

## Laboratory #6: Naming Compounds

### Part A: Nomenclature of Binary Compounds:

#### Ionic Compounds (Metal + Non-Metal)

	Compound Formula	Cation Formula and name	Anion Formula and name	Compound Name
<b>Example:</b>	NaCl	Na <sup>+</sup> , sodium ion	Cl <sup>-</sup> , chloride ion	Sodium chloride
<b>1.</b>	CaBr <sub>2</sub>	Ca <sup>2+</sup> , calcium ion	Br <sup>-</sup> , bromide ion	Calcium bromide
<b>2.</b>	Mg <sub>3</sub> N <sub>2</sub>	Mg <sup>2+</sup> , magnesium ion	N <sup>3-</sup> , nitride ion	Magnesium nitride
<b>3.</b>	K <sub>2</sub> S	K <sup>+</sup> , potassium ion	S <sup>2-</sup> , sulfide ion	Potassium sulfide
<b>4.</b>	ZnO	Zn <sup>2+</sup> , zinc ion	O <sup>2-</sup> , oxide ion	Zinc oxide
<b>5.</b>	SnO <sub>2</sub>	Sn <sup>4+</sup> , tin(IV) ion	O <sup>2-</sup> , oxide ion	Tin(IV) oxide
<b>6.</b>	Cr <sub>2</sub> S <sub>3</sub>	Cr <sup>3+</sup> , chromium (III) ion	S <sup>2-</sup> , sulfide ion	Chromium(III) sulfide
<b>7.</b>	Cu <sub>3</sub> P	Cu <sup>+</sup> , copper (I) ion	P <sup>3-</sup> , phosphide ion	Copper(I) phosphide

#### Molecular Compounds (Non-Metal + Non-Metal)

	Compound Formula	Compound Name
<b>Example:</b>	N <sub>2</sub> O <sub>3</sub>	Dinitrogen trioxide
<b>1.</b>	SF <sub>6</sub>	Sulfur hexafluoride
<b>2.</b>	CO	Carbon monoxide
<b>3.</b>	CH <sub>4</sub>	Carbon tetrahydride

**Ionic Compounds (Metal + Non-Metal)**

	<b>Compound Formula</b>	<b>Cation Formula and name</b>	<b>Anion Formula and name</b>	<b>Compound Name</b>
<b>1.</b>	RbI	Rb <sup>+</sup> , rubidium ion	I <sup>-</sup> , iodide ion	RbI
<b>2.</b>	Ca <sup>2+</sup>	Ca <sup>2+</sup> , calcium ion	N <sup>3-</sup> , nitride ion	Calcium nitride
<b>3.</b>	TiCl <sub>4</sub>	Ti <sup>4+</sup> , titanium(IV) ion	Cl <sup>-</sup> , chloride ion	Titanium(IV) chloride
<b>4.</b>	SrS	Sr <sup>2+</sup> , strontium ion	S <sup>2-</sup> , sulfide ion	Strontium sulfide
<b>5.</b>	Au <sub>2</sub> O <sub>3</sub>	Au <sup>3+</sup> , gold (III) ion	O <sup>2-</sup> , oxide ion	Gold(III) oxide
<b>6.</b>	HgO	Hg <sup>2+</sup> , mercury(II) ion	O <sup>2-</sup> , oxide ion	Mercury(II) oxide
<b>7.</b>	Cd <sub>3</sub> P <sub>2</sub>	Cd <sup>2+</sup> , cadmium ion	P <sup>3-</sup> , phosphide ion	Cadmium phosphide

**Molecular Compounds (Non-Metal + Non-Metal)**

	<b>Compound Formula</b>	<b>Compound Name</b>
<b>1.</b>	ICl	Iodine monochloride
<b>2.</b>	N <sub>2</sub> O <sub>5</sub>	Dinitrogen pentoxide
<b>3.</b>	BrF <sub>5</sub>	Bromine pentafluoride
<b>4.</b>	C <sub>3</sub> H <sub>8</sub>	Tricarbon octahydride

**Part B: Nomenclature of Ionic Compounds with Polyatomic Ions:**

	<b>Compound Formula</b>	<b>Cation Formula and name</b>	<b>Anion Formula and name</b>	<b>Compound Name</b>
<b>1.</b>	NaNO <sub>3</sub>	Na <sup>+</sup> , sodium ion	NO <sub>3</sub> <sup>-</sup> , nitrate ion	Sodium nitrate
<b>2.</b>	Ca(NO <sub>2</sub> ) <sub>2</sub>	Ca <sup>2+</sup> , calcium ion	NO <sub>2</sub> <sup>-</sup> , nitrite ion	Calcium nitrite
<b>3.</b>	NH <sub>4</sub> Cl	NH <sub>4</sub> <sup>+</sup> , ammonium ion	Cl <sup>-</sup> , chloride ion	Ammonium chloride
<b>4.</b>	SrSO <sub>4</sub>	Sr <sup>2+</sup> , strontium ion	SO <sub>4</sub> <sup>2-</sup> , sulfate ion	Strontium sulfate
<b>5.</b>	Ag <sub>2</sub> SO <sub>3</sub>	Ag <sup>+</sup> , silver ion	SO <sub>3</sub> <sup>2-</sup> , sulfite ion	Silver sulfite
<b>6.</b>	KC <sub>2</sub> H <sub>3</sub> O <sub>2</sub>	K <sup>+</sup> , potassium ion	C <sub>2</sub> H <sub>3</sub> O <sub>2</sub> <sup>-</sup> , acetate ion	Potassium acetate
<b>7.</b>	Cd <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub>	Cd <sup>2+</sup> , cadmium ion	PO <sub>4</sub> <sup>3-</sup> , phosphate ion	Cadmium phosphate
<b>8.</b>	Cu(OH) <sub>2</sub>	Cu <sup>2+</sup> , copper(II) ion	OH <sup>-</sup> , hydroxide ion	Copper(II) hydroxide
<b>9.</b>	NaCN	Na <sup>+</sup> , sodium ion	CN <sup>-</sup> , cyanide ion	Sodium cyanide

## Part C: Chemical Formulas

### 1. Name the following compounds:

- a)  $\text{NaF}$                   sodium fluoride
- b)  $\text{PbS}_2$                 lead(IV) sulfide
- c)  $\text{TiO}_2$                 titanium(IV) oxide
- d)  $\text{Cr}_2\text{O}_3$               chromium(III) oxide
- e)  $\text{Zn}_3\text{P}_2$               zinc phosphide
- f)  $\text{MnO}_2$               magnesium oxide
- g)  $\text{PI}_3$                 phosphorus triiodide
- h)  $\text{S}_2\text{Br}_2$               disulfur dibromide
- i)  $\text{IBr}_5$                 iodine pentabromide
- j)  $\text{XeF}_4$                 xenon tetrafluoride

### 2. Write the formulas for the following compounds:

- a) Barium iodide                                   $\text{BaI}_2$
- b) Palladium (II) bromide                         $\text{PdBr}_2$
- c) Zinc arsenide                                    $\text{Zn}_3\text{As}_2$
- d) Gold (III) oxide                                 $\text{Au}_2\text{O}_3$
- e) Lead (IV) oxide                                 $\text{PbO}_2$
- f) Copper (I) sulfide                               $\text{Cu}_2\text{S}$
- g) Sulfur hexafluoride                            $\text{SF}_6$
- h) Nitrogen trichloride                           $\text{NCl}_3$
- i) Chlorine Dioxide                                $\text{ClO}_2$
- j) Phosphorus pentachloride                    $\text{PCl}_5$

**Name the following compounds:**

- |  |   |  |   |
|--|---|--|---|
| 1. ZnS   | zinc sulfide                                | 26. NH <sub>3</sub>                                  | nitrogen trihydride                         |
| 2. Mg(ClO <sub>2</sub> ) <sub>2</sub>                | magnesium chlorite                          | 27. PCl <sub>5</sub>                                 | phosphorus pentachloride                    |
| 3. Ca(OH) <sub>2</sub>                               | calcium hydroxide                           | 28. Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>    | sodium thiosulfate                          |
| 4. KMnO <sub>4</sub>                                 | potassium permanganate                      | 29. KH <sub>2</sub> PO <sub>4</sub>                  | Potassium dihydrogen phosphate              |
| 5. Ag <sub>3</sub> PO <sub>4</sub>                   | silver phosphate                            | 30. CoS  | cobalt(II) sulfide                          |
| 6. H <sub>2</sub> S                                  | hydrosulfuric acid<br>(or hydrogen sulfide) | 31. Cd <sub>3</sub> (AsO <sub>4</sub> ) <sub>2</sub> | cadmium arsenate                            |
| 7. CaO   | calcium oxide                               | 32. NaHSO <sub>3</sub>                               | sodium hydrogen sulfite                     |
| 8. H <sub>2</sub> CO <sub>3</sub>                    | carbonic acid                               | 33. Li <sub>2</sub> HPO <sub>4</sub>                 | lithium hydrogen phosphate                  |
| 9. Ni(NO <sub>3</sub> ) <sub>2</sub>                 | nickel(II) nitrate                          | 34. H <sub>3</sub> PO <sub>3</sub>                   | phosphorous acid                            |
| 10. KCl  | potassium chloride                          | 35. MnSO <sub>4</sub>                                | manganese(II) sulfate                       |
| 11. Li <sub>2</sub> O                                | lithium oxide                               | 36. Ca(IO) <sub>2</sub>                              | calcium hypoiodate                          |
| 12. Al(H <sub>2</sub> PO <sub>4</sub> ) <sub>3</sub> | Aluminum dihydrogen phosphate               | 37. SiO <sub>2</sub>                                 | silicon dioxide                             |
| 13. MgO  | magnesium oxide                             | 38. CuCl   | copper(I) chloride                          |
| 14. SnF <sub>2</sub>                                 | tin(II) fluoride                            | 39. CrCl <sub>3</sub>                                | chromium(III) trichloride                   |
| 15. AsCl <sub>5</sub>                                | arsenic pentachloride                       | 40. CaSO <sub>4</sub> · 2H <sub>2</sub> O            | calcium sulfate dihydrate                   |
| 16. Hg(OH) <sub>2</sub>                              | mercury(II) hydroxide                       | 41. Hg <sub>2</sub> Cl <sub>2</sub>                  | mercury(I) chloride                         |
| 17. HF   | hydrofluoric acid<br>(or hydrogen fluoride) | 42. P <sub>2</sub> O <sub>3</sub>                    | diphosphorus trioxide                       |
| 18. FeSO <sub>4</sub>                                | iron(II) sulfate                            | 43. HClO   | hypochlorous acid                           |
| 19. SnCl <sub>4</sub>                                | tin(IV) chloride                            | 44. NO <sub>2</sub>                                  | nitrogen dioxide                            |
| 20. AsBr <sub>3</sub>                                | arsenic tribromide                          | 45. NaH  | sodium hydride                              |
| 21. KCN  | potassium cyanide                           | 46. H <sub>2</sub> O <sub>2</sub>                    | hydrogen peroxide                           |
| 22. NH <sub>4</sub> OH                               | ammonium hydroxide                          | 47. Pb(NO <sub>3</sub> ) <sub>2</sub>                | lead(II) nitrate                            |
| 23. NaHCO <sub>3</sub>                               | sodium hydrogen carbonate                   | 48. H <sub>2</sub> Se                                | hydroselenic acid<br>(or hydrogen selenide) |
| 24. HNO <sub>2</sub>                                 | nitrous acid                                | 49. H <sub>3</sub> PO <sub>2</sub>                   | hypophosphorous acid                        |
| 25. CS <sub>2</sub>                                  | carbon disulfide                            | 50. CaH <sub>2</sub>                                 | calcium hydride                             |

**Write the formulas for the following compounds:**

- |                                     |   |  |   |
|-------------------------------------|---|--|---|
| 51. lithium fluoride                | LiF   | 76. strontium carbonate                              | SrCO <sub>3</sub>                               |
| 52. phosphoric acid                 | H <sub>3</sub> PO <sub>4</sub>                  | 77. calcium nitrate                                  | Ca(NO <sub>3</sub> ) <sub>2</sub>               |
| 53. boron trichloride               | BCl <sub>3</sub>                                | 78. sulfur dichloride                                | SCl <sub>2</sub>                                |
| 54. ferric phosphate                | FePO <sub>4</sub>                               | 79. tin(IV) oxide                                    | SnO <sub>2</sub>                                |
| 55. carbon tetrachloride            | CCl <sub>4</sub>                                | 80. sodium bisulfite<br>(or sodium hydrogen sulfite) | NaHSO <sub>3</sub>                              |
| 56. silver sulfide                  | Ag <sub>2</sub> S                               | 81. strontium chlorate                               | Sr(ClO <sub>2</sub> ) <sub>2</sub>              |
| 57. antimony trichloride            | SbCl <sub>3</sub>                               | 82. aluminum hydroxide                               | Al(OH) <sub>3</sub>                             |
| 58. barium carbonate                | BaCO <sub>3</sub>                               | 83. cadmium nitrate                                  | Cd(NO <sub>3</sub> ) <sub>2</sub>               |
| 59. magnesium                       | Mg  | 84. phosphorus trioxide                              | PO <sub>3</sub>                                 |
| 60. lead (IV) sulfate               | Pb(SO <sub>4</sub> ) <sub>2</sub>               | 85. potassium hydride                                | KH  |
| 61. magnesium chloride pentahydrate | MgCl <sub>2</sub> ·5H <sub>2</sub> O            | 86. calcium nitride                                  | Ca <sub>3</sub> N <sub>2</sub>                  |
| 62. ammonium sulfate                | (NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> | 87. sulfur trioxide                                  | SO <sub>3</sub>                                 |
| 63. hydrogen fluoride               | HF  | 88. aluminum nitrite                                 | Al(NO <sub>2</sub> ) <sub>3</sub>               |
| 64. hydrobromic acid                | HBr   | 89. silver oxide                                     | Ag <sub>2</sub> O                               |
| 65. tin(II) sulfide                 | SnS   | 90. ammonium phosphate                               | (NH <sub>4</sub> ) <sub>3</sub> PO <sub>4</sub> |
| 66. beryllium chloride              | BeCl <sub>2</sub>                               | 91. cupric bromate                                   | Cu(BrO <sub>2</sub> ) <sub>2</sub>              |
| 67. calcium bicarbonate             | CaHCO <sub>3</sub>                              | 92. lithium fluoride                                 | LiF   |
| 68. copper(II) cyanide              | Cu(CN) <sub>2</sub>                             | 93. sodium bisulfate                                 | NaHSO <sub>4</sub>                              |
| 69. cesium iodite                   | CsIO <sub>2</sub>                               | 94. radium carbonate                                 | RaCO <sub>3</sub>                               |
| 70. zinc phosphate                  | Zn <sub>3</sub> (PO <sub>4</sub> ) <sub>2</sub> | 95. copper(II) oxide                                 | CuO   |
| 71. nitrogen pentoxide              | NO <sub>5</sub>                                 | 96. iron(III) sulfate                                | Fe <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub> |
| 72. ferrous chromate                | FeCrO <sub>4</sub>                              | 97. magnesium perchlorate                            | Mg(ClO <sub>4</sub> ) <sub>2</sub>              |
| 73. bromous acid                    | HBrO <sub>2</sub>                               | 98. potassium hypochlorite                           | KClO  |
| 74. perchloric acid                 | HClO <sub>4</sub>                               | 99. disodium monohydrogen phosphate                  | Na <sub>2</sub> HPO <sub>4</sub>                |
| 75. potassium cyanide               | KCN   | 100. hydrosulfuric acid                              | H <sub>2</sub> S                                |