

REFERENCE LISTS OF CHEMICAL ELEMENTS

EDGAR T. WHERRY

THE accompanying lists have been compiled from the most recent publications available. In Table I the data are taken chiefly from the 1916 Report of the International Committee on Atomic Weights, with a few additions; the atomic weights are carried to the first decimal place, which is all that is necessary for the calculation of mineral compositions.

TABLE I. THE CHEMICAL ELEMENTS, WITH THEIR SYMBOLS AND ATOMIC WEIGHTS

<i>Elements</i>	<i>Sym- bols</i>	<i>Atomic weights</i>	<i>Elements</i>	<i>Sym- bols</i>	<i>Atomic weights</i>
Actinium	Ac	—	Molybdenum	Mo	96.0
Aluminium	Al	27.1	Neodymium	Nd	144.3
Antimony (Stibium)	Sb	120.2	Neon	Ne	20.2
Argon	A	39.9	Nickel	Ni	58.7
Arsenic	As	75.0—	Niton (Ra-emanation)	Nt	222.0
Barium	Ba	137.4—	Nitrogen	N	14.0
Bismuth	Bi	208.0	Osmium	Os	190.9
Boron	B	11.0	Oxygen (THE STANDARD)	O	16.0
Bromine	Br	79.9	Palladium	Pd	106.7
Cadmium	Cd	112.4	Phosphorus	P	31.0+
Calcium	Ca	40.1—	Platinum	Pt	195.2
Carbon	C	12.0	Polonium	Po	—
Cerium	Ce	140.3—	Potassium (Kalium)	K	39.1
Cesium (Caesium)	Cs	132.8	Praseodymium	Pr	140.9
Chlorine	Cl	35.5—	Radium	Ra	226.0
Chromium	Cr	52.0	Rhodium	Rh	102.9
Cobalt	Co	59.0—	Rubidium	Rb	85.5—
Columbium (Niobium)	Cb	93.5	Ruthenium	Ru	101.7
Copper (Cuprum)	Cu	63.6—	Samarium	Sa	150.4
Dysprosium	Dy	162.5	Scandium	Sc	44.1
Erbium	Er	167.7	Selenium	Se	79.2
Europium	Eu	152.0	Silicon	Si	28.3
Fluorine	F	19.0	Silver (Argentum)	Ag	107.9—
Gadolinium	Gd	157.3	Sodium (Natrium)	Na	23.0
Gallium	Ga	69.9	Strontium	Sr	87.6+
Germanium	Ge	72.5	Sulfur (Sulphur)	S	32.1—
Glucinum (Beryllium)	Gl	9.1	Tantalum	Ta	181.5
Gold (Aurum)	Au	197.2	Tellurium	Te	127.5
Helium	He	4.0	Terbium	Tb	159.2
Holmium	Ho	163.5	Thallium	Tl	204.0
Hydrogen	H	1.0+	Thorium	Th	232.4
Indium	In	114.8	Thulium	Tm	168.5
Iodine	I	126.9	Tin (Stannum)	Sn	118.7
Iridium	Ir	193.1	Titanium	Ti	48.1
Iron (Ferrum)	Fe	55.8+	Tungsten (Wolframium)	W	184.0
Krypton	Kr	82.9	Uranium	U	238.2
Lanthanum	La	139.0	Vanadium	V	51.0
Lead (Plumbum)	Pb	207.2*	Xenon	Xe	130.2
Lithium	Li	6.9+	Ytterbium (Neo-)	Yb	173.5
Lutecium	Lu	175.0	Yttrium	Yt	88.7
Magnesium	Mg	24.3	Zinc	Zn	65.4—
Manganese	Mn	54.9+	Zirconium	Zr	90.6
Mercury (Hydrargyrum)	Hg	200.6			

* Radio-lead, which has the same chemical properties as lead, has a variable atomic weight, within the limits 206.3 and 208.5.

The nomenclature, symbols, and atomic weights given in the above list will be used in this magazine. Discoveries of new elements, and redeterminations of atomic weights which lead to essential changes, will be announced, as published, in our "Reviews and Abstracts" department.

In Table II, which represents the latest arrangement of the Periodic System, the 47 elements which have been reported as occurring native are underlined.

TABLE II. THE POSITIONS OF THE NATIVE ELEMENTS IN THE PERIODIC SYSTEM

<u>H</u>	<u>He</u>	Li	Be	B	<u>C</u>	<u>N</u>	<u>O</u>	<u>F</u>	
<u>Ne</u>	<u>Na</u>	Mg		Al	<u>Si</u>	<u>P</u>	<u>S</u>	<u>Cl</u>	
<u>A</u>	<u>K</u>	<u>Ca</u>	Sc	Ti		<u>V</u>	<u>Cr</u>	<u>Mn</u>	{ <u>Fe</u> <u>Co</u> <u>Ni</u>
		<u>Cu</u>	<u>Zn</u>	Ga	Ge	<u>As</u>	<u>Se</u>	<u>Br</u>	
<u>Kr</u>	Rb	<u>Sr</u>	Y	<u>Zr</u>		<u>Cb</u>	Mo		{ <u>Ru</u> <u>Rh</u> <u>Pd</u>
		<u>Ag</u>	Cd	In	<u>Sn</u>	<u>Sb</u>	<u>Te</u>	<u>I</u>	
<u>Xe</u>	Cs	Ba	{ LaSaHo CeEuEr PrGdTm NdTbYb ..DyLu }	..		<u>Ta</u>	W	<u>A</u>	{ <u>Os</u> <u>Ir</u> <u>Pt</u>
		<u>Au</u>		Hg	Tl	<u>Pb</u>	<u>Bi</u>	..	
<u>Nt</u>		Ra	Ac	Th		<u>Po</u>	U

While some of these native elements are found free in essentially pure form, many are known only as isomorphous mixtures with other closely related ones; these are indicated by the term "isomorph" in the table below. A few occur only in dispersoid form, that is, distributed in sub-microscopic particles through crystalline minerals, and giving rise to non-essential colors; these are also noted in Table III. In this table the relative stabilities under ordinary conditions of the different forms in which many of the elements occur are indicated by their order, the most stable ones being stated first in each case.

TABLE III. THE FORMS OF THE NATIVE ELEMENTS

<i>Elements</i>	<i>States or Types of Crystallization</i>	<i>Elements</i>	<i>States or Types of Crystallization</i>
Hydrogen	Gas	Vanadium	Isometric (Meteorite, isomorph)
Helium	Gas	Columbium	Isometric (Isomorph)
Neon	Gas	Tantalum	Isometric (Isomorph)
Argon	Gas	Oxygen	Gas
Krypton	Gas	—Ozone	Gas
Xenon	Gas	Sulfur	Orthorhombic
Nitron	Gas		Monoclinic
Sodium	Dispersoid		Amorphous
Potassium	Dispersoid		Gas
Copper	Isometric	Selenium	Monoclinic
Silver	Isometric		Trigonal (Isomorph)
	Amorphous		Orthorhombic (Isomorph)
	Liquid (Amalgam)		Amorphous
	Gas		Gas
Gold	Isometric	Tellurium	Trigonal
	Amorphous		Orthorhombic (Isomorph)
	Liquid (Amalgam)		Gas
Calcium	Dispersoid	Chromium	Isometric (Meteorite, isomorph)
Zinc	Trigonal	Fluorine	Gas
Mercury	Isometric (Isomorph)	Chlorine	Gas
	Liquid	Bromine	Gas (or liquid)
	Gas	Iodine	Amorphous
Carbon	Trigonal (Graphite)	Manganese	Isometric (Isomorph)
	Isometric (Diamond)	Iron	Isometric
	Amorphous	Cobalt	Isometric (Isomorph)
Silicon	Dispersoid	Nickel	Isometric (Isomorph)
Tin	Tetragonal	Ruthenium	Trigonal (Isomorph)
Lead	Isometric	Rhodium	Trigonal (Isomorph)
Nitrogen	Gas		Isometric (Isomorph')
Phosphorus	Isometric (Meteorite)	Palladium	Isometric (Isomorph)
	Amorphous		Trigonal
Arsenic	Trigonal	Osmium	Trigonal (Isomorph)
	Monoclinic		Isometric (Isomorph)
	Isometric	Iridium	Trigonal (Isomorph)
	Amorphous		Isometric (Isomorph)
Antimony	Trigonal	Platinum	Isometric (Isomorph)
Bismuth	Trigonal		Trigonal (Isomorph)

Several of the above forms have not been noted in Dana's System of Mineralogy nor any of the Appendices to that work; references to their occurrence will be given in a subsequent article.