

1 H hydrogen																	2 He helium														
3 Li lithium	4 Be beryllium																	5 B boron	6 C carbon	7 N nitrogen	8 O oxygen	9 F fluorine	10 Ne neon								
11 Na sodium	12 Mg magnesium																	13 Al aluminum	14 Si silicon	15 P phosphorus	16 S sulfur	17 Cl chlorine	18 Ar argon								
19 K potassium	20 Ca calcium	21 Sc scandium	22 Ti titanium	23 V vanadium	24 Cr chromium	25 Mn manganese	26 Fe iron	27 Co cobalt	28 Ni nickel	29 Cu copper	30 Zn zinc	31 Ga gallium	32 Ge germanium	33 As arsenic	34 Se selenium	35 Br bromine	36 Kr krypton														
37 Rb rubidium	38 Sr strontium	39 Y yttrium	40 Zr zirconium	41 Nb niobium	42 Mo molybdenum	43 Tc technetium	44 Ru ruthenium	45 Rh rhodium	46 Pd palladium	47 Ag silver	48 Cd cadmium	49 In indium	50 Sn tin	51 Sb antimony	52 Te tellurium	53 I iodine	54 Xe xenon														
55 Cs cesium	56 Ba barium	57 La lanthanum	58 Ce cerium	59 Pr praseodymium	60 Nd neodymium	61 Pm promethium	62 Sm samarium	63 Eu europium	64 Gd gadolinium	65 Tb terbium	66 Dy dysprosium	67 Ho holmium	68 Er erbium	69 Tm thulium	70 Yb ytterbium	71 Lu lutetium	72 Hf hafnium	73 Ta tantalum	74 W tungsten	75 Re rhenium	76 Os osmium	77 Ir iridium	78 Pt platinum	79 Au gold	80 Hg mercury	81 Tl thallium	82 Pb lead	83 Bi bismuth	84 Po polonium	85 At astatine	86 Rn radon
87 Fr francium	88 Ra radium	89 Ac actinium	90 Th thorium	91 Pa protactinium	92 U uranium	93 Np neptunium	94 Pu plutonium	95 Am americium	96 Cm curium	97 Bk berkelium	98 Cf californium	99 Es einsteinium	100 Fm fermium	101 Md mendelevium	102 No nobelium	103 Lr lawrencium	104 Db dubnium	105 Sg seaborgium	106 Bh bohrium	107 Hs hassium	108 Mt meitnerium	109 Ds darmstadtium	110 Rg roentgenium	111 Uub unbibium	112 Uut ununtrium	113 Uuq unquadium	114 Uup unpentium	115 Uuh unhexium	116 Uus unseptium	117 Uuo unoctium	118 Uug unvigintiium

1
H
hydrogen

2
He
helium

3
Li
lithium

4
Be
beryllium

5
B
boron

6
C
carbon

7
N
nitrogen

8
O
oxygen

9
F
fluorine

10
Ne
neon

11
Na
sodium

12
Mg
magnesium

13
Al
aluminum

14
Si
silicon

15
P
phosphorus

16
S
sulfur

17
Cl
chlorine

18
Ar
argon

19
K
potassium

20
Ca
calcium

21
Sc
scandium

22
Ti
titanium

23
V
vanadium

24
Cr
chromium

25
Mn
manganese

26
Fe
iron

27
Co
cobalt

28
Ni
nickel

29
Cu
copper

30
Zn
zinc

31
Ga
gallium

32
Ge
germanium

33
As
arsenic

34
Se
selenium

35
Br
bromine

36
Kr
krypton

37
Rb
rubidium

38
Sr
strontium

39
Y
yttrium

40
Zr
zirconium

41
Nb
niobium

42
Mo
molybdenum

43
Tc
technetium

44
Ru
ruthenium

45
Rh
rhodium

46
Pd
palladium

47
Ag
silver

48
Cd
cadmium

49
In
indium

50
Sn
tin

51
Sb
antimony

52
Te
tellurium

53
I
iodine

54
Xe
xenon

55
Cs
cesium

56
Ba
barium

57
La
lanthanum

58
Ce
cerium

59
Pr
praseodymium

60
Nd
neodymium

61
Pm
promethium

62
Sm
samarium

63
Eu
europium

64
Gd
gadolinium

65
Tb
terbium

66
Dy
dysprosium

67
Ho
holmium

68
Er
erbium

69
Tm
thulium

70
Yb
ytterbium

71
Lu
lutetium

72
Hf
hafnium

73
Ta
tantalum

74
W
tungsten

75
Re
rhenium

76
Os
osmium

77
Ir
iridium

78
Pt
platinum

79
Au
gold

80
Hg
mercury

81
Tl
thallium

82
Pb
lead

83
Bi
bismuth

84
Po
polonium

85
At
astatine

86
Rn
radon

87
Fr
francium

88
Ra
radium

89
Ac
actinium

90
Th
thorium

91
Pa
protactinium

92
U
uranium

93
Np
neptunium

94
Pu
plutonium

95
Am
americium

96
Cm
curium

97
Bk
berkelium

98
Cf
californium

99
Es
einsteinium

100
Fm
fermium

101
Md
mendelevium

102
No
nobelium

103
Lr
lawrencium

104
Db
dubnium

105
Sg
seaborgium

106
Bh
bohrium

107
Hs
hassium

108
Mt
meitnerium

109
Ds
darmstadtium

110
Rg
roentgenium

111
Uub
unbibium

112
Uut
ununtrium

113
Uuq
unquadium

114
Uup
unpentium

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unhexium

116
Uus
unseptium

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Uuo
unoctium

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unvigintiium

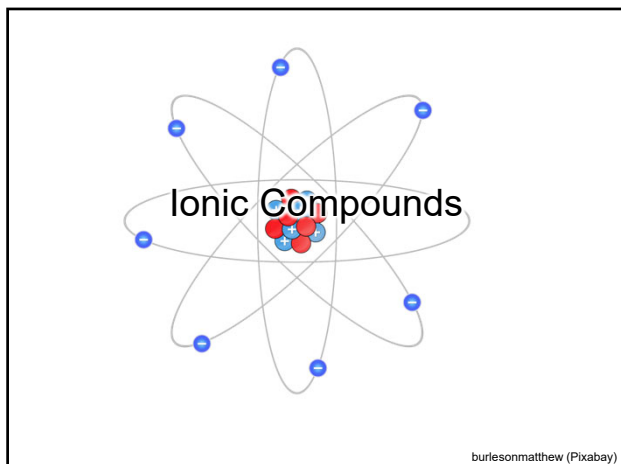
STABLE
half life more than one trillion years
half life in range of billion years
half life in range of million years
half life in range of thousands of years
half life in range of years
half life in range of days
half life in range of hours
half life in range of minutes
half life in range of seconds
half life in range of milliseconds
half life experimentally

Naming Chemical Compounds

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Naming Chemical Compounds

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burlesonmatthew (Pixabay)

Simple Compounds

- The name of a binary compound containing monatomic ions consists of the name of the **cation** (the name of the metal) followed by the name of the **anion** (the name of the nonmetallic element with its ending replaced by the suffix *-ide*).

Examples

- NaCl
 - Sodium chloride
- MgF_2
 - Magnesium fluoride
- Al_2O_3
 - Aluminum oxide
- Na_2O
 - Sodium oxide

Compounds Containing Polyatomic Ions

- Compounds containing polyatomic ions are named by naming the cation and then the anion.

Examples

- CaSO_4
 - Calcium sulfate
- KNO_3
 - Potassium nitrate
- NaOH
 - Sodium hydroxide
- $\text{Al}_2(\text{CO}_3)_3$
 - Aluminum carbonate

Compounds Containing a Metal Ion with a Variable Charge

- All the transition metals and many main group metals can form cations with different charges.
- In the name, the charge of the metal ion is specified by a Roman numeral in parentheses after the name of the metal.
- The charge of the metal ion is determined from the formula of the compound and the charge of the anion.

- For example, consider the compound FeCl_2 .
- Iron can have a charge of 2+ or 3+.
- Chlorine has a charge of 1-.
- There are two chlorine atoms, so the total charge from chlorine is 2-.
- Since the number of charges must be equal, the charge on iron must be 2+.
- Therefore, the name of iron must be iron(II).
- The compound is therefore iron(II) chloride.

Examples

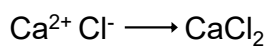
- FeCl_3
 - Iron(III) chloride
- SnF_2
 - Tin(II) fluoride
- SnF_4
 - Tin(IV) fluoride
- HgO
 - Mercury(II) oxide

Writing Formulas

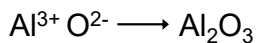
- Write the chemical symbol for both ions, including the charge.
- “Criss-cross” the charges of each ion.
- Like charges cancel out.

Examples

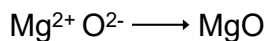
calcium chloride



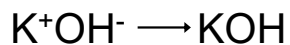
aluminum oxide



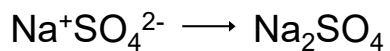
magnesium oxide



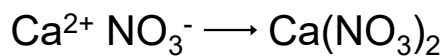
potassium hydroxide



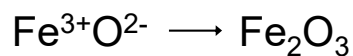
sodium sulfate



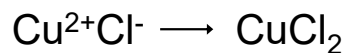
calcium nitrate



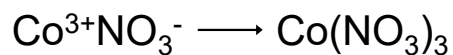
iron(III) oxide

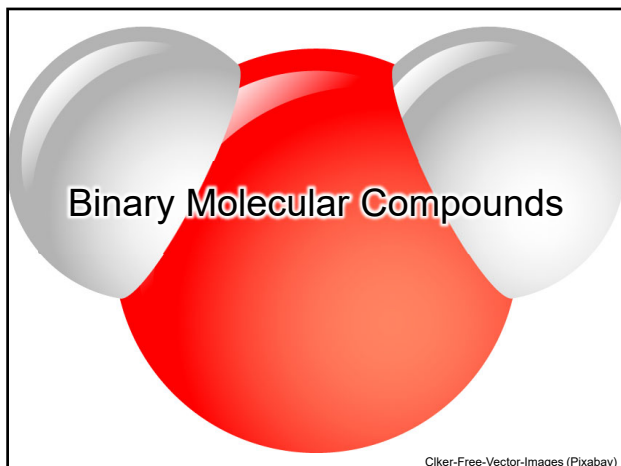


copper(II) chloride



cobalt(III) nitrate





- When two non-metallic elements form a molecular compound, several combination ratios are often possible.
- For example, carbon and oxygen can form the compounds CO and CO₂.
- Since these are different substances with different properties, they cannot both have the same name.
- To deal with this situation, we add prefixes to specify the numbers of atoms of each element.

- The name of a binary molecular compound consists of the name of the first element followed by the name of the second element with the suffix "ide."
- A prefix representing the number of atoms is placed in front of each name.
- If there is only one of the first element, the prefix is normally omitted.

Prefixes

- | | |
|-------------|-------------|
| • 1 = mono | • 6 = hexa |
| • 2 = di | • 7 = hepta |
| • 3 = tri | • 8 = octa |
| • 4 = tetra | • 9 = nona |
| • 5 = penta | • 10 = deca |

Examples

CO_2	carbon dioxide
N_2O_5	dinitrogen pentoxide
C_4H_8	tetracarbon octahydride

Writing Formulas

- Write the chemical symbol for both elements.
- The number of each element is given by the prefix.

Examples

tricarbon tetrahydride C_3H_4

sulfur dioxide SO_2

nitrogen monoxide NO
