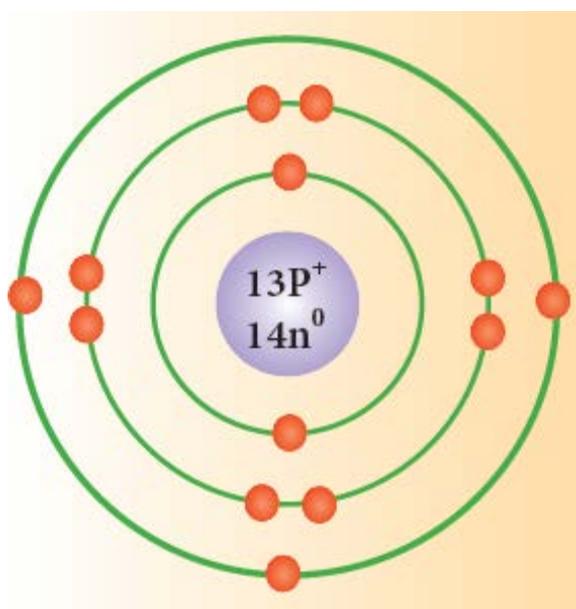


Aluminum

عدد الالكترونات	رقم الغلاف (n)	رمز الغلاف
2	1	K
8	2	L
3	3	M



Aluminum: reactions of elements

1. Reaction of Aluminum with air

Aluminum is a silvery white metal. Aluminum will burn in oxygen with a brilliant white flame to form the trioxide alumnium(III) oxide, Al₂O₃.



2. Reaction of Aluminum with water

Aluminum is a silvery white metal. Aulumium metal does not react with the water.



3.Reaction of Aluminum with the halogens

Aluminum metal reacts vigorously with all the halogens to form Aluminum halides. So, it reacts with chlorine, Cl₂, bromine, I₂, and iodine, I₂, to form respectively Aluminum(III) chloride, AlCl₃, Aluminum(III) bromide, AlBr₃, and Aluminum(III) iodide, AlI₃.



4.Reaction of Aluminum with acids

Aluminum metal dissolves readily in dilute sulphuric acid to form solutions containing the aquated Al(III) ion together with hydrogen gas, H₂. The corresponding reactions with dilute hydrochloric acid also give the aquated Al(III) ion.



5.Reaction of Aluminum with bases

Aluminum dissolves in sodium hydroxide with the evolution of hydrogen gas, H₂, and the formation of aluminates of the type [Al(OH)₄]⁻.



Fourth group IVA

1. The elements of this group are characterized present four electrons in the outer shell include: Carbon (C), Silicon (Si), Germanium (Ge), Tin (Sn), Lead (Pb).
2. The metallic properties of these elements including non-metallic for carbon properties but in silicon and germanium semi-metals, while tin and lead are considered as real metallic.
3. Decreased the boiling point and melting point from top to bottom of the group.
4. This group needs to gain or lose or contribute four electrons to reach a stable electronic arrangement and for the difficulty of losing or gain four electrons, they tend to share four electrons by forming a covalent bond.
5. Oxidative state of elements of this group +4.

1 IA	2 IIA											13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1 H	2 He											5 B	6 C	7 N	8 O	9 F	10 Ne
3 Li	4 Be											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
11 Na	12 Mg	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 ← VIIIIB →	9 VIIIIB	10 →	11 IB	12 IIB	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 I	54 Xe
55 Cs	56 Ba	57 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 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Uun	111 Uuu	112 Uub						

Carbon: reactions of elements

1. Reaction of carbon with air

Carbon and also burns in air when heated to 600-800°C - an expensive way to make carbon dioxide!



When the air or oxygen supply is restricted, incomplete combustion to carbon monoxide, CO, occurs.



2.Reaction of carbon with water

Carbon, either as graphite or diamond does not react with water under normal conditions. Under more forcing conditions, the reaction becomes important. In industry, water is blown through hot coke. The resulting gas is called water gas and is a mixture of hydrogen (H₂, 50%), carbon monoxide (CO, 40%), carbon dioxide (CO₂, 5%), nitrogen and methane (N₂ + CH₄, 5%).



3.Reaction of carbon with the halogens

Graphite reacts with fluorine, F₂, at high temperatures to make a mixture of carbon tetrafluoride, CF₄, together with some C₂F₆ and C₅F₁₂.



The other halogens appear to not react with graphite.

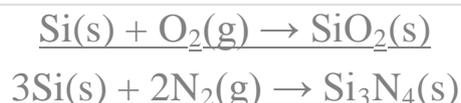
4.Reaction of carbon with acids

Graphite reacts with the oxidizing acid hot concentrated nitric acid to form mellitic acid, C₆(CO₂H)₆.

Silicon: reactions of elements

1.Reaction of silicon with air

The surface of silicon is protected by a very thin layer of silicon dioxide, SiO₂. At temperatures above about 1400°C, silicon reacts with nitrogen, N₂, in the air as well as oxygen, to form the Si₃N₄.



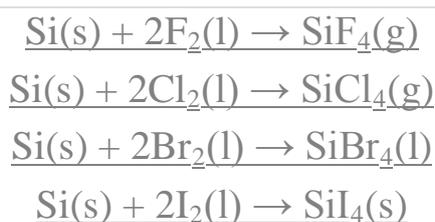
2. Reaction of silicon with water

The surface of lumps of silicon is protected by a very thin layer of silicon dioxide, SiO₂.



3. Reaction of silicon with the halogens

Silicon reacts with all the halogens to form silicon tetrahalides. So, it reacts with fluorine, F₂, chlorine, Cl₂, bromine, Br₂, and iodine, I₂, to form respectively silicon(IV) fluoride, SiF₄, silicon(IV) chloride, SiCl₄, silicon(IV) bromide, SiBr₄, and silicon(IV) iodide, SiI₄. The reaction with fluorine takes place at room temperature but the others requiring warming over 300°C.



4. Reaction of silicon with acids

Silicon does not react with most acids under normal conditions but is dissolved by hydrofluoric acid (HF)



5. Reaction of silicon with bases

Silicon is attacked by bases such as aqueous sodium hydroxide to give silicates, highly complex species containing the anion $[\text{SiO}_4]^{4-}$.

