New periodic table

On the origin of the elements of the Universe

Let's start from the very beginning: from the origin of the Universe, when, as a result of the Big Bang, a superdense clot of matter shatters into fragments. The farther from the center, the larger the fragments (look at the web of cracks in any point-like impact, say, with a pebble on glass). The smallest and fastest fragments, let's call them **Uni** (yellow dots in Figure 1), are in the center. Further from the center are small particles - electrons. Even further away are nucleons (protons or neutrons. Large fragments form, as it were, an outer dome, a screen that reflects small and medium particles, not allowing all of its actors to scatter until the end of the grandiose performance - the birth of the Universe. The particles that did not penetrate through the cracks of this mosaic dome are reflected from it, scatter in all directions, including back to the center, thereby preventing the following particles from scattering too quickly. And if from the moment of the explosion all particles had an exclusively centrifugal vector, then now a chaotic component is superimposed on it, which, as we will see later, will put an end to formlessness and chaos!

Particles (nucleons) collide with each other, form nucleon clusters - nuclei of future elements. These nuclei take various forms, which are immediately modified by the most powerful streams of other nucleons and U-particles, just like the sea wave polishes other pebbles. Unprotected nucleons strongly protruding from the cluster are knocked down by the flow of particles, and the already formed nuclei are compacted from all sides like the process of making snowballs by spherical palms, as a result of which all the nuclei would take a spherical shape. But, fortunately, the explosion ended quickly, because for its longer duration it would have left us in an ideally spherical, but sadly monotonous world without all this colorful splendor of various chemical elements!

And in this case, our world seems to have frozen in its unfinished development, and in this instant photo we can observe all the bricks of the universe: the atoms of chemical elements. Now in nature there are no longer those powerful forces that could change the existing elements. Except, of course, the person!

Well, now, the nuclei are formed. What is now keeping them from disintegration? Yes, all the same tiny **Uni** that have not gone anywhere and continue to exert pressure on the nuclei from all sides. In physics, the forces that hold nucleons in the nucleus are called intranuclear. But we have seen from previous works («Universal interaction») that they are, in fact, external and, in essence, are gravitational. For gravity, in a nutshell, is the approach of two bodies under the action of **Uni**, exerting pressure on the outer sides of these bodies, while their inner sides are in the shadow of each other.

Let's see what elements turned out to be the most tenacious in such extreme, to put it mildly, conditions. The most ideal of all possible elements in terms of resistance to external influences is the nucleus of the hydrogen atom. The perfect sphere. Neither subtract nor add. This is why hydrogen makes up 75% of the Universe.

The next in the periodic table is helium, which consists of 4 nucleons. Stop. And where are the elements with two and three nucleons? Yes, they simply do not exist, apart from exotic isotopes, which will be discussed later. The fact is that their designs turned out to be completely unviable, since their sphericity, that is, resistance to bombardment by external particles, is very low.

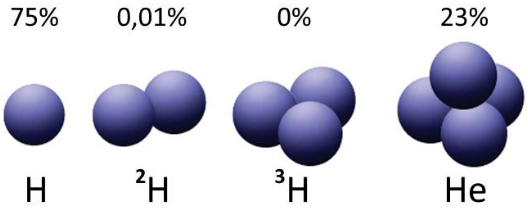


Fig.2

The modeling of the process of formation of elements during the primary explosion was carried out. Small balls equal to the number of nucleons in the nucleus of the element under study were covered with a thin layer of plasticine. Then all these balls, collected together, were compressed evenly from all sides by palms, like a snowball, until they took a shape close to a ball. As a result, in spite of the fact that the shape of all nuclei was close to spherical, there were still minor differences in their structure. But more on that later.

As an indicator of the stability of the nucleus to external influences, we take the coefficient of spherical asymmetry ***Ks*** - the ratio of the difference between the maximum and minimum size of the shadow cast by the body by parallel rays falling on it from all sides to the average size of the shadow.

$$Ks = \frac{Smax - Smin}{Save} \qquad (1)$$

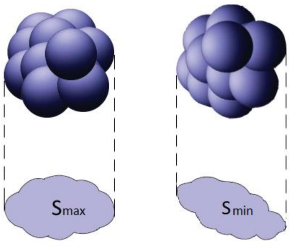


Fig.3

For an ideal sphere, ***Ks*** = 0 (round zero!), And for an ideal non-sphere (digit one without a tail), ***Ks*** = 1.

Let us represent the dependence of ***Ks*** on the number of nucleons in a nucleus ***N*** in the form of a Table 1.

Table 1

element	**H**			**He**			**Li**		**Be**
N	1	2	3	4	5	6	7	8	9
Ks	0	0.67	0.3	0.06	0.2	0.13	0.11	0.23	0.07

A nucleus with two nucleons is the most unstable of all possible formations for the reason that both the nucleons themselves and the places of their junctions are open from all sides, and the particles bombarding them easily break this bond, again forming two hydrogen nuclei. Содержание дейтерия в природе – 0,01%.

This applies to almost the same extent to a nucleus with three nucleons, which either decays into three hydrogen nuclei, or turns into a more stable helium nucleus, attaching one more nucleon to itself.

But the nucleus of a helium atom already has good stability. Its ***Ks*** is only 0.06 (the asymmetry of a nucleus of two nucleons is 10 times greater - 0.67!). The junctions of its nucleons are well protected from bombardment. Therefore, helium is the second most abundant element in the Universe. Its content in nature is 23%.

A nucleus of 5 nucleons would have an asymmetry of 0.2 if it existed. But in nature there is no nucleus with 5 nucleons. In the process of primary nucleosynthesis (element formation), such a nucleus was immediately transformed into a helium nucleus with ***Ks*** = 0.06 or lithium, in which ***Ks*** = 0.11.

This would be followed by a nucleus with 8 nucleons, but with an asymmetry of 0.23 it suffered the same fate: it does not exist in nature at all. And, here, the beryllium nucleus with 9 nucleons has a good sphericity - only 0.07.

All nuclei with more than 9 nucleons already have a more or less spherical shape. And now not only the external forms of the nuclei are beginning to affect, but also their internal content in the literal and figurative sense of the word.

If you look at the specific binding energy of the nuclei of elements (this is also a kind of indicator of resistance to external influences), then you can see its growth with some fluctuations for the first light elements (**A** from 1 to 11).

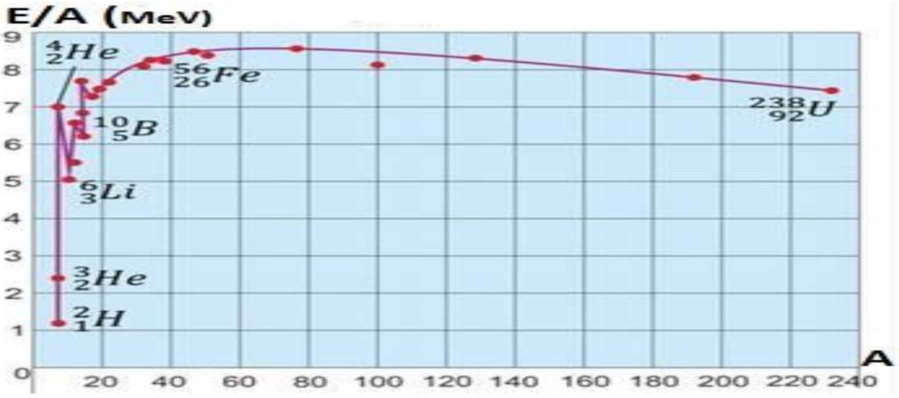


Fig.4

That is, to separate a nucleon from a light nucleus requires much less energy than from a heavier one. But, after all, this is what the data of the dependence of the coefficient of sphericity (resistance to external influences) on the number of nucleons **N** in the nucleus indicate (see Table.1)! In Fig.5, we see the combined graphs of the dependence of the specific binding energy (more precisely, the value, its inverse) - orange, and the asphericity coefficient (blue) of nuclei "stuck together" in the Big Bang on the number of nucleons in the nucleus.

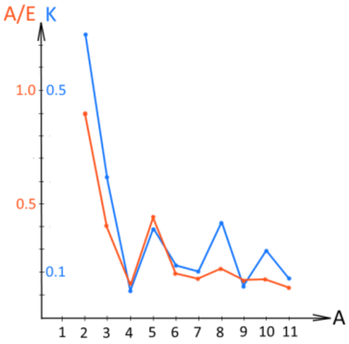


Fig.5

The perfect correlation between these curves is visible, which confirms our theory of the primary formation of elements!

New periodic table of chemical elements

Simulating the process of formation of primary elements, many nuclei of various elements were molded from balls (nucleons) 1 cm in diameter. For example, a beryllium nucleus was molded from 9 balls. Its radius was measured. Then, on the outside, this core was covered with the next layer of tightly packed balls. It turned out that the total number of balls in this new nucleus: the scandium nucleus is equal to 45 (and this is its atomic mass!). The radius of the scandium core was measured.

They also covered it with a third layer - it turned out an iodine nucleus with the number of nucleons - 127. We also measured its radius. Such modeling was carried out with almost the entire upper half of the elements of the periodic table. Based on the data obtained, the packing density of nucleons in nuclei and the radii of nuclei were determined. This laborious work was necessary so that later, at the stage of mathematical modeling, there would be some practical confirmation of the formula obtained.

Let's proceed to the conclusion of this formula now. The Fig.6 schematically shows the structure of a nucleus consisting of 22 nucleons and having a radius R3, which was formed from a nucleus with 7 nucleons (R2), which, in turn, was formed from a nucleus with one nucleon (R1).

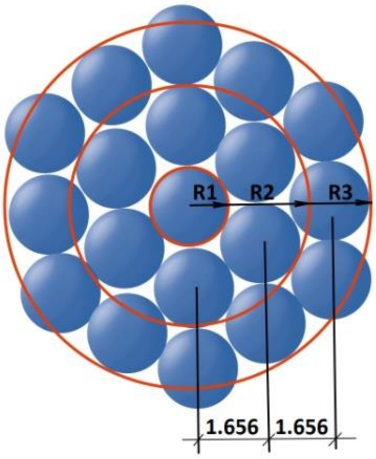


Fig.6

Let us take the nucleon radius equal to 1 and assume that the nucleons in the nucleus have the most dense packing with **K = 0.7**. **K** is the ratio of the total volume of nucleons to the volume of the nucleus. In such a packing, the average distance between the layers (radii) is 1.656, then the number of nucleons in a new nucleus formed by adding one layer of nucleons to the previous nucleus with the number of nucleons **x** will be determined by the formula for the genesis of elements.

$$\boldsymbol{A = 0,7 \cdot \left(\sqrt[3]{x\,/\,0,7} + 1,656\right)^{3}} \qquad (2)$$

where the first term is the radius of the primary nucleus, the second is the thickness of the subsequent layer (addition to the radius), the expression in brackets is the radius of the newly formed nucleus, and the cube of this expression is the volume of the new nucleus.

For example, a nucleus with the number of nucleons **x=6** (lithium), being covered with another layer of nucleons, will contain **35.55** nucleons. An element with such a number of nucleons (atomic mass) in the periodic table is chlorine **A = 35.45**.

$$\mathrm{Cl}^{6}_{35} = 35.45$$

$$0.7 \cdot \left(\sqrt[3]{6/0.7} + 1.656\right)^{3} = 35.55$$

From a nucleus with a number of nucleons equal to 13 (carbon **C13**), an element with **A = 55.84** is obtained. Such an element in the periodic table is iron with **A = 55.84**. It turns out a complete coincidence!

$$\mathrm{Fe}^{13}_{56} = 55.84$$

$$0.7 \cdot \left(\sqrt[3]{13/0.7} + 1.656\right)^{3} = 55.84$$

Copper with **A = 63.57** (**63.55** on the periodic table) comes from oxygen.

$$\boxed{\mathrm{Cu}^{16}_{64}} = 63.55$$

$$0.7\cdot\left(\sqrt[3]{16/0.7} + 1.656\right)^3 = 63.57$$

And so on.

This confirms the hypothesis of the origin of all elements by "sculpting" their nuclei from nucleons during the Big Bang. As a result of natural selection, the elements of the most spherical shape were preserved. Then some of these elements were overgrown with subsequent layers and turned into heavier, but still related elements.

Thus, the properties of elements are determined not by electrons, but by the nucleon structure of nuclei. Namely, by the number of nucleons inside the nucleus, which, however, also determines the total number of nucleons in the nucleus. You can call them protons or neutrons - all the same: all nuclei were formed from the same particles (two scenarios of nucleosynthesis will be presented below).

In Table 2, orange circles indicate elements whose mass number coincides with the number predicted by the formula for the genesis of elements (1) to within a few tenths. The larger the circle, the more accurate the match.

Table 2

ПЕРИОДИЧЕСКАЯ СИСТЕМА ХИМИЧЕСКИХ ЭЛЕМЕНТОВ Д. И. МЕНДЕЛЕЕВА

Свойства химических элементов, а также состав и свойства их соединений находятся в периодической зависимости от заряда атомных ядер

Электроотрицательность по эмпирической шкале →
Атомный номер →
Степени окисления в сложных веществах → 2345678
101,07 ← Относительная атомная масса
44 Ru ← Химический символ
РУТЕНИЙ ← Название элемента
← Характер кислородных соединений: основный амфотерный кислотный

s-элемент
p-элемент
d-элемент
f-элемент

	I A 1	II A 2	III B 3	IV B 4	V B 5	VI B 6	VII B 7	VIII B 8	9	10	I B 11	II B 12	III A 13	IV A 14	V A 15	VI A 16	VII A 17	VIII A 18
1	1,008 1 H ВОДОРОД																	4,00260 2 He ГЕЛИЙ
2	6,94 3 Li ЛИТИЙ	9,01218 4 Be БЕРИЛЛИЙ											10,81 5 B БОР	12,011 6 C УГЛЕРОД ●	14,007 7 N АЗОТ ●	15,999 8 O КИСЛОРОД ●	18,9984 9 F ФТОР ●	20,1797 10 Ne НЕОН ●
3	22,9898 11 Na НАТРИЙ	24,305 12 Mg МАГНИЙ ●											26,9815 13 Al АЛЮМИНИЙ	28,085 14 Si КРЕМНИЙ ●	30,9738 15 P ФОСФОР	32,06 16 S СЕРА ●	35,45 17 Cl ХЛОР ●	39,948 18 Ar АРГОН
4	39,0983 19 K КАЛИЙ ●	40,078 20 Ca КАЛЬЦИЙ	44,9559 21 Sc СКАНДИЙ ●	47,867 22 Ti ТИТАН ●	50,9415 23 V ВАНАДИЙ ●	51,9961 24 Cr ХРОМ	54,9380 25 Mn МАРГАНЕЦ	55,845 26 Fe ЖЕЛЕЗО ●	58,9332 27 Co КОБАЛЬТ ●	58,6934 28 Ni НИКЕЛЬ ●	63,546 29 Cu МЕДЬ ●	65,38 30 Zn ЦИНК	69,723 31 Ga ГАЛЛИЙ ●	72,63 32 Ge ГЕРМАНИЙ ●	74,9216 33 As МЫШЬЯК	78,971 34 Se СЕЛЕН	79,904 35 Br БРОМ ●	83,798 36 Kr КРИПТОН
5	85,4678 37 Rb РУБИДИЙ ●	87,62 38 Sr СТРОНЦИЙ ●	88,9058 39 Y ИТТРИЙ ●	91,224 40 Zr ЦИРКОНИЙ ●	92,9064 41 Nb НИОБИЙ	95,95 42 Mo МОЛИБДЕН ●	[98] 43 Tc ТЕХНЕЦИЙ ●	101,07 44 Ru РУТЕНИЙ	102,906 45 Rh РОДИЙ ●	106,42 46 Pd ПАЛЛАДИЙ ●	107,868 47 Ag СЕРЕБРО	112,414 48 Cd КАДМИЙ ●	114,818 49 In ИНДИЙ ●	118,710 50 Sn ОЛОВО ●	121,760 51 Sb СУРЬМА	127,60 52 Te ТЕЛЛУР ●	126,904 53 I ИОД ●	131,293 54 Xe КСЕНОН ●
6	132,905 55 Cs ЦЕЗИЙ ●	137,327 56 Ba БАРИЙ ●	* 174,967 71 Lu ЛЮТЕЦИЙ ●	178,49 72 Hf ГАФНИЙ ●	180,948 73 Ta ТАНТАЛ ●	183,84 74 W ВОЛЬФРАМ ●	186,207 75 Re РЕНИЙ ●	190,23 76 Os ОСМИЙ ●	192,217 77 Ir ИРИДИЙ ●	195,084 78 Pt ПЛАТИНА ●	196,967 79 Au ЗОЛОТО ●	200,592 80 Hg РТУТЬ ●	204,38 81 Tl ТАЛЛИЙ ●	207,2 82 Pb СВИНЕЦ ●	208,980 83 Bi ВИСМУТ ●	[209] 84 Po ПОЛОНИЙ ●	[210] 85 At АСТАТ	[222] 86 Rn РАДОН ●
7	[223] 87 Fr ФРАНЦИЙ ●	[226] 88 Ra РАДИЙ	** [266] 103 Lr ЛОУРЕНСИЙ ●	[267] 104 Rf РЕЗЕРФОРДИЙ ●	[268] 105 Db ДУБНИЙ ●	[272] 106 Sg СИБОРГИЙ	[278] 107 Bh БОРИЙ ●	[276] 108 Hs ХАССИЙ ●	[282] 109 Mt МЕЙТНЕРИЙ	[281] 110 Ds ДАРМШТАДТИЙ ●	[286] 111 Rg РЕНТГЕНИЙ ●	[285] 112 Cn КОПЕРНИЦИЙ	[290] 113 Nh НИХОНИЙ	[289] 114 Fl ФЛЁРОВИЙ ●	[289] 115 Mc МОСКОВИЙ ●	[293] 116 Lv ЛИВЕРМОРИЙ ●	[294] 117 Ts ТЕННЕССИН ●	[295] 118 Og ОГАНЕСОН

* ЛАНТАНОИДЫ	138,905 57 La ЛАНТАН ●	140,116 58 Ce ЦЕРИЙ	140,908 59 Pr ПРАЗЕОДИМ ●	144,242 60 Nd НЕОДИМ	[145] 61 Pm ПРОМЕТИЙ ●	150,36 62 Sm САМАРИЙ ●	151,964 63 Eu ЕВРОПИЙ ●	157,25 64 Gd ГАДОЛИНИЙ ●	158,925 65 Tb ТЕРБИЙ ●	162,500 66 Dy ДИСПРОЗИЙ ●	164,930 67 Ho ГОЛЬМИЙ ●	167,259 68 Er ЭРБИЙ ●	168,934 69 Tm ТУЛИЙ ●	173,054 70 Yb ИТТЕРБИЙ ●
** АКТИНОИДЫ	[227] 89 Ac АКТИНИЙ ●	232,038 90 Th ТОРИЙ ●	231,036 91 Pa ПРОТАКТИНИЙ	238,029 92 U УРАН	[237] 93 Np НЕПТУНИЙ ●	[244] 94 Pu ПЛУТОНИЙ ●	[243] 95 Am АМЕРИЦИЙ	[247] 96 Cm КЮРИЙ ●	[247] 97 Bk БЕРКЛИЙ ●	[251] 98 Cf КАЛИФОРНИЙ ●	[252] 99 Es ЭЙНШТЕЙНИЙ ●	[257] 100 Fm ФЕРМИЙ	[258] 101 Md МЕНДЕЛЕВИЙ ●	[259] 102 No НОБЕЛИЙ ●

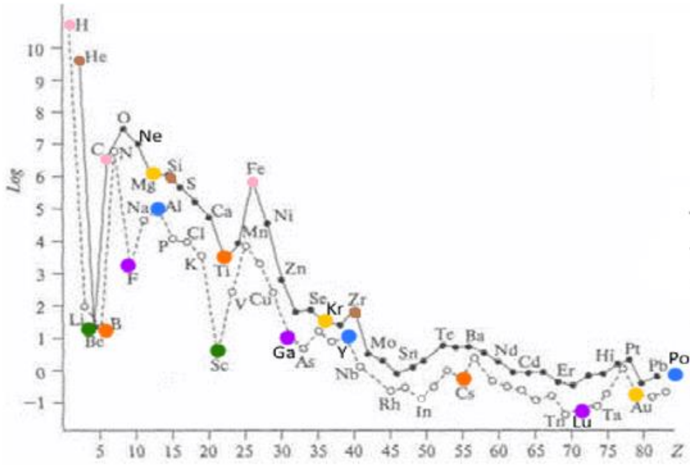
As you can see, almost all elements of the periodic table are marked! The initial elements from hydrogen to boron are not marked with dots because there are no nucleons inside their nuclei, and all their nucleons are a shell. 4 elements: **C, N, O, F**- have one nucleon inside. Our formula (1) at **x = 1** shows **A = 15.08**. If we determine the average mass of the nuclei of all these elements, then we get **A = 15.25**.

$$\frac{\boxed{\substack{12{,}011\\ \mathrm{C}\\ \text{УГЛЕРОД}}} + \boxed{\substack{14{,}007\\ \mathrm{N}\\ \text{АЗОТ}}} + \boxed{\substack{15{,}999\\ \mathrm{O}\\ \text{КИСЛОРОД}}} + \boxed{\substack{18{,}9984\\ \mathrm{F}\\ \text{ФТОР}}}}{4} = 15.25$$

$$0.7\cdot\left(\sqrt[3]{1/0.7} + 1.656\right)^3 = 15.08$$

The coincidence is incomplete, but considering the actual variety of shells with only one nucleon inside, it is quite good.

As another confirmation of the correctness of this hypothesis, let us consider the graph of the abundance of chemical elements in nature.



– beryllium Be^{0}_{9}, scandium Sc^{9}_{45};
– hydrogen H^{0}_{1}, carbon C^{1}_{13}, iron Fe^{13}_{56};
– fluorine F^{1}_{19}, gallium Ga^{19}_{71}, lutetium Lu^{71}_{175};
– boron B^{0}_{10}, titanium Ti^{10}_{48}, cesium Cs^{19}_{71};
– aluminum Al^{3}_{27}, yttrium Y^{27}_{89}, polonium Po^{89}_{209};
– magnesium Mg^{3}_{24}, krypton Kr^{24}_{82}, gold Au^{82}_{197};
– helium He^{0}_{4}, silicon Si^{4}_{28}, zirconium Zr^{28}_{90}.

Fig.7

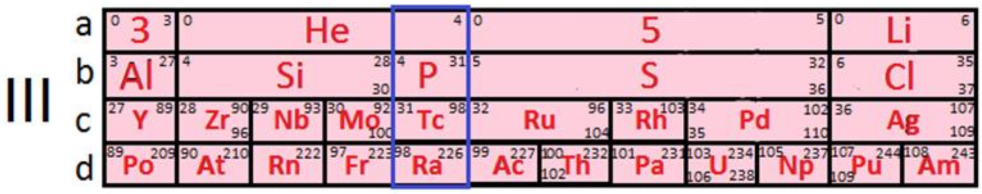
On the graph, sharp jumps in the abundance of some elements are striking.
Steep dips for beryllium **Be** $^{0}_{9}$ and scandium **Sc** $^{9}_{45}$ clearly visible. Or bursts - for aluminum **Al** $^{3}_{27}$,iron **Fe** $^{13}_{56}$ zirconium **Zr** $^{28}_{90}$. In these designations, the number of nucleons inside the shell of the nucleus is indicated at the top right of the element, and its atomic mass (total number of nucleons) is indicated at the bottom. We can say that beryllium with 9 nucleons is inside the scandium shell. This explains the low prevalence of scandium: after all, its ancestor, beryllium, was also a rarity in nature.

The following chains of elements, shown to the right of the graph, were formed in a similar way.

Based on all of the above, a new periodic table of chemical elements is presented to your attention, which shows the relationship of the elements, their historical origin of one from the other (Table 4).

Related elements, directly descended from one another, are located in the same vertical column of 4 elements.
For example, in the **5**th group (column) of the **III** (pink) period, 4 nucleons of the helium nucleus **He**, being covered with a lay of nucleons, form a phosphorus **P** nucleus, which, being covered with a lay of nucleons, turns into technetium **Tc**, and then into radium **Ra**.

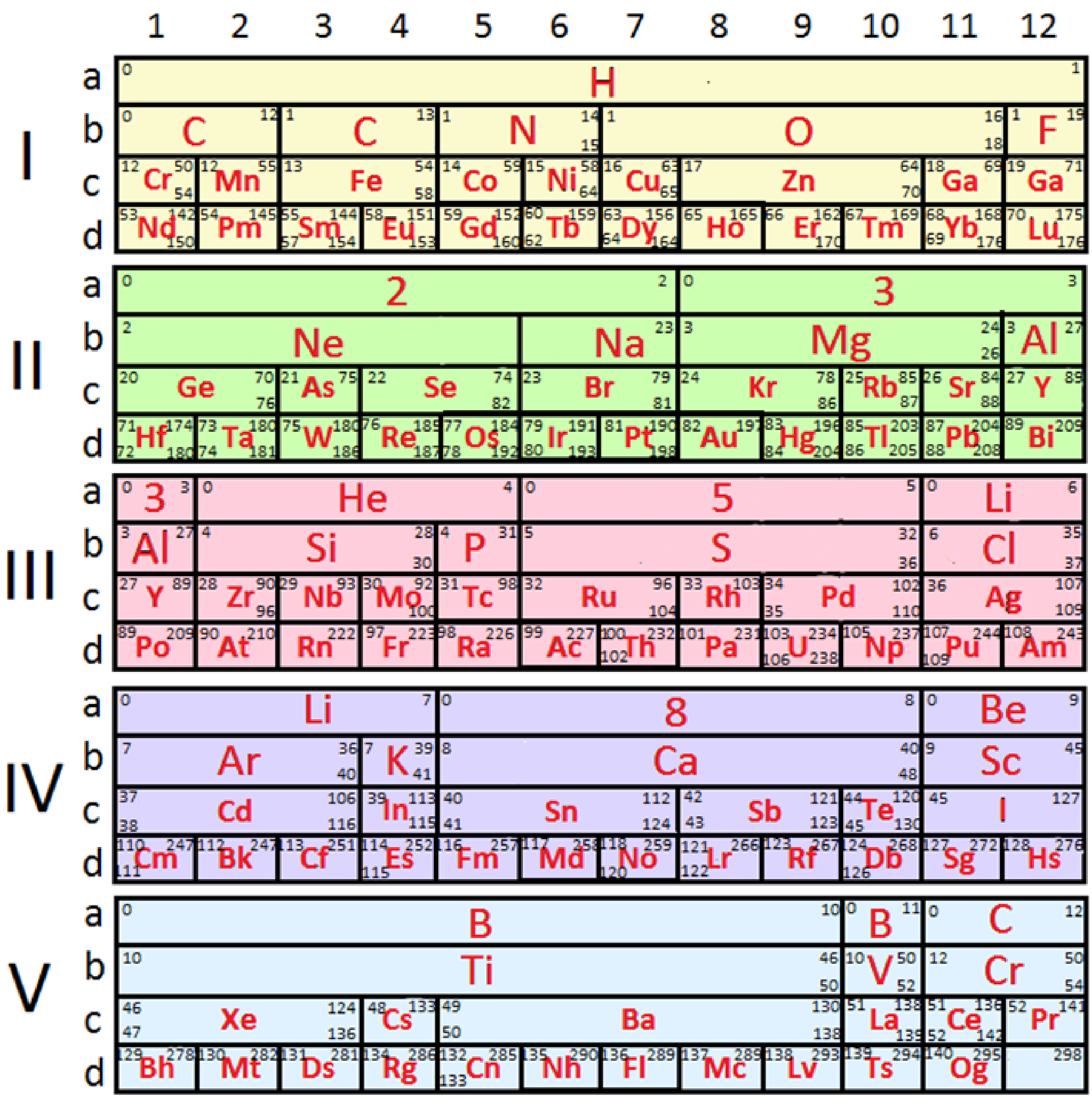
Table 3



III	a	0 3 3	0 He 4				0 5 5						0 Li 6
	b	3 Al 27	4 Si 28 30			4 P 31	5 S 32 36						6 Cl 35 37
	c	27 Y 89	28 Zr 90 96	29 Nb 93	30 Mo 92 100	31 Tc 98	32 Ru 96 104		33 Rh 103	34 Pd 102 35 110		36 Ag 107 109	
	d	89 Po 209	90 At 210	Rn 222	97 Fr 223	98 Ra 226	99 Ac 227	100 Th 232 102	101 Pa 231	103 U 234 106 238	105 Np 237	107 Pu 244 109	108 Am 243

In this table 4 there are elements designated by the numbers **2, 3, 5, 8** - this is their atomic mass, the number of nucleons in their nuclei. Now there are none in nature, but during the primary nucleosynthesis they appeared for a short time, turning (after a new layer of nucleons grew on them) into heavier elements, and therefore have every right to be present in our table of the genesis of elements as the founding fathers of a large set of elements.
You need to read table 4 like a book: from left to right, from top to bottom. First, the first lines (**a**) of all color block-periods are viewed (from the 1st to the 12th column of the time zone), then the second lines (**b**), then the third lines (**c**), and finally the fourth lines (**d**).

Table 4

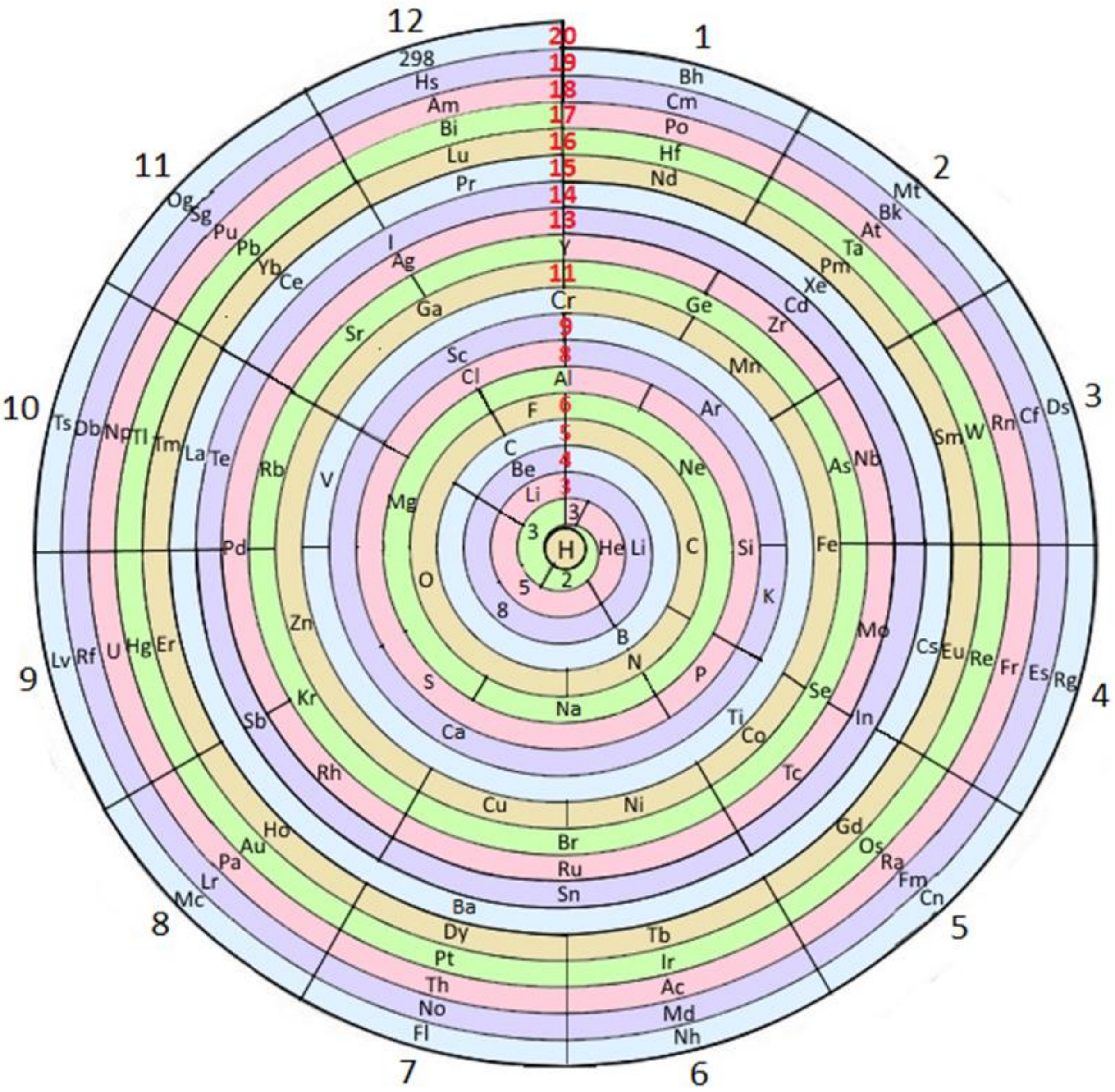


		1	2	3	4	5	6	7	8	9	10	11	12
I	a	0 H 1											
	b	0 C 12		1 C 13		1 N 14 15		1 O 16 18					1 F 19
	c	12 Cr 50 54	12 Mn 55	13 Fe 54 58		14 Co 59	15 Ni 58 64	16 Cu 63 65	17 Zn 64 70			18 Ga 69	19 Ga 71
	d	53 Nd 142 150	54 Pm 145	55 Sm 144 57 154	58 Eu 151 153	59 Gd 152 160	60 Tb 159 62	63 Dy 156 64 164	65 Ho 165	66 Er 162 170	67 Tm 169	68 Yb 168 69 176	70 Lu 175 176
II	a	0 2 2							0 3 3				
	b	2 Ne					Na 23		3 Mg 24 26				3 Al 27
	c	20 Ge 70 76		21 As 75	22 Se 74 82		23 Br 79 81		24 Kr 78 86		25 Rb 85 87	26 Sr 84 88	27 Y 89
	d	71 Hf 174 72 180	73 Ta 180 74 181	75 W 180 186	76 Re 185 187	77 Os 184 78 192	79 Ir 191 80 193	81 Pt 190 198	82 Au 197	83 Hg 196 84 204	85 Tl 203 86 205	87 Pb 204 88 208	89 Bi 209
III	a	0 3 3	0 He 4				0 5 5					0 Li 6	
	b	3 Al 27	4 Si 28 30			4 P 31	5 S 32 36					6 Cl 35 37	
	c	27 Y 89	28 Zr 90 96	29 Nb 93	30 Mo 92 100	31 Tc 98	32 Ru 96 104		33 Rh 103	34 Pd 102 35 110		36 Ag 107 109	
	d	89 Po 209	90 At 210	Rn 222	97 Fr 223	98 Ra 226	99 Ac 227	100 Th 232 102	101 Pa 231	103 U 234 106 238	105 Np 237	107 Pu 244 109	108 Am 243
IV	a	0 Li 7				0 8 8						0 Be 9	
	b	7 Ar 36 40			7 K 39 41	8 Ca 40 48						9 Sc 45	
	c	37 Cd 106 38 116			39 In 113 115	40 Sn 112 41 124			42 Sb 121 43 123		44 Te 120 45 130	45 I 127	
	d	110 Cm 247 111	112 Bk 247	113 Cf 251	114 Es 252 115	116 Fm 257	117 Md 258	118 No 259 120	121 Lr 266 122	123 Rf 267	124 Db 268 126	127 Sg 272	128 Hs 276
V	a	0 B 10									0 B 11	0 C 12	
	b	10 Ti 46 50									10 V 50 52	12 Cr 50 54	
	c	46 Xe 124 47 136			48 Cs 133	49 Ba 130 50 138					51 La 138 139	51 Ce 136 52 142	52 Pr 141
	d	129 Bh 278	130 Mt 282	131 Ds 281	134 Rg 286	132 Cn 285 133	135 Nh 290	136 Fl 289	137 Mc 289	138 Lv 293	139 Ts 294	140 Og 295	298

number of nucleons from- 55 Sm 144 - from total number of nucleons
inside the nucleus to- 57 154 - to in the nucleus

The same table can be represented as a spiral, dialectically unfolding from the brick of the universe – hydrogen.

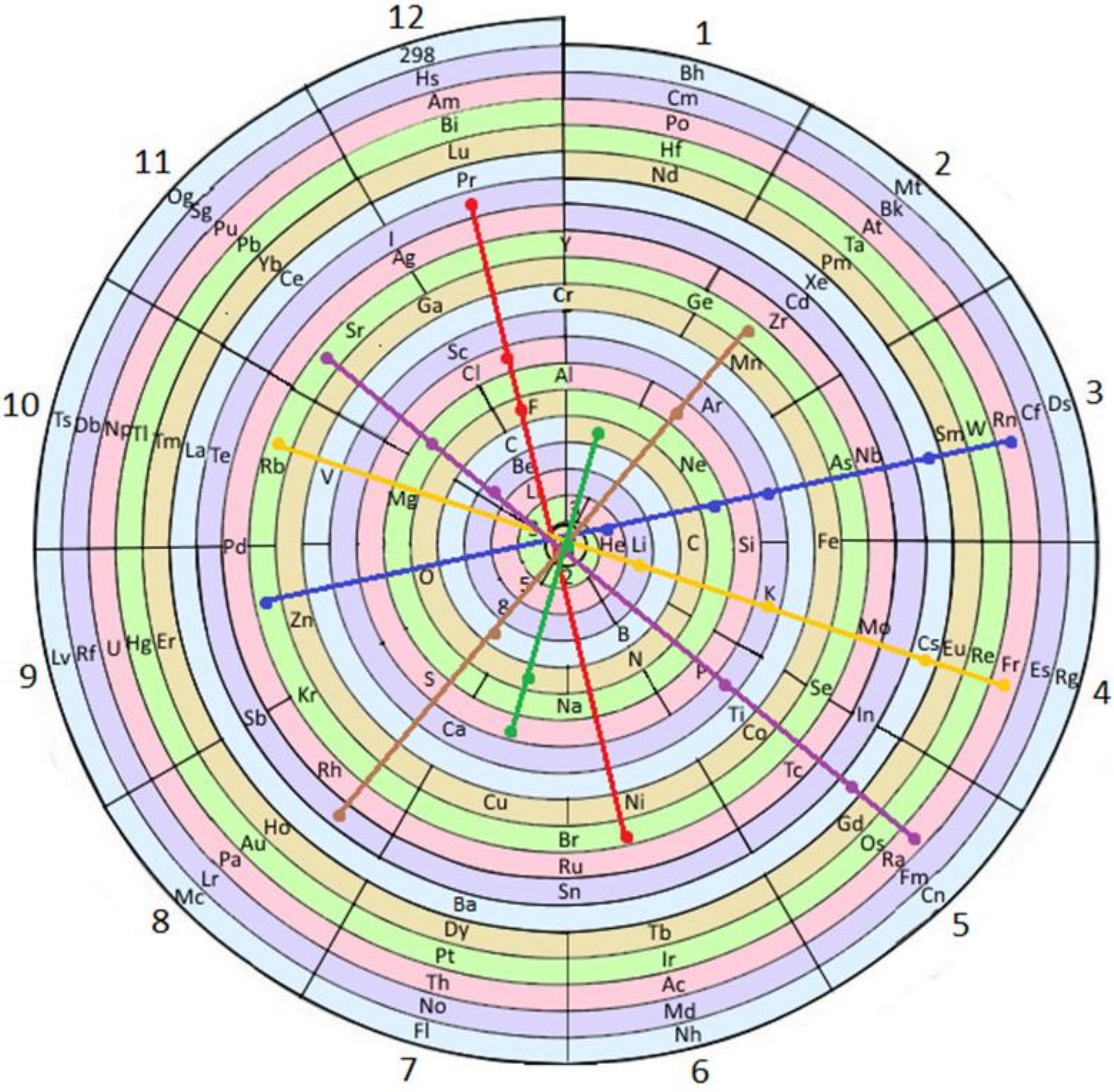
Table 5



Each element of this "spiral galaxy" has its own polar coordinates: the hour sector-group (from 1 to 12) and the number of the spiral turn - the period (marked in red from 1 to 20). For example, gold in this system is designated as **Au 8-17**.

This spiral table combines both the table of origin of the elements and the periodic table of properties of the elements. It contains elements similar in properties - families (it is not for nothing that chemists called them that!). They are located not only in one group, but also in the opposite (plus 6 "hours") group, so to speak, along the diameter of the table.

Table 6

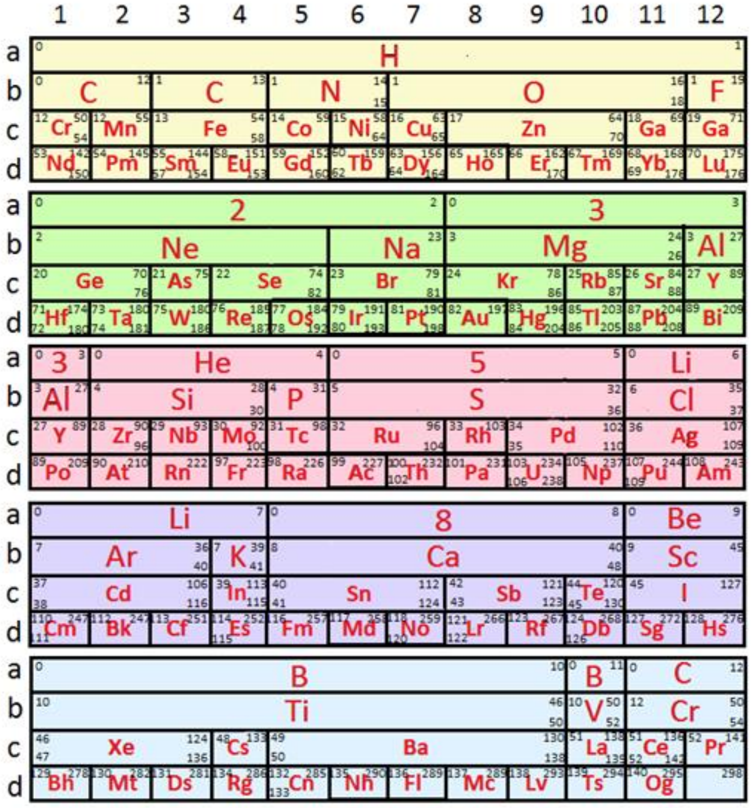


Alkalai metals (yellow-line): **Li, K, Ru, Cs, Fr** - are in **4-10** groups.
Alkaline earth metals (purple-line): **Be, Mg, Ca, Sr, Ba, Ra** - in the **5-11** groups. Metalloids (brown-line): **B, Si, Ge, Sb** - in the **2-8** groups.
Other non-metals (green-line): **H, C, O, S** - in **1-7**
Halogens (red-line): **F, Cl, Br, I** - in the **6-12** groups.
Noble gases (blue-line): **He, Ne, Ar, Kr, Xe, Rn** - in the **3-9** groups.

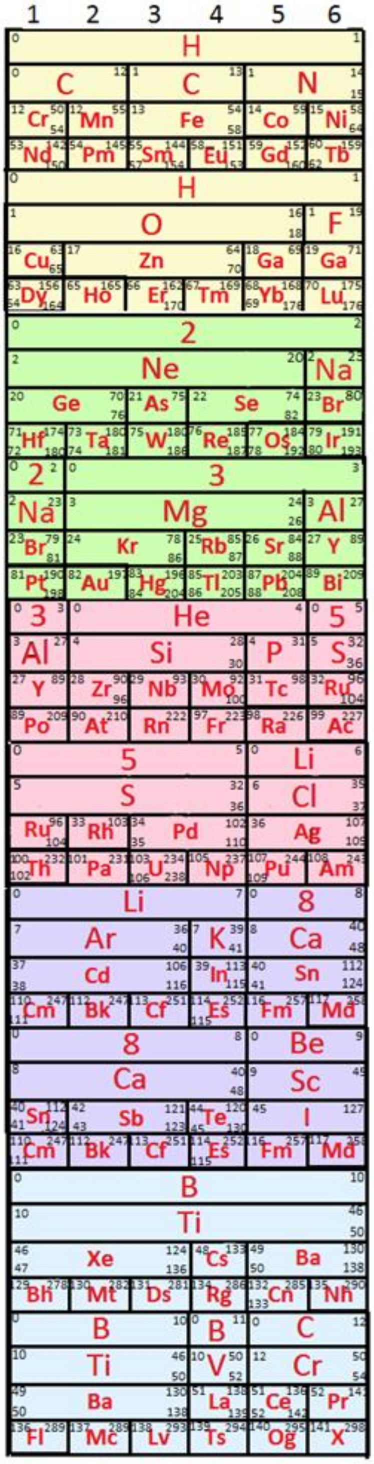
From the trinity of magnetic elements: iron **Fe**, nickel **Ni** and cobalt **Co**, paramagnets such as neodymium Nd and samarium Sm are derived.

It can be seen that the lanthanides (beige ring) come from metals (the same beige ring) of the **4th** period of the periodic table, and actinides (pink ring) come from metals (the same pink ring) of the **5th** period of the periodic table. And you don't need to take them out of the table of elements anywhere! In the new Table 5, they are simply placed under their predecessors.

Such, along the diameter, arrangement of elements similar in properties indicates the presence not so much of a 12-fold periodicity of their properties, but of a 6-fold one. The visual presentation of such a table causes certain difficulties (it will be a narrow, high column), but, nevertheless, we will present it.



		1	2	3	4	5	6	7	8	9	10	11	12
I	a	H											
	b	C		C		N		O					F
	c	Cr	Mn	Fe		Co	Ni	Cu	Zn			Ga	Ga
	d	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
II	a	2							3				
	b	Ne					Na		Mg				Al
	c	Ge		As	Se		Br		Kr		Rb	Sr	Y
	d	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi
III	a	3	He				5					Li	
	b	Al	Si			P	S					Cl	
	c	Y	Zr	Nb	Mo	Tc	Ru		Rh	Pd		Ag	
	d	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am
IV	a	Li				8						Be	
	b	Ar			K	Ca						Sc	
	c	Cd			In	Sn			Sb		Te	I	
	d	Cm	Bk	Cf	Es	Fm	Md	No	Lr	Rf	Db	Sg	Hs
V	a	B									B	C	
	b	Ti									V	Cr	
	c	Xe			Cs	Ba					La	Ce	Pr
	d	Bh	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og	



1	2	3	4	5	6
H					
C		C		N	
Cr	Mn	Fe		Co	Ni
Nd	Pm	Sm	Eu	Gd	Tb
H					
O					F
Cu	Zn			Ga	Ga
Dy	Ho	Er	Tm	Yb	Lu
2					
Ne					Na
Ge		As	Se		Br
Hf	Ta	W	Re	Os	Ir
2	3				
Na	Mg				Al
Br	Kr		Rb	Sr	Y
Pt	Au	Hg	Tl	Pb	Bi
3	He				5
Al	Si			P	S
Y	Zr	Nb	Mo	Tc	Ru
Po	At	Rn	Fr	Ra	Ac
5				Li	
S				Cl	
Ru	Rh	Pd		Ag	
Th	Pa	U	Np	Pu	Am
Li				8	
Ar			K	Ca	
Cd			In	Sn	
Cm	Bk	Cf	Es	Fm	Md
8				Be	
Ca				Sc	
Sn	Sb		Te	I	
Cm	Bk	Cf	Es	Fm	Md
B					
Ti					
Xe			Cs	Ba	
Bh	Mt	Ds	Rg	Cn	Nh
B			B	C	
Ti			V	Cr	
Ba			La	Ce	Pr
Fl	Mc	Lv	Ts	Og	X

In this interpretation, 6 families of chemical elements are located in one of the 6 columns of the table. If we now imagine this narrow table in a spiral form, then there will be twice as many turns of the spiral in it, which will worsen its perception. Therefore, it is much more convenient to use Table 5.

Some features and regularity

The nuclei of the first elements of the periodic table up to carbon inside the shell do not have a single nucleon, that is, all nucleons lie on the surface. Carbon C_{12} turned out to be just a perfect spherical shell.

In this case, a cavity remains inside the shell of the C_{12} carbon nucleus, the dimensions of which are suitable for just one nucleon. And for carbon C_{13}, this cavity is already filled by a nucleon (red colour).

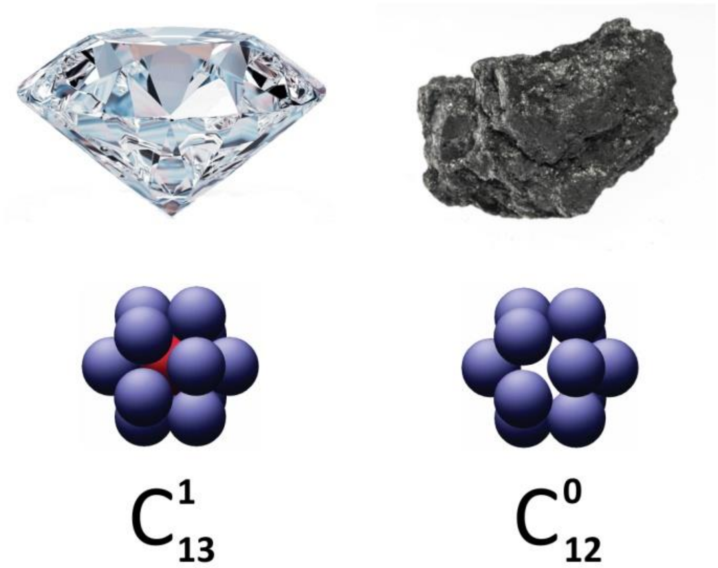


Fig.8

Perhaps this is precisely the difference between two forms of the same element - carbon: brittle graphite C_{12}^{0} and hard diamond C_{13}^{1}!

We continue our ascent according to the periodic table. All subsequent elements of the first period of the periodic table have only one nucleon inside the nucleus. But, look what these elements are. Carbon, nitrogen, oxygen, fluorine - together with the hydrogen inside these elements ("red nucleon"), forms the basis of the entire organic world!

Starting from carbon C_{13}^{1}, the nuclei will now have an outer shell and an inner filling, the ratio between which determines the transition to the next element.

We note an extraordinary surge in the abundance of iron in nature (Fig.9).

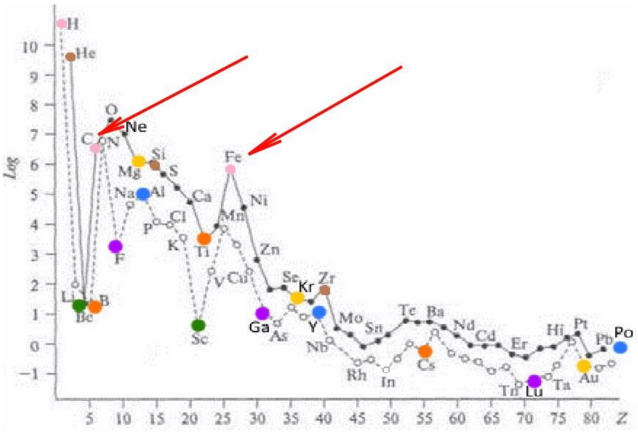


Fig.9

This is due to the fact that there are 13 nucleons inside its shell. Yes, a kind of diamond inside! Carbon, after all, is an extremely common element.

But the neighbor of iron - manganese **Mn** has 12 nucleons inside (respectively, with a void inside them). Therefore, like graphite, it is fragile.

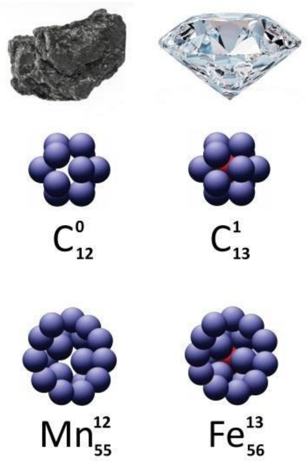
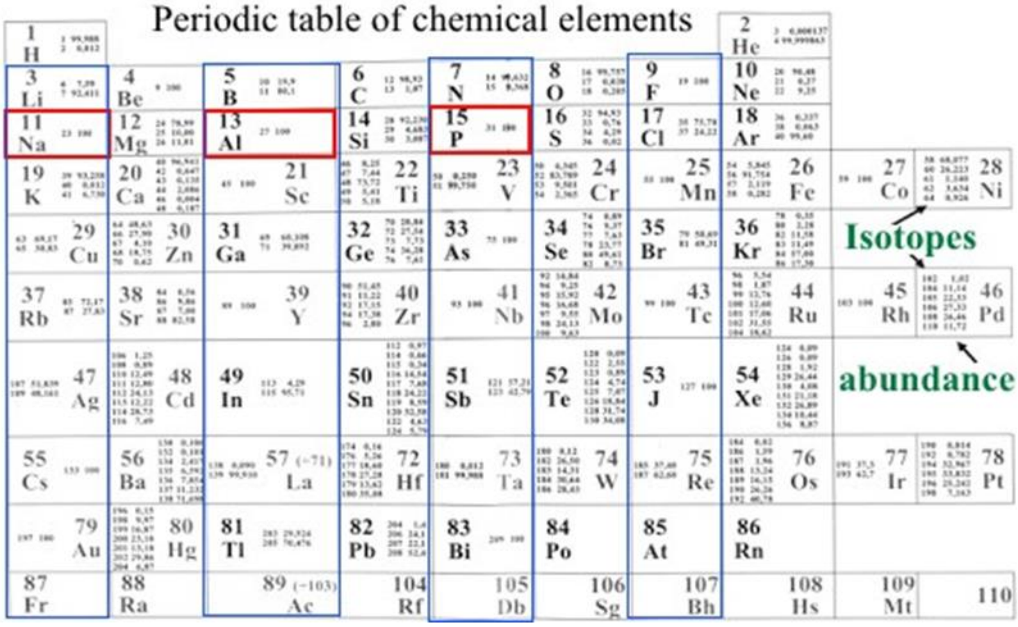


Fig.10

In addition, this little void makes manganese uniquely different from its nearest neighbor. It has approximately **15**! times lower thermal conductivity, **20** (!) Times lower electrical conductivity, **50** % lower melting point, **20** % lower electronegativity and **10** % higher specific heat. And this despite the fact that the usual deviations of the parameters of neighboring elements are ten times less!

If you look at the isotope Table 9 or Fig. 9, you will see that elements with good sphericity and nuclear packing: **Na, Al, P** ... - have practically no isotopes and are located in odd groups of the periodic table.

Table 7



Periodic table of chemical elements

1 H							2 He		
3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne		
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar		
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni
29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr		
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd
47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 J	54 Xe		
55 Cs	56 Ba	57 (-71) La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt
79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn		
87 Fr	88 Ra	89 (-103) Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110

At the same time, elements with stacking faults have several isotopes and are located in even groups of the table. The abundance of odd elements in nature (dashed line in Fig. 7) is less than even (solid line), which is understandable: the ideal is less common.