

Binary Ionic Compounds Worksheet

1. Write the **chemical formula** for the following binary ionic compounds.

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|-----------------------|------------------------------------|----------------------|------------------------------------|
| a. sodium fluoride | <u>NaF</u> | h. calcium phosphide | <u>Ca₃P₂</u> |
| b. potassium chloride | <u>KCl</u> | i. magnesium oxide | <u>MgO</u> |
| c. calcium oxide | <u>CaO</u> | j. aluminum chloride | <u>AlCl₃</u> |
| d. lithium bromide | <u>LiBr</u> | k. sodium iodide | <u>NaI</u> |
| e. beryllium chloride | <u>BeCl₂</u> | l. potassium nitride | <u>K₃N</u> |
| f. potassium sulphide | <u>K₂S</u> | m. lithium sulfide | <u>Li₂S</u> |
| g. magnesium nitride | <u>Mg₃N₂</u> | n. barium phosphide | <u>Ba₃P₂</u> |

2. Write the **name** for the following binary ionic compounds.

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|-----------------------------------|----------------------------|-----------------------------------|--------------------------|
| a. LiCl | <u>lithium chloride</u> | h. Na ₂ O | <u>sodium oxide</u> |
| b. MgS | <u>magnesium sulfide</u> | i. KBr | <u>potassium bromide</u> |
| c. NaCl | <u>sodium chloride</u> | j. BeO | <u>beryllium oxide</u> |
| d. Al ₂ O ₃ | <u>aluminum oxide</u> | k. CaF ₂ | <u>calcium fluoride</u> |
| e. CaS | <u>calcium sulfide</u> | l. BaBr ₂ | <u>barium bromide</u> |
| f. Zn ₃ P ₂ | <u>zinc phosphide</u> | m. Na ₃ N | <u>sodium nitride</u> |
| g. Be ₃ P ₂ | <u>beryllium phosphide</u> | n. Al ₂ S ₃ | <u>aluminum sulfide</u> |

Chemistry 112

Worksheet: Binary Ionic Compounds

1. Write the chemical formula for the following ionic compounds, complete with SATP pure state of matter.

- (a) mercury (II) sulfide $\text{HgS}(s)$
 (b) lead (IV) sulfide $\text{PbS}_2(s)$
 (c) zinc oxide $\text{ZnO}(s)$
 (d) manganese (IV) fluoride $\text{MnF}_4(s)$
 (e) calcium phosphide $\text{Ca}_3\text{P}_2(s)$
 (f) nickel (II) bromide $\text{NiBr}_2(s)$
 (g) copper (II) chloride $\text{CuCl}_2(s)$
 (h) iron (III) iodide $\text{FeI}_3(s)$

2. Write the chemical formula and IUPAC name of the most common ionic product for each of the following chemical reactions. Do not get distracted by the formulas for the nonmetals or try to balance the equation.

Common ion

- | | | | |
|----|---|-------------------------|------------------------|
| 2+ | (a) $\text{Cu}(s) + \text{Br}_{2(l)} \rightarrow$ | CuBr_2 | copper (II) chloride |
| 2+ | (b) $\text{Ni}(s) + \text{O}_{2(g)} \rightarrow$ | NiO | nickel (II) oxide |
| 1+ | (c) $\text{Ag}(s) + \text{S}_{8(s)} \rightarrow$ | Ag_2S | silver (I) sulfide |
| 4+ | (d) $\text{Sn}(s) + \text{I}_{2(s)} \rightarrow$ | SnI_4 | tin (IV) iodide |
| 1+ | (e) $\text{Li}(l) + \text{Cl}_{2(g)} \rightarrow$ | LiCl | lithium chloride |
| 3+ | (f) $\text{Cr}(s) + \text{S}_{8(s)} \rightarrow$ | Cr_2S_3 | chromium (III) sulfide |
| 2+ | (g) $\text{Co}(s) + \text{Cl}_{2(g)} \rightarrow$ | CoCl_2 | cobalt (II) chloride |
| 3+ | (h) $\text{Fe}(s) + \text{O}_{2(g)} \rightarrow$ | Fe_2O_3 | iron (III) oxide |

3. Use the IUPAC rules to name the following binary ionic compounds.

- (a) $\text{CuS}(s)$ copper (II) sulfide
 (b) $\text{Cu}_2\text{S}(s)$ copper (I) sulfide
 (c) $\text{MgO}(s)$ magnesium oxide
 (d) $\text{Al}_2\text{O}_3(s)$ aluminum oxide
 (e) $\text{PbS}_2(s)$ lead (IV) sulfide
 (f) $\text{Fe}_2\text{O}_3(s)$ iron (III) oxide
 (g) $\text{ZnS}(s)$ zinc sulfide
 (h) $\text{Cr}_2\text{O}_3(s)$ chromium (III) oxide
 (i) $\text{CaCl}_2(s)$ calcium chloride
 (j) $\text{V}_2\text{O}_5(s)$ vanadium(V) oxide

Chemistry 112

Worksheet: Polyatomic Compounds

1. Write the chemical name for each of the following ionic compounds containing polyatomic ions.

- (a) $\text{NaNO}_3(s)$ Sodium nitrate
 (b) $\text{NaNO}_2(s)$ Sodium nitrite
 (c) $(\text{NH}_4)_2\text{HPO}_4(s)$ ammonium hydrogen phosphate
 (d) $\text{NH}_4\text{H}_2\text{PO}_4(s)$ ammonium dihydrogen phosphate
 (e) $\text{Cu}(\text{NO}_3)_2(s)$ copper II nitrate
 (f) $\text{CuNO}_3(s)$ Copper I nitrate
 (g) $\text{Na}_2\text{SiO}_3(s)$ sodium silicate
 (h) $\text{Al}_2(\text{SiO}_3)_3(s)$ aluminum silicate
 (i) $\text{Ca}_3(\text{PO}_4)_2(s)$ calcium phosphate
 (j) $\text{FeCO}_3(s)$ iron (III) carbonate
 (k) $\text{Zn}(\text{NO}_3)_2(s)$ Zinc (II) nitrate or zinc nitrate

2. Write the chemical formula complete with the SATP pure state of matter for each of the following ionic compounds containing polyatomic ions.

- (a) sodium phosphate $\text{Na}_3\text{PO}_4(s)$
 (b) sodium bicarbonate $\text{NaHCO}_3(s)$
 (c) sodium carbonate $\text{Na}_2\text{CO}_3(s)$
 (d) calcium hydroxide $\text{Ca}(\text{OH})_2(s)$
 (e) ammonium nitrate $\text{NH}_4\text{NO}_3(s)$
 (f) manganese (II) carbonate $\text{MnCO}_3(s)$
 (g) ammonium phosphate $(\text{NH}_4)_3\text{PO}_4(s)$
 (h) copper (II) sulfide $\text{CuS}(s)$
 (i) magnesium hydroxide $\text{Mg}(\text{OH})_2(s)$
 (j) lead (IV) carbonate $\text{Pb}(\text{CO}_3)_2(s)$
 (k) sodium acetate $\text{NaC}_2\text{H}_3\text{O}_2(s)$ or $\text{NaCH}_3\text{COO}(s)$

Attachments

Type 1 Ionic.JPG

multivalent ionic.JPG

Polyatomic ionic.JPG