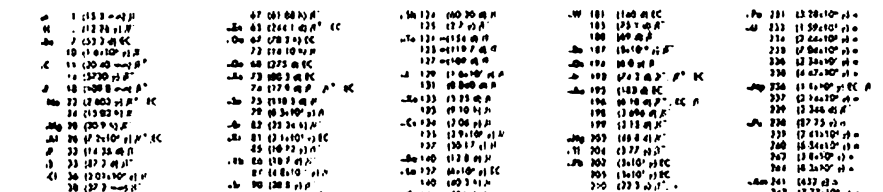
PERIODIC TABLE OF THE ELEMENTS

Table of Selected Radioactive Isotopes



Selected Radioactive Isotopes

Naturally occurring radioactive isotopes are designated by a mass number in blue (although some are also manufactured). Letter m indicates an isomer of another isotope of the same mass number. Half-lives listed in parentheses where s, min, h, d, and y stand respectively for seconds, minutes, hours, days, and years. The table includes mainly the longer-lived radioactive isotopes; many others have been prepared. Isotopes known to be radioactive but with half-lives exceeding 10^{14} y have not been included. Symbols describing the principal mode (or modes) of decay are as follows (these processes are generally accompanied by gamma radiation):

- α alpha particle emission
- β^- beta particle (electron) emission
- β^+ positron emission
- EC orbital electron capture
- IT isomeric transition from upper to lower isomeric state
- SF spontaneous fission

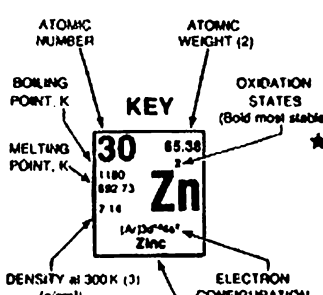
GROUP IA | IIA | IIIA | IVA | VA | VIA | VIIA | VIIIA | IB | IIB | IIIB | IVB | VB | VIB | VIIB | VIII

1 1.0079 1 **H** Hydrogen																	2 4.00260 **He** Helium
3 6.941 **Li** Lithium	4 9.01218 **Be** Beryllium										5 10.81 **B** Boron	6 12.011 **C** Carbon	7 14.0067 **N** Nitrogen	8 15.9994 **O** Oxygen	9 18.9984003 **F** Fluorine	10 20.179 **Ne** Neon
11 22.98977 **Na** Sodium	12 24.305 **Mg** Magnesium										13 26.98154 **Al** Aluminum	14 28.0855 **Si** Silicon	15 30.97376 **P** Phosphorus	16 32.06 **S** Sulfur	17 35.453 **Cl** Chlorine	18 39.948 **Ar** Argon
19 39.0983 **K** Potassium	20 40.08 **Ca** Calcium	21 44.9559 **Sc** Scandium	22 47.90 **Ti** Thanium	23 50.9415 **V** Vanadium	24 51.996 **Cr** Chromium	25 54.9380 **Mn** Manganese	26 55.847 **Fe** Iron	27 58.9332 **Co** Cobalt	28 58.70 **Ni** Nickel	29 63.546 **Cu** Copper	30 65.38 **Zn** Zinc	31 69.72 **Ga** Gallium	32 72.59 **Ge** Germanium	33 74.9216 **As** Arsenic	34 78.96 **Se** Selenium	35 79.904 **Br** Bromine	36 83.80 **Kr** Krypton
37 85.4678 **Rb** Rubidium	38 87.62 **Sr** Strontium	39 88.9059 **Y** Yttrium	40 91.22 **Zr** Zirconium	41 92.9064 **Nb** Niobium	42 95.94 **Mo** Molybdenum	43 (98) **Tc** Technetium	44 101.07 **Ru** Ruthenium	45 102.9055 **Rh** Rhodium	46 106.4 **Pd** Palladium	47 107.868 **Ag** Silver	48 112.41 **Cd** Cadmium	49 114.82 **In** Indium	50 118.69 **Sn** Tin	51 121.75 **Sb** Antimony	52 127.60 **Te** Tellurium	53 126.9045 **I** Iodine	54 131.30 **Xe** Xenon
55 132.9054 **Cs** Cesium	56 137.33 **Ba** Barium	57 138.9055 **La** Lanthanum	72 178.49 **Hf** Hafnium	73 180.9479 **Ta** Tantalum	74 183.85 **W** Tungsten	75 186.207 **Re** Rhenium	76 190.2 **Os** Osmium	77 192.22 **Ir** Iridium	78 195.09 **Pt** Platinum	79 196.9665 **Au** Gold	80 200.59 **Hg** Mercury	81 204.37 **Tl** Thallium	82 207.2 **Pb** Lead	83 208.9804 **Bi** Bismuth	84 (209) **Po** Polonium	85 (210) **At** Astatine	86 (222) **Rn** Radon
87 (223) **Fr** Francium	88 226.0254 **Ra** Radium	89 227.0278 **Ac** Actinium	104 (261) **Unq** (Unnilquadium)	105 (262) **Unp** (Unnilpentium)	106 (263) **Unh** (Unnilhexium)												

† The names and symbols of elements 104 - 106 are those recommended by IUPAC as systematic alternatives to those suggested by the purported discoverers Berkeley (USA) researchers have proposed Rutherfordium, Rf, for element 104 and Hahnium, Ha, for element 105. Dubna (USSR) researchers, who also claim the discovery of these elements have proposed different names (and symbols).

The A & B subgroup designations, applicable to elements in rows 4, 5, 6, and 7, are those recommended by the International Union of Pure and Applied Chemistry. It should be noted that some authors and organizations use the opposite convention in distinguishing these subgroups.

* Estimated Values



★ 58 140.12 **Ce** [Xe]4f¹5d¹6s² Cerium	59 140.9077 **Pr** [Xe]4f³6s² Praseodymium	60 144.24 **Nd** [Xe]4f⁴6s² Neodymium	61 (145) **Pm** [Xe]4f⁵6s² Promethium	62 150.4 **Sm** [Xe]4f⁶6s² Samarium	63 151.96 **Eu** [Xe]4f⁷6s² Europium	64 157.25 **Gd** [Xe]4f⁷5d¹6s² Gadolinium	65 158.9254 **Tb** [Xe]4f⁹6s² Terbium	66 162.50 **Dy** [Xe]4f¹⁰6s² Dysprosium	67 164.9304 **Ho** [Xe]4f¹¹6s² Holmium	68 167.26 **Er** [Xe]4f¹²6s² Erbium	69 168.9342 **Tm** [Xe]4f¹³6s² Thulium	70 173.04 **Yb** [Xe]4f¹⁴6s² Ytterbium	71 174.967 **Lu** [Xe] 4f¹⁴5d¹6s² Lutetium
★★ 90 232.0381 **Th** [Rn]6d²7s² Thorium	91 231.0359 **Pa** [Rn]5f²6d¹7s² Protactinium	92 238.029 **U** [Rn]5f³6d¹7s² Uranium	93 237.0482 **Np** [Rn]5f⁴6d¹7s² Neptunium	94 (244) **Pu** [Rn]5f⁶7s² Plutonium	95 (243) **Am** [Rn]5f⁷7s² Americium	96 (247) **Cm** [Rn]5f⁷6d¹7s² Curium	97 (247) **Bk** [Rn]5f⁹7s² Berkelium	98 (251) **Cf** [Rn]5f¹⁰7s² Californium	99 (252) **Es** [Rn]5f¹¹7s² Einsteinium	100 (257) **Fm** [Rn]5f¹²7s² Fermium	101 (258) **Md** [Rn]5f¹³7s² Mendelevium	102 (259) **No** [Rn]5f¹⁴7s² Nobelium	103 (260) **Lr** [Rn]5f¹⁴6d¹7s² Lawrencium

NOTES:

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

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

(3) Entries marked with asterisks refer to the gaseous state at 273 K and 1 atm and are given in units of g/l