particle appears as a reactant or product.

EXAMPLE: Identify the energetic particle in the following nuclear reaction.



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Types of Radioactivity

• There are ____ types of radioactivity:

□ (1) ____ decay, (2) ____ decay, (3) ____ emission, (4) ____ emission

- Decay (emission) occurs when energetic particle is ____ from an unstable nucleus and is a ____.

□ (5) Electron ____: energetic particle is ____ and is a ____.

EXAMPLE: Identify radioactivity as decay or capture.

