Journal of Theoretics

MODELS OF THE ATOMIC NUCLEI

Ph.M. Kanarev : kanphil@mail.kuban.ru
The Kuban State Agrarian University, Department of Theoretical Mechanics
13, Kalinin Street, 350044, Krasnodar, Russia

ABSTRACT: The principles of formation of the atomic nuclei of chemical elements are described. The method of formation of the nuclei is specified, the diagrams of the atomic nuclei of the first twenty chemical elements of the periodic table are given.
Key words: atom, nucleus, proton, neutron, electric field, magnetic field, magnetic poles, structure.

INTRODUCTION

It has been supposed that the nuclear forces provide strength of the atomic nuclei. Billions dollars have been spent for construction of the accelerators for bombardment of the atomic nuclei in order to destroy them. The experiments have shown that in order to destroy the atomic nuclei, energy being equal to their heating by millions degrees is required. The possibility of transmutation of the nuclei at usual temperatures and high temperatures was denied.

But during the last years of the previous millennium the scientists of USA, Japan, Russia and some other countries carried out a number of experiments and proved that transmutation of the nuclei is possible at usual temperatures. This process was called "cold nuclear fusion" [6], [7], [8], [9].

1. General

The results of our previous theoretical and experimental investigations are assumed as a basis of formation of the atomic nuclei of the chemical elements [1], [2].

The analysis of the laws of formation of the spectra shows that the electrons in the atoms do not have an orbital movement. The electron interacts with the nucleus as a bar magnet, i.e. with its axis of rotation. The unlike electric fields of the electron and the proton draw them together, and the like magnetic poles restrict this rapprochement.

The proton has the spherical electrical field and the magnetic field similar to the symmetric magnetic field of a bar cylindrical magnet. The neutron is also represented by the spherical, but complicated magnetic field, which has six magnetic poles: three north poles and three south ones.

The protons and the neutrons in the nucleus are connected by means of unlike magnetic poles. All the protons have free magnetic poles for the interaction with the electrons, which precesses on them. The neutrons play the role of the connecting links and screen the electric fields of the protons at the same time when they are connected to two magnetic poles of the neutron [1], [2].

Thus, in order to provide the interaction of each atomic electron with the nucleus, it is necessary to arrange the protons on the surface of the nucleus. Similar charges of the protons exclude the nucleus structure, in which the protons touch each other. Nature builds the nucleus in such a way that a neutron should be between the protons. As it is difficult to meet the last requirement when there are many protons in the nucleus, additional neutrons are involved. That's why the nuclei of all chemical elements contain more neutrons than protons. When the number of the protons and the neutrons in the nucleus is increased, the share of "spare" neutrons is increased [1], [2].

If we take into account magnetic moment of the proton $M_p = 1.411 \cdot 10^{-26} J/T$ and its energy $E_p = 9.383 \cdot 10^8 eV$, we'll obtain magnetic field strength B_p in the centre of symmetry of the proton

$$B_p = \frac{E_p}{4\pi M_p} = \frac{9.383 \cdot 10^8 \cdot 1.602 \cdot 10^{-19}}{4 \cdot 3.142 \cdot 1.411 \cdot 10^{-26}} = 8.476 \cdot 10^{14} T. \quad (1)$$

This is colossal magnetic field strength in the centre of symmetry of the proton. Outside this centre, it is decreased quickly. Along the axis of rotation of the proton this decrease is proportional to cube of the distance from its geometrical centre. Such large magnetic field strength generates corresponding large magnetic forces. If magnetic field of the proton is similar to magnetic field of the bar cylindrical magnet, unlike magnetic poles will juxtapose the protons and the neutrons. If we imagine the proton in the form of a sphere with radius $r_p = 1{,}3 \cdot 10^{-15}\,м$, Coulomb force will act during the direct contact of two protons between them [2]

$$F_p = \frac{e^2}{4\pi\varepsilon_0 (2 \cdot r_p^2)} = \frac{(1.6 \cdot 10^{-19})^2}{12.56 \cdot 8.8 \cdot 10^{-12} (2.6 \cdot 10^{-15})^2} \approx 27H \tag{2}$$

For the sake of comparison, let us calculate gravitational force, which exists between the protons in this case

$$F_{gp} = G \cdot \frac{m \cdot m}{(r_p)^2} = 6.67 \cdot 10^{-11} \frac{(1.67 \cdot 10^{-27})^2}{(2.6 \cdot 10^{-15})^2} \approx 2.7 \cdot 10^{-34} H \tag{3}$$

The results of these calculations prove that during formation of the atomic nuclei electrostatic forces and magnetic ones, not gravitational forces, play a decisive role. They form the atomic nuclei.

As we try to find the principle, by which Nature is guided in formation of the atomic nuclei, the above-mentioned information concerning the models of the proton and the neutron shows that the charge and magnetic moment of the proton as well as magnetic moment of the neutron and its lack of the charge are the main properties of these particles, which control the formation of the atomic nuclei. Availability of magnetic moments of these particles gives us the reason to suppose that they have magnetic poles [1], [2].

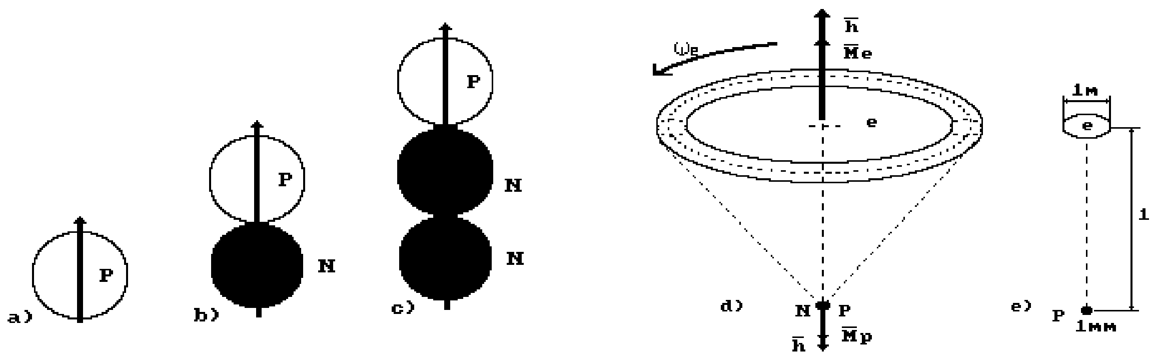
Magnetic forces of unlike poles of magnetic fields of the proton and the neutron are the only forces, which are capable to connect these particles with each other. Electrostatic forces of the protons are the only forces, which restrict the approach of the protons in the nucleus.

Nevertheless, the experiment has revealed the existence of the nuclear forces, which connect the protons and the neutrons in the atomic nuclei. The value of these forces is by two orders of magnitude greater than electrostatic forces of repulsion of the protons. The forces, which generate such interaction, are called nuclear forces. Their nature remains unknown [3], [4], [5].

If we take into account large strength of magnetic fields in the centre of symmetry of the proton (1) and suppose that it is not less than strength of the neutron, there is every reason to believe that magnetic forces of the proton and the neutron, which act at the distances being close to their geometrical centres, are the forces, which have been called the nuclear ones [1], [2].

2. Diagrams of Nuclei and Atom of Hydrogen

A nucleus of the hydrogen atom is known to consist of one proton (Fig. 1, a). Hydrogen, which nucleus has one proton and one neutron, is called deuterium (Fig. 1, b). If the hydrogen atom has one proton and two neutrons, such atom is called tritium (Fig. 1, c). The protons and the neutrons in the nuclei of deuterium and tritium connect their unlike magnetic poles. The structure of the nucleus must be such that only one magnetic pole of the proton should be occupied, the second pole should remain free for the interaction with the electron of the atom [1], [2].



a) the proton; b) deuterium nucleus; c) tritium nucleus

Hydrogen atom

Fig. 1. Diagrams of the nuclei and atom of the hydrogen

If the scale is chosen that the size of the proton is equal to one millimetre, the size of the electron will be nearly one meter, and the distance between the proton and the electron in the hydrogen atom will be 100 metres according to Coulomb law (Fig. 1, e).

3. Diagrams of Nuclei and Atom of Helium

Electric fields are known to be screened easily. It is much more difficult to screen magnetic fields. It means that the neutrons screen electric fields of the protons and relax electrostatic forces of repulsion acting between them.

If the neutron is between two protons (Fig. 2, a), it will screen their electric fields and reduce the electrostatic forces of repulsion. Nature has 0.000138% of the helium atoms, which have such nucleus.

The second variant of formation of the helium atom is shown in Fig. 2, b. Here two neutrons screen electric fields of two protons. Such diagram of the nucleus of the helium atom can be considered to be more preferable, because in such composition diagram of the nucleus the electrostatic forces of repulsion acting between two protons are reduced to greater degree than in the diagram shown in Fig. 2, a.

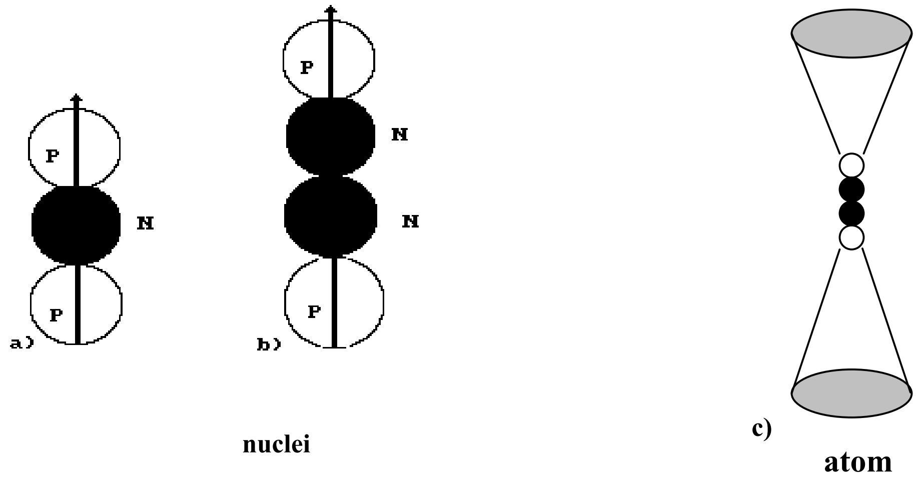


Fig. 2. Diagrams of the nuclei and atom of the helium

Quantity of the helium atoms, which nuclei consist of two protons and two neutrons (Fig. 2, b), is 99.999862%. The life period of the helium atoms, which nuclei have 4 or 6 neutrons, is determined in milliseconds.

It should be noted that in the majority of the nuclear reactions the nucleus of the helium atom is released in the form of a positively charged formation called an alpha particle (Fig. 2, b). Ordinal number 2 of the chemical element helium belongs to a row of magic numbers, which characterize particular stability of the nucleus of this element. The next magic numbers are 8 and 20. Later on we'll consider the structure of the nucleus of the oxygen atom with the magic number 8 and the nucleus of the calcium atom with the magic number 20, and we'll see that their geometrical symmetry serves a reason of stability of these nuclei [1], [2].

4. Structure of Nucleus and Atom of Lithium

In Nature, 92.50% of nuclei of the lithium atoms have three protons and four neutrons (Fig. 3, a). The rest 7.50% of nuclei of the lithium atoms have three neutrons and three protons (Fig. 3, b).

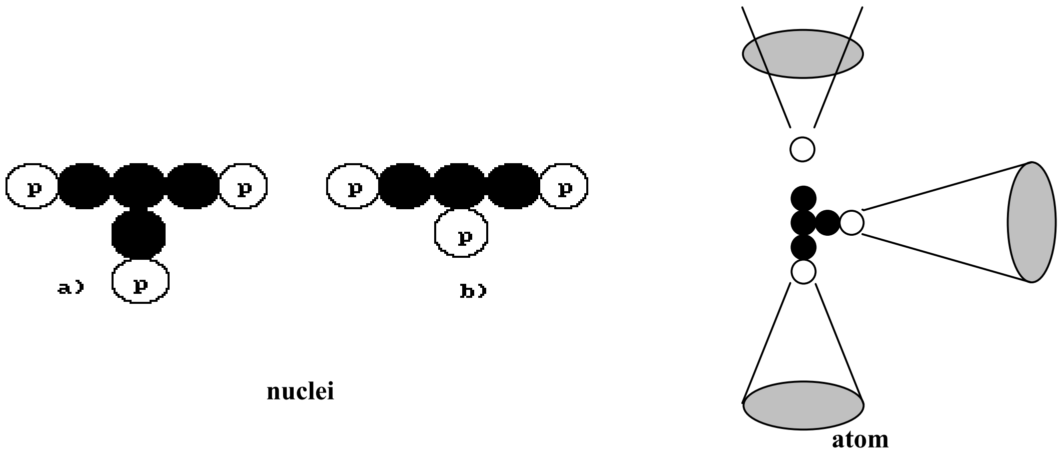
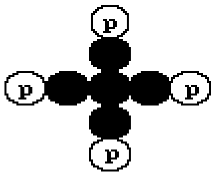


Fig. 3. Diagrams of the nuclei of the lithium atom

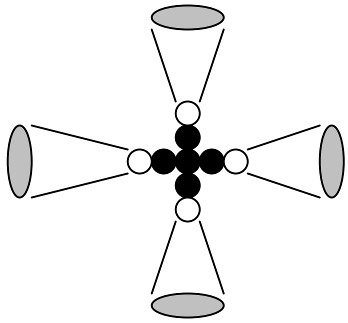
Why does Nature prefer the compositions of the nuclei of the lithium atom, which are shown in Fi.3, a and b? Because the protons and the neutrons in the atomic nucleus connect magnetic force, not nuclear forces. The most important fact is that the majority of lithium atoms have four neutrons, not three (Fig. 3, a). An unexpected conclusion results from this diagram: magnetic field of the neutron is formed by four magnetic poles minimum. This supposition is made, because in the diagram of Fig. 3, a, the central neutron has three contacts, which correspond to three magnetic poles. The fourth contact of this neutron is free, it corresponds to the fourth magnetic pole, to which the neutrons of the isotopes of the lithium atom are connected [1], [2].

5. Structure of Nucleus and Atom of Beryllium

The results of the nuclear experimental spectroscopy show that 100% of natural atoms of beryllium have the nuclei with four protons and five neutrons (Fig. 4).



nucleus



atom

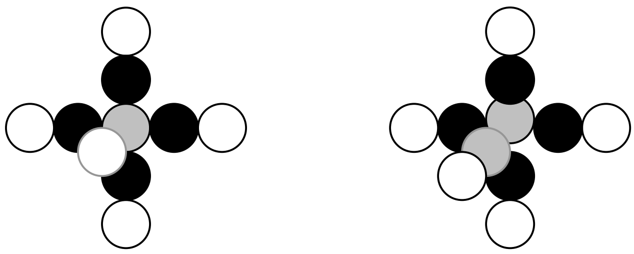
Fig. 4. Diagrams of the nucleus and atom of the beryllium

The structure of the nucleus of the beryllium atom shown in Fig. 4 gives additional evidences of connection of the neutrons and the protons by means of unlike magnetic poles of these particles. This diagram proves significance of the screening functions of the neutron and complexity of its magnetic field.

In Fig. 4, the central neutron has four contacts. It means that the structure of magnetic field of the neutron has four magnetic poles in one plane: two south poles and two north poles [1], [2].

6. Diagram of Nucleus of Boron Atom

Boron is the fifth element in the periodic table of chemical elements. It seems that the majority of the atoms of this element should have the nuclei with five protons and five neutrons, but it is not the case. Only 20% of the boron atoms have the nuclei with five protons and five neutrons (Fig. 5, a), and 80% of atoms of this element have the nuclei, which consists of five protons and six neutrons (Fig. 5, b). (Axial neutrons are shown in grey) [1].



a) b)

Fig. 5. Diagrams of the nuclei of the boron atom:
a) with five neutron, b) with six neutrons
(the protons are shown in white, the neutrons are shown in black)

The analysis of the diagrams of the composition of the boron atom (Fig. 5, a and b) proves that an additional neutron (Fig. 5, b) separates the fifth proton from the rest four protons at a large distance. Due to this fact, in the nucleus, which diagram is shown in Fig. 5, b, the electrostatic forces of repulsion of the fifth proton from the rest four protons are less than in the nucleus shown in Fig. 5, a. Thus, the additional neutron improves strength of the nucleus of the boron atom, that's why there are more nuclei of the boron atom with six neutron than with five neutrons in Nature [1].

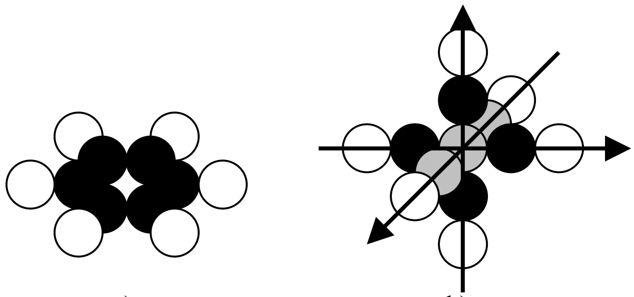
Let us pay attention to a number of contacts of the central neutron with the rest neutrons. There are five of them and one free. If each contact corresponds to a definite magnetic pole of the magnetic field of the neutron, the total number of contacts should be even, i.e. it should be six. One contact (it means one magnetic pole) of the central neutron is free. Later on we'll see that it is occupied in the structure of the nucleus of the carbon atom when a diamond is formed from it.

Thus, we get additional confirmations of connection of the protons with the neutrons in nuclei of the atoms by means of unlike magnetic poles only, not nuclear forces. Each neutron has a compound magnetic field, which helps to generate six magnetic poles: three north poles and three south poles [1].

7. Diagrams of Nucleus of Carbon Atom

Carbon is supposed to be a base of life, because it forms a large number of bonds with the atoms of other chemical elements. Let us consider a cause of its such activity.

A flat nucleus of this element is shown in Fig. 6, a. Graphite is formed from the atoms, which have such nucleus. But there is carbon with other, spatial composition of the nucleus in Nature. Mechanical properties of diamond (Fig. 6, b), which consists of carbon as well, differ from mechanical properties of graphite significantly.



a) b)

Fig. 6. Structural diagrams of carbon atom:
a) diagram of flat nucleus; b) diagram of spatial nucleus

Now we can see that the form of the carbon nucleus determines properties of a substance, which consists of the atoms of this chemical element. Graphite is a brittle scaly substance. These properties are the after-effect of flat composition of the atomic nuclei of this element (Fig. 6, a) [1].

The structure of other nucleus of the carbon atom is shown in Fig. 6, b. This structure has 7 neutrons. One of them is situated in the centre of the spatial coordinate system, and tree pairs of other neutrons are directed along three coordinate axes. A proton is connected to each outer neutron along these axes. Thus, spatial nucleus of the carbon atom is an ideal point of the lattice. Such structure of the nucleus provides strength of the diamond crystals.

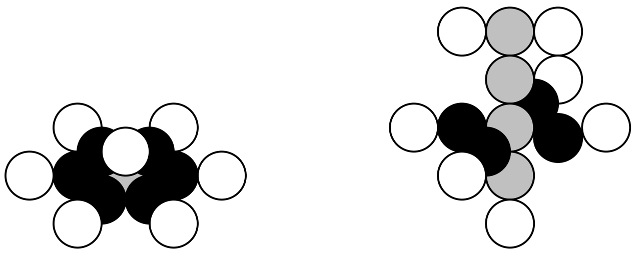
Experimental nuclear spectroscopy proves that 98.90% of the carbon nuclei contain 6 protons and 6 neutrons, and only 1.10% of the nuclei of this element has a surplus neutron. Now we see that they are the diamond atoms (Fig. 6, b).

Let us pay attention to limit symmetry of both nuclei of the carbon atom. Flat symmetric nucleus belongs to carbon, which forms organic substances.

It is clear from the second structural diagram (Fig, 6, b) of the nucleus of the carbon atom that the neutron has a compound magnetic field, which consist of six magnetic poles. In all cases being considered by us, magnetic pole of the proton remains similar to magnetic pole of the bar cylindrical magnet [1].

8. Structure of Nucleus of Nitrogen Atom

Nitrogen is the seventh chemical element in the periodic table. There are 99.63% of the nitrogen atoms in Nature, which nuclei consist of 7 neutrons and 7 protons (Fig. 7, a). The eighth surplus neutron is available in 0.37% of the nuclei of the atoms of this element.



a) b)

Fig. 7. Diagrams of the nuclei of the nitrogen atom

Six neutrons arranged in one plane have six free magnetic poles directed to the centre of circumference, which they form (Fig. 7, a). As each neutron has four magnetic poles in one plane, the seventh neutron occupies free space in the centre, and the seventh proton is connected to it from above (Fig. 7, a). As the central neutron has one free magnetic pole in its lower part, the eighth neutron can be connected to it forming a nucleus of the nitrogen isotope. It is obvious that other neutrons can be connected to the neutron increasing the number of the isotopes of this element. The nuclei of the isotopes of the nitrogen atom can have four surplus neutrons [1].

It should be noted that it is impossible to form the nucleus of the nitrogen atom from the spatial structure of the nucleus of the carbon atom (Fig. 6, b). This structure has already had 7 neutrons and 6 protons, there is no place for the seventh proton. But if one surplus neutron is added to the spatial structure of the nucleus of the carbon atom, the conditions take place for the formation of a nucleus of the nitrogen atom with seven protons and eight neutrons (Fig. 7, b).

As there are only 0.37% of the nuclei of the nitrogen atoms with eight neutrons, we have every reason to believe that the majority of the nuclei of the nitrogen atom should have a flat nucleus of the nitrogen atom (Fig. 7,a).

9. Structure of Nucleus of Oxygen Atom

The experimenters attribute magical properties of stability to the nucleus of this atom. The number, which corresponds to the ordinal number of this element, is also considered to be a magic one. Symmetry of arrangement of the neutrons and the protons in this nucleus proves this fact (Fig. 8, a). The nucleus of this atom has 8 protons and 8 neutrons. In the central part of the nucleus, two neutrons are arranged along its axis, and two protons are connected to them. As a result, an ideal symmetrical, i.e. stable structure is formed. As the nucleus of the oxygen atom has symmetrical spatial structure, the possibilities of chemical activity are increased greatly.

In Nature, 99.762% of the oxygen atoms have eight neutrons and eight protons (Fig. 8, a). Analysis of the diagram of a symmetrical nucleus of the oxygen atom shows that the neutron can penetrate between the upper and the power central protons, and the nuclei of the oxygen isotopes are formed. There are 0.038% of the nuclei of the oxygen atom with one surplus neutron (Fig. 8, b) and 0.200% of the nuclei with two surplus neutrons in Nature (Fig. 8, c). The nucleus of the oxygen atom can have five surplus neutrons [1].

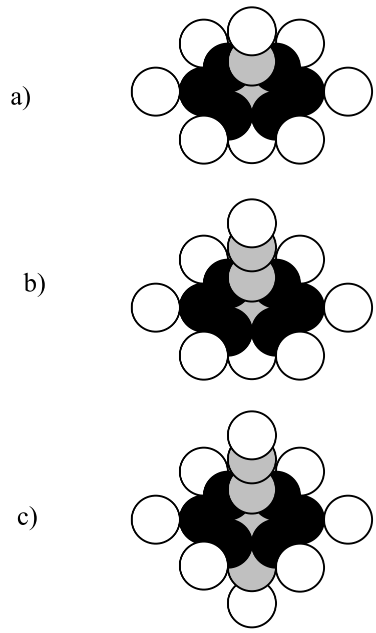


Fig. 8. Diagrams of the nuclei of the oxygen atom

10. Diagram of Nucleus of Fluorine Atom

Fluorine is the ninth element of the periodic table. It is situated in the seventh group of this table. Its stable nucleus has 9 protons and 10 neutrons (Fig. 9). When the nucleus of this element is formed, two neutrons and two protons are connected to one of the protons of the nucleus of the oxygen atom arranged along the axis of the nucleus.

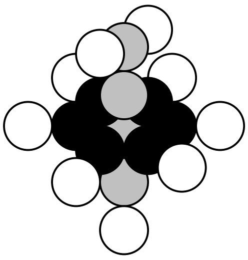


Fig. 9. Diagram of the nucleus of the fluorine atom

Let us pay attention to the fact that all protons are arranged on the surface of the nucleus, and each has one free magnetic pole [1].

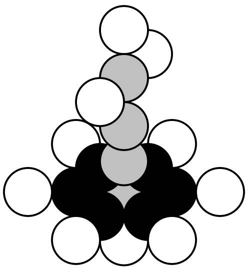
11. Diagram of Nucleus of Neon Atom

Neon is the tenth element of the periodic table. It is situated in the eight group of this table. There are 90.51% of the nuclei of this atom with 10 protons and 10 neutrons in Nature (Fig. 10, a). In fact, 0.27% of the nuclei of this element have one surplus neutron and 9.22% of the nuclei have two neutrons (Fig. 10, b).

In order to preserve symmetry of the nucleus, it is built by means of connection of one neutron and one proton to the axial chain of the nucleus of the fluorine atom. We get a symmetrical structure (Fig. 10, a).

If one neutron is added to the lower part of the axis of the nucleus, the nucleus of an isotope the neon atom is formed (there are 0.27% of such ones in Nature). When the twelfth neutron is connected to the neutron in the upper part of the axis of the nucleus, the screening effect of the neutron is strengthened (Fig. 10, b). There are 9.22% of the neon atoms with such nucleus in Nature [1].

a)



b)

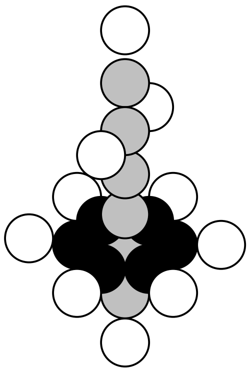


Fig. 10. Diagrams of the nuclei of the neon atom

12. Diagram of Nucleus of Sodium Atom

Sodium is the eleventh element in the periodic table. It is situated in the first group of this table. It means that the nucleus of this atom should have the elements of the nucleus of the lithium atom. In Nature, 100% of the atoms of this element have the nuclei with eleven protons and twelve neutrons (Fig. 11). There are isotopes of this element with various periods of half-life [1].

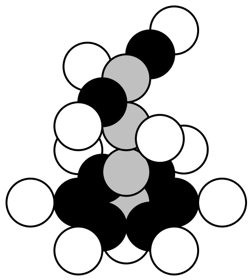


Fig. 11. Diagram of the nucleus of the sodium atom

The upper part of the nucleus of the sodium atom (Fig. 11) contains the elements of the composition of the nucleus of the lithium atom (Fig. 3, b), that's why lithium and sodium are situated in the same group of the periodic table [1].

13. Diagram of Nucleus of Magnesium Atom

Magnesium is the twelfth element in the periodic table. It is situated in the second group of this table, that's why the elements of the nucleus of the beryllium atom should be in the structure of its nucleus (Fig. 4, b). In Nature, 78.99% of the nuclei of the magnesium atoms contain 12 protons and 12 neutrons (Fig. 12, a).

Let us pay attention to the flat structure of the nucleus of the beryllium atom (Fig. 4). There are five neutrons in one plane, and four protons are connected to them. The same structure is formed in the composition of the nucleus of the magnesium atom. In Fig. 12, a, it is separated from the whole nucleus and is represented separately from above. The arrow points out the direction of the connection of these parts. The axial neutrons are shown in grey.

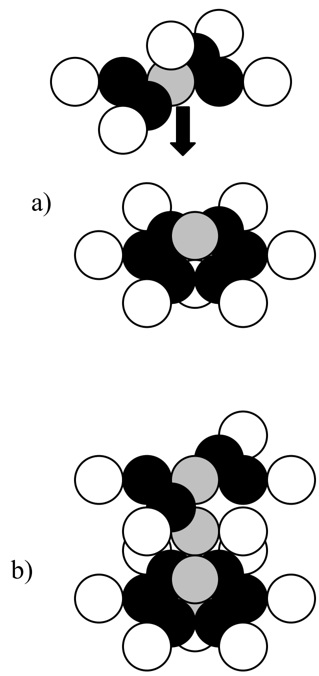


Fig. 12. Diagrams of the nuclei of the magnesium atom

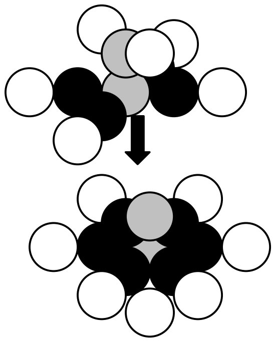
There are twelve protons and twelve neutrons in the nuclear structure. The twelfth proton is situated in the axis of the nucleus in its power part. In Nature, 10.00% of the nuclei of the magnesium atom have the thirteenth neutron, which is connected to the lower axial neutron of the nucleus of the carbon atom. The fourteenth neutron is situated over the upper axial proton. In Nature, there are 11.01% of the magnesium atoms, whose nucleus has 14 neutrons.

Another composition of the nucleus of the magnesium atom is possible (Fig. 12, b). It does not contain an exact copy of the nucleus of the boron atom, which is situated in the same group of the table as magnesium is. But it cannot serve as a cause, which excludes the analysis of such structure of the nucleus of the magnesium atom [1].

14. Structure of Nucleus of Aluminium Atom

Aluminium is the thirteenth element of the periodic table. In Nature, 100% of the atoms of this element have 13 protons and 14 neutrons. The nuclei with large number of the neutrons belong to short-life isotopes of this element (Fig. 13, b). As aluminium is included into the third group of the periodic table, it should contain the elements of the nucleus of the boron atom. The structure of this nucleus is given in Fig. 5, a. In Fig. 13, the structure of the nucleus of the aluminium atom with the specified part, in which the nuclei of the boron atom are present [1].

a)



b)

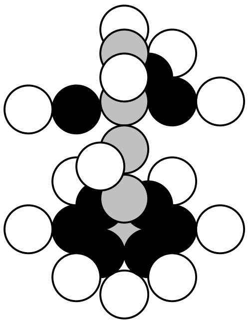


Fig. 13. Diagrams of structure of the nuclei of aluminium atom

15. Structure of Nucleus of Silicon Atom

Silicon is the fourteenth element. Its stable nucleus (there are 92.23% of such nuclei) contains 14 protons and 14 neutrons (Fig. 14).

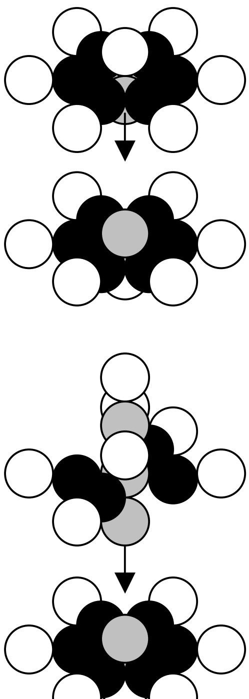


Fig. 14. Structures of the nuclei of the silicon atom

As silicon is included in the fourth group of the periodic table together with carbon, the nucleus of the carbon atom should be in the structure of the nucleus of the silicon atom. It can be represented in two types: the flat on (Fig. 14, a) and the spatial one (Fig. 14, b). As in Nature there is silicon with structure, which resembles the structure of a diamond, but less rigid the nuclei of the atoms of this element as well as the carbon nuclei are formed in two variants: from flat structures (Fig. 14, a) and flat-spatial structures (Fig. 14, b) of the nucleus of the carbon atom (Fig. 6).

There are 4.67% of the nuclei of the silicon atoms with one surplus neutron, and there are 3.10% of the nuclei with two surplus neutrons. One surplus neutron is situated in lower axial part of the nucleus between the central neutron and lower proton. The second surplus neutron is situated on the axis as well [1].

16. Structure of Nucleus of Phosphorus Atom

Phosphorus is the fifteenth element of the periodic table. In Nature, 100% of the nuclei of this chemical element contain 15 protons and 16 neutrons (Fig. 15). There are short-life isotopes of this element as well [1].

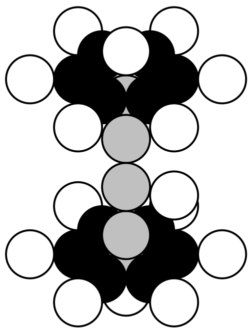


Fig. 15. Structure of the nucleus of the phosphorus atom

17. Structure of Nucleus of Sulphur Atom

Sulphur is the sixteenth element of the periodic table. It is situated in its sixteenth group. Each of 95.02% of the nuclei of this element contains 16 protons and 16 neutrons. Each of 0.75% of the nuclei of the sulphur atoms has one surplus neutron, and 4.21% of the nuclei have two surplus neutrons. In Fig. 16, the structure of the main nucleus of this element, which has 16 protons and 16 neutrons, is shown [1].

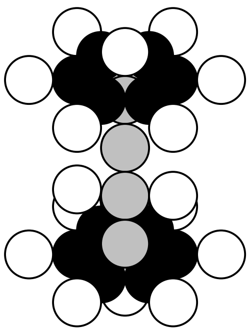


Fig. 16. Structure of the nucleus of the sulphur atom

18. Structure of Nucleus of Chlorine Atom

Chlorine is the seventeenth chemical element of the periodic table. Each of 75.77% of the nuclei of this element has 17 protons and 18 neutrons, and 24.23% of the nuclei have three surplus neutron [1].

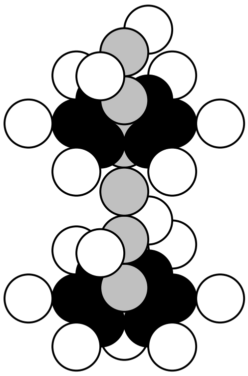


Fig. 17. Structure of the nucleus of the chlorine atom

19. Structure of Nucleus of Argon Atom

Argon is the eighteenth element in the periodic table. It is included in the eighth group of this table. Each of 99.60% of the nuclei of this element contains 18 protons and 22 neutrons. Each of 0.337% of the nuclei has 18 protons and 18 neutrons, and 0.063% of the nuclei have 18 protons and 20 neutrons.

Let us pay attention to the structure of the nucleus of the chlorine atom. It has three tiers. The upper and the lower tiers consist of the nuclei of the carbon atom. The middle tier remains unfinished. It is asymmetric. It is necessary to add one more proton. Then the middle tier will become symmetric. But the electrostatic forces of repulsion, which exist between the protons of the tiers, will be increased. In order to reduce the influence of these forces, it is necessary to increase the distance between the tiers. It is achieved with the help of four surplus neutrons, and a symmetric nucleus of the argon atom is produced (Fig. 18) [1].

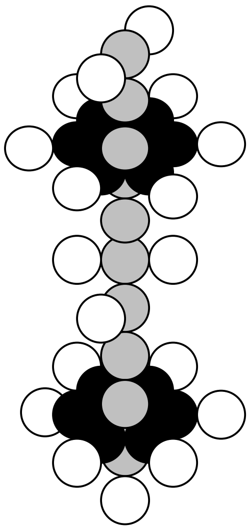


Fig. 18. Structure of the nucleus of the argon atom

20. Structure of Nucleus of Potassium Atom

Potassium is the nineteenth element of the periodic table. In Nature, 93.258% of the nuclei of this element have 19 protons and 20 neutrons. There are the potassium isotopes with two and three surplus neutrons [1].

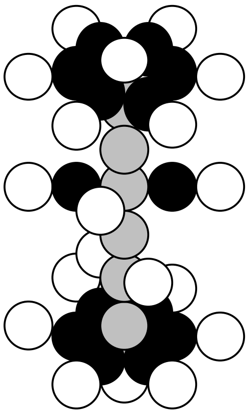


Fig. 19. Structure of the nucleus of the potassium atom

21. Structure of Nucleus of Calcium Atom

Calcium is the twentieth element in the periodic table. In Nature, 96.94% of the nuclei of the atom of this element have 20 protons and 20 neutrons. The isotopes of this element have 2, 3, 4, 6 and 8 surplus neutrons. The analysis of the structure of the nucleus of the potassium atom shows that it has the same number of the neutrons as the nucleus of the calcium atom. It means that one free place for the proton should be in the nucleus of the potassium atom. And we see it. One more tier has appeared in the nucleus of the potassium atom instead of one middle tier. One of them has an empty cell for the proton. Let us put a proton in this cells, and we'll get a symmetric structure of the nucleus of the calcium atom (Fig. 20) [1].

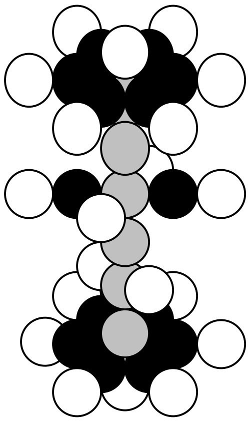


Fig. 20. Structure of the nucleus of the calcium atom

The model looks well, but it should be taken into consideration that it is built on the grounds of a flat model of the carbon atom. If we take a spatial model of the nucleus of the carbon atom as a basis, the structure of the nucleus of the calcium atom can be different. We leave the possibility of construction of such model to other investigators [1].

There exists lack of information concerning a variety of sizes of the proton and the neutron for a determined continuation of construction of more complicated nuclei. The mass of the neutron exceeds the mass of the proton. Besides, the neutron has more complicated magnetic field, that's why we have every reason to believe that the size of the neutron is larger than the size of the proton. If it turns out that the size of the neutron is five times or ten times as much the size of the proton, a direct contact between the flat carbon nuclei is possible in the nuclei of phosphorus, chlorine, argon and more complicated elements. Then the tiers, which we have arranged in these nuclei between two flat carbon nuclei, will be situated not inside the nucleus, but outside it copying the nuclei of above arranged chemical elements. In this case, the similarity between the nuclei of the elements situated in the like groups will be strengthened. Further search will clear up these details.

CONCLUSION

The considered sequence of construction of the nuclei of the atoms of twenty chemical elements gives the grounds for some generalizations.

There is every reason to state that the principle of construction of the nuclei of the atoms of chemical elements has been found. The neutrons and the protons in the atomic nucleus combine magnetic forces of their magnetic poles. The proton has the simplest magnetic field, which is similar to magnetic field of the bar cylindrical magnet. The neutron has a complex magnetic field, which forms on its surface six symmetrically arranged magnetic poles: three south poles and three north ones.

The nucleus of any chemical element is formed in such a way that a neutron should be present between the protons. This neutron connects the protons and functions as a screen between the like electric fields of the protons.

The above-mentioned method of construction of the nuclei of the atoms of the chemical elements gives the possibility to build a nucleus of any atom. It is clear now that a flat nucleus of this atom serves as a foundation for the nuclei of all atoms, which are more complex than the carbon atom. If we go on in such a way, it leads to the fact that consequently the flat components will take place, which are similar to the flat nucleus of the carbon atom. The complexity of the structure of the nucleus will be determined by the number of the nuclei of the carbon atom in it.

Analysis of the structure of the atomic nuclei of twenty chemical elements shows considerable heterogeneity of strength of the nuclei and the presence of weak links in them. The results being obtained allow us not only to explain transmutation of the nuclei at the usual temperatures, but to forecast its results during the experimental investigations [1].

REFERENCES

1.Kanarev Ph. M. Models of the Atomic Nuclei. Krasnodar. 2002. 23p.
2. Kanarev Ph. M. Water is a new source of energy. The third edition. Krasnodar, 2001.
3. T. Erdei-Gruz. Principles of matter composition. M., “Mir”, 1976.
4. Korolev F.A. Course of physics (Optics, atomic and nuclear physics). M, Prosveshchenie, 1974.
5. Prokhorov A.M. et al. Physical encyclopaedia. Volume 3. M., Large Russian encyclopaedia, 1992.
6. Bazhutov Yu.N., Yashin S.N. Regularly reproduced radiation effects during electrolysis with gas discharge. Cold transmutation of the nuclei. Proceedings of the 6th Russian conference on cold transmutation of nuclei of chemical elements. M., 1999, pages 24-33.
7.Tadahiko Mizuno. Nuclear Trasmutation: The Reality of Cold Fusion. Infinite Energy Press, Concord, New Hampshire, USA, 1999.
8.Ohmori T. Mizuno T. Strong Excess Energy Evolution, New Element Production and Electromagnetic Wave and/or Neutron Emission in Light Water Electrolysis with Tunsten Cathode. Infinite Energy. Volume 4, Issue 20, 1998. pag. 14 -17.
9. Harold L. Fox. Cold Nuclear Fusion: Essence, Problems, Influence of the World. View from USA. Production group “SVITAX” M.: 1993, 180 pages.

Journal Home Page