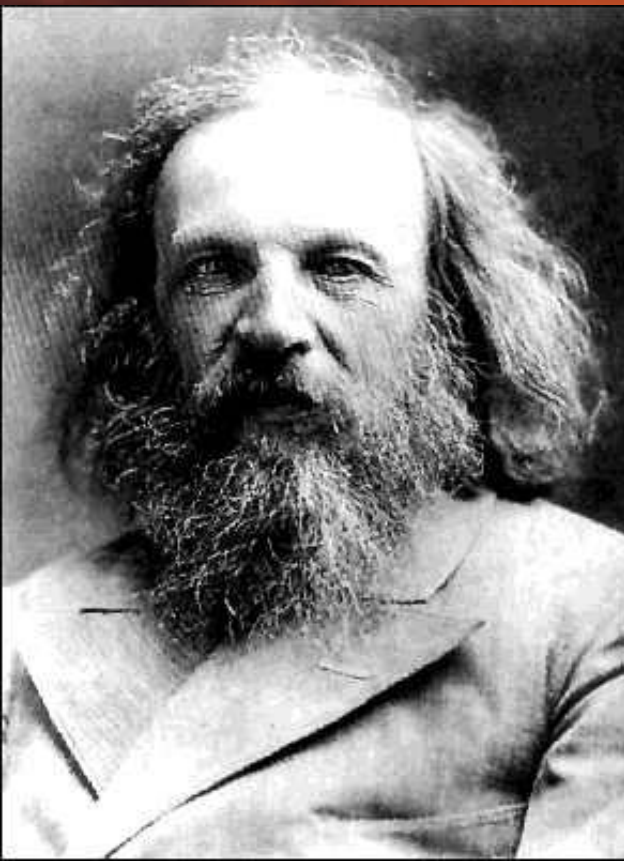


The Periodical Table of Elements



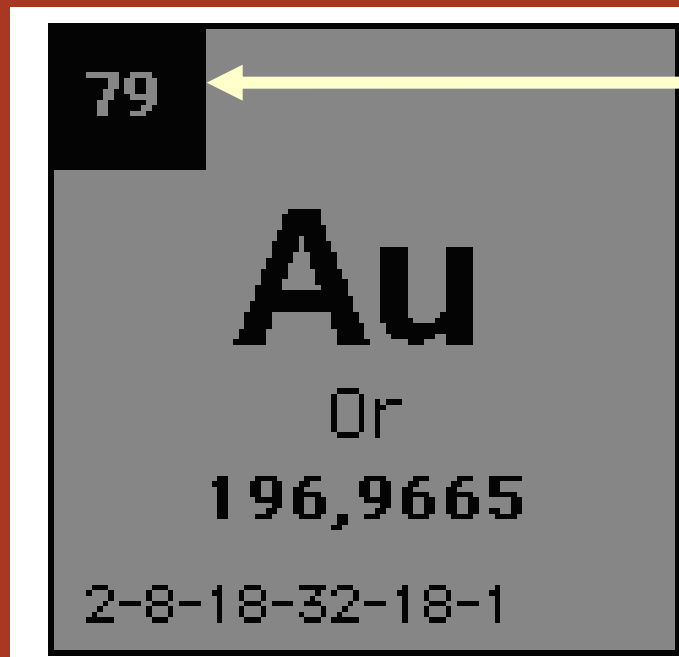
ПЕРИОДИЧЕСКАЯ СИСТЕМА ХИМИЧЕСКИХ ЭЛЕМЕНТОВ Д.И.МЕНДЕЛЕЕВА

ПЕРИОДЫ	РЯДЫ	Г Р У П П Ы										Э Л Е М Е Н Т О В										
		I	II	III	IV	V	VI	VII	VIII													
1	1	H ¹ ВОДОРОД 1,008																			He ² ГЕЛИЙ 4,003	
2	2	Li ³ ЛИТИЙ 6,941	Be ⁴ БЕРИЛЛИЙ 9,012	B ⁵ БОР 10,811	C ⁶ УГЛЕРОД 12,011	N ⁷ АЗОТ 14,008	O ⁸ КИСЛОРОД 15,999	F ⁹ ФТОР 18,998													Ne ¹⁰ НЕОН 20,179	
3	3	Na ¹¹ НАТРИЙ 22,989	Mg ¹² МАГНИЙ 24,304	Al ¹³ АЛЮМИНИЙ 26,981	Si ¹⁴ КРЕМНИЙ 28,085	P ¹⁵ ФОСФОР 30,974	S ¹⁶ СЕРА 32,064	Cl ¹⁷ ХЛОР 35,453														Ar ¹⁸ АРГОН 39,948
4	4	K ¹⁹ КАЛИЙ 39,098	Ca ²⁰ КАЛЬЦИЙ 40,078	Sc ²¹ СКАНДИЙ 44,956	Ti ²² ТИТАН 47,88	V ²³ ВАНАДИЙ 50,942	Cr ²⁴ ХРОМ 51,996	Mn ²⁵ МАРГАНЕЦ 54,938	Fe ²⁶ ЖЕЛЕЗО 55,847	Co ²⁷ КОБАЛЬТ 58,933	Ni ²⁸ НИКЕЛЬ 58,70											
5	5	Cu ²⁹ МЕДЬ 63,546	Zn ³⁰ ЦИНК 65,38	Ga ³¹ ГАЛЛИЙ 69,72	Ge ³² ГЕРМАНИЙ 72,59	As ³³ МЫШЬЯК 74,922	Se ³⁴ СЕЛЕН 78,96	Br ³⁵ БРОМ 79,904														Kr ³⁶ КРИПТОН 83,80
6	6	Rb ³⁷ РУБИДИЙ 85,468	Sr ³⁸ СТРОНЦИЙ 87,62	Y ³⁹ ИТРИЙ 88,906	Zr ⁴⁰ ЦИРКОНИЙ 91,22	Nb ⁴¹ НИОБИЙ 92,906	Mo ⁴² МОЛИБДЕН 95,94	Tc ⁴³ ТЕХНЕЦИЙ 98,906	Ru ⁴⁴ РУТЕНИЙ 101,07	Rh ⁴⁵ РОДИЙ 102,905	Pd ⁴⁶ ПАЛЛАДИЙ 106,4											
7	7	Ag ⁴⁷ СЕРЕБРО 107,868	Cd ⁴⁸ КАДМИЙ 112,41	In ⁴⁹ ИНДИЙ 114,82	Sn ⁵⁰ ОЛОВО 118,69	Sb ⁵¹ СУРЬМА 121,75	Te ⁵² ТЕЛЛУР 127,6	I ⁵³ ИОД 126,904														Xe ⁵⁴ КСЕНОН 131,30
8	8	Cs ⁵⁵ ЦЕЗИЙ 132,905	Ba ⁵⁶ БАРИЙ 137,33	La ⁵⁷ ЛАНТАН 138,905	Hf ⁷² ГАФНИЙ 178,49	Ta ⁷³ ТАНТАЛ 180,94	W ⁷⁴ ВОЛЬФРАМ 183,84	Re ⁷⁵ РЕНИЙ 186,207	Os ⁷⁶ ОСМИЙ 190,2	Ir ⁷⁷ ИРИДИЙ 192,22	Pt ⁷⁸ ПЛАТИНА 195,08											
9	9	Au ⁷⁹ ЗОЛОТО 196,967	Hg ⁸⁰ РУТУТЬ 200,59	Tl ⁸¹ ТАЛЛИЙ 204,37	Pb ⁸² СВИНЕЦ 207,2	Bi ⁸³ ВИСМУТ 208,980	Po ⁸⁴ ПОЛОНИЙ (209)	At ⁸⁵ АСТАТ (210)														Rn ⁸⁶ РАДОН (222)
10	10	Fr ⁸⁷ ФРАНЦИЙ (223)	Ra ⁸⁸ РАДИЙ (226,025)	Ac ⁸⁹ АКТИНИЙ (227)	Ku ¹⁰⁴ КУРЧАТОВИЙ (261)	Ns ¹⁰⁶ НИЛЬСБОРИЙ (289)																
		Высшие оксиды	R ₂ O	RO	R ₂ O ₃	RO ₂	R ₂ O ₅	RO ₃	R ₂ O ₇													RO ₄
		Летучие водородные соединения				RH ₄	RH ₃	H ₂ R	HR													
* П л а н т а н о и д ы 58 - 71																						
		Ce ⁵⁸ ЦЕРИЙ 140,12	Pr ⁵⁹ ПРАЗЕДИЙ 140,908	Nd ⁶⁰ НЕОДИМ 144,24	Pm ⁶¹ ПРОМЕТИЙ (145)	Sm ⁶² САМАРИЙ 150,4	Eu ⁶³ ЕВРОПИЙ 151,96	Gd ⁶⁴ ГАДОЛИНИЙ 157,25	Tb ⁶⁵ ТЕРБИЙ 158,925	Dy ⁶⁶ ДИСПРОЗИЙ 162,50	Ho ⁶⁷ ГОЛЬМИЙ 164,930	Er ⁶⁸ ЕРБИЙ 167,26	Tm ⁶⁹ ТЮЛЬМИЙ 168,934	Yb ⁷⁰ ИТТЕРБИЙ 173,04	Lu ⁷¹ ЛУТЦИЙ 174,967							
** а к т и н о и д ы 90 - 103																						
		Th ⁹⁰ ТОРИЙ 232,038	Pa ⁹¹ ПРОТАКТИНИЙ 231,036	U ⁹² УРАН 238,029	Np ⁹³ НЕПУТНИЙ 237,048	Pu ⁹⁴ ПУЛТОНИЙ 244	Am ⁹⁵ АМЕРИЦИЙ 243	Cm ⁹⁶ КУРИЙ 247	Bk ⁹⁷ БЕРКЛИЙ 247	Cf ⁹⁸ КАЛИФОРНИЙ 251	Es ⁹⁹ ЭЙНШТЕЙНИЙ 254	Fm ¹⁰⁰ ФЕРМИЙ 257	Md ¹⁰¹ МЕНДЕЛЕВИЙ 258	(No) ¹⁰² НОББИЙ 259	(Lr) ¹⁰³ ЛУРЕНСКИЙ 260							

Условные обозначения в периодической системе химических элементов Д.И.Менделеева см. на третьей стороне обложки.

The Atomic Number

- Indicates the number of protons present in the element's nucleus.



Atomic number

The Atomic Mass

- The mass of an average atom of an element
- Always written in a decimal number and is measured in the atomic mass unit (amu)

17	—
Cl	
Chlore	
35,5	

La masse atomique

The Ion Charge

- Is an electric charge that forms on an atom when it gains or loses electrons
- Some elements may possess multiple ion charges

22	4+
Ti	3+
Titane	
47,9	

Multiple ion charges

The Ion :

- An electrically charged atom
- An ion that loses electrons is positively charged (cation)
- An ion that gains electrons is negatively charged (anion)

Metalloids

- Possess characteristics of both metals and non-metals
 - Some conduct electricity, but poorly conduct heat

Group***	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	IA	IIA	IIIB	IVB	VB	VIB	VII B	VIII	VIII	VIII	IB	IIB	IIIA	IVA	VA	VIA	VIIA	VIIIA
Period	1A	2A	3B	4B	5B	6B	7B	8	8	8	1B	2B	3A	4A	5A	6A	7A	8A
1	1 <u>H</u> 1.008																	2 <u>He</u> 4.003
2	3 <u>Li</u> 6.941	4 <u>Be</u> 9.012											5 <u>B</u> 10.81	6 <u>C</u> 12.01	7 <u>N</u> 14.01	8 <u>O</u> 16.00	9 <u>F</u> 19.00	10 <u>Ne</u> 20.18
3	11 <u>Na</u> 22.99	12 <u>Mg</u> 24.31											13 <u>Al</u> 26.98	14 <u>Si</u> 28.09	15 <u>P</u> 30.97	16 <u>S</u> 32.07	17 <u>Cl</u> 35.45	18 <u>Ar</u> 39.95
4	19 <u>K</u> 39.10	20 <u>Ca</u> 40.08	21 <u>Sc</u> 44.96	22 <u>Ti</u> 47.88	23 <u>V</u> 50.94	24 <u>Cr</u> 52.00	25 <u>Mn</u> 54.94	26 <u>Fe</u> 55.85	27 <u>Co</u> 58.47	28 <u>Ni</u> 58.69	29 <u>Cu</u> 63.55	30 <u>Zn</u> 65.39	31 <u>Ga</u> 69.72	32 <u>Ge</u> 72.59	33 <u>As</u> 74.92	34 <u>Se</u> 78.96	35 <u>Br</u> 79.90	36 <u>Kr</u> 83.80
5	37 <u>Rb</u> 85.47	38 <u>Sr</u> 87.62	39 <u>Y</u> 88.91	40 <u>Zr</u> 91.22	41 <u>Nb</u> 92.91	42 <u>Mo</u> 95.94	43 <u>Tc</u> (98)	44 <u>Ru</u> 101.1	45 <u>Rh</u> 102.9	46 <u>Pd</u> 106.4	47 <u>Ag</u> 107.9	48 <u>Cd</u> 112.4	49 <u>In</u> 114.8	50 <u>Sn</u> 118.7	51 <u>Sb</u> 121.8	52 <u>Te</u> 127.6	53 <u>I</u> 126.9	54 <u>Xe</u> 131.3
6	55 <u>Cs</u> 132.9	56 <u>Ba</u> 137.3	*	72 <u>Hf</u> 178.5	73 <u>Ta</u> 180.9	74 <u>W</u> 183.9	75 <u>Re</u> 186.2	76 <u>Os</u> 190.2	77 <u>Ir</u> 190.2	78 <u>Pt</u> 195.1	79 <u>Au</u> 197.0	80 <u>Hg</u> 200.5	81 <u>Tl</u> 204.4	82 <u>Pb</u> 207.2	83 <u>Bi</u> 209.0	84 <u>Po</u> (209)	85 <u>At</u> (210)	86 <u>Rn</u> (222)
7	87 <u>Fr</u> (223)	88 <u>Ra</u> (226)	**	104 <u>Rf</u> (261)	105 <u>Db</u> (262)	106 <u>Sg</u> (266)	107 <u>Bh</u> (264)	108 <u>Hs</u> (269)	109 <u>Mt</u> (268)	110 <u>Ds</u> (281)	111 <u>Rg</u> (272)	112 <u>Uub</u> (285)	113 <u>Uut</u> (284)	114 <u>Uuq</u> (289)	115 <u>Uup</u> (288)	116 <u>Uuh</u> (292)	117 <u>Uus</u> ()	118 <u>Uuo</u> (294)


Lanthanide Series*
(Lanthanoid)


57 <u>La</u> 138.9	58 <u>Ce</u> 140.1	59 <u>Pr</u> 140.9	60 <u>Nd</u> 144.2	61 <u>Pm</u> (145)	62 <u>Sm</u> 150.4	63 <u>Eu</u> 152.0	64 <u>Gd</u> 157.3	65 <u>Tb</u> 158.9	66 <u>Dy</u> 162.5	67 <u>Ho</u> 164.9	68 <u>Er</u> 167.3	69 <u>Tm</u> 168.9	70 <u>Yb</u> 173.0	71 <u>Lu</u> 175.0
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------


Actinide Series**
(Actinoids)

89 <u>Ac</u> (227)	90 <u>Th</u> 232.0	91 <u>Pa</u> (231)	92 <u>U</u> (238)	93 <u>Np</u> (237)	94 <u>Pu</u> (244)	95 <u>Am</u> (243)	96 <u>Cm</u> (247)	97 <u>Bk</u> (247)	98 <u>Cf</u> (251)	99 <u>Es</u> (252)	100 <u>Fm</u> (257)	101 <u>Md</u> (258)	102 <u>No</u> (259)	103 <u>Lr</u> (262)
--------------------------	--------------------------	--------------------------	-------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	--------------------------	---------------------------	---------------------------	---------------------------	---------------------------

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	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr	
37 Rb	38 Sr	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe	
55 Cs	56 Ba	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn	

 All the metals appear on the left side of the periodic table.

 All the non-metals (except hydrogen) appear on the right.

 The metalloids form a diagonal line toward the right side.


 These non-metals are all gases at room temperature.

Figure 2.14 The metals, non-metals, and metalloids as they appear in the periodic table

Periods

- Horizontal lines, numbered 1 to 7
ex : H and He make up the first period

Periods

Le tableau périodique des éléments

1																	18
1 H Hydrogène 1,0																	2 He Hélium 4,0
3 Li Lithium 6,9	4 Be Béryllium 9,0											5 B Bore 10,8	6 C Carbone 12,0	7 N Azote 14,0	8 O Oxygène 16,0	9 F Fluore 19,0	10 Ne Neon 20,2
11 Na Sodium 23,0	12 Mg Magnésium 24,3											13 Al Aluminium 27,0	14 Si Silicium 28,1	15 P Phosphore 31,0	16 S Soufre 32,1	17 Cl Chlore 35,5	18 Ar Argon 39,9
19 K Potassium 39,1	20 Ca Calcium 40,1	21 Sc Scandium 45,0	22 Ti Titane 47,9	23 V Vanadium 50,9	24 Cr Chrome 52,0	25 Mn Manganèse 54,9	26 Fe Fer 55,8	27 Co Cobalt 58,9	28 Ni Nickel 58,7	29 Cu Cuivre 63,5	30 Zn Zinc 65,4	31 Ga Gallium 69,7	32 Ge Germanium 72,6	33 As Arsenic 74,9	34 Se Sélénium 79,0	35 Br Brome 79,9	36 Kr Krypton 83,8
37 Rb Rubidium 85,5	38 Sr Strontium 87,6	39 Y Yttrium 88,9	40 Zr Zirconium 91,2	41 Nb Niobium 92,9	42 Mo Molybdène 95,9	43 Tc Technétium (98)	44 Ru Ruthénium 101,1	45 Rh Rhodium 102,9	46 Pd Palladium 106,4	47 Ag Argent 107,9	48 Cd Cadmium 112,4	49 In Indium 114,8	50 Sn Étain 118,7	51 Sb Antimoine 121,8	52 Te Tellure 127,6	53 I Iode 126,9	54 Xe Xénon 131,3
55 Cs Césium 137,9	56 Ba Baryum 137,3	57 La Lanthane 138,9	58 Ce Cérum 140,1	59 Pr Praseodyme 140,9	60 Nd Neodyme 144,2	61 Pm Prométhium (145)	62 Sm Samarium 150,4	63 Eu Europium 152,0	64 Gd Gadolinium 157,3	65 Tb Terbium 158,9	66 Dy Dysprosium 162,5	67 Ho Holmium 164,9	68 Er Erbium 167,3	69 Tm Thulium 168,9	70 Yb Ytterbium 173,0	71 Lu Lutécium 175,0	
87 Fr Francium (223)	88 Ra Radium (226)	89 Ac Actinium (227)	90 Th Thorium 232,0	91 Pa Protactinium 231,0	92 U Uranium 238,0	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Américium (243)	96 Cm Curium (247)	97 Bk Berkélium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendélévium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)	

métal
 métalloïde
 non-métal

Numéro atomique → 22
 Symbole → Ti
 Nom → Titane
 Masse atomique → 47,9

Charges → 4+
 Charges → 3+

élément naturel
 élément synthétique

* Noms temporaires

Basé sur la masse du C-12 à 12,00.

Les valeurs entre parenthèses représentent la masse de l'isotope le plus stable ou le plus connu des éléments absents de la nature.

58 Ce Cérum 140,1	59 Pr Praseodyme 140,9	60 Nd Neodyme 144,2	61 Pm Prométhium (145)	62 Sm Samarium 150,4	63 Eu Europium 152,0	64 Gd Gadolinium 157,3	65 Tb Terbium 158,9	66 Dy Dysprosium 162,5	67 Ho Holmium 164,9	68 Er Erbium 167,3	69 Tm Thulium 168,9	70 Yb Ytterbium 173,0	71 Lu Lutécium 175,0
90 Th Thorium 232,0	91 Pa Protactinium 231,0	92 U Uranium 238,0	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Américium (243)	96 Cm Curium (247)	97 Bk Berkélium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendélévium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)

Families

- Columns numbered 1 to 18
- Sorted into **groups** which possess similar chemical properties

Families

Le tableau périodique des éléments

1	Le tableau périodique des éléments																18
1	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>1 H⁺ Hydrogène 1,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>2 He⁰ Hélium 4,0</p> </div> </div>																2
2	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>3 Li⁺ Lithium 6,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>4 Be²⁺ Béryllium 9,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>5 B³⁺ Bore 10,8</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>6 C⁴⁺ Carbone 12,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>7 N³⁻ Azote 14,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>8 O²⁻ Oxygène 16,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>9 F⁻ Fluor 19,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>10 Ne⁰ Néon 20,2</p> </div> </div>																
3	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>11 Na⁺ Sodium 23,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>12 Mg²⁺ Magnésium 24,3</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>13 Al³⁺ Aluminium 27,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>14 Si⁴⁺ Silicium 28,1</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>15 P³⁻ Phosphore 31,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>16 S²⁻ Soufre 32,1</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>17 Cl⁻ Chlore 35,5</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>18 Ar⁰ Argon 39,9</p> </div> </div>																
4	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>19 K⁺ Potassium 39,1</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>20 Ca²⁺ Calcium 40,1</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>21 Sc³⁺ Scandium 45,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>22 Ti⁴⁺ Titane 47,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>23 V⁵⁺ Vanadium 50,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>24 Cr³⁺ Chrome 52,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>25 Mn²⁺ Manganèse 54,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>26 Fe³⁺ Fer 55,8</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>27 Co²⁺ Cobalt 58,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>28 Ni³⁺ Nickel 58,7</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>29 Cu²⁺ Cuivre 63,5</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>30 Zn²⁺ Zinc 65,4</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>31 Ga³⁺ Gallium 69,7</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>32 Ge⁴⁺ Germanium 72,6</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>33 As³⁻ Arsenic 74,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>34 Se²⁻ Sélénium 79,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>35 Br⁻ Brome 79,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>36 Kr⁰ Krypton 83,8</p> </div> </div>																
5	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>37 Rb⁺ Rubidium 85,5</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>38 Sr²⁺ Strontium 87,6</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>39 Y³⁺ Yttrium 88,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>40 Zr⁴⁺ Zirconium 91,2</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>41 Nb⁵⁺ Niobium 92,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>42 Mo³⁺ Molybdène 95,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>43 Tc⁷⁺ Technétium (98)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>44 Ru³⁺ Ruthénium 101,1</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>45 Rh⁴⁺ Rhodium 102,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>46 Pd⁴⁺ Palladium 106,4</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>47 Ag¹⁺ Argent 107,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>48 Cd²⁺ Cadmium 112,4</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>49 In³⁺ Indium 114,8</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>50 Sn⁴⁺ Étain 118,7</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>51 Sb³⁺ Antimoine 121,8</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>52 Te²⁻ Tellure 127,6</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>53 I⁻ Iode 126,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>54 Xe⁰ Xénon 131,3</p> </div> </div>																
6	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>55 Cs⁺ Césium 132,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>56 Ba²⁺ Baryum 137,3</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>57 La³⁺ Lanthane 138,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>72 Hf⁴⁺ Hafnium 178,5</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>73 Ta⁵⁺ Tantale 180,9</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>74 W⁶⁺ Tungstène 183,8</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>75 Re⁷⁺ Rhénium 186,2</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>76 Os⁴⁺ Osmium 190,2</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>77 Ir⁴⁺ Iridium 192,2</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>78 Pt²⁺ Platine 195,1</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>79 Au¹⁺ Or 197,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>80 Hg²⁺ Mercure 200,6</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>81 Tl³⁺ Thallium 204,4</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>82 Pb⁴⁺ Plomb 207,2</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>83 Bi³⁺ Bismuth 209,0</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>84 Po²⁺ Polonium (209)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>85 At⁻ Astate (210)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>86 Rn⁰ Radon (222)</p> </div> </div>																
7	<div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 2px;"> <p>87 Fr⁺ Francium (223)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>88 Ra²⁺ Radium (226)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>89 Ac³⁺ Actinium (227)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>104 Rf⁴⁺ Rutherfordium (261)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>105 Db⁵⁺ Dubnium (262)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>106 Sg⁶⁺ Seaborgium (263)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>107 Bh⁷⁺ Bohrium (262)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>108 Hs⁸⁺ Hassium (265)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>109 Mt⁷⁺ Meitnerium (266)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>110 Ds⁴⁺ Darmstadtium (281)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>111 Rg³⁺ Roentgenium (272)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>112 Uub* Ununbium (285)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>113 Uut* Ununtrium (284)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>114 Uuq* Ununquadium (289)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>115 Uup* Ununpentium (288)</p> </div> <div style="border: 1px solid black; padding: 2px;"> <p>116 Uuh* Ununhexium (292)</p> </div> </div>																

Numéro atomique → 22

Symbole → Ti

Nom → Titane

Massa atomique → 47,9

Charges ioniques → 4+, 3+

□ métal

◻ métaïoïde

◻ non-métal

○ élément naturel

◻ élément synthétique

* Noms temporaires

Basé sur la masse du C-12 à 12,00.

Les valeurs entre parenthèses représentent la masse de l'isotope le plus stable ou le plus connu des éléments absents de la nature.

58 Ce ³⁺ Cérium 140,1	59 Pr ³⁺ Praséodyme 140,9	60 Nd ³⁺ Néodyme 144,2	61 Pm ³⁺ Prométhium (145)	62 Sm ³⁺ Samarium 150,4	63 Eu ³⁺ Europium 152,0	64 Gd ³⁺ Gadolinium 157,3	65 Tb ³⁺ Terbium 158,9	66 Dy ³⁺ Dysprosium 162,5	67 Ho ³⁺ Holmium 164,9	68 Er ³⁺ Erbium 167,3	69 Tm ³⁺ Thulium 168,9	70 Yb ³⁺ Ytterbium 173,0	71 Lu ³⁺ Lutétium 175,0
90 Th ⁴⁺ Thorium 232,0	91 Pa ⁵⁺ Protactinium 231,0	92 U ⁶⁺ Uranium 238,0	93 Np ⁵⁺ Neptunium (237)	94 Pu ⁶⁺ Plutonium (244)	95 Am ⁵⁺ Américium (243)	96 Cm ⁵⁺ Curium (247)	97 Bk ⁴⁺ Berkélium (247)	98 Cf ⁴⁺ Californium (251)	99 Es ³⁺ Einsteinium (252)	100 Fm ³⁺ Fermium (257)	101 Md ²⁺ Mendélévium (258)	102 No ²⁺ Nobélium (259)	103 Lr ³⁺ Lawrencium (262)

Alkali metals

- soft, shiny and silver
- Ex: Lithium, sodium, potassium, etc.




Figure 2.16 Les métaux alcalins sont mous et très réactifs.



www.jane



- 
- Is it possible to create a Francium bomb?
 - Consider that :
 - » Francium's half life is about 22 minutes
 - » Francium forms and decomposes constantly
 - » There is only about 20-30 grams of Francium on Earth at a time

Alkaline Earth Metals

- → shiny, silver and a bit more robust than alkali
- → Beryllium, magnesium, calcium, etc

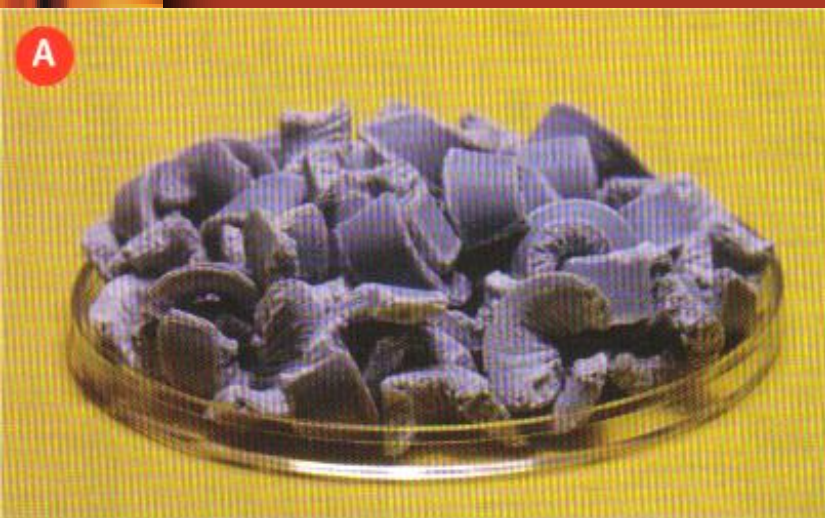


Figure 2.17 Le calcium (A) et le magnésium (B) sont des métaux alcalino-terreux.

Halogens

- → non-metals
- → toxic
- → React with alkali metals to form salts
- Fluorine, chlorine, bromine, iodine...



Figure 2.18 Les halogènes : le fluor (A), le chlore (B), le brome (C) et l'iode (D)

Noble Gases

- → the most stable and unreactive in the table
- → Helium, neon, argon, krypton...

