IMAGES OF THE INHABITANTS OF THE MICROWORLD
ИЗОБРАЖЕНИЯ ОБЪЕКТОВ МИКРОМИРА

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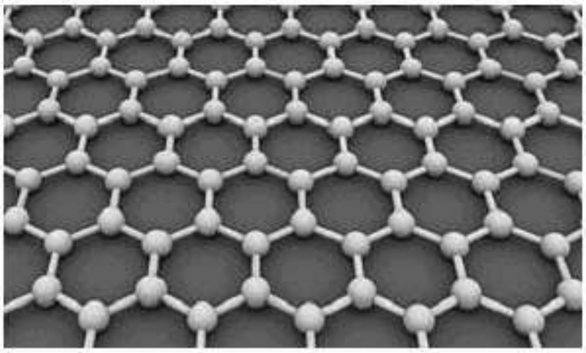
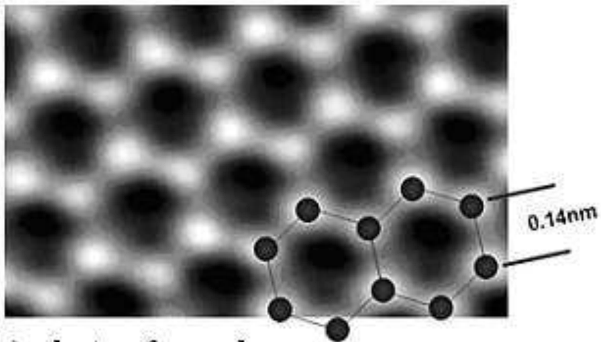
Announcement. The modern electron scanning microscopes make it possible to obtain visual information concerning the inhabitants of the microworld, but the old erroneous theory of this world closes out the possibility of a correct interpretation of such information. A new Russian theory of the microworld describes the images of the inhabitants of the microworld with the resolution by 3 to 5 orders of magnitude deeper than the scanning microscopes do it.

Аннотация. Современные электронные сканирующие микроскопы делают возможным получение визуальной информации, касающейся микромира, но старые ошибочные теории, описывающие этот микромир, исключают возможность правильной интерпретации такой информации. Новые российские теории микромира описывают образы объектов микромира с разрешением на 3 до 5 порядков глубже, чем сканирующие микроскопы в состоянии это сделать.

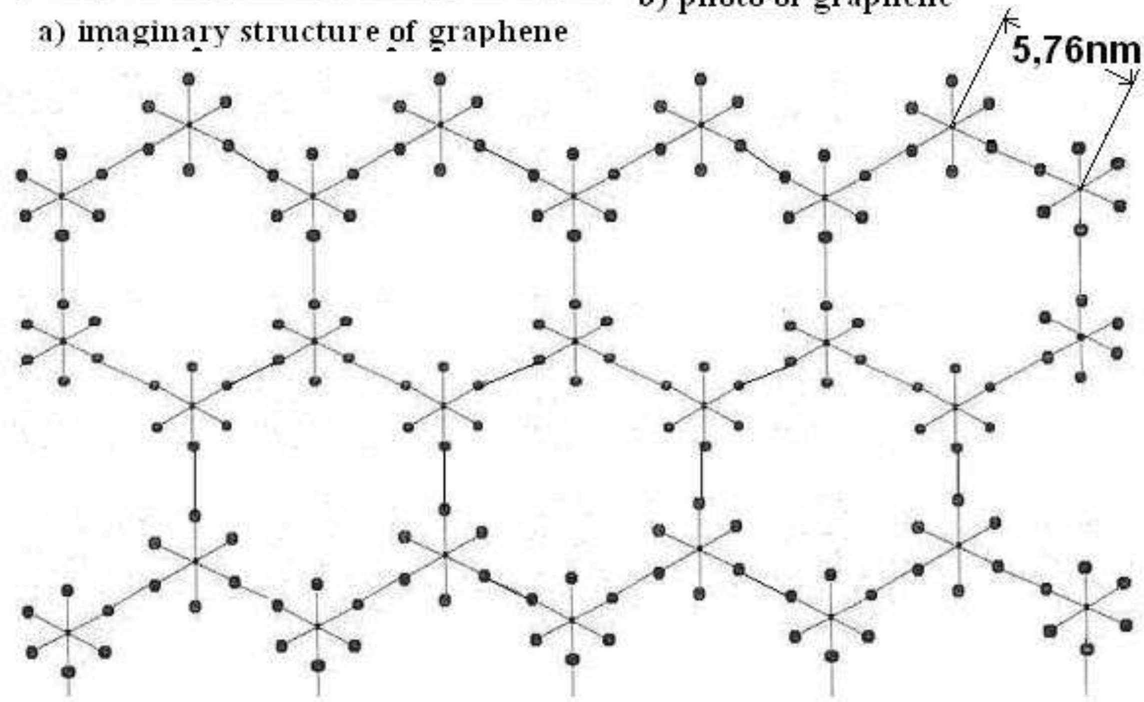
They have managed to obtain the most concise information with the help of a scanning microscope that concerns the inhabitants of the microworld, which consist of the carbon atoms and molecules. In Fig. 1, b, an image of a graphite layer, which has been called graphene, is given; in Fig. 1, a, a result of computer processing of this image is given. The orbital theory of the atom is unable to explain a cause of the formation of the hexagonal molecules of carbon, which are given in Fig. 1, a and b, and the new Russian theory of the microworld makes it possible to see the graphene atoms and electrons (Fig. 1, c) [1], [2], [5].



a) imaginary structure of graphene



b) photo of graphene



c) theoretical structure of graphene

Fig. 1. a) imaginary structure of graphene,
b) photo of graphene; c) theoretical structure of graphene

The European investigators tried to capture an image of benzene cluster $\tilde{N}_6 H_6$, which contains a hydrogen atom, the smallest atom (Fig. 2).

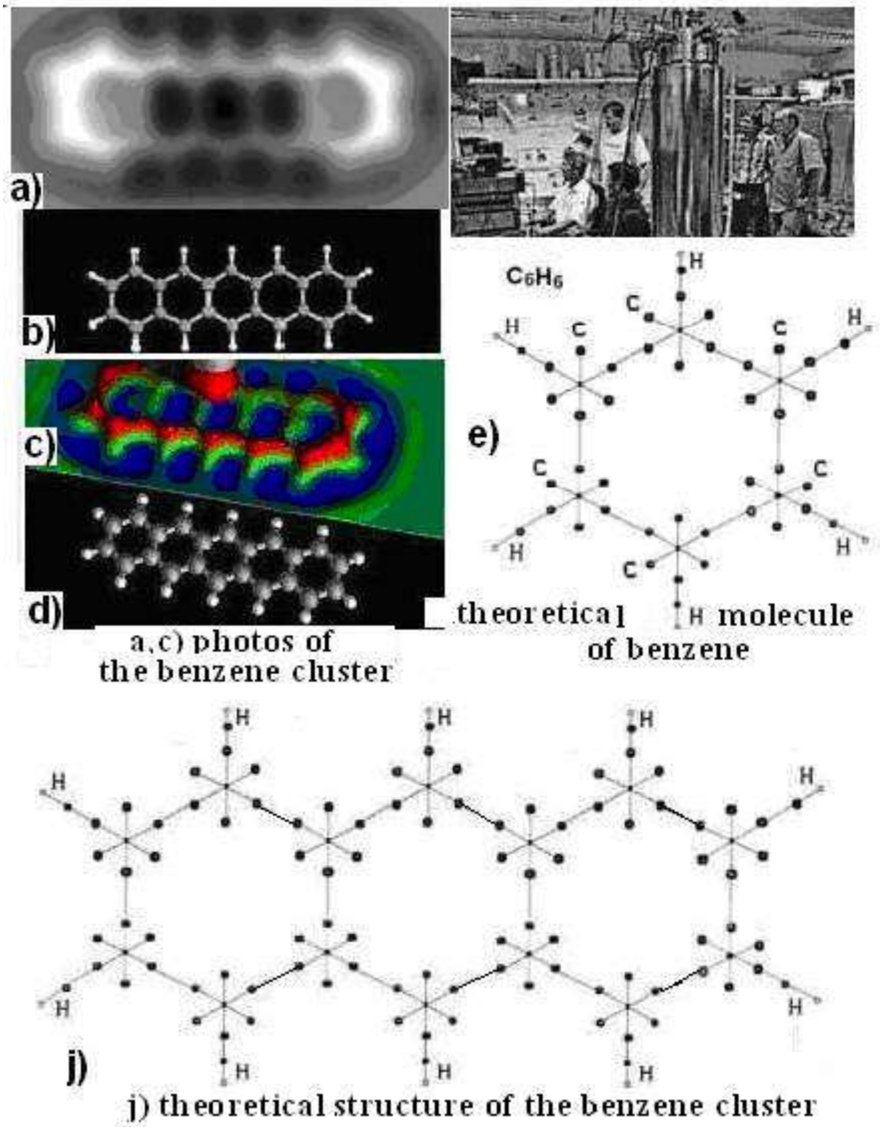


Fig. 2. a,c) photos of the benzene cluster; b) and d) computer processing of the photo of the benzene clusters; e) theoretical molecule of benzene $\tilde{N}_6 H_6$; j) theoretical structure of the benzene cluster

The Japanese investigators tried to capture an image of a separate hydrogen atom. ITAR-TASS informed about it
http://www.glubinnaya.info/modules.php?name=News&file=article&sid=994

For the first time in history, a team of the specialists of the Tokyo University managed to capture an image of a separate hydrogen atom, the lightest and the smallest atom among all atoms (Fig. 3). The investigators headed by Professor Yuichi Ikuhara informed that a fundamentally new electron scanning microscope was used for this purpose.

A hydrogen atom has a diameter of about one-10 billionth of a metre. It was supposed earlier that it was next to impossible to take its photo with the use of modern equipment. Together with the hydrogen atom, the Japanese scientists captured an image of a separate vanadium atom. It is possible to catch images of other elementary particles in the same way. “Now we can see all the atoms, which compose our world, - says Professor Ikuhara. - It is a breach to the new forms of production when it is possible to adopt decisions at the level of separate atoms and molecules in the future”. (Fig. 3).

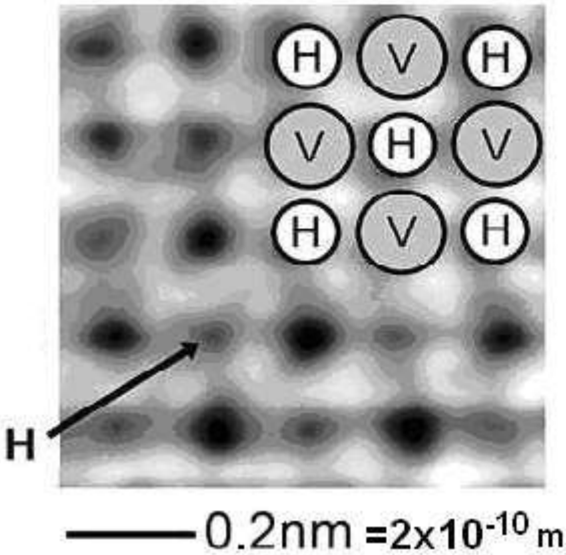


Fig. 3. Japanese photo of the hydrogen atoms **H**

Let us analyse the achievement of the experimentalists with help of the new Russian theory of the microworld. Let us begin with the simplest atom, the hydrogen atom, which image has been captured by the Japanese scientists (Fig. 3).

Dear Professor Yuichi Ikuhara,

I recollect the first Japanese sensation concerning a creation of the electron microscope with the resolution of 1 Angstrom unit $(10^{-10} m)$, which took place at the beginning of seventies of the last century. At that time, I was greatly impressed by the achievement of your scientists. Why did they fail to capture an image of a hydrogen atom, which size is near to one Angstrom unit in an unexcited state? Certainly, you have no answer to this question, because it is impossible to get it on the basis of old scientific knowledge, which you have. Please, allow me to answer instead of you.

Prior to analyze the image of the hydrogen atom, which has been published by you at the site http://search.japantimes.co.jp/cgi-bin/nn20101105a1.html (Fig. 3), one should know that the free hydrogen atoms exist only in a plasma state at the minimal temperature of nearly 2700 K and the maximal temperature of 10000 K. At the above-mentioned temperatures the electron of the hydrogen atom is in an excited state and transits between the energy levels continuously changing a size of the atom and emitting and absorbing the photons. It appears from this that it is impossible to capture the image of a hydrogen atom in a free state. In the free state, it is possible to give its theoretical presentation only. The theoretical model of the hydrogen atom (Fig. 4) results from the mathematical models (1) and (2) of the law of formation of the spectra of the atoms and ions being discovered by us in the year of 1995 [3]. There is no energy of an orbital motion of the electron in this law, but there is energy E_b of a linear interaction of the electrons with the protons of the atomic nuclei (2) [1], [2], [5], [6]

$$E_f = E_i - \frac{E_1}{n^2}, \quad (1)$$

where E_f is energy of the photon being emitted by the electron; E_i is energy of ionization of the hydrogen atom; E_1 is binding energy of the hydrogen atom with its proton, which corresponds to the first (unexcited) energy level of the hydrogen atom; n=1, 2, 3,… is the main quantum number.

Binding energy of the electron with the proton, which corresponds to any energy level of any atom, is determined according to the formula [1], [2], [5], [6]

$$E_b = \frac{E_1}{n^2} = \frac{h\nu_1}{n^2} . \quad (2)$$

Energies of the photons being emitted by the electron of the hydrogen atom and other atoms when the electrons transit between the energy levels are calculated according to the formula [1], [2], [5], [6]

$$\Delta E_f = E_f = E_1 \cdot \left[\frac{1}{n_1^2} - \frac{1}{n_2^2}\right]. \quad (3)$$

According to Coulomb's law, if an electron of the hydrogen atom resides at the first energy level (in an unexcited state), a distance between the proton and the electron is [1], [2], [6]

$$R_1 = \frac{e^2}{4\pi \cdot \varepsilon_o \cdot E_1} = \frac{(1.602 \cdot 10^{-19})^2}{4 \cdot 3.142 \cdot 8.854 \cdot 10^{-12} \cdot 13.598 \cdot 1.602 \cdot 10^{-19}} = 1.059 \cdot 10^{-10} m. \quad (4)$$

Table 1. The hydrogen atom spectrum, the binding energies E_b between the proton and the electron and the distances R_i between them [1], [2]

Values	n	2	3	4	5
E_f (exp)	eV	10.20	12.09	12.75	13.05
E_f (theor)	eV	10.198	12.087	12.748	13.054
E_b (theor)	eV	3.40	1.51	0.85	0.54
R_i (theor)	$\cdot 10^{-10} m$	4.23	9.54	16.94	26.67

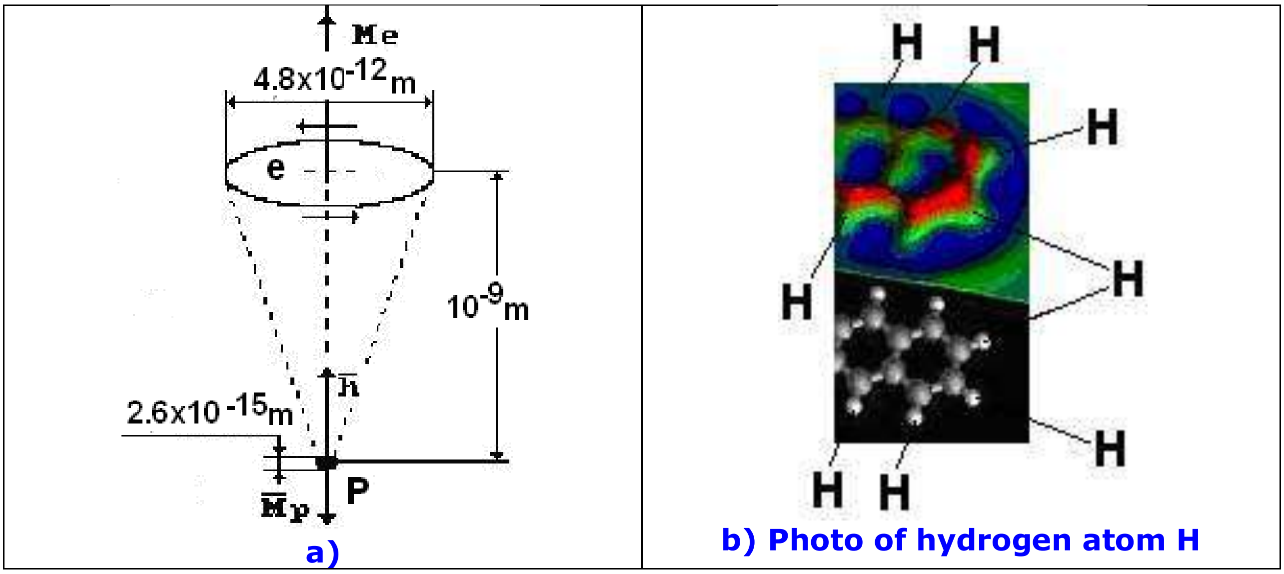


Fig. 4. a)-theoretical model of the hydrogen atom and its dimensions in the unexcited state; b) photo of hydrogen atom H

Dear Professor Yuichi Ikuhara,

The calculation results according to these formulas are given in Table 1. A hydrogen atom model results from these formulas and the calculation results according to these formulas (Fig. 4). As it is clear (Fig. 4), the electron of the hydrogen atom interacts with its proton linearly, not orbitally. It is a consequence of an absence of energy of an orbital motion of the electrons in the atoms resulting from the laws of formation of the spectra of the atoms and ions expressed by the mathematical models (1), (2), (3).

Dear Professor Yuichi Ikuhara,

I hope that you understand a reason why it is impossible to take the photo of the hydrogen atom in the free state. It is possible to take its photo only in the molecule composition; it was performed by the European investigators (Fig. 2, a, c) when they tried to take the photo of a cluster of the benzene molecules $\tilde{N}_6\acute{I}_6$. As you see (Fig. 2, e), the benzene molecule consists of six carbon atoms and six hydrogen atoms. The photos (Fig. 2, a, c) prove an authenticity of the linear interaction of the electrons of the carbon atoms and the hydrogen atoms and an authenticity of our theoretical model of the hydrogen atom (Fig. 4). The results (Fig. 2, b, d) of computer processing of the photos (Fig. 2, a, c) performed by the Europeans prove an authenticity of our theoretical models of the hydrogen atoms (Fig. 4) and the carbon atoms (Fig. 5, b) as well as the molecules of benzene (Fig. 2, e) and its clusters (Fig. 2, j).

Let us pay attention to the theoretical models of the benzene molecule (Fig. 2, e), its cluster (Fig. 2, j), and a photo of this cluster (Fig. 2, a, c). The hydrogen clusters are on the external contour of the benzene molecule (Fig. 2, e) and its cluster (Fig. 2, j) and are connected with the electrons of the carbon atoms linearly. The supermodern European microscope has caught sight of the misty contours of the carbon atoms in the benzene molecule (Fig. 2, a, c) and the misty linear projections on the external contour of the benzene cluster (Fig. 2, a, c), which belong to the hydrogen atoms in its theoretical model (Fig. 2, e).

What has the Japanese microscope managed to see (Fig. 3)? It has seen the misty contours of the structures, which forms resemble a square form. The white misty tops of these squares are the atoms of the molecules, which form the cluster. The centres of the squares are the hollows, but you, **dear Professor Yuichi Ikuhara,** have marked them as the atoms of hydrogen and vanadium; it seems that you have supposed that the white misty spots are the orbits of the electrons, and their nuclei are in the centres of the squares. I hope that you understand that your notions differ from more correct notions the European scientists (Fig. 2, a, b, c, d).

Let us consider the resolution of the Japanese electron microscope. We should let alone the fairy tales of the relativists that the electrons bring the images of the microworld objects to an electron microscope photo. The photons only are the visual information carriers [1].

There is a photo of the graphene in Fig. 1, b, where the carbon atoms are given in the form of the misty white spots with the misty bonds between them, which form hexagons. What connects these white spots of the carbon atoms with each other? The orbits of the electrons? If so, how do they form a hexagonal structure of a graphene cell?

The photos of the inhabitants of the microworld (Fig. 1, b; Fig. 2, a, c; Fig. 3) and the results of their computer processing (Fig. 1, a; Fig. 2, b and d) prove a connection of the inhabitants of the microworld, which are given in them, with our theoretical models (Fig. 1, c; Fig. 2, e and j; Figs 4, 5, 6 and 7) of these inhabitants.

In Fig. 1, c, the theoretical structure of graphene resulting from the new Russian theory of the microworld is given [1]. Let us analyze in detail a connection of this structure with the structure of graphene, which image has been captured (Fig. 1, b).

Two natural mineral formations, which consist of the carbon atoms and possess radically different properties, are known. Graphite writes on paper, and diamond cuts glass. Why? The new theory of the microworld gives a simple answer to this question.

Carbon is the sixth element in Mendeleev's table. Its nucleus has 6 protons, and the number of the neutrons can be various. 98.90% of the nuclei of the carbon atoms have 6 neutrons (Fig. 5, a), and 1.10% have 7 neutrons (Fig. 5, c). The graphite atoms (Fig. 5, b) have flat nuclei (Fig. 5, a), and the diamond atoms (Fig. 5, d) have dimensional nuclei (Fig. 5, c) [1], [2], [5], [6].

The structure of the diamond atom (Fig. 5, d), which is formed from the dimensional nucleus (Fig. 5, c) of this atom, has three axes of symmetry. They are the axes of the Cartesian coordinate system. The structure of the dimensional nucleus (Fig. 5, c) and the structure of the spatial carbon atom (Fig. 5, d) demonstrate the main property of diamond: its strength.

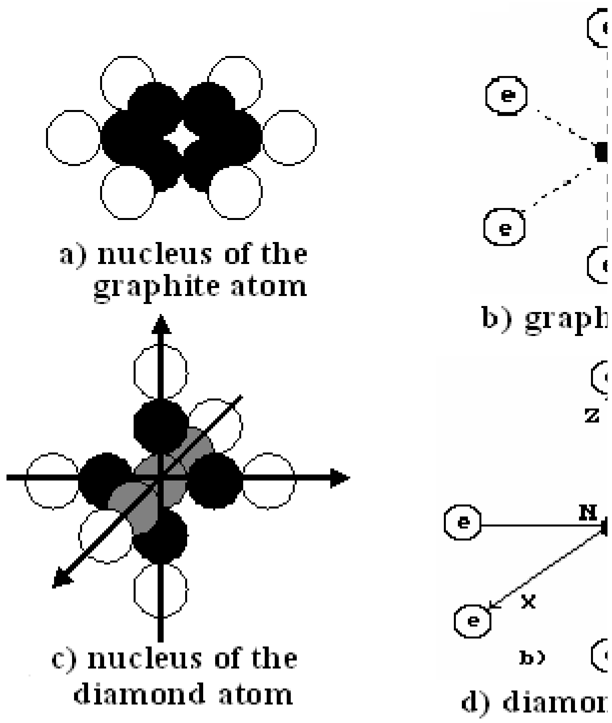


Fig. 5. a) flat nucleus of the carbon atom; b) flat atom of graphite;
c) dimensional nucleus of the carbon atom; d) dimensional carbon atom, diamond atom

It appears from the new theory of the microworld that the protons are arranged on the surface of the nuclei (Fig. 5, a and c), and the electrons of the atoms interact with them linearly, not orbitally (Fig. 5, b and d). As a result, a graphite atom (Fig. 5, b) is a flat formation; a diamond atom (Fig. 5, d) is a limitedly symmetrical, dimensional formation.

A theoretical structure of the flat atom of carbon (graphite) is given in Fig. 6. It results from the new law of the formation of the spectra of the atoms and the ions. There is no energy of the orbital motion of the electrons in the atoms in the mathematical models of this law (1, 2, 3); there are energies of the linear interaction of the electrons e with the protons p (2), which are arranged on the surface of the nuclei interacting with the neutrons n linearly as well (Figs 5, a, c, and 6) [1], [6].

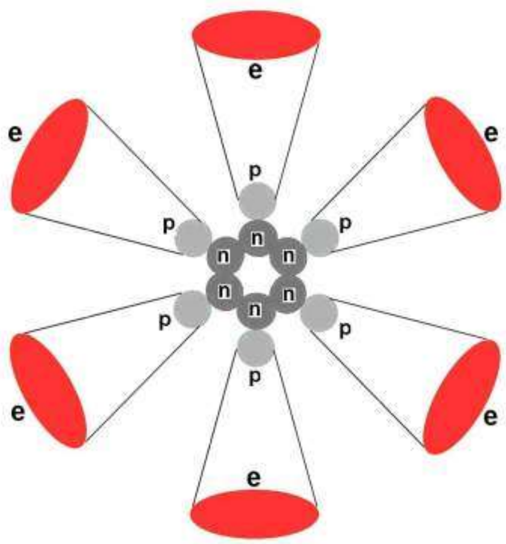


Fig. 6. Diagram of the carbon nucleus and the carbon atom

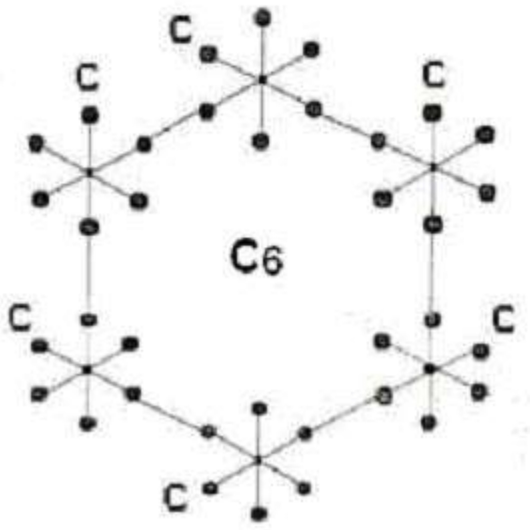


Fig. 7. Diagram of the carbon molecule

A structure of a carbon molecule is given in Fig. 7. It results from it that six-ray carbon atoms connect the valence electrons of the atoms linearly, not orbitally.

It results from the Planck's law of ideal black body emission that the law of emission of this body does not depend on black body material, i.e. on its chemical composition (Fig. 8) [1], [2], [5], [6]. It appears from this that binding energy of valence electrons in various molecules of solid matters of various chemical elements have close values at one and the same temperature. Consequently, in order to check authenticity of resolution of the electron microscope of 0.14 *nm* $=0.14\cdot10^{-9}$ *m* (Fig. 1, b), one can use Coulomb's law (4).

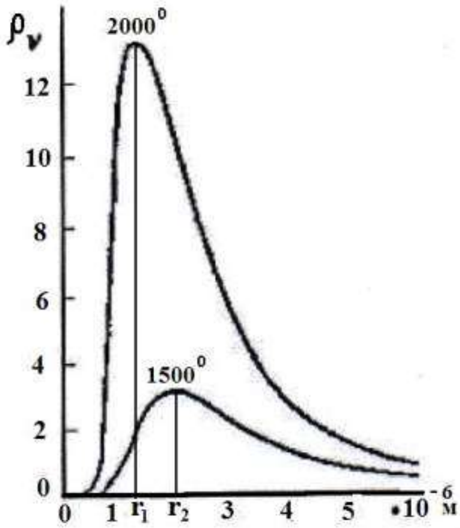


Fig. 8. The curved lines of energy distribution of the ideal black body spectrum

As it is clear (Fig. 7), the carbon atom in the carbon molecule has two bonds. Their total energy is known and is 615 kJ/mole [3]. Let us express this energy in electron volts.

$$E_{b2} = \frac{615\cdot 1000}{6.02\cdot 10^{23}\cdot 1.602\cdot 10^{-19}} = 6.377 eV\,. \tag{5}$$

Energy of one bond is 6.377/2=3.19 eV. The distances between the nuclei of the neighbouring carbon atoms of in the carbon molecule will be equal to three atomic radii (Fig. 7).

$$R_3 = 3R_1 = \frac{3\cdot e^2}{4\pi\cdot\varepsilon_o\cdot E_1} = \frac{3\cdot(.,602\cdot 10^{-19})^2}{4\cdot 3.142\cdot 8.854\cdot 10^{-12}\cdot 3.19\cdot 1.602\cdot 10^{-19}} = 1.35\cdot 10^{-8} m \tag{6}$$

An analysis of the graphene image (Fig. 1, b) shows that the distance between the white spots in the tops of the hexagons (between the carbon atoms, Fig. 6) is equal to nearly a size of the white spot itself. It means that a size of a side of the hexagon is equal to nearly four radii of the white spots, i.e. to 4 radii of the carbon atoms (Fig. 6).

The carbon atom in graphene (Fig. 1, a, b, c) has three bonds. Energy of these bonds is known and is 812 kJ/mole [3]. Let us express this energy in electron volts.

$$E_b = \frac{812\cdot 1000}{6.02\cdot 10^{23}\cdot 1.602\cdot 10^{-19}} = 8.42 eV\,. \tag{7}$$

One bond has energy E_b =8.42/3=2.81 eV. As we have mentioned, the distance between the carbon atoms in graphene (Fig. 1, b) is 4 distances between the electron of the carbon atom and its proton (Fig. 6)

$$R_4 = 4R_1 = \frac{4\cdot e^2}{4\pi\cdot\varepsilon_o\cdot E_1} = \frac{4\cdot(1.602\cdot 10^{-19})^2}{4\cdot 3.142\cdot 8.854\cdot 10^{-12}\cdot 2.81\cdot 1.602\cdot 10^{-19}} = 5.76\cdot 10^{-9} m \tag{8}$$

It exceeds the value, which is given in Fig. 1, b, $5.76\cdot10^{-9}/0.14\cdot10^{-9}$=41.14fold.

Dear Professor Yuichi Ikuhara,

Let us consider the resolution of the Japanese electron microscope. It is shown in your Fig. 3 that a side of the misty square is nearly $0.20\cdot10^{-9}$ *m*. You have failed to write a chemical formula, in which the hydrogen atoms connect the vanadium atoms. We do not know a structure of a vanadium atom either, but its nucleus is already available (Fig. 9). We'd like to draw your attention to the fact that the new Russian theory of the microworld makes it possible to see the structures of the atomic nuclei with the resolution, which exceeds the resolution of the modern electron microscopes by 5 orders of magnitude.

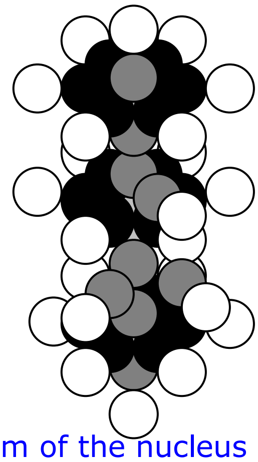


Fig. 9. Diagram of the nucleus of the vanadium atom

The protons are designated with the help of the light spheres (Fig. 9). All of them are on the surface of the nucleus, and an electron interacts with each of them linearly. If the hydrogen atoms are near vanadium, they will play the role of the connecting links between the vanadium atoms. You affirm that the atoms of hydrogen and vanadium are in your photo (Fig. 3). A question arises at once: what chemical compound is formed by them? You write nothing about it; that's why there is no reason to trust your interpretation of visual information, which is given in your photo (Fig. 3). We have already explained to you that the hydrogen atoms cannot exist in the free state, and you show them in your photo (Fig. 3).

The size of the hexagon of the graphene cell, which is presented by us (Fig. 1, b) and is equal to $5.76\cdot10^{-9}$ *m*, affords ground to a supposition that the size of the side of the square in your photo (Fig. 3) exceeds the size of the side of the hexagon in the structure of grapheme. If the experimental size of the hexagon (Fig. 1, b) differs from a theoretical value by 41.14fold, the experimental size of your square will differ from an actual size hundredfold minimum. That's why it becomes necessary to repeat your experiment and to determine the size, which is stipulated by you in Fig. 3, more exactly as well as the presence of the free hydrogen atoms in this photo.

Thus, the Russian theory of the microworld goes before the possibilities of the experimentalists to present its results visually.

CONCLUSION

The Russian theory of the microworld makes it possible to see the structure of the inhabitants of the microworld by 3 to 5 order of magnitude deeper than the modern scanning microscopes do it. As NT-MDT, the Russian company, is among the leading designers of the modern scanning microscopes, the new Russian theory of the microworld will help it to strengthen its positions [4], [5], [6].

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