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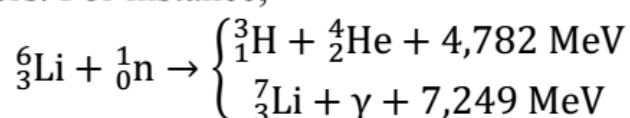
Reactions of Li and Be isotopes with neutrons

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All light nuclei have several isotopes. They are stable and radioactive. The isotopes have their own properties and characteristics.

Lithium is an alkaline metal. Nowadays lithium has nine isotopes and two excited isomer states of ^{10m1}Li $-$ ^{10m2}Li nuclides. There are two stable isotopes - ^{6}Li and ^{7}Li. ^{6}Li is used in thermonuclear energetics. The capture section (σ) of thermal neutrons by lithium isotopes is different: ^{6}Li 945 barn, ^{7}Li 0,033 barn [1]. The use of lithium in technics is important.

Neutrons induce some nuclear reactions which are important in divisions of high nuclei, also in formation of radioactive isotopes. The main property of such reactions with neutrons is a growth by parabolic law of reaction section while the energy of neutrons decreases. Thus, many ordinary nuclear reactors operate with neutrons which are in a thermal equilibrium with environment [2]. Neutrons participate in all interactions of elementary particles. They are strong, electromagnetic, weak and gravitational [3].

Reactions of Li and Be isotopes with neutrons in nuclear reactors were studied theoretically and reactions energies were calculated. The reactions, which has sufficient energies can be in nuclear reactors. For instance,

$$^6_3\text{Li} + ^1_0\text{n} \rightarrow \begin{cases} ^3_1\text{H} + ^4_2\text{He} + 4{,}782 \text{ MeV} \\ ^7_3\text{Li} + \gamma + 7{,}249 \text{ MeV} \end{cases}$$

The passage of such reactions and sufficient energies are very important in nuclear energetic, because almost all reactions in nuclear reactors are important in energy production.

References:

[1] www.wikipedia.org

[2] Bartolimey G.G., Baibakov V.D., Alhutov M.C., Bat' G.A. Principles of theories and methods of calculations of nuclear energetic reactors. Moscow: Poweratompubl., 1982. — p. 512.

[3] K.N.Muhin"E[perimental nuclear physics"t.1,p.1.,p.347–349.