

II. Binary Compounds containing Two Non-Metals

The name consists of the non-metal that is further toward the left and bottom of the periodic table, followed by the -ide form of the second non-metal.

Compounds containing more than one of the non-metal elements can be distinguished by:

Mono – one	Penta – five	Octa – eight
Di – two	Hexa – six	Nona – nine
Tri – three	Hepta – seven	Deca – ten
Tetra – four		



Ex. CO Carbon monoxide
CO₂ Carbon dioxide

Practice: Name the following compounds.

- | | | | |
|-----------------------------------|-------------------------------|----------------------------------|------------------------------|
| 1. PBr ₃ | <u>phosphorous tribromide</u> | 4. SiO ₂ | <u>silicon dioxide</u> |
| 2. CS ₂ | <u>carbon disulfide</u> | 5. N ₂ O ₅ | <u>di nitrogen pentoxide</u> |
| 3. Cl ₂ O ₇ | <u>dichlorine heptoxide</u> | 6. XeF ₄ | <u>xenon tetrafluoride</u> |

Practice: Write the formula for the following compounds.

- | | | | |
|--------------------------|------------------------------------|-----------------------------|-----------------------------------|
| 1. Dibromine tetraoxide | <u>Br₂O₄</u> | 4. Tetrasulfur tetranitride | <u>S₄N₄</u> |
| 2. Diiodine tetraoxide | <u>I₂O₄</u> | 5. Sulfur hexafluoride | <u>SF₆</u> |
| 3. Phosphorous triiodide | <u>PI₃</u> | 6. Oxygen dibromide | <u>OBr₂</u> |

V. Binary Inorganic Compounds (Acids)

Containing a hydrogen and a non-metal. Start with hydrogen then the -ide form of the non-metal. When this type of compound is in an aqueous solution it will form an acid, then state hydro for the hydrogen and add the suffix -ic to the non-metal.

An acid is a molecular substance that when dissolved in water produces hydrogen ions (H⁺).

Ex. HCl(aq) hydrochloric acid
H₂S(aq) hydrosulfuric acid

If the combination is hydrogen and a polyatomic ion change the -ate of the polyatomic ion to -ic.

Ex. C₂H₃O₂⁻ acetate → HC₂H₃O₂ acetic acid
PO₄³⁻ phosphate → H₃PO₄ phosphoric acid

VI. Ternary Compounds (Acids)

Chlorine, nitrogen, sulfur, phosphorus, and others form oxyacids. Oxyacids are ternary compounds with hydrogen and oxygen.

If the acid has the most oxygen then it has the suffix -ic.

If the acid has fewer oxygen then it has the suffix -ous.

If the acid has the greatest number of oxygen it has the prefix per-

If the acid has the least number of oxygen it has the prefix hypo-

Ex. HClO₄ Perchloric acid
HClO₃ Chloric acid
HClO₂ Chlorous acid
HClO Hypochlorous acid

 and w/ ide

n.m. + oxygen
end -ate
-ite

Write the name for the following ionic compounds.

26. Mg_3N_2 magnesium nitride 31. Ag_2S Silver(2) sulfide
 27. $Ca_3(PO_4)_2$ Calcium phosphate 32. $Fe(NO_3)_3$ iron(III) nitrate
 28. $Al_2(SO_4)_3$ aluminium sulfate 33. $Ba(CO_3)$ barium carbonate
 29. $(NH_4)Cl$ ammonium chloride 34. $Li_2(C_2O_4)$ lithium oxalate
 30. K_2O potassium oxide 35. CuI_2 Copper(II) iodide

Write the formula for the following ionic compounds.

36. Calcium sulfide CaS 41. Barium phosphate $Ba_3(PO_4)_2$
 37. Magnesium phosphide Mg_3P_2 42. Ammonium nitrite $(NH_4)(NO_2)$
 38. Sodium sulfate $Na_2(SO_4)$ 43. Aluminium chloride $AlCl_3$
 39. Potassium bicarbonate $K(HCO_3)$ 44. Cesium bromide $CsBr$
 40. Zinc bromide $ZnBr_2$ 45. Potassium permanganate $K(MnO_4)$

Write the names for the following metallic compounds.

46. $^{+1}CuCl^{-1}$ copper(I) chloride 48. $^{+3}Fe_2O_3^{-2}$ iron(III) oxide
 47. $^{+2}HgO^{-2}$ mercury(II) oxide 49. Bi_2O_3 bismuth(III) oxide

Write the formula for the following metallic compounds.

50. Tin(IV) chloride $SnCl_4$ 55. Mercury(I) nitride Hg_2N
 51. Cobalt(II) fluoride CoF_2 56. Iron(II) oxide FeO
 52. Chromium(II) sulfide CrS 57. Copper(II) hydroxide $Cu(OH)_2$
 53. Lead(II) sulfide PbS 58. Iron(III) nitrate $Fe(NO_3)_3$
 54. Tin(II) bromide $SnBr_2$ 59. Copper(II) iodide CuI_2

Write the name for the following covalent compounds.

60. NO _____ 65. N_2O_3 _____
 61. P_2O_5 _____ 66. S_2Br_2 _____
 62. PCl_5 _____ 67. CS_2 _____
 63. IF_7 _____ 68. ClF_5 _____
 64. CBr_4 _____ 69. SO_3 _____

IA X ⁺ 1+	IIA X ²⁺ 2+	Grp B imitate bases on charge	IIIA X ³⁺ 3+	IIIA X ⁴⁺ 4+	IVA X ³⁻ 3-	VIA X ²⁻ 2-	VIIA X ¹⁻ 1-	VIIIA X ⁰ none
linear	trigonal planar	tetra- hedral	pyra- midal	bent				

Type of Bonds

0 - 0.49 nonpolar covalent - NPC — non-polar molecule

0.5 - 1.9 polar covalent - PC

2.0 - 4.0 ionic - I

} will need arrows to determine
molecular polarity

	Lewis Dot Structure	Ball + Stick	Type of Bonds	Name of shape	Molecular Polarity
<u>SeBr₂</u>			$\begin{array}{r} 2.8 \\ 2.4 \\ \hline .4 \end{array}$ NPC	bent	nonpolar molecule
<u>GaCl₃</u>			$\begin{array}{r} Cl 3.0 \\ Ga 1.6 \\ \hline 1.4 \end{array}$ PC	trigonal planar	nonpolar mol.
<u>PF₃</u>			$\begin{array}{r} F 4.0 \\ P 2.1 \\ \hline 1.9 \end{array}$ PC	pyramidal	Polar mol.
<u>MgI₂</u>			$\begin{array}{r} I 2.5 \\ Mg 1.2 \\ \hline 1.3 \end{array}$ PC	linear	nonpolar mol.

Homework: Study for bonds + shapes Quesd, study polyatomic ions.

