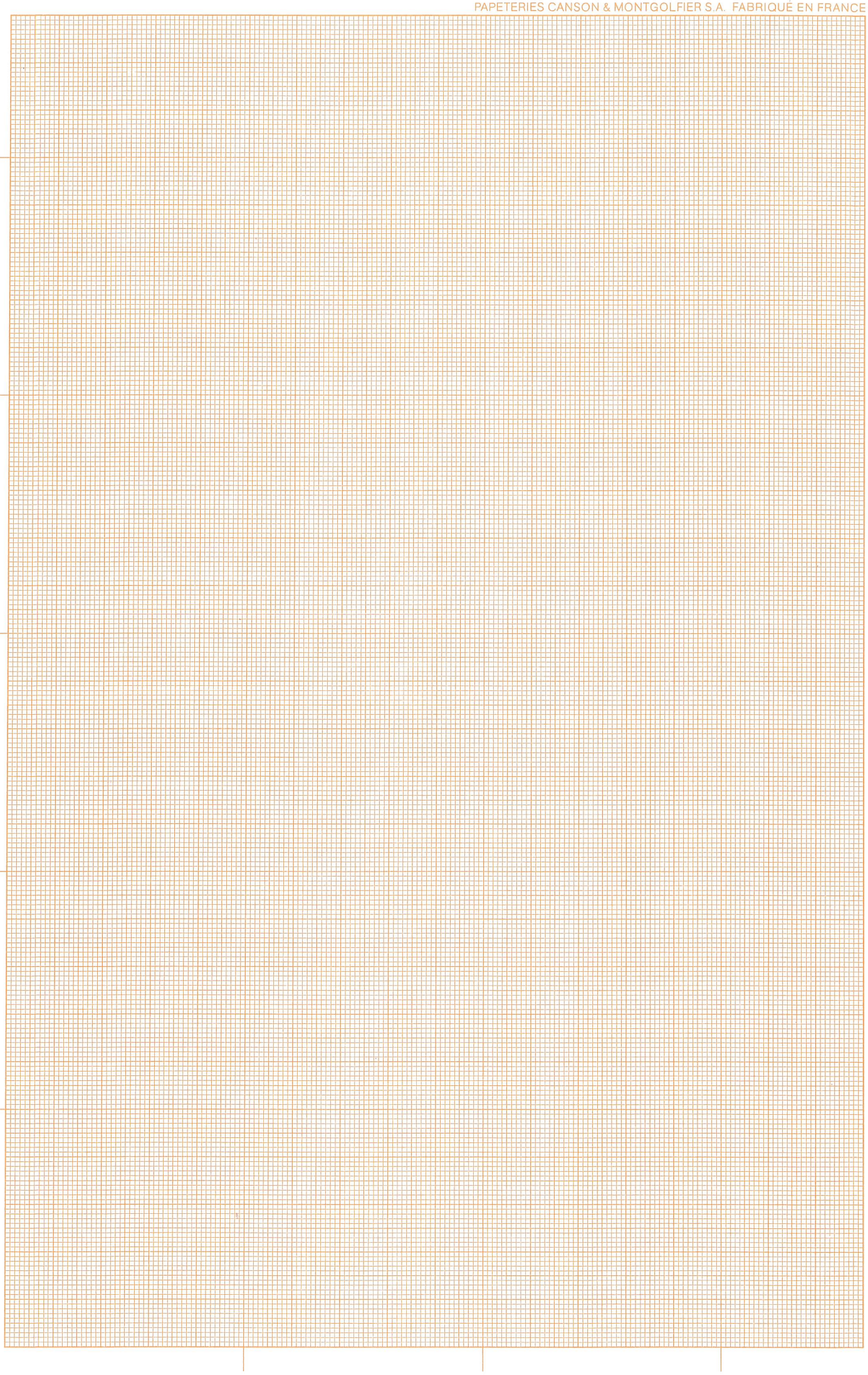
CATIONS
% meq/L
ANIONS
Ca
Mg
Na + K
Cl
SO4
HCO3+ CO3
Calcium (Ca)
Magnesium (Mg)
Sodium (Na) + Potassium (K)
Chlorine (Cl)
Sulfate (SO4)
Carbonate (Co3) + Bicarbonate (HCO3)
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
20
40
60
80


100
10
1
0.1
0.01



PERIODIC TABLE OF THE ELEMENTS

Table of Radioactive Isotopes

Ac 227(22y)β⁻,γ
Ag 110(24s)β⁻,γ
111(7.5d)β⁻,γ
Am241(458y)α,γ,e⁻
242(16.0h)β⁻,K,μ,γ
243(8000y)α,γ
As 76(26.7h)β⁻,γ
77(39h)β⁻,γ
At 210(8.3h)K,μ,γ
211(7.2h),Kα,γ
Au 198(2.69d)β⁻,γ
Ba 131(12d)K,γ
133(7.2y)K,γ,e⁻
Bi 210(5d)β⁻,α
Bk 245(4.9d)K,α,γ
249(314d)β⁻,α,SF
Br 82(36h)β⁻,γ
C 14(5700 y)β⁻
Ca 41(8x10⁴y)K
45(165 d)β⁻
47(4.5d)β⁻,γ
Cd 115(43d)β⁻,γ
Ce 141(32d)β⁻,γ
143(33h)β⁻,γ
144(285d)β⁻,γ
Cf 246(35hl)α,γ,SF
249(360 y)α,γ,SF
251(800 y)γ
Cl 36(3x10⁵y)β⁻
Cm 243(35y)α,γ
245(9300y)α,γ
247(10⁷y)
Co 58(71d),K,β⁺,γ
60(5.27y)β⁻,γ
Cr 51(27d),K,γ
Cs 134(2.0y),β⁻,γ
135(3x10⁶y)β⁻
137(30y)β⁻,γ
Cu 64(12.8h)K,β⁻,β⁺,γ
Es 253(20d)α,γ,SF
254(1y)α,SF
Eu 154(16y)β⁻,γ
155(1.8y)β⁻,γ
Fe 55(2.6y)K
59(45d)β⁻,γ
Fm 255(20h)α
Fr 223(22m)β⁻,γ,α
Ga 72(14.1h)β⁻,γ
Gd 153(236d)K,γ,e⁻
159(18h)β⁻,γ
Ge 71(11d)K
H 3(12.3y)β⁻
Hf 181(45d)β⁻,γ,e⁻
Hg 197(65h)K,γ,e⁻
203(47d)β⁻,γ,e
Ho 166(27.3h)β⁻,γ
I 129(10⁷y)β⁻,γ,e
131(8.05d)β⁻,γ
In 114(50d)γ
Ir 192(74.4d)β⁻,γ
K 40(10⁹y)β⁻,K,γ
42(12.4h),β⁻,γ
La 140(40.2h)β⁻,γ
Lu 176(10¹⁰y)β⁻,K,γ
177(6.8d)β⁻,γ
Md 256(90m)K,SF
Mo 99(67h)β⁻,γ
Na 22(2.6y),β⁺,K,γ
24(15h)β⁻,γ
Nd 147(11.1d)β⁻,γ
Ni 63(125y)β⁻
59(8x10⁴y),K
Np 237(2.2x10⁶y)α,γ
239(2.33d)β⁻,γ
Os 191(15d)β⁻,γ,e⁻
P 32(14.2d)β⁻
Pa 231(34000y)α,γ
Pb 210(19.4y)β⁻,γ,e⁻
202(10³y)L
Pd 103(17d)K,γ
Pm 147(2.6y)β⁻
Po 210(138.4d)α,γ
209(103 y)α,K,γ
Pr 143(13.8d)β⁻
Pt 197(18h)β⁻,γ
Pu 242(3.8 x 10⁵y)α,SF
241(13y)β⁻,α,γ
239(24300y)α,γ,SF
Ra 226(1620y)α,γ
Rb 86(18.6d)β⁻,γ
Re 188(16.7h)β⁻,γ
186(3.7d)β⁻,γ
Rn 222(3.82d)α
Ru 103(40d)β⁻,γ
97(2.9d)K,γ,e⁻
S 35(88d)β⁻
Sb 122(2.8d)β⁻,K,β⁺,γ
124(60d)β⁻,γ
Sc 46(84d)β⁻,γ
Se 75(120 d)K,γ
Sm 153(47h)β⁻,γ
145(340d)K,γ
Sn 113(119d)K,L,γ,e⁻
Sr 90(28y)β⁻
89(51 d)β⁻,γ
85(64d)K,γ
Ta 182(115d)β⁻,γ
Tb 160(73d)β⁻γ
Tc 99(2x10⁵y)β⁻
97(10⁶y)K
Te 127(9.3h)β⁻
Th 232(1.4x10¹⁰y)α,γ,SF
228(1.91y)β⁻
Tl 204(3.81y)β⁻,K
Tm 170(134 d)β⁻,γ,e
U 238(4.5x10⁹y)α,γ,SF
234(2.5x10⁵y)α,γ,SF
235(7.1x10⁸y)α,γ,SF
233(1.6x10⁵y)α,γ
W 185(75d)β⁻
Y 90(64h)β⁻,e⁻
Yb 175(4.2d)β⁻,γ
169(31d)K,γ,e⁻
Zn 65(245d)K,β⁺,γ
Zr 95(65d)β⁻,γ,e⁻
93(9x10⁵y)β⁻,γ

Naturally occurring radioactive isotopes are indicated by a blue mass number. Half lives are in parentheses where s, m, h, d and y stand for seconds, minutes, hours, days and years respectively. The symbols describing the mode of decay and resulting radiation are defined as follows:

α	alpha particle	L	L-electron capture
β⁻	beta particle	SF	spontaneous fission
β⁺	positron	γ	gamma ray
K	K-electron capture	e⁻	internal electron conversion

GROUP IA | IIA | IIIB | IVB | VB | VIB | VIIB | VIII | IB | IIB | IIIA | IVA | VA | VIA | VIIA | VIIIA

1 1.00797 −252.7 −259.2 0.071 **H** Hydrogen																	2 4.0026 −268.9 −269.7 0.126 **He** Helium
3 6.939 1330 180.5 0.53 **Li** Lithium	4 9.0122 2770 1277 1.85 **Be** Beryllium											5 10.811 — 12030 2.34 **B** Boron	6 12.01115 4830 3727? 2.26 **C** Carbon	7 14.0067 −195.8 −210 0.81 **N** Nitrogen	8 15.9994 −183 −218.8 1.14 **O** Oxygen	9 18.9984 −186.2 −219.6 1.505 **F** Fluorine	10 20.183 −246 −248.6 1.20 **Ne** Neon
11 22.9898 892 97.8 0.97 **Na** Sodium	12 24.312 1107 650 1.74 **Mg** Magnesium											13 26.9815 2450 660 2.70 **Al** Aluminum	14 28.086 2680 1410 2.33 **Si** Silicon	15 30.9738 280w 44.2w 1.82w **P** Phosphorus	16 32.064 444.6 119.0 2.07 **S** Sulfur	17 35.453 −34.7 −101.0 1.56 **Cl** Chlorine	18 39.948 −185.8 −189.4 1.40 **Ar** Argon
19 39.102 760 63.7 0.86 **K** Potassium	20 40.08 1440 838 1.55 **Ca** Calcium	21 44.956 2730 1539 3.0 **Sc** Scandium	22 47.90 3260 1668 4.51 **Ti** Titanium	23 50.942 3450 1900 6.1 **V** Vanadium	24 51.996 2665 1875 7.19 **Cr** Chromium	25 54.938 2150 1245 7.43 **Mn** Manganese	26 55.847 3000 1536 7.86 **Fe** Iron	27 58.933 2900 1495 8.9 **Co** Cobalt	28 58.71 2730 1453 8.9 **Ni** Nickel	29 63.54 2595 1083 8.96 **Cu** Copper	30 65.37 906 419.5 7.14 **Zn** Zinc	31 69.72 2237 29.8 5.91 **Ga** Gallium	32 72.59 2830 937.4 5.32 **Ge** Germanium	33 74.922 613* ±3.5 617 5.72 **As** Arsenic	34 78.96 685 217 4.79 **Se** Selenium	35 79.909 58 −7.2 3.12 **Br** Bromine	36 83.80 −152 −157.3 2.6 **Kr** Krypton
37 85.47 688 38.9 1.53 **Rb** Rubidium	38 87.62 1380 768 2.6 **Sr** Strontium	39 88.905 2927 1509 4.47 **Y** Yttrium	40 91.22 3580 1852 6.49 **Zr** Zirconium	41 92.906 3300 2468 8.4 **Nb** Niobium	42 95.94 5560 2610 10.2 **Mo** Molybdenum	43 (98) — 2140 11.5 **Tc** Technetium	44 101.07 4900 2500 12.2 **Ru** Ruthenium	45 102.905 4500 1966 12.4 **Rh** Rhodium	46 106.4 3980 1552 12.0 **Pd** Palladium	47 107.870 2210 960.8 10.5 **Ag** Silver	48 112.40 765 320.9 8.65 **Cd** Cadmium	49 114.82 2000 156.2 7.31 **In** Indium	50 118.69 2270 231.9 7.30 **Sn** Tin	51 121.75 1380 630.5 6.62 **Sb** Antimony	52 127.60 989.8 449.5 6.24 **Te** Tellurium	53 126.904 183 113.7 4.94 **I** Iodine	54 131.30 −108.0 −111.9 3.06 **Xe** Xenon
55 132.905 690 28.7 1.90 **Cs** Cesium	56 137.34 1640 714 3.5 **Ba** Barium	57 138.91 3470 920 6.17 **La** Lanthanum ★	72 178.49 5400 2222 13.1 **Hf** Hafnium	73 180.948 5425 2996 16.6 **Ta** Tantalum	74 183.85 5930 3410 19.3 **W** Wolfram	75 186.2 5900 3180 21.0 **Re** Rhenium	76 190.2 5500 3000 22.6 **Os** Osmium	77 192.2 5300 2454 22.5 **Ir** Iridium	78 195.09 4530 1769 21.4 **Pt** Platinum	79 196.967 2970 1063 19.3 **Au** Gold	80 200.59 357 −38.4 13.6 **Hg** Mercury	81 204.37 1457 303 11.85 **Tl** Thallium	82 207.19 1725 327.4 11.4 **Pb** Lead	83 208.980 1360 271.3 9.8 **Bi** Bismuth	84 (210) — 254 (9.2) **Po** Polonium	85 (210) — 13021 — **At** Astatine	86 (222) [1-61.8] [1-71] — **Rn** Radon
87 (223) — — — **Fr** Francium	88 (226) — 700 5.0 **Ra** Radium	89 (227) — 1050 — **Ac** Actinium ★★	104														

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58 140.12 3468 795 6.67 **Ce** Cerium	59 140.907 3127 935 6.77 **Pr** Praseodymium	60 144.24 3027 1024 7.00 **Nd** Neodymium	61 (147) — 11027 — **Pm** Promethium	62 150.35 1900 1072 7.54 **Sm** Samarium	63 151.96 1439 826 5.26 **Eu** Europium	64 157.25 3000 1312 7.89 **Gd** Gadolinium	65 158.924 2800 1356 8.27 **Tb** Terbium	66 162.50 2600 1407 8.54 **Dy** Dysprosium	67 164.930 2600 1461 8.80 **Ho** Holmium	68 167.26 2900 1497 9.05 **Er** Erbium	69 168.934 1727 1545 9.33 **Tm** Thulium	70 173.04 1427 824 6.98 **Yb** Ytterbium	71 174.97 3327 1652 9.84 **Lu** Lutetium
90 232.038 3850 1750 11.7 **Th** Thorium	91 (231) — 11230? 15.4 **Pa** Protactinium	92 238.03 3818 1132 19.07 **U** Uranium	93 (237) — 637 19.5 **Np** Neptunium	94 (242) — 3235 640 — **Pu** Plutonium	95 (243) — — — 11.7 **Am** Americium	96 (247) — — — — **Cm** Curium	97 (247) — — — — **Bk** Berkelium	98 (249) — — — — **Cf** Californium	99 (254) — — — — **Es** Einsteinium	100 (253) — — — — **Fm** Fermium	101 (256) — — — — **Md** Mendelevium	102 (254) — — — — **No** Nobelium	103 (257) — — — — **Lw** Lawrencium

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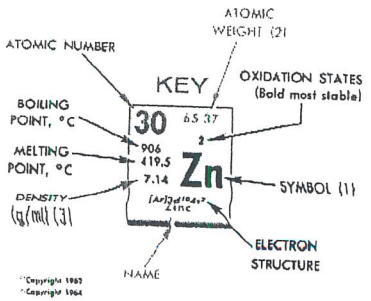

NOTES:

(1) Black — solid.
Red — gas.
Blue — liquid.
Outline — synthetically prepared.

(2) Based upon carbon – 12. ( ) indicates most stable or best known isotope.

(3). Values for gaseous elements are for liquids at the boiling point.

SARGENT-WELCH
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