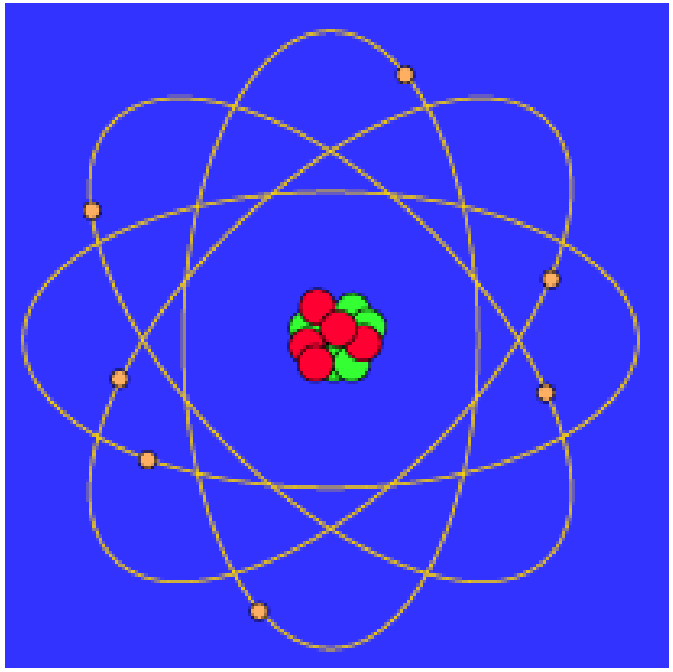
Struktur dan Ikatan Atom

Material Teknik

Pendahuluan

- Atom terdiri dari elektron dan inti atom
- Inti atom disusun oleh proton dan neutron
- Elektron mengelilingi inti atom dalam orbitnya masing-masing
- Massa elektron $9{,}109 \times 10^{-28}$ g dan bermuatan $-1{,}602 \times 10^{-19}$ C
- Massa proton $1{,}673 \times 10^{-24}$ g dan bermuatan $1{,}602 \times 10^{-19}$ C
- Massa neutron $1{,}675 \times 10^{-24}$ g dan tidak bermuatan
- Massa atom terpusat pada inti atom
- Jumlah elektron dan proton sama, sedangkan neutron neutral, maka atom menjadi neutral

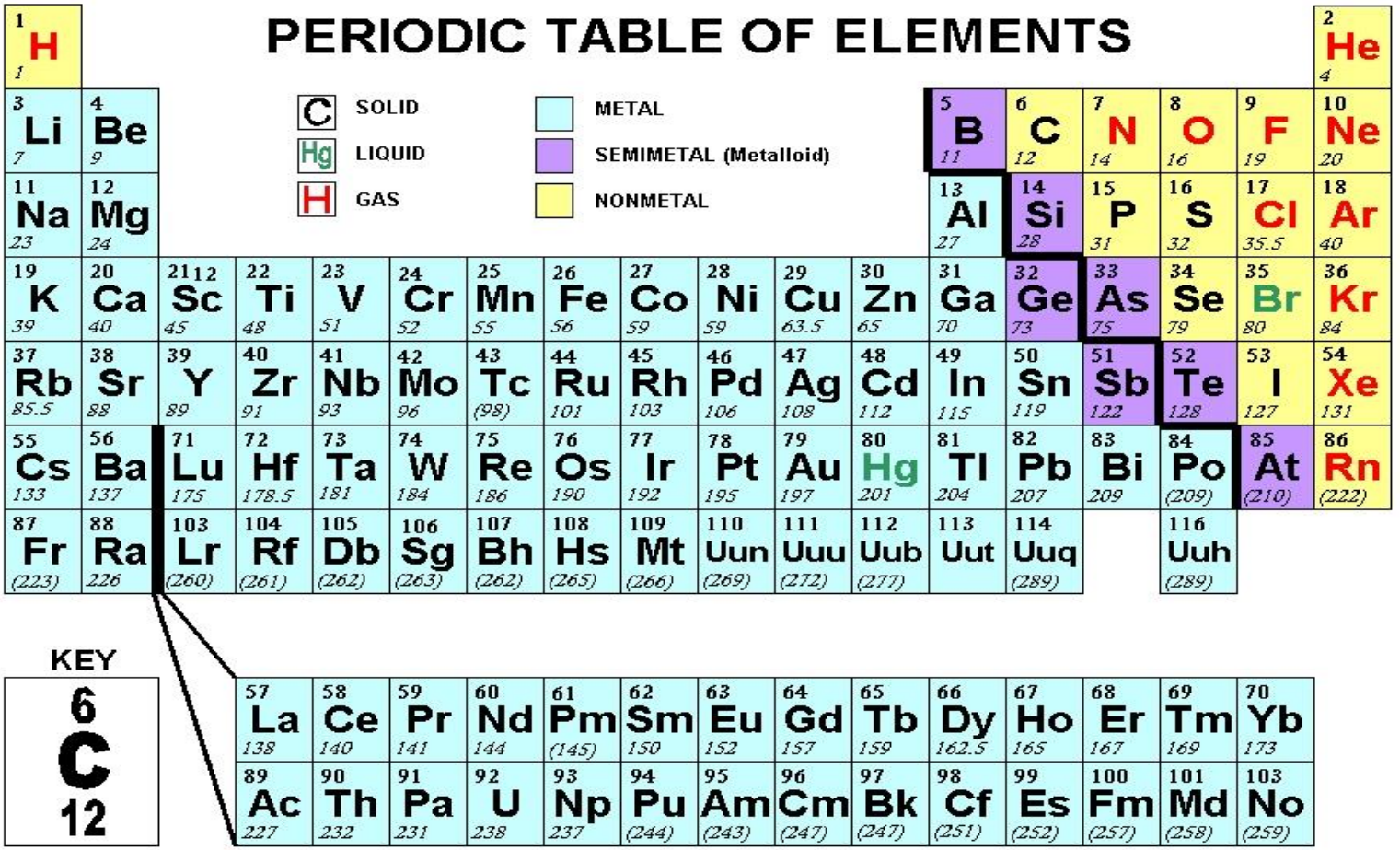
Model atom Bohr



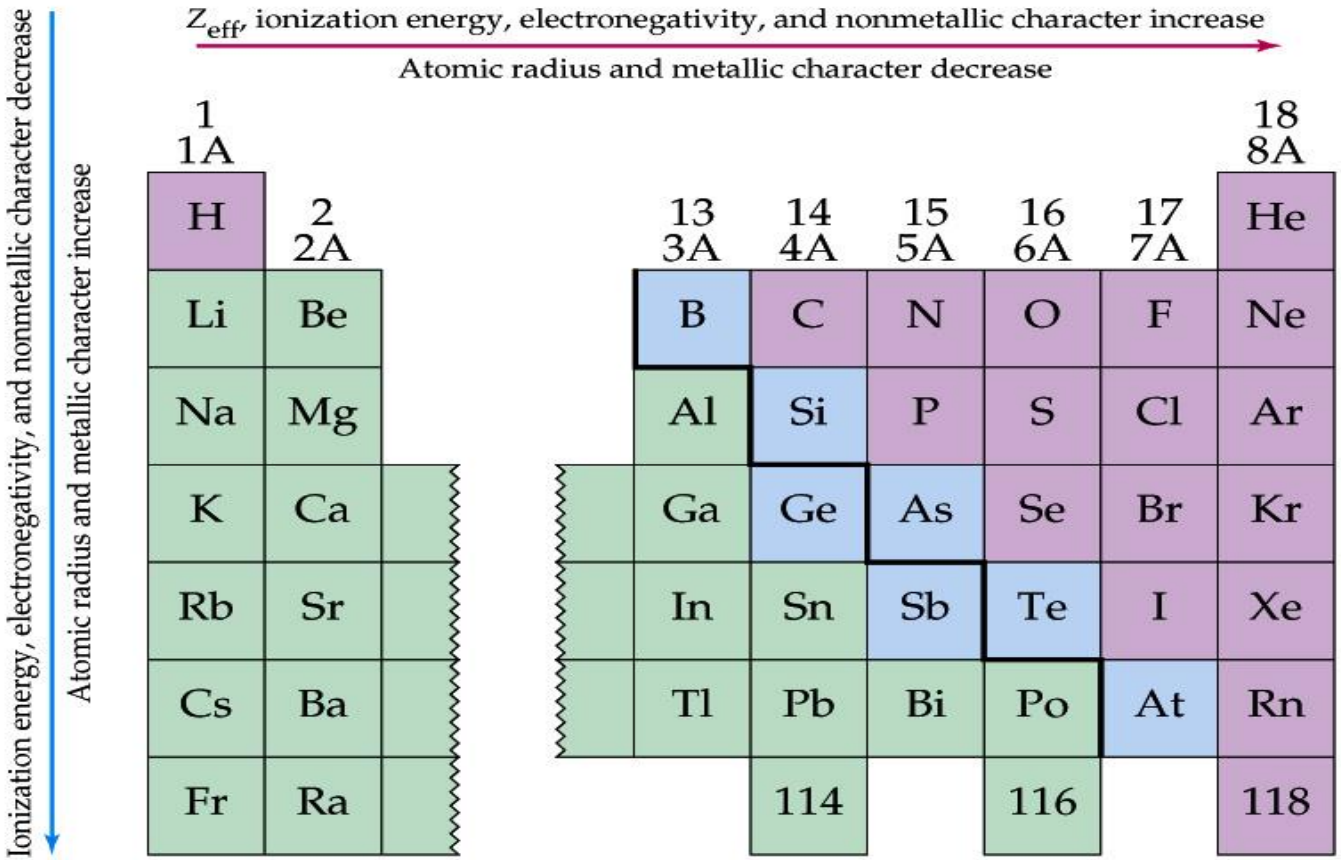
Konfiguration elektron unsur

No.	Element	K	L	M	N	O	P	Q
		1	2	3	4	5	6	7
		s	s p	s p d	s p d f	s p d f	s p d f	s
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 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			

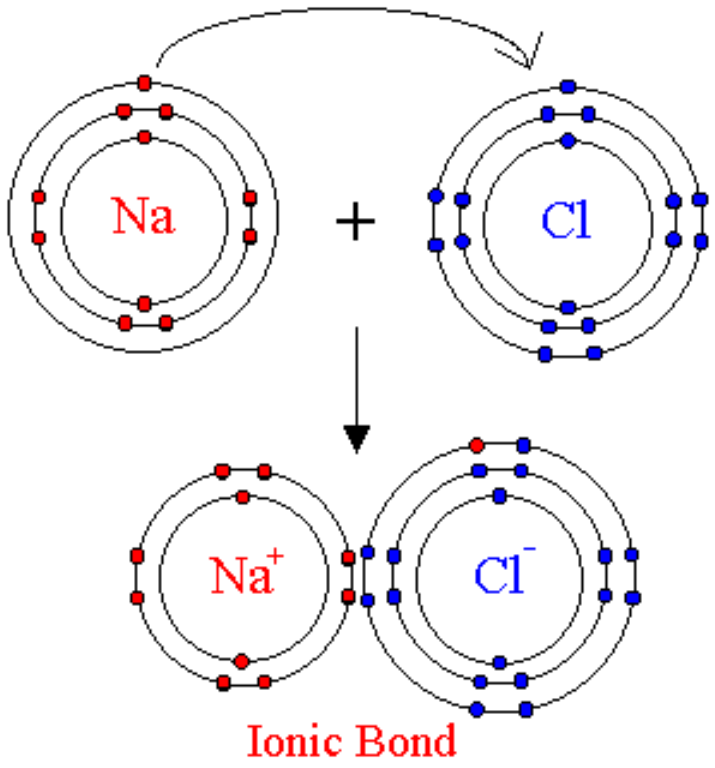
Tabel Periodik



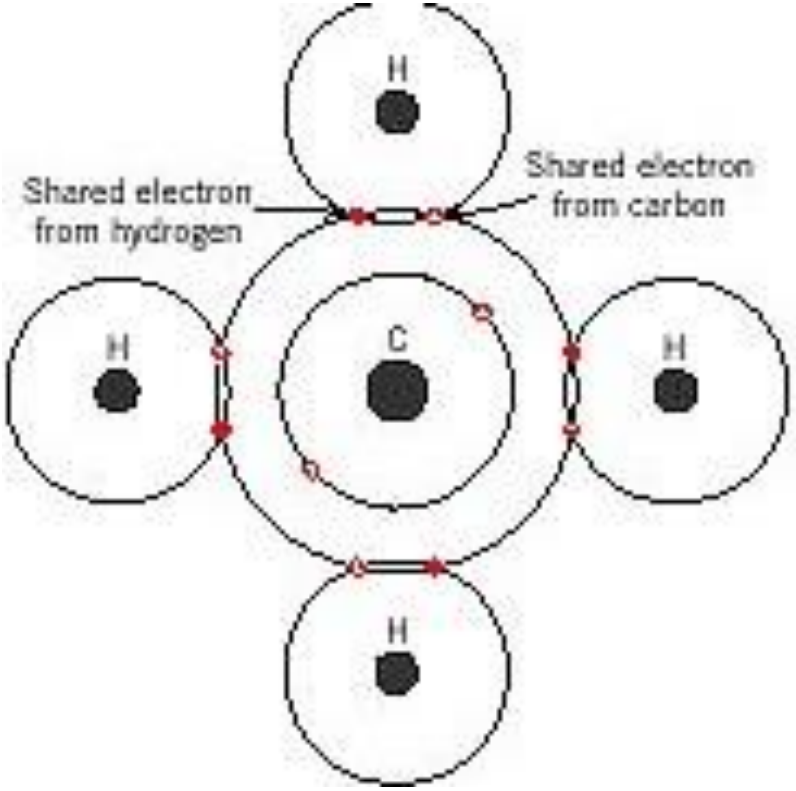
Elektronegatip dari Unsur



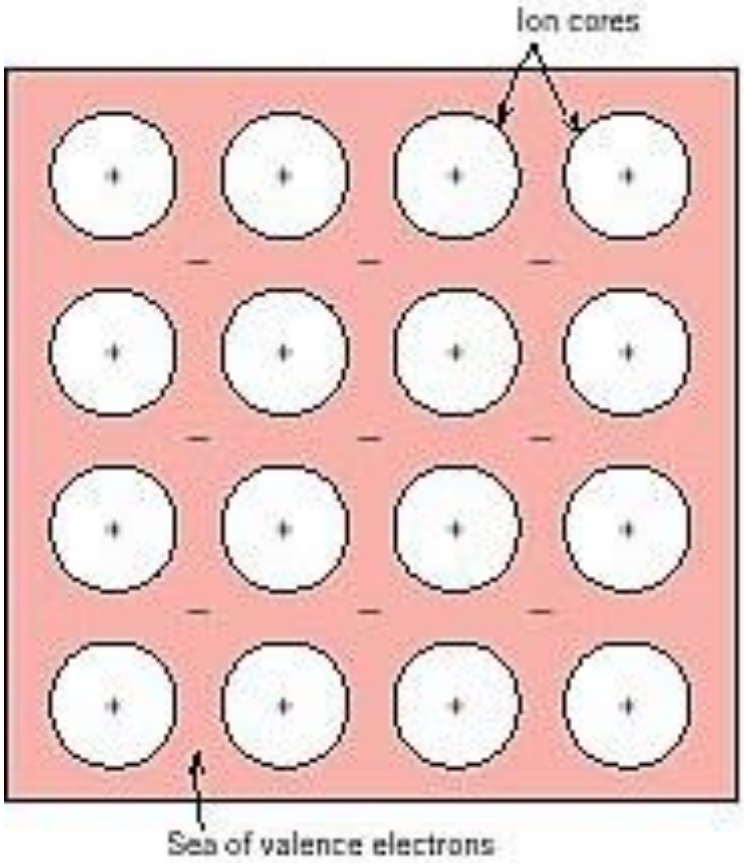
Ikatan Atom Ionik



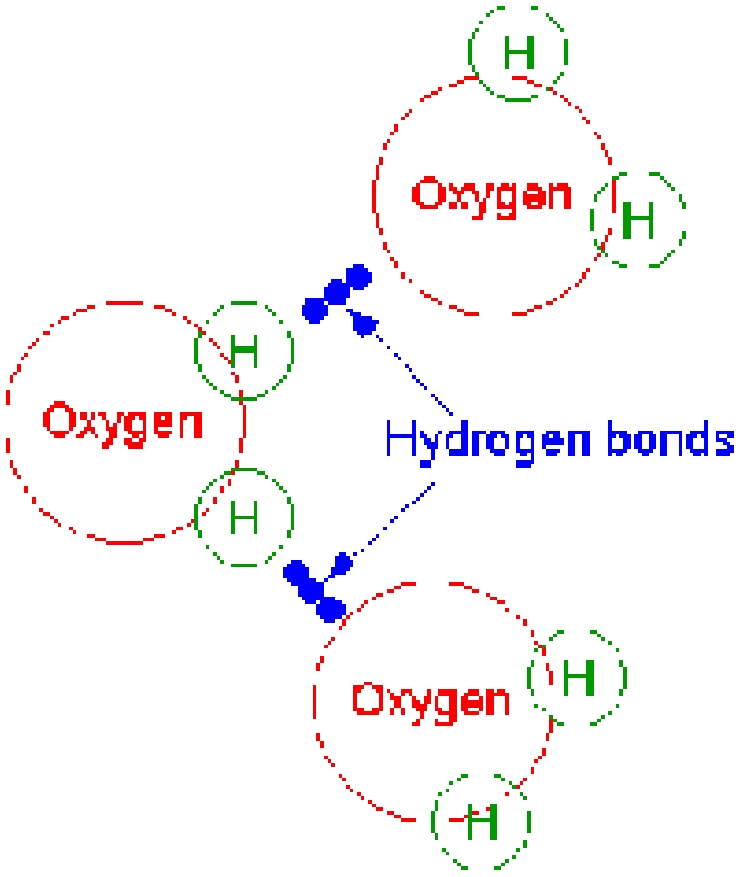
Ikatan Atom Kovalen



Ikatan Atom Logam



Ikatan Atom Hidrogen



Bilangan Koordinasi utk Ikatan Atom

Lattice Types and Madelung Constants for Different Stoichiometries and Radius Ratios of Cations and Anions

Radius Ratio (Cation/Anion)	Lattice Type	Coordination Number of Cation	Coordination Number of Anion	Madelung Constant	Reduced Madelung Constant
A. 1:1 Stoichiometry of Salt (MX)					
0.225–0.414	Wurtzite (ZnS)	4	4	1.63805	1.63805
	Zinc blende (ZnS)	4	4	1.64132	1.64132
0.414–0.732	Rock salt (NaCl)	6	6	1.74756	1.74756
0.732–1.000	CsCl	8	8	1.76267	1.76267
B. 1:2 Stoichiometry of Salt (MX_2)					
0.225–0.414	Beta-quartz (SiO_2)	4	2	2.201	1.467
0.414 0.732	Rutile (TiO_2)	6	3	2.408[a]	1.605
0.732–1.000	Fluorite (CaF_2)	8	4	2.51939	1.6796
C. 2:3 Stoichiometry of Salt (M_2X_3)					
0.414–0.732	Corundum (Al_2O_3)	6	4	4.1719[a]	1.6688
D. Other Stoichiometries and Lattice Types					
Never favored	Ion pair	1	1	1.00000	1.0000
0.000–0.155		2			
0.155 0.225		3			
0.225–0.414		4			
0.414–0.732		6			
0.732 1.000		8			
1.000		12			

NOTE: Reduced Madelung constant = Madelung constant × $2/p$, where p = number of ions in the simplest formula of the salt.

[a] Exact value dependent on details of the structure.