ALPHA:

The general equation representing alpha decay is:

where:

* is the parent nucleus, the starting nucleus.
* is the total number of [nucleons](https://energyeducation.ca/encyclopedia/Nucleon) (the number of neutrons plus the number of protons).
* is the total number of protons.
* is the daughter nucleus, the ending nucleus
* is the released alpha particle

BETA

1)

The general equation representing alpha decay is:

where:

* is the parent nucleus, the starting nucleus.
* is the daughter nucleus
* is the released beta particle, an electron
* is the released anti-neutrino

2)

The general equation representing alpha decay is:

where:

* is the parent nucleus, the starting nucleus.
* is the daughter nucleus
* is the released beta particle, an electron
* is the released anti-neutrino

GAMMA

where:

* is the excited atom
* is a relaxed state of the initial excited atom
* is the released gamma ray photon

where:

* is the initial, higher energy state of the nucleon
* is the final, lower energy state of the nucleon
* is [Planck's constant](https://energyeducation.ca/encyclopedia/Planck%27s_constant)
* is the frequency of the emitted radiation

|  |  |  |  |
| --- | --- | --- | --- |
| Property | Alpha *α* ray | Beta *β* ray | Gamma *γ* ray |
| Nature | Positive charged particles, 2He 4 nucleus | Negatively charged particles (electrons). | Electromagnetic radiation |
| Charge | +2e | –e | 0 |
| Mass | 6.6466 × 10–27 kg | 9.109 × 10–31 kg | 0 |
| Range | ~10 cm in air, can be stopped by 1mm of Aluminum | Upto a few m in air, can be stopped by a thin layer of Aluminum | Several m in air, can be stopped by a thick layer of Lead |
| Natural Sources | By natural radioisotopes e.g.92U236 | By radioisotopes e.g.29Co68 | Excited nuclei formed as a result of Gamma decay |