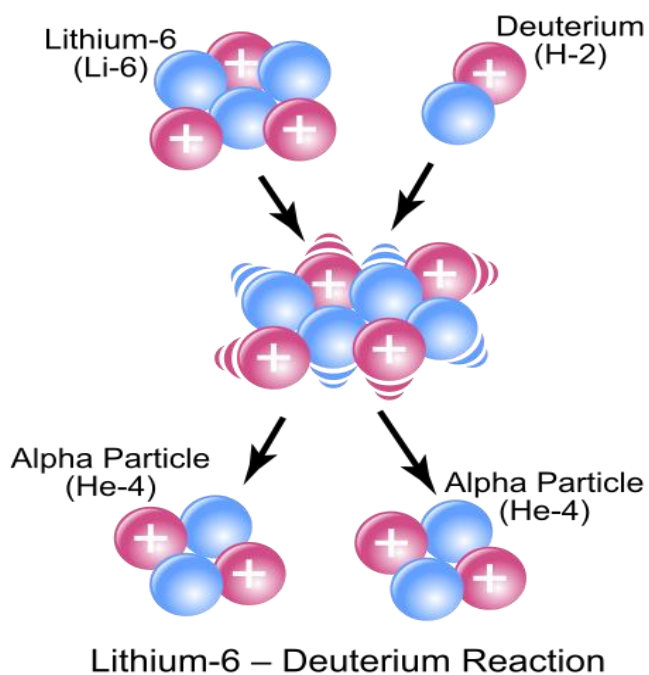


Nuclear Reactions - WHY? - Simon – 1S

A nuclear reaction is the process in which two nuclei collide to produce one or more nuclide (like isotopes, isotones, isobars or nuclear isomers (1)). The difference between a chemical reaction and a nuclear reaction is the fact that the first one concern only electrons and atoms links whereas the other concern the nucleus.

With this representation of a nuclear reaction between lithium-6 (isotope of the lithium) and deuterium, the two components react to produce a highly excited intermediate nucleus. Then this nucleus decays immediately into two particles of helium-4, that we can also call “alpha particles”. Protons are symbolized by red spheres and neutrons by blue spheres.

In fact, with this representation, there are two nuclear reactions, the first one, that divide the nucleus, is called fission and the second one, that fuse two nucleus into one, is called the fusion, which produce much more energy (it is also used for the atomic bombs with hydrogen and nuclear power plants).



These reactions, in case of high exposition, can have serious effect on health, like increasing the possibility of a cancer, sterility, blindness, malformations or mental delays. The lethal dose, which bring death to half of the exposed people without any treatment is considered for human at 4.5 Sv (Sievert, the unity of radioactivity).

(1): Two atoms are isotopes if they have the same number of protons; two atoms are isotones if they have the same number of neutrons; two atoms are isobars if they have the same mass; two molecules are isomers if they have the same molecular formula but different chemical structures.

(2): The atomic number is the number of protons and the mass number is the number of protons and of neutrons (the mass number is higher than the atomic number)