Ionic compounds summary nomenclature worksheet

losing 1 electron gives you a +1 positive charge

R - gain

L - losing

Name: Maia Cherin

Ionic Compound Formula and Nomenclature Worksheet

Predict the charge of the ion that the following atoms form.

Ex. Sodium (Na) forms a +1 ion.

reg metals leave alone

non metals: valence electrons → row − 8

1. K +1
2. I −1
3. O −2
4. Mg +2
5. Ba +2
6. F −1
7. P −3
8. U +1
9. S −2
10. C −4

Write the formula for the following ionic compound formed between the two provided elements.

Ex. Calcium and Chlorine: For every Calcium (Ca) ion at a +2 charge, it would take two Chlorine (Cl) ions at a -1 charge each to form a neutral ionic compound, with a written formula: $CaCl_2$

11. Potassium and Bromine: KBr
12. Beryllium and Bromine: $BeBr_2$
13. Lithium and Oxygen: Li_2O
14. Lithium and Nitrogen: Li_3N
15. Calcium and Nitrogen: Ca_3N_2
16. Sodium and Phosphorus: Na_3P

Provide the name for the following monoatomic ionic compounds.

Ex. Nomenclature for monoatomic ionic compounds: name of first element + name of second element with an "ide" suffix. Li_2S → Lithium and Sulfur + ide → Lithium Sulfide

17. NaCl: Sodium Chloride
18. KBr: Potassium Bromide
19. MgO: Magnesium Oxide
20. Mg_3P_2: Magnesium phosphoride
21. Ba_3N_2: Barium Nitride
22. K_2I: Potassium Iodide

Name: _____ Period: ___

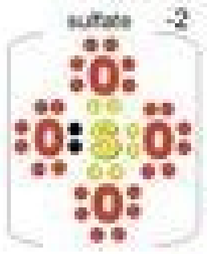
Ionic Formula Writing

1. Al^{+3} Br^{-1} $AlBr_3$
2. Al^{+3} $(C_2H_3O_2)^{-1}$ $Al(C_2H_3O_2)_3$
3. Ba^{+2} S^{-2} BaS
4. $(NH_4)^{+1}$ $(NO_3)^{-1}$ NH_4NO_3
5. Ca^{+2} I^{-1} _____
6. Cr^{+3} F^{-1} _____
7. $(NH_4)^{+1}$ $(OH)^{-1}$ _____
8. Cu^{+1} Cl^{-1} _____
9. H^{+1} S^{-2} _____
10. K^{+1} $(OH)^{-1}$ _____
11. H^{+1} $(CO_3)^{-2}$ _____
12. Hg^{+2} $(C_2H_3O_2)^{-1}$ _____
13. Cu^{+2} S^{-2} _____
14. Al^{+3} O^{-2} _____
15. Sn^{+4} O^{-2} _____
16. Ag^{+1} Cl^{-1} _____
17. Ca^{+2} $(PO_4)^{-3}$ _____
18. Ba^{+2} $(Cr_2O_7)^{-2}$ _____
19. Bi^{+3} $(AsO_4)^{-3}$ _____
20. Na^{+1} $(ClO)^{-1}$ _____
21. lead(II) chloride $PbCl_2$
22. silver nitrate $AgNO_3$
23. mercury(II) iodide HgI_2
24. strontium nitrite $Sr(NO_2)_2$
25. barium sulfate _____
26. tin(IV) sulfide _____
27. copper(II) chlorate _____
28. iron(II) oxide _____
29. lead(II) bromide _____
30. iron(III) phosphate _____
31. lead(II) chromate _____
32. magnesium fluoride _____
33. hydrogen bromide _____
34. magnesium sulfide _____
35. lithium iodide _____
36. silver carbonate _____
37. zinc sulfite _____
38. iron(II) chlorate _____
39. barium oxide _____
40. ammonium phospate _____

Name _____KEY_____ Period _____

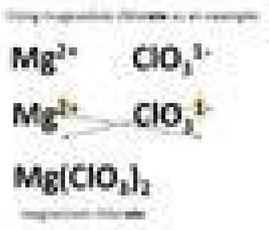
Polyatomic = "many atoms"

Name	Formula	Charge
Bromate	BrO_3^-	1-
Chlorate	ClO_3^-	1-
Phosphate	PO_4^{3-}	3-
Nitrate	NO_3^-	1-
Carbonate	CO_3^{2-}	2-
Sulfate	SO_4^{2-}	2-
Hydroxide	OH^-	1-
Ammonium	NH_4^+	1+



Writing formulas with polyatomic ions:

1. write the cation and its charge
2. write the anion and its charge
3. 'crisscross' the charges to become subscripts
4. add parentheses if necessary to keep the polyatomic ion together



Compound Name	*Positive Ion*	*Negative Ion*	*Formula*
sodium carbonate	Na^+	CO_3^{2-}	Na_2CO_3
calcium nitrate	Ca^{2+}	NO_3^{1-}	$Ca(NO_3)_2$
potassium phosphate	K^{1+}	PO_4^{3-}	K_3PO_4
beryllium hydroxide	Be^{2+}	OH^{1-}	$Be(OH)_2$
ammonium chloride	NH_4^{1+}	Cl^{1-}	NH_4Cl
ammonium carbonate	NH_4^{1+}	CO_3^{2-}	$(NH_4)_2CO_3$

Name _____KEY_____ Period _____

Naming and Writing Formulas for Monatomic Ionic Compounds

A regular ionic compound has a very simple name.

We simply take the name of the **metal element** and follow it with the name of the **non-metal element**, with the ending changed to **-ide**.

Example: NaCl = sodium and chlorine □ sodium chloride

Name the following ionic compounds:

NaBr = ___sodium bromide_____ CaO = ___calcium oxide_____

Li_2S = ___lithium sulfide_____ $MgBr_2$ = ___magnesium bromide_____

Chemical Name	*Metal Ion*	*Non-metal Ion*	*"Criss-Cross"*	*Chemical Formula*
sodium fluoride	Na^+	F^-	Na^{1+} F^{1-}	NaF
boron iodide	B^{3+}	I^-	B^{3+} I^{1-}	BI_3
calcium phosphide	Ca^{2+}	P^{3-}	Ca^{2+} P^{3-}	Ca_3P_2
magnesium oxide	Mg^{2+}	O^{2-}	Mg^{2+} O^{2-}	MgO
potassium chloride	K^{1+}	Cl^{1-}	K^{1+} Cl^{1-}	KCl
beryllium sulfide	Be^{2+}	S^{2-}	Be^{2+} S^{2-}	BeS
barium nitride	Ba^{2+}	N^{3-}	Ba^{2+} N^{3-}	Ba_3N_2
aluminum sulfide	Al^{3+}	S^{2-}	Al^{3+} S^{2-}	Al_2S_3
lithium phosphide	Li^{1+}	P^{3-}	Li^{1+} P^{3-}	Li_3P
potassium sulfide	K^{1+}	S^{2-}	K^{1+} S^{2-}	K_2S
boron oxide	B^{3+}	O^{2-}	B^{3+} O^{2-}	B_2O_3

To ensure that you understand the material in this chapter, you should review the meanings of the following bold terms and ask yourself how they relate to the topics in the chapter. Atoms combine into compounds by forming chemical bonds. A survey of stable atoms and molecules leads to the octet rule, which says that stable atoms tend to have eight electrons in their outermost, or valence, shell. One way atoms obtain eight electrons in the valence shell is for some atoms to lose electrons while other atoms gain them. When this happens, the atoms take on an electrical charge. Charged atoms are called ions. Ions having opposite charges attract each other. This attraction is called ionic bonding, and the compounds formed are called ionic compounds. Positively charged ions are called cations, while negatively charged ions are called anions. The formation of both cations and anions can be illustrated using electron configurations. Because elements in a column of the periodic table have the same valence shell electron configuration, atoms in the same column of the periodic table tend to form ions having the same charge. Electron dot diagrams, or Lewis diagrams, can also be used to illustrate the formation of cations and anions. Ionic compounds are represented in writing by a chemical formula, which gives the lowest ratio of cations and anions present in the compound. In a formula, the symbol of the cation is written first, followed by the symbol of the anion. Formula unit is considered the basic unit of an ionic compound because ionic compounds do not exist as discrete units. Instead, they exist as crystals, three-dimensional arrays of ions, with cations surrounded by anions and anions surrounded by cations. Chemical formulas for ionic compounds are determined by balancing the positive charge from the cation(s) with the negative charge from the anion(s). A subscript to the right of the ion indicates that more than one of that ion is present in the chemical formula. Some ions are groups of atoms bonded together and having an overall electrical charge. These are called polyatomic ions. Writing formulas with polyatomic ions follows the same rules as with monatomic ions, except that when more than one polyatomic ion is present in a chemical formula, the polyatomic ion is enclosed in parentheses and the subscript is outside the right parenthesis. Ionic compounds typically form between metals and nonmetals or between polyatomic ions. Names of ionic compounds are derived from the names of the ions, with the name of the cation coming first, followed by the name of the anion. If an element can form cations of different charges, there are two alternate systems for indicating the compound's name. In the Stock system, a roman numeral in parentheses indicates the charge on the cation. An example is the name for FeCl2, which is iron(II) chloride. In the common system, the suffixes -ous and -ic are used to stand for the lower and higher possible charge of the cation, respectively. These suffixes are attached to a stem representing the element (which frequently comes from the Latin form of the element name). An example is the common name for FeCl2, which is ferrous chloride. The formula mass of an ionic compound is the sum of the masses of each individual atom in the formula. Care must be taken when calculating formula masses for formulas containing multiple polyatomic ions because the subscript outside the parentheses refers to all the atoms in the polyatomic ion. Ionic compounds are hard, brittle and have very high melting points. When in solution, the ions separate and form electrolyte solutions. Home You are currently using guest access (Log in)

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