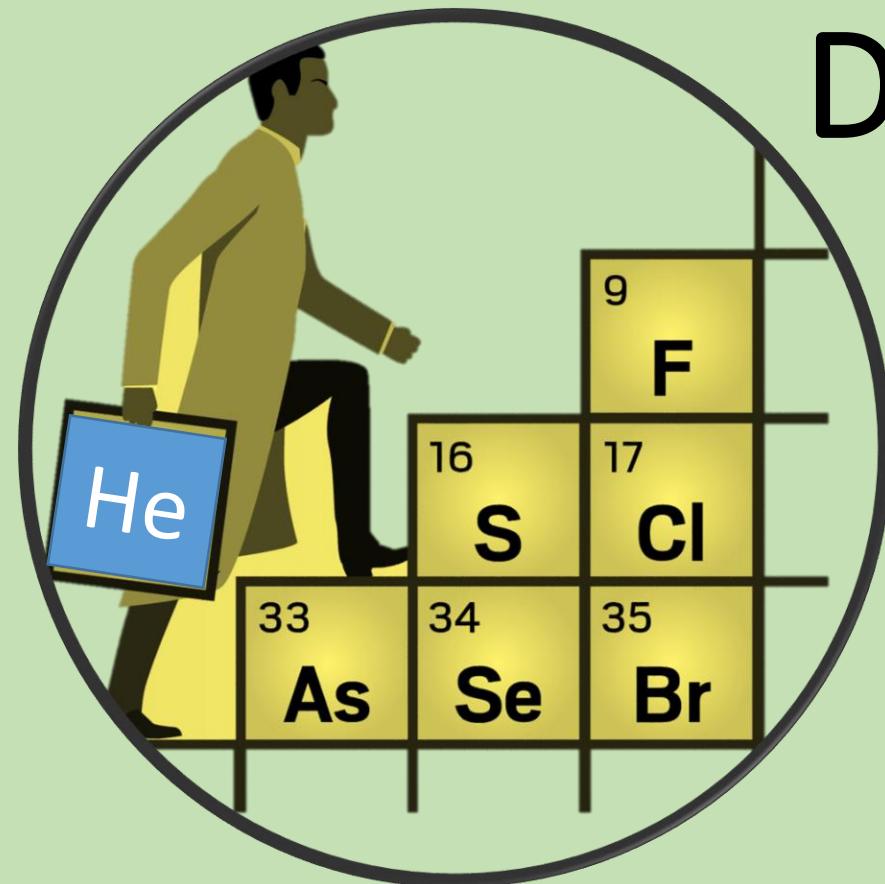


Suite CLASSIFICATION PÉRIODIQUE DES ÉLÉMENTS

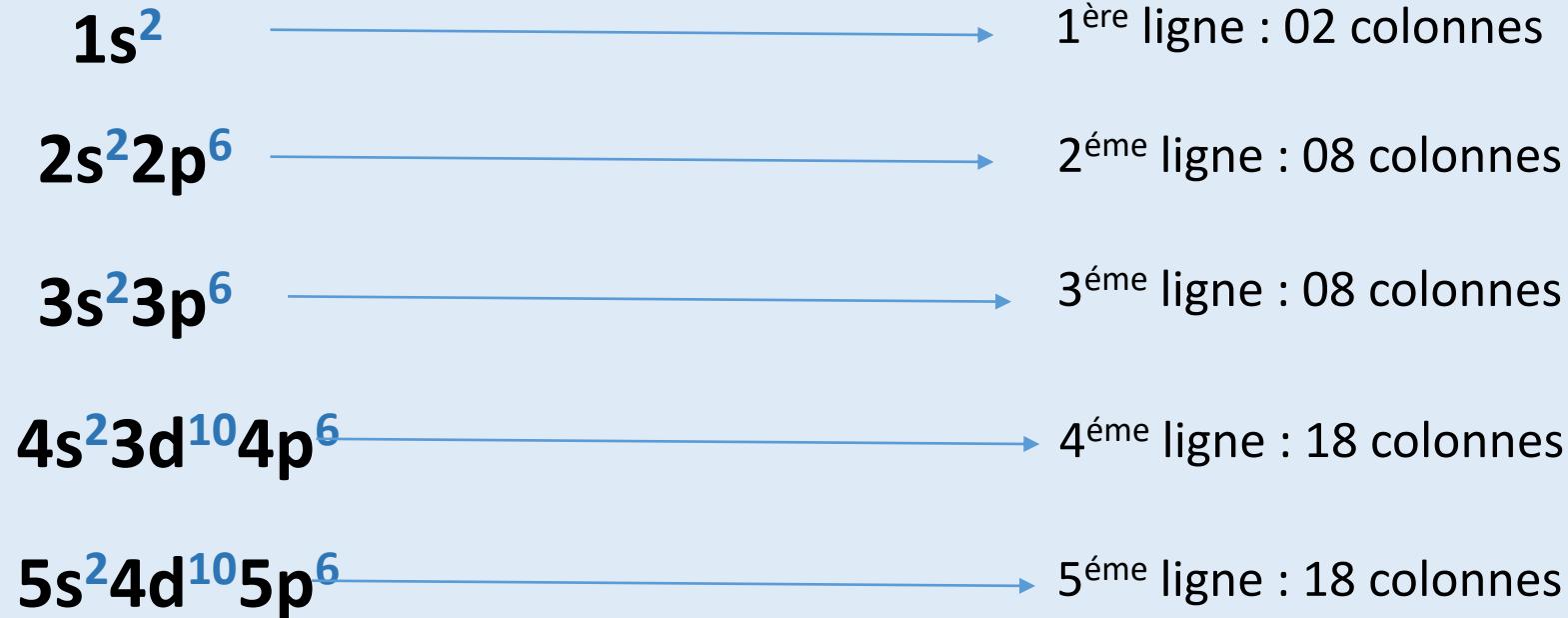
Description du tableau périodique et propriétés comparables des éléments



Mourad AMARA

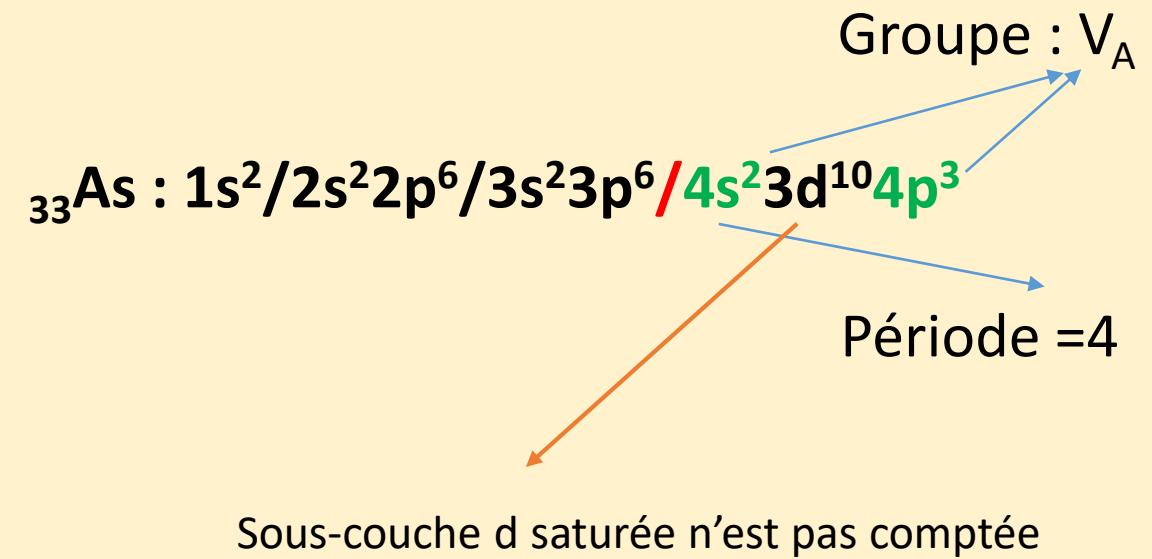
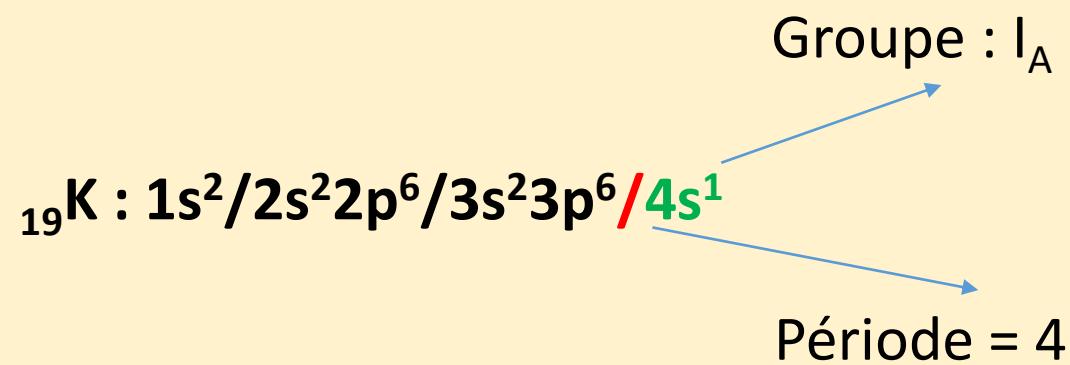
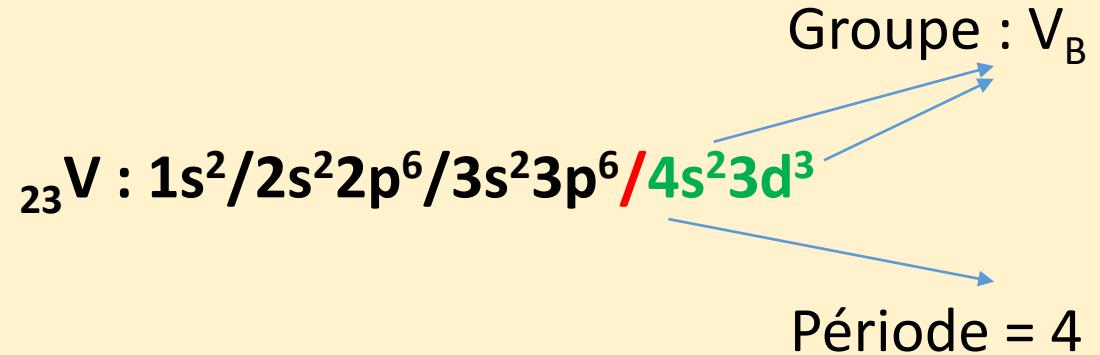
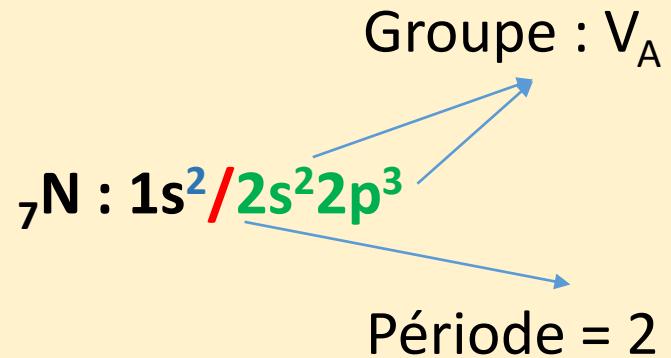
A partir de l'écriture de la configuration électronique, on peut comprendre la construction du tableau périodique

1s²/2s²2p⁶/3s²3p⁶/4s²3d¹⁰4p⁶/5s²4d¹⁰5p⁶/ 6s²4f¹⁴5d¹⁰6p⁶/7s²



Les lignes = périodes
Les colonnes = groupes

Exemples :



Période

$n = 1$

$n = 2$

$n = 3$

1 IA 1A	1 H Hydrogen 1.008
3 IIA 2A	2 Be Beryllium 9.012
11 Na Sodium 22.990	12 Mg Magnesium 24.305
19 K Potassium 39.098	20 Ca Calcium 40.078
37 Rb Rubidium 84.468	38 Sr Strontium 87.62
55 Cs Cesium 132.905	56 Ba Barium 137.328
87 Fr Francium 223.020	88 Ra Radium 226.025
89-103	104 Rf Rutherfordium [261]
	105 Db Dubnium [262]
	106 Sg Seaborgium [266]
	107 Bh Bohrium [268]
	108 Hs Hassium [269]
	109 Mt Meitnerium [269]
	110 Ds Darmstadtium [269]
	111 Rg Roentgenium [272]
	112 Cn Copernicium [277]
	113 Uut Ununtrium unknown
	114 Fl Flerovium [289]
	115 Uup Ununpentium unknown
	116 Lv Livermorium [298]
	117 Uus Ununseptium unknown
	118 Uuo Ununoctium unknown

Ions plus stables Na^+ , Mg^{2+} , Al^{3+} ...

Alcalino-terreux

Métaux de transition

3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIIB 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B
21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38
39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414
57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592
	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [268]	108 Hs Hassium [269]	109 Mt Meitnerium [269]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]
									113 Uut Ununtrium unknown
									114 Fl Flerovium [289]
									115 Uup Ununpentium unknown
									116 Lv Livermorium [298]
									117 Uus Ununseptium unknown
									118 Uuo Ununoctium unknown

Lanthanide Series

Actinide Series

57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

Ions plus stables O^{2-} , S^{2-} , ...

F⁻, Cl⁻, Br⁻
Halogènes

Gaz rares

VIIIA
8A

He
Helium
4.003

Ne
Neon
20.180

Ar
Argon
39.948

Kr
Krypton
84.798

Xe
Xenon
131.294

Rn
Radon
220.018

Electronégativité : Capacité de l'atome à capter l'électron

1 IA 1A	
1 H Hydrogen 1.008	+1

Période : $Z \uparrow \Rightarrow EN \uparrow$ $B < C < N < O < F$

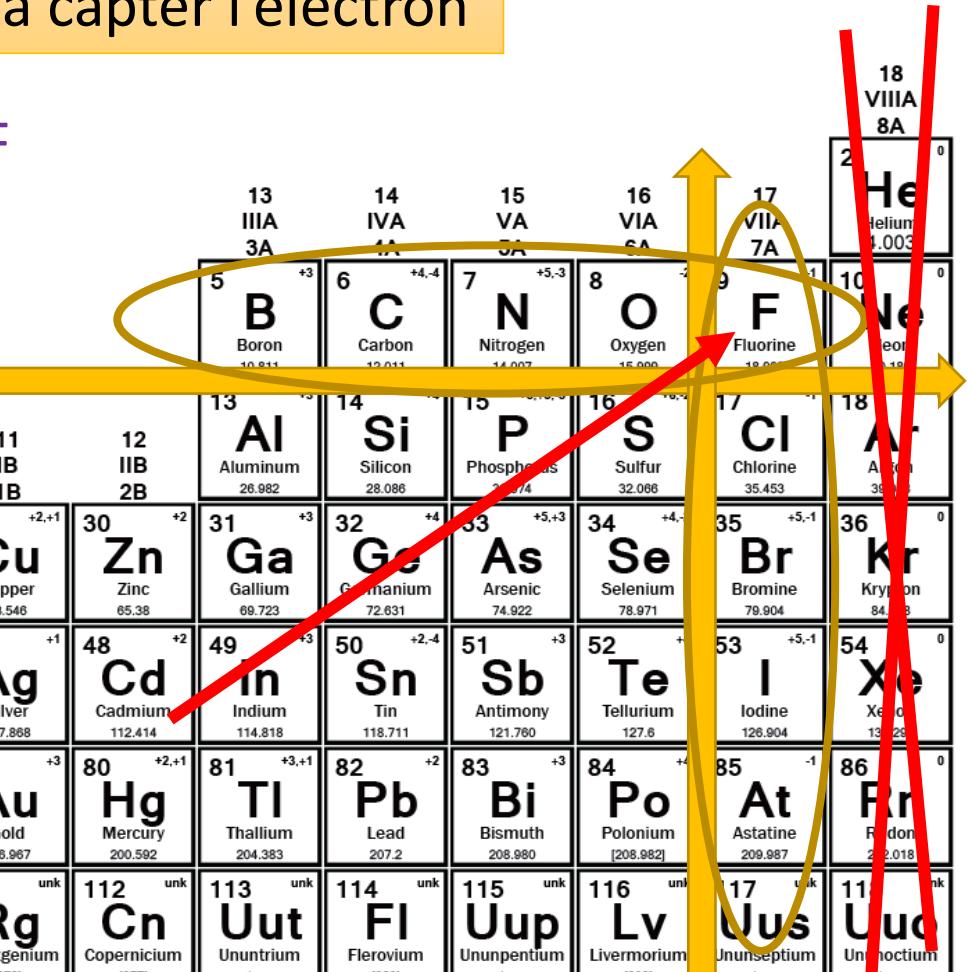
2 IIA 2A	
3 Li Lithium 6.941	+1

Groupe : $Z \uparrow \Rightarrow EN \downarrow$ $I < Br < Cl < F$

11 Na Sodium 22.990	+1
12 Mg Magnesium 24.305	+2

3 IIIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIIB 7B	8	9	10		11 IB 1B	12 IIB 2B	13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A	
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Al Aluminum 26.982	32 Si Silicon 28.086	33 P Phosphorus 30.974	34 S Sulfur 32.066	35 Cl Chlorine 35.453	36 Ar Argon 36.96
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.888	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Krypton 84.8
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [288]	17 Jus Ununseptium unknown	11 Uuo Ununoctium unknown

Lanthanide Series	57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
Actinide Series	89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]



Potentiel d'ionisation : Energie nécessaire pour arracher l'électron

1 IA 1A	
1 H Hydrogen +1	2 IIA 2A
3 Li Lithium +1	4 Be Beryllium +2
11 Na Sodium +1	12 Mg Magnesium +2
19 K Potassium +1	20 Ca Calcium +2
37 Rb Rubidium +1	38 Sr Strontium +2
55 Cs Cesium +1	56 Ba Barium +2
87 Fr Francium +1	88 Ra Radium +2

Période : $Z \uparrow \Rightarrow PI \uparrow$

$Si < P < S < Cl < Ar$

Groupe : $Z \uparrow \Rightarrow PI \downarrow$

$Cs < Rb < K < Na < Li$

3 IIIB 3D	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIIB 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B	13 IIIA 3A	14 IVA 4A	15 VA 5A	16 VIA 6A	17 VIIA 7A	18 VIIIA 8A		
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 84.798
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103	104 Rf Rutherfordium [261]	105 unk	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 unk	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [288]	117 unk	118 Uus Ununseptium unknown

Lanthanide Series

57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.243	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

Rayon atomique: Taille de l'atome

Période : $Z \uparrow \Rightarrow R \downarrow$

Groupe : $Z \uparrow \Rightarrow R \uparrow$

Na > Mg > Al > Si > P

Cs > Rb > K > Na > Li > H

1 IA	18 VIIIA
1 H Hydrogen 1.008	2 He Helium 4.003
2 IIA	8A
3 IA	18
3 Li Lithium 6.941	2 He Helium 4.003
4 IIA	0
4 Be Beryllium 9.012	2 He Helium 4.003
11 IA	18 VIIIA
11 Na Sodium 22.990	2 He Helium 4.003
12 IIA	8A
12 Mg Magnesium 24.312	2 He Helium 4.003
13 IIIA	18
13 Sc Scandium 44.956	2 He Helium 4.003
14 IVA	0
14 Ti Titanium 47.867	2 He Helium 4.003
15 VA	18 VIIIA
15 V Vanadium 50.942	2 He Helium 4.003
16 VIA	8A
16 Cr Chromium 51.996	2 He Helium 4.003
17 VIIA	18
17 Mn Manganese 54.938	2 He Helium 4.003
18	0
18 Fe Iron 55.845	2 He Helium 4.003
19 IIIB	18 VIIIA
19 Co Cobalt 58.933	2 He Helium 4.003
20 IB	8A
20 Ni Nickel 58.693	2 He Helium 4.003
21 IIB	18
21 Cu Copper 63.546	2 He Helium 4.003
22 3B	0
22 Zn Zinc 65.38	2 He Helium 4.003
23 4B	18 VIIIA
23 Ga Gallium 69.723	2 He Helium 4.003
24 5B	8A
24 Ge Germanium 72.631	2 He Helium 4.003
25 6B	18
25 As Arsenic 74.922	2 He Helium 4.003
26 7B	0
26 Se Selenium 78.971	2 He Helium 4.003
27 VIII	18 VIIIA
27 Br Bromine 79.904	2 He Helium 4.003
28 8	8A
28 Kr Krypton 84.798	2 He Helium 4.003
29 1B	18
29 Rb Rubidium 84.468	2 He Helium 4.003
30 2B	0
30 Sr Strontium 87.62	2 He Helium 4.003
31 3B	18 VIIIA
31 Y Yttrium 88.906	2 He Helium 4.003
32 4B	8A
32 Zr Zirconium 91.224	2 He Helium 4.003
33 5B	18
33 Nb Niobium 92.906	2 He Helium 4.003
34 6B	0
34 Mo Molybdenum 95.95	2 He Helium 4.003
35 7B	18 VIIIA
35 Tc Technetium 98.907	2 He Helium 4.003
36 VIII	8A
36 Ru Ruthenium 101.07	2 He Helium 4.003
37 8	18
37 Rh Rhodium 102.906	2 He Helium 4.003
38 1B	0
38 Cd Cadmium 106.42	2 He Helium 4.003
39 2B	18 VIIIA
39 Ag Silver 107.868	2 He Helium 4.003
40 3B	8A
40 In Indium 114.818	2 He Helium 4.003
41 4B	18
41 Ta Tantalum 180.948	2 He Helium 4.003
42 5B	0
42 W Tungsten 183.84	2 He Helium 4.003
43 6B	18 VIIIA
43 Re Rhenium 186.207	2 He Helium 4.003
44 7B	8A
44 Os Osmium 190.23	2 He Helium 4.003
45 VIII	18
45 Ir Iridium 192.217	2 He Helium 4.003
46 8	0
46 Pt Platinum 195.085	2 He Helium 4.003
47 1B	18 VIIIA
47 Au Gold 196.967	2 He Helium 4.003
48 2B	8A
48 Hg Mercury 200.592	2 He Helium 4.003
49 3B	18
49 Tl Thallium 204.383	2 He Helium 4.003
50 4B	0
50 Pb Lead 207.2	2 He Helium 4.003
51 5B	18 VIIIA
51 Bi Bismuth 208.980	2 He Helium 4.003
52 6B	8A
52 Te Tellurium 127.6	2 He Helium 4.003
53 7B	18
53 I Iodine 126.904	2 He Helium 4.003
54 VIII	0
54 Xe Xenon 131.294	2 He Helium 4.003
55 1B	18 VIIIA
55 Cs Cesium 132.905	2 He Helium 4.003
56 2B	8A
56 Ba Barium 137.328	2 He Helium 4.003
57-71 3B	18
57-71 Hf Hafnium 178.49	2 He Helium 4.003
72 4B	0
72 Ta Tantalum 180.948	2 He Helium 4.003
73 5B	18 VIIIA
73 W Tungsten 183.84	2 He Helium 4.003
74 6B	8A
74 Re Rhenium 186.207	2 He Helium 4.003
75 7B	18
75 Os Osmium 190.23	2 He Helium 4.003
76 VIII	0
76 Ir Iridium 192.217	2 He Helium 4.003
77 8	18 VIIIA
77 Pt Platinum 195.085	2 He Helium 4.003
78 1B	8A
78 Au Gold 196.967	2 He Helium 4.003
79 2B	18
79 Hg Mercury 200.592	2 He Helium 4.003
80 3B	0
80 Tl Thallium 204.383	2 He Helium 4.003
81 4B	18 VIIIA
81 Pb Lead 207.2	2 He Helium 4.003
82 5B	8A
82 Bi Bismuth 208.980	2 He Helium 4.003
83 6B	18
83 Po Polonium [208.982]	2 He Helium 4.003
84 7B	0
84 At Astatine 209.987	2 He Helium 4.003
85 VIII	18 VIIIA
85 Rn Radon 222.018	2 He Helium 4.003
87 1B	8A
87 Fr Francium 223.020	2 He Helium 4.003
88 2B	18
88 Ra Radium 226.025	2 He Helium 4.003
89-103 3B	0
89-103 Rf Rutherfordium [261]	2 He Helium 4.003
104 4B	18 VIIIA
104 Db Dubnium [262]	2 He Helium 4.003
105 unk	8A
105 Sg Seaborgium [266]	2 He Helium 4.003
106 unk	18
106 Bh Bohrium [264]	2 He Helium 4.003
107 unk	0
107 Hs Hassium [269]	2 He Helium 4.003
108 unk	18 VIIIA
108 Mt Meitnerium [268]	2 He Helium 4.003
109 unk	8A
109 Ds Darmstadtium [269]	2 He Helium 4.003
110 unk	18
110 Rg Roentgenium [272]	2 He Helium 4.003
111 unk	0
111 Cn Copernicium [277]	2 He Helium 4.003
112 unk	18 VIIIA
112 Uut Ununtrium unknown	2 He Helium 4.003
113 unk	8A
113 Fl Flerovium [289]	2 He Helium 4.003
114 unk	18
114 Up Ununpentium unknown	2 He Helium 4.003
115 unk	0
115 Lv Livermorium [288]	2 He Helium 4.003
116 unk	18 VIIIA
116 Uus Ununseptium unknown	2 He Helium 4.003
117 unk	8A
117 Uuo Ununoctium unknown	2 He Helium 4.003
118 unk	18
Lanthanide Series	57 La Lanthanum 138.905
Actinide Series	58 Ce Cerium 140.116
	59 Pr Praseodymium 140.908
	60 Nd Neodymium 144.243
	61 Pm Promethium 144.913
	62 Sm Samarium 150.36
	63 Eu Europium 151.964
	64 Gd Gadolinium 157.25
	65 Tb Terbium 158.925
	66 Dy Dysprosium 162.500
	67 Ho Holmium 164.930
	68 Er Erbium 167.259
	69 Tm Thulium 168.934
	70 Yb Ytterbium 173.055
	71 Lu Lutetium 174.967
	89 Ac Actinium 227.028
	90 Th Thorium 232.038
	91 Pa Protactinium 231.036
	92 U Uranium 238.029
	93 Np Neptunium 237.048
	94 Pu Plutonium 244.064
	95 Am Americium 243.061
	96 Cm Curium 247.070
	97 Bk Berkelium 247.070
	98 Cf Californium 251.080
	99 Es Einsteinium [254]
	100 Fm Fermium 257.095
	101 Md Mendelevium 258.1
	102 No Nobelium 259.101
	103 Lr Lawrencium [262]

EXERCICE

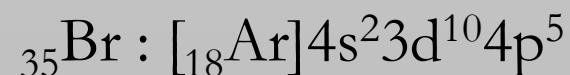
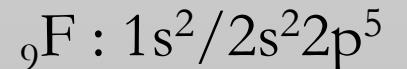
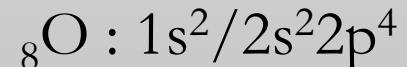
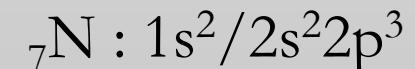
Soient les éléments suivants :



- Donner les configurations électroniques de ces éléments.
- Situer les éléments ci-dessus dans le tableau périodique
- Classer ces éléments par ordre d'électronégativités décroissantes. Justifiez.

CORRECTION

1. Configurations électroniques :



2. Position dans le tableau périodique :

	V _A	VI _A	VII _A
2	N	O	F
3	P		Cl
4			Br

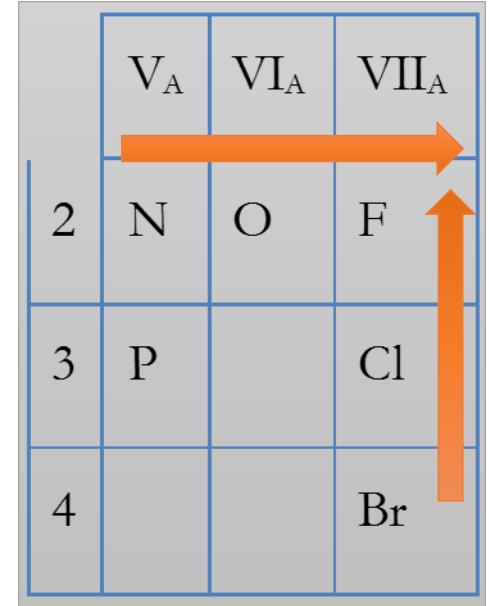
3. Le classement de ces éléments par ordre d'électronégativité se fait soit par rapport à leur situation vis-à-vis du fluor (le plus électronégatif) ou suivant la période et le groupe.

Dans une même période lorsque Z augmente,
l'électronégativité augmente $\Rightarrow N < O < F$.

Dans un même groupe, lorsque Z augmente,
l'électronégativité diminue $\Rightarrow Br < Cl < F$ et $P < N$.

Le classement global est alors : $P < Br < N < Cl < O < F$.

	V _A	VI _A	VII _A
2	N	O	F
3	P		Cl
4			Br



Le plus proche du Fluor est le plus électronégatif. A même distance c'est celui qui a le numéro atomique le plus petit qui est le plus électronégatif.

Merci et à bientôt

Dimitri Mendeléiev

