

HW Video Notes: Nuclear Reactions

BIG IDEAS

DETAILS

Nuclear Particles	The nucleus of an atom contains <u>protons & neutrons</u>, but can also absorb and release <u>electrons</u> & <u>photons</u>. While we round both protons & neutrons to 1 amu - a neutron actually has a slightly <u>more</u> mass than a proton. And while we consider electrons to be massless, they do have a tiny mass - about the <u>difference</u> in mass between a proton & a neutron! So in many ways, one <u>proton</u> + one <u>electron</u> = one <u>neutron</u>
Nuclear Chemistry	When dealing with nuclear reactions, we can ignore the <u>electron cloud</u>. Nuclear chemistry and radioactivity is focused on changes in the <u>nucleus</u> of the atom.
Alpha Radiation	Alpha radiation is produced by radioactive decay - the process of a small particle being shot out of the <u>nucleus</u> of the atom. The particle lost in alpha radiation contains 2 <u>protons</u> and 2 <u>neutrons</u>. Basically - it's a <u>helium</u> nucleus. No matter the particle expelled, the mass of the original atom will <u>equal</u> the sum of the masses of the particles produced, and the same is true of the <u>charge</u> of the nuclei.
Beta Radiation	Beta decay is also the process of a nucleus <u>ejecting</u> a small particle. But this time, instead of an alpha particle (a <u>helium</u> nucleus), an <u>electron</u> is expelled FROM THE NUCLEUS. This process turns a <u>neutron</u> into a <u>proton</u>. An electron expelled during radioactive decay is called a <u>beta</u> particle.
Gamma Radiation	Along with alpha and beta particles, when decay occurs <u>gamma</u> radiation is also emitted. This is extremely high <u>energy</u> light (photons). These have <u>no</u> mass or <u>charge</u>.