There Are Only 92 stable elements in Nature

Jiang Chun-xuan

P. O. Box 142-206, Beijing 100854, P. R. China
jcxxxx@163.com

Abstract

Using the stable number theory[3] we obtain the best electron configurations of the elements and prove that there are only 92 stable elements in nature.

[Jiang Chun-xuan. **There Are Only 92 stable elements in Nature.** *Academ Arena* 2017;9(11):71-80]. ISSN 1553-992X (print); ISSN 2158-771X (online). http://www.sciencepub.net/academia. 9. doi:10.7537/marsaaj091117.09.

Keywords: 92 stable elements, Nature

In studying the stability of the many-body problem we suggest two principles [1-9].

(1) The prime number principle. A prime number is irreducible in the integers, it seems therefore natural to associate it with the most stable subsystem. We prove that 1, 3, 5, 7, 11, 23, 47 are the most stable primes.

(2) The symmetric principle. The most stable configuration of two prime numbers is then stable symmetric system in nature. We prove that 2, 4, 6, 10, 14, 22, 46, 94 are the most stable even numbers. The stability can be defined as long life and existence in nature, and instability as short life or non-existence in nature.

In this paper by using the prime number principle and the symmetric principle we make the new electron configurations of the elements. Total quantum number n and orbital quantum number l determine the new electron configurations of the elements

Electron shells: $n=1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6...$
$K \quad L \quad M \quad N \quad O \quad P...$

Electron subshells: $2(2l+1)=2 \quad 6 \quad 10 \quad 14 \quad 18 \quad 22...$
$s \quad p \quad d \quad f \quad g \quad h...$

An atomic subshell that contains its full quota of electrons is said to be closed. A closed s subsell $(l=0)$ holds two electrons, a closed p subshed $(l=1)$ six electrons, a closed d subshell $(l=2)$ ten electrons, a closed f subshell $(l=3)$ fourteen electrons, these subshells are the most stable, a closed g subshell $(l=4)$ eighteen electrons is the most unstable. Using the symmetric principle it has been proved the $2(2l+1)=2,6,10$ and 14 are stable and $2(2l+1)=18$ is unstable. The $s, p.d$, and f subshells are stable and the g subshell is unstable.

Table 1 shows the best electron configurations of the elements. From 1 to 92 of the atomic numbers every subshell is stable. It has been proved that the last stable element that occurs naturally is uranium with an atomic number of 92 and there are only 92 stable elements in nature. Since $5g$ subshell is unstable, the elements 93-110 are unstable. Since $5g$ is unstable, $6s, bp, 6d, 6f, 6g$ and $6h$ subshells are unstable. Therefore the elements 111-182 are unstable.

Many of the chemical and physical properties of the elements are related to the number of electrons in the outermost shell, the electrons that are valence electrons in these atoms. In table 1 there are correct valence electron configurations of the elements. In Mendeleev periodic table the elements (1-18, 29-36 and 46) have correct valence electron configurations and the elements (19-28, 37-45 and 47-92) have wrong valence electron configurations. Ionization of orbitals cannot determine valence electrons.Therefore Mendeleev periodic table of elements is wrong.

Using the 1s,2s,3s,4s and 5s of table 1 we make the best periodic table of elements with five periods.Table 2 shows the relationship between the outermost subshell electron configurations and the best periodic table. The best periodic table reflects the order in which atomic orbitals are filled.The s orbitals are filled in the two rows.The p orbitals are filled in the six rows.The d orbitals are filled in the ten rows.The f orbitals are filled in the fourteen rows.The g orbitals are filled in the eighteen rows.

Conclusion. In table 1 s, p, d and f are stable subshells. Therefore the elements 1 to 92 are stable. In table 1 $5g$ is the unstable subshell. Therefore the elements 93 to 110 are unstable. The best periodic table is correct. But Mendeleev periodic table is wrong.Using the tables 1 and 2 chemists study the chemical properties of the elements 1 to 92 and discover many of the new chemical compounds. Pythagoras believes that all things are numbers. But Jiang believes that all things are stable numbers [1-9].

人类找到元素最佳周期表，门捷列夫周期表是错的。

这是人类第一次用数论证明并给出新元素电子结构和正确价电子结构，这是化学基础.化学家研究新元素电子结构将会发现很多新化合物。门捷列夫元素周期表是错的,元素1-18,用实验证明价电子是正确的，估算元素29-36和46价电子是正确的，但其它元素价电子是不正确的，元素没有周期性。目前化学研究是猜想没有理论指导。本文是蒋春暄1981年提出”素数原理和对称原理”两个原理一个应用。化学是计算问题. 只能用正确价电子才能找到新化合物。本文给化学和生物化学提供一个理论基础。首先理论计算而后在实验室可找到这种化合物和生物结构. 人类研究结果自然界只有92种元素，所有科学家对这个问题一筹莫展，本文用非常简单方法就证明了自然界只有92种元素，其它元素都是人造的. 所以这种证明是正确的. 化学理论要重新改写. 本文已在国外上网，这应该是”十八大”最大成果，我最近才知valence electrons的重要性，所以重写本文. 元素电子排列应该是连续的，门捷列夫周期表中电子排列不是连续的，对元素>18核外电子排列按周期性排列是跳跃式排列，中间留下断层，他们也知道5g和6g是不稳定的,排列元素电子不用5g和6g，但元素电子排列利用不稳定6s,6p,6d,7s,... 这是错误的. 这个问题延续到今天仍是这样. 房子只能一层一层的建，

保证每层都稳是才行。第五层不稳定,那末第六层也是不稳定的，这道理大家都明白。我们证明 5g 是不稳定的,所以元素 93-110 是不稳定的，所以 6s,6p,6d,6f,6g,6h 是不稳定的，以后元素更不稳定的. 我们证明自然界只有 92 种稳定元素是绝对正确的。

Table 1. The Best Electron Configuration of the Elements

Z	Sym	*K*	*L*		*M*			*N*				*O*				
		1*s*	2*s*	2*p*	3*s*	3*p*	3*d*	4s	4p	4d	4f	5s	5p	5d	5f	5g
1	H	1														
2	He	2														
3	Li	2	1													
4	Be	2	2													
5	B	2	2	1												
6	C	2	2	2												
7	N	2	2	3												
8	O	2	2	4												
9	F	2	2	5												
10	Ne	2	2	6												
11	Na	2	2	6	1											
12	Mg	2	2	6	2											
13	Al	2	2	6	2	1										
14	Si	2	2	6	2	2										
15	P	2	2	6	2	3										
16	S	2	2	6	2	4										
17	Cl	2	2	6	2	5										
18	Ar	2	2	6	2	6										
19	K	2	2	6	2	6	1									
20	Ca	2	2	6	2	6	2									
21	Sc	2	2	6	2	6	3									
22	Ti	2	2	6	2	6	4									
23	V	2	2	6	2	6	5									
24	Cr	2	2	6	2	6	6									
25	Mn	2	2	6	2	6	7									
26	Fe	2	2	6	2	6	8									
27	Co	2	2	6	2	6	9									
28	Ni	2	2	6	2	6	10									
29	Cu	2	2	6	2	6	10	1								
30	Zn	2	2	6	2	6	10	2								
31	Ga	2	2	6	2	6	10	2	1							
32	Ge	2	2	6	2	6	10	2	2							
33	As	2	2	6	2	6	10	2	3							
34	Se	2	2	6	2	6	10	2	4							
35	Br	2	2	6	2	6	10	2	5							
36	Kr	2	2	6	2	6	10	2	6							
37	Rb	2	2	6	2	6	10	2	6	1						
38	Sr	2	2	6	2	6	10	2	6	2						
39	Y	2	2	6	2	6	10	2	6	3						
40	Zr	2	2	6	2	6	10	2	6	4						
41	Nb	2	2	6	2	6	10	2	6	5						
42	Mo	2	2	6	2	6	10	2	6	6						
43	Tc	2	2	6	2	6	10	2	6	7						
44	Ru	2	2	6	2	6	10	2	6	8						
45	Rh	2	2	6	2	6	10	2	6	9						
46	Pd	2	2	6	2	6	10	2	6	10						

Table 1. (Continued)

Z	Sym	*K*	*L*		*M*			*N*				*O*				
		1*s*	2*s*	2*p*	3*s*	3*p*	3*d*	4s	4p	4d	4f	5s	5p	5d	5f	5g
47	Ag	2	2	6	2	6	10	2	6	10	1					
48	Cd	2	2	6	2	6	10	2	6	10	2					
49	In	2	2	6	2	6	10	2	6	10	3					
50	Sn	2	2	6	2	6	10	2	6	10	4					
51	Sb	2	2	6	2	6	10	2	6	10	5					
52	Te	2	2	6	2	6	10	2	6	10	6					
53	I	2	2	6	2	6	10	2	6	10	7					
54	Xe	2	2	6	2	6	10	2	6	10	8					
55	Cs	2	2	6	2	6	10	2	6	10	9					
56	Ba	2	2	6	2	6	10	2	6	10	10					
57	La	2	2	6	2	6	10	2	6	10	11					
58	Ce	2	2	6	2	6	10	2	6	10	12					
59	Pr	2	2	6	2	6	10	2	6	10	13					
60	Nd	2	2	6	2	6	10	2	6	10	14					
61	Pm	2	2	6	2	6	10	2	6	10	14	1				
62	Sm	2	2	6	2	6	10	2	6	10	14	2				
63	Eu	2	2	6	2	6	10	2	6	10	14	2	1			
64	Gd	2	2	6	2	6	10	2	6	10	14	2	2			
65	Tb	2	2	6	2	6	10	2	6	10	14	2	3			
66	Dy	2	2	6	2	6	10	2	6	10	14	2	4			
67	Ho	2	2	6	2	6	10	2	6	10	14	2	5			
68	Er	2	2	6	2	6	10	2	6	10	14	2	6			
69	Tm	2	2	6	2	6	10	2	6	10	14	2	6	1		
70	Yb	2	2	6	2	6	10	2	6	10	14	2	6	2		
71	Lu	2	2	6	2	6	10	2	6	10	14	2	6	3		
72	Hf	2	2	6	2	6	10	2	6	10	14	2	6	4		
73	Ta	2	2	6	2	6	10	2	6	10	14	2	6	5		
74	W	2	2	6	2	6	10	2	6	10	14	2	6	6		
75	Re	2	2	6	2	6	10	2	6	10	14	2	6	7		
76	Os	2	2	6	2	6	10	2	6	10	14	2	6	8		
77	Ir	2	2	6	2	6	10	2	6	10	14	2	6	9		
78	Pt	2	2	6	2	6	10	2	6	10	14	2	6	10		
79	Au	2	2	6	2	6	10	2	6	10	14	2	6	10	1	
80	Hg	2	2	6	2	6	10	2	6	10	14	2	6	10	2	
81	Tl	2	2	6	2	6	10	2	6	10	14	2	6	10	3	
82	Pb	2	2	6	2	6	10	2	6	10	14	2	6	10	4	
83	Bi	2	2	6	2	6	10	2	6	10	14	2	6	10	5	
84	Po	2	2	6	2	6	10	2	6	10	14	2	6	10	6	
85	At	2	2	6	2	6	10	2	6	10	14	2	6	10	7	
86	Rn	2	2	6	2	6	10	2	6	10	14	2	6	10	8	
87	Fr	2	2	6	2	6	10	2	6	10	14	2	6	10	9	
88	Ra	2	2	6	2	6	10	2	6	10	14	2	6	10	10	
89	Ac	2	2	6	2	6	10	2	6	10	14	2	6	10	11	
90	Th	2	2	6	2	6	10	2	6	10	14	2	6	10	12	
91	Pa	2	2	6	2	6	10	2	6	10	14	2	6	10	13	
92	U	2	2	6	2	6	10	2	6	10	14	2	6	10	14	

Table 1.(Continued)

Z	Sym	*K*	*L*		*M*			*N*				*O*				
		1*s*	2*s*	2*p*	3*s*	3*p*	3*d*	4s	4p	4d	4f	5s	5p	5d	5f	5g
93	Np	2	2	6	2	6	10	2	6	10	14	2	6	10	14	1
94	Pu	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2
95	Am	2	2	6	2	6	10	2	6	10	14	2	6	10	14	3
96	Cm	2	2	6	2	6	10	2	6	10	14	2	6	10	14	4
97	Bk	2	2	6	2	6	10	2	6	10	14	2	6	10	14	5
98	Cf	2	2	6	2	6	10	2	6	10	14	2	6	10	14	6
99	Es	2	2	6	2	6	10	2	6	10	14	2	6	10	14	7
100	Fm	2	2	6	2	6	10	2	6	10	14	2	6	10	14	8
101	Md	2	2	6	2	6	10	2	6	10	14	2	6	10	14	9
102	No	2	2	6	2	6	10	2	6	10	14	2	6	10	14	10
103	Lr	2	2	6	2	6	10	2	6	10	14	2	6	10	14	11
104	Rf	2	2	6	2	6	10	2	6	10	14	2	6	10	14	12
105	Db	2	2	6	2	6	10	2	6	10	14	2	6	10	14	13
106	Sg	2	2	6	2	6	10	2	6	10	14	2	6	10	14	14
107	Bh	2	2	6	2	6	10	2	6	10	14	2	6	10	14	15
108	Hs	2	2	6	2	6	10	2	6	10	14	2	6	10	14	16
109	Mt	2	2	6	2	6	10	2	6	10	14	2	6	10	14	17
110	Ds	2	2	6	2	6	10	2	6	10	14	2	6	10	14	18

References

[1] Jiang, Chun-xuan. A new theory for many-body problem stabilities. (Chinese) Qian Kexue 1, 38-48 (1981).

[2] Jiang ,Chun-xuan. On the symmetries and the stabilities of $4n+2$ electron configurations of the elements. Phys. Lett. 73A, 385-386(1979).

[3] Jiang, Chun-xuan. The application of stable groups to biological structures. Acta Math. Sci. 5, 243-260(1985).

[4] Jiang, Chun-xuan. The prime principle in biology (Chinese), J. Biomath, 1, 123-125(1986).

[5] Jiang, Chun-xuan. A mathematical model for particle classification. Hadronic J. Supp. 2, 514-522(1986).

[6] Jiang, Chun-xuan. On the limit for the periodic table of the elements. Apeiron Vol. 5 Nr. 1-2, 21-24(1998).

[7] Jiang, Chun-xuan. Foundations of Santilli's isonumber theory Part 1. Algebras, Groups and Geometries. 15, 351-393 (1998).

[8] Jiang, Chun-xuan. Foundations of Santilli Isonumber Theory with applications to new cryptograms, Fermat's theorem and Goldbach's Conjecture.pp.85-88. Inter, Acad, Press. 2002. MR2004c:11001. http://www.i-b-r.org/docs/jiang.pdf

[9] Jiang, Chun-xuan. The prime principle and the symmetric principle in clusters and nanostructures.
http://vixra.org/pdf/1004.0043v1.pdf.

Table 3. WRONG MENDELEEV ELECTRONIC CONFIGURATION OF THE ELEMENTS

Num.	Symbol	K	L		M			N				O				P				Q	
1. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	7p
1	H	1																			
2	He	2																			
2. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	7p
3	Li	2	1																		
4	Be	2	2																		
5	B	2	2	1																	
6	C	2	2	2																	
7	N	2	2	3																	
8	O	2	2	4																	
9	F	2	2	5																	
10	Ne	2	2	6																	
3. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	7p
11	Na	2	2	6	1																
12	Mg	2	2	6	2																
13	Al	2	2	6	2	1															

14	Si	2	2	6	2	2															
15	P	2	2	6	2	3															
16	S	2	2	6	2	4															
17	Cl	2	2	6	2	5															
18	Ar	2	2	6	2	6															
4. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	
19	K	2	2	6	2	6	..	1													
20	Ca	2	2	6	2	6	..	2													
21	Sc	2	2	6	2	6	1	2													
22	Ti	2	2	6	2	6	2	2													
23	V	2	2	6	2	6	3	2													
24	Cr	2	2	6	2	6	5	1													
25	Mn	2	2	6	2	6	5	2													
26	Fe	2	2	6	2	6	6	2													
27	Co	2	2	6	2	6	7	2													
28	Ni	2	2	6	2	6	8	2													
29	Cu	2	2	6	2	6	10	1													
30	Zn	2	2	6	2	6	10	2													
31	Ga	2	2	6	2	6	10	2	1												
32	Ge	2	2	6	2	6	10	2	2												
33	As	2	2	6	2	6	10	2	3												
34	Se	2	2	6	2	6	10	2	4												
35	Br	2	2	6	2	6	10	2	5												
36	Kr	2	2	6	2	6	10	2	6												
5. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	7p
37	Rb	2	2	6	2	6	10	2	6	..	..	1									
38	Sr	2	2	6	2	6	10	2	6	..	..	2									
39	Y	2	2	6	2	6	10	2	6	1	..	2									
40	Zr	2	2	6	2	6	10	2	6	2	..	2									
41	Nb	2	2	6	2	6	10	2	6	4	..	1									
42	Mo	2	2	6	2	6	10	2	6	5	..	1									
43	Tc	2	2	6	2	6	10	2	6	6	..	1									
44	Ru	2	2	6	2	6	10	2	6	7	..	1									
45	Rh	2	2	6	2	6	10	2	6	8	..	1									
46	Pd	2	2	6	2	6	10	2	6	10	..	..									
47	Ag	2	2	6	2	6	10	2	6	10	..	1									

48	Cd	2	2	6	2	6	10	2	6	10	..	2									
49	In	2	2	6	2	6	10	2	6	10	..	2	1								
50	Sn	2	2	6	2	6	10	2	6	10	..	2	2								
51	Sb	2	2	6	2	6	10	2	6	10	..	2	3								
52	Te	2	2	6	2	6	10	2	6	10	..	2	4								
53	I	2	2	6	2	6	10	2	6	10	..	2	5								
54	Xe	2	2	6	2	6	10	2	6	10	..	2	6								
6. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	7p
55	Cs	2	2	6	2	6	10	2	6	10	..	2	6	..	..	1					
56	Ba	2	2	6	2	6	10	2	6	10	..	2	6	..	..	2					
57	La	2	2	6	2	6	10	2	6	10	..	2	6	1	..	2					
58	Ce	2	2	6	2	6	10	2	6	10	2	2	6	..	..	2					
59	Pr	2	2	6	2	6	10	2	6	10	3	2	6	..	..	2					
60	Nd	2	2	6	2	6	10	2	6	10	4	2	6	..	..	2					
61	Pm	2	2	6	2	6	10	2	6	10	5	2	6	..	..	2					
62	Sm	2	2	6	2	6	10	2	6	10	6	2	6	..	..	2					
63	Eu	2	2	6	2	6	10	2	6	10	7	2	6	..	..	2					
64	Gd	2	2	6	2	6	10	2	6	10	7	2	6	1	..	2					
65	Tb	2	2	6	2	6	10	2	6	10	9	2	6	..	..	2					
66	Dy	2	2	6	2	6	10	2	6	10	10	2	6	..	..	2					
67	Ho	2	2	6	2	6	10	2	6	10	11	2	6	..	..	2					
68	Er	2	2	6	2	6	10	2	6	10	12	2	6	..	..	2					
69	Tm	2	2	6	2	6	10	2	6	10	13	2	6	..	..	2					
70	Yb	2	2	6	2	6	10	2	6	10	14	2	6	..	..	2					
71	Lu	2	2	6	2	6	10	2	6	10	14	2	6	1	..	2					
72	Hf	2	2	6	2	6	10	2	6	10	14	2	6	2	..	2					
73	Ta	2	2	6	2	6	10	2	6	10	14	2	6	3	..	2					
74	W	2	2	6	2	6	10	2	6	10	14	2	6	4	..	2					
75	Re	2	2	6	2	6	10	2	6	10	14	2	6	5	..	2					
76	Os	2	2	6	2	6	10	2	6	10	14	2	6	6	..	2					
77	Ir	2	2	6	2	6	10	2	6	10	14	2	6	7	..	2					
78	Pt	2	2	6	2	6	10	2	6	10	14	2	6	9	..	1					
79	Au	2	2	6	2	6	10	2	6	10	14	2	6	10	..	1					
80	Hg	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2					
81	Tl	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	1				
82	Pb	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	2				

83	Bi	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	3				
84	Po	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	4				
85	At	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	5				
86	Rn	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	6				
7. Period		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	6s	6p	6d	6f	7s	7p
87	Fr	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	6	..	..	1	
88	Ra	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	6	..	..	2	
89	Ac	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	6	1	..	2	
90	Th	2	2	6	2	6	10	2	6	10	14	2	6	10	..	2	6	2	..	2	
91	Pa	2	2	6	2	6	10	2	6	10	14	2	6	10	2	2	6	1	..	2	
92	U	2	2	6	2	6	10	2	6	10	14	2	6	10	3	2	6	1	..	2	
93	Np	2	2	6	2	6	10	2	6	10	14	2	6	10	4	2	6	1	..	2	
94	Pu	2	2	6	2	6	10	2	6	10	14	2	6	10	6	2	6	..	..	2	
95	Am	2	2	6	2	6	10	2	6	10	14	2	6	10	7	2	6	..	..	2	
96	Cm	2	2	6	2	6	10	2	6	10	14	2	6	10	7	2	6	1	..	2	
97	Bk	2	2	6	2	6	10	2	6	10	14	2	6	10	9	2	6	..	..	2	
98	Cf	2	2	6	2	6	10	2	6	10	14	2	6	10	10	2	6	..	..	2	
99	Es	2	2	6	2	6	10	2	6	10	14	2	6	10	11	2	6	..	..	2	
100	Fm	2	2	6	2	6	10	2	6	10	14	2	6	10	12	2	6	..	..	2	
101	Md	2	2	6	2	6	10	2	6	10	14	2	6	10	13	2	6	..	..	2	
102	No	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	..	..	2	
103	Lr	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	1	..	2	
104	Rf	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	2	..	2	
105	Db	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	3	..	2	
106	Sg	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	4	..	2	
107	Bh	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	5	..	2	
108	Hs	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	6	..	2	
109	Mt	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	7	..	2	
110	Uun	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	9	..	1	
111	Uuu	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	10	..	1	
112	Uub	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	10	..	2	
114	Uuq	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2	6	10	..	2	2

Table 2. The Best periodic table of elements.

Atomic Orbitals	Outermost Subshell electrons	1. Period	2. Period	3. Period	4. Period	5. Period
s	1 2	1 H 2 He	3 Li 4 Be	11 Na 12 Mg	29 Cu 30 Zn	61 Pm 62 Sm
p	1 2 3 4 5 6	Stable elements	5 B 6 C 7 N 8 O 9 F 10 Ne	13 Al 14 Si 15 P 16 S 17 Cl 18 Ar	31 Ga 32 Ge 33 As 34 Se 35 Br 36 Kr	63 Eu 64 Gd 65 Tb 66 Dy 67 Ho 68 Er
d	1 2 3 4 5 6 7 8 9 10	Stable elements		19 K 20 Ca 21 Sc 22 Ti 23 V 24 Cr 25 Mn 26 Fe 27 Co 28 Ni	37 Rb 38 Sr 39 Y 40 Zr 41 Nb 42 Mo 43 Tc 44 Ru 45 Rh 46 Pd	69 Tm 70 Yb 71 Lu 72 Hf 73 Ta 74 W 75 Re 76 Os 77 Ir 78 Pt
f	1 2 3 4 5 6 7 8 9 10 11 12 13 14	Stable elements			47 Ag 48 Cd 49 In 50 Sn 51 Sb 52 Te 53 I 54 Xe 55 Cs 56 Ba 57 La 58 Ce 59 Pr 60 Nd	79 Au 80 Hg 81 Tl 82 Pb 83 Bi 84 Po 85 At 86 Rn 87 Fr 88 Ra 89 Ac 90 Th 91 Pa 92 U
g	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	Unstable elements				93 Np 94 Pu 95 Am 96 Cm 97 Bk 98 Cf 99 Es 100 Fm 101 Md 102 No 103 Lr 104 Rf 105 Db 106 Sg 107 Bh 108 Hs 109 Mt 110 Ds

10/22/2017