

PRACTICAL APPLICATIONS OF BORON ISOTOPES

*Burkova N.A., Tkachenko A.S.
Al-Farabi Kazakh National University*

A large number of different boron isotopes are known, but according to their properties and the lifetime, it's able to find a practical application just to several of them. The most common used isotopes are ^{10}B and ^{11}B .

One of the possible branches of boron isotopes applying is the reactor building. The interest in the boron isotopes in that area is based mainly on isotopic composition of boron and its nuclear physics and radiative characteristics, as well as on its ability to produce a series of chemical compounds characterized by high heat and corrosion resistance. The fact that the nuclear properties of the different isotopes differ significantly is also should be considered. This provides abilities for the ^{10}B and ^{11}B boron isotopes applying.

The following facts should be also taken into consideration [1]:

- the thermal neutron capture cross sections of ^{10}B and ^{11}B differ sharply;
- very smooth energy dependence of the capture cross section of the interacting neutrons for ^{10}B .

The cross section of the thermal neutrons capture for ^{10}B equals 3820,5 barns. For ^{11}B this parameter equals only 0,05 barns [2,3].

The energy dependence of the neutrons capture for the boron-10 reveals no any areas of the resonance increase. It should be noted that to a number of other effective neutron absorbers this dependence is less favorable.

Another important fact is the presence of the nuclear magnetic momentum of ^{10}B and its absence for ^{11}B .

In the reactor building the boron-10 is usually used as an integral part of the rods that regulate the rate of nuclear processes in the reactor. At the present time ^{10}B is mainly used in the control rods of thermal neutron reactors [4].

Thus, it is obvious that the study of photonucleon processes on boron isotopes is very important.

In addition to the practical application, the study of boron and its isotopes plays an important role in the study of primordial nucleosynthesis processes of the Universe.

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