

The Modern View of Atomic Structure

The atom consists of positive, negative, and neutral entities (protons, electrons, and neutrons).

The Modern View of Atomic Structure

Isotopes, Atomic Numbers, and Mass Numbers

Atomic number (Z) = number of protons in the nucleus.

Mass number (A) = total number of nucleons in the nucleus (i.e., protons and neutrons).

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Isotopes, Atomic Numbers, and Mass Numbers

TABLE 2.2 Some of the Isotopes of Carbon^a

Symbol	Number of Protons	Number of Electrons	Number of Neutrons
^{11}C	6	6	5
^{12}C	6	6	6
^{13}C	6	6	7
^{14}C	6	6	8

^a Almost 99 percent of the carbon found in nature consists of ^{12}C .

The Periodic Table

1A 1																		8A 18
1 H	2A 2												3A 13	4A 14	5A 15	6A 16	7A 17	2 He
3 Li	4 Be						8B						5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	3B 3	4B 4	5B 5	6B 6	7B 7	8	9	10	1B 11	2B 12	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar	
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr	
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe	
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn	
87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Uun	111 Uuu	112 Uub							
Metals			58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu		
Metalloids			90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr		
Nonmetals																		

The Periodic Table

Some of the groups in the periodic table are given special names.

These names indicate the similarities between group members:

Molecules and Molecular Compounds

Molecular and Empirical Formulas

Molecular formulas

Empirical formulas

Ions and Ionic Compounds

Predicting Ionic Charge

The number of electrons an atom loses is related to its position on the periodic table.

Metals tend to form cations whereas non-metals tend to form anions.

1A	2A	Transition metals						3A	4A	5A	6A	7A	8A
H ⁺												H ⁻	NOBLE GASES
Li ⁺									N ³⁻	O ²⁻	F ⁻		
Na ⁺	Mg ²⁺						Al ³⁺			S ²⁻	Cl ⁻		
K ⁺	Ca ²⁺									Se ²⁻	Br ⁻		
Rb ⁺	Sr ²⁺									Te ²⁻	I ⁻		
Cs ⁺	Ba ²⁺												

Naming Inorganic Compounds

Names and Formulas of Ionic Compounds

Naming of compounds, nomenclature, is divided into organic compounds (those containing C) and inorganic compounds (the rest of the periodic table).

Naming Inorganic Compounds

Names and Formulas of Ionic Compounds

Common Cations

Charge	Formula	Name	Formula	Name
1+	H	Hydrogen ion	NH ₄ ⁺	Ammonium ion
	Li ⁺	Lithium ion	Cu ⁺	Copper(I) or cuprous ion
	Na ⁺	Sodium ion		
	K ⁺	Potassium ion		
	Cs ⁺	Cesium ion		
	Ag ⁺	Silver ion		
2+	Mg ²⁺	Magnesium ion	Co ²⁺	Cobalt(II) or cobaltous ion
	Ca ²⁺	Calcium ion	Cu ²⁺	Copper(II) or cupric ion
	Sr ²⁺	Strontium ion	Fe ²⁺	Iron(II) or ferrous ion
	Ba ²⁺	Barium ion	Mn ²⁺	Manganese(II) or manganous ion
	Zn ²⁺	Zinc ion	Hg ₂ ²⁺	Mercury(I) or mercurous ion
	Cd ²⁺	Cadmium ion	Hg ²⁺	Mercury(II) or mercuric ion
			Ni ²⁺	Nickel(II) or nickelous ion
			Pb ²⁺	Lead(II) or plumbous ion
			Sn ²⁺	Tin(II) or stannous ion
3+	Al ³⁺	Aluminum ion	Cr ³⁺	Chromium(III) or chromic ion
			Fe ³⁺	Iron(III) or ferric ion

Naming Inorganic Compounds

Names and Formulas of Ionic Compounds

Monatomic anions (with only one atom) are called

Polyatomic anions (with many atoms) containing oxygen end in

Naming Inorganic Compounds

Names and Formulas of Ionic Compounds

Polyatomic anions containing oxygen with more than two members in the series are named as follows

Naming Inorganic Compounds

Names and Formulas of Ionic Compounds

Polyatomic anions containing oxygen with additional hydrogens are named by

Naming Inorganic Compounds

Names and Formulas of Ionic Compounds

Name the anion then cation for the ionic compound.

Naming Inorganic Compounds

Names and Formulas of Acids