Ionic and molecular compounds worksheet answers

Continue

NAMING MOLECULAR COMPOUNDS Name key

Name the following covalent compounds.

1. CO_2 carbon dioxide
2. CO carbon monoxide
3. SO_2 sulfur dioxide
4. SO_3 sulfur trioxide
5. N_2O dinitrogen monoxide (laughing gas)
6. NO nitrogen monoxide
7. N_2O_3 dinitrogen trioxide
8. NO_2 nitrogen dioxide
9. N_2O_4 dinitrogen tetroxide
10. N_2O_5 dinitrogen pentoxide
11. PCl_3 phosphorus trichloride
12. PCl_5 phosphorus pentachloride
13. NH_3 nitrogen trihydride (ammonia)
14. SCl_2 sulfur dichloride
15. P_2O_5 diphosphorus pentoxide
16. CCl_4 carbon tetrachloride
17. SiO_2 silicon dioxide (sand)
18. CS_2 carbon disulfide
19. OF_2 oxygen difluoride
20. PBr_3 phosphorus tribromide

OIL reducing agent RIG oxidizing agent

REDOX REACTIONS

Name _____

For the equations below, identify the substance oxidized, the substance reduced, the oxidizing agent, the reducing agent, and write the oxidation and reduction half reactions.

Example: $\overset{\text{oxidized}}{Mg} + \overset{\text{reduced}}{Br_2} \rightarrow MgBr_2$

(Mg: reducing agent; Br_2: oxidizing agent)

oxidation half reaction: $Mg^0 \rightarrow Mg^{+2} + 2e^-$

reduction half reaction: $2e^- + Br_2^0 \rightarrow 2Br^-$

1. $\overset{0}{2H_2} + \overset{0}{O_2} \rightarrow 2H_2O$ (ra. / oa.)

oxid $2H_2 \rightarrow 4H^+ + 4e^-$

red $O_2 + 4e^- \rightarrow 2O^{2-}$

2. $\overset{0}{Fe} + \overset{+2}{Zn^{2+}} \rightarrow Fe^{2+} + Zn$ (ra. / oa.)

oxid $Fe \rightarrow Fe^{2+} + 2e^-$

red $Zn^{2+} + 2e^- \rightarrow Zn$

3. $\overset{0}{2Al} + \overset{+2}{3Fe^{+2}} \rightarrow 2Al^{+3} + 3Fe$ (ra. / oa.)

oxid $2Al \rightarrow 2Al^{3+} + 6e^-$

red $3Fe^{2+} + 6e^- \rightarrow 3Fe$

4. $\overset{0}{Cu} + 2AgNO_3 \rightarrow Cu(NO_3)_2 + 2Ag$ (ra. / oa.)

oxid $Cu \rightarrow Cu^{2+} + 2e^-$

red $2e^- + 2Ag^+ \rightarrow 2Ag$

WKS
Naming & Formulas of Covalent Compounds & Acids WS

NAME _____
Period _____ ***Date*** _____

1. What is a binary molecular compound?
   A covalently-bonded compound composed of only two kinds of non-metal elements, that does not start with H (those compounds are acids).

2. In the table below, fill in the prefix corresponding to the number of atoms in the formula:

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

In the table below, determine the formula of the binary covalent compound or acid from its name, or the name of the compound from the formula.

Name to Formula		Formula to Name	
3. antimony tribromide	$SbBr_3$	14. P_4S_5	tetraphosphorous pentasulfide
4. iodine pentafluoride	IF_5	15. SeO_3	selenium trioxide
5. dinitrogen trioxide	N_2O_3	16. Si_2Br_6	disilicon hexabromide
6. ammonia	NH_3	17. SCl_4	sulfur tetrachloride
7. phosphorus triiodide	PI_3	18. CH_4	methane
8. carbon monoxide	CO	19. NF_3	nitrogen trifluoride
9. phosphorous pentachloride	PCl_5	20. N_2O	dinitrogen monoxide
10. tetraiodine nonoxide	I_4O_9	21. IF_7	iodine heptafluoride
11. bromic acid No hydro, so bromate	$HBrO_3$	22. $HClO$	ClO^- = hypochlorite hypoclorous acid
12. phosphorous acid No hydro, so phosphite	H_3PO_3	23. HF	F^- = fluoride hydrofluoric acid
13. hydroiodic acid hydro, so iodide	HI	24. H_2CO_3	CO_3^{2-} = carbonate carbonic acid

25. What is the difference between a binary acid and an oxyacid? How are each named?
    A binary acid contains H covalently bonded to what looks like a monatomic anion from the periodic table (or a polyatomic anion ending in –ide). An oxyacid contains H covalently bonded to what looks like a polyatomic oxyanion from Table D. The binary acid is named by adding "hydro-" before the root and "-ic acid" after the root of the anion, and oxyacids are named by changing the ending of the anion, either "–ate" to "–ic acid" or "–ite" to "–ous acid"

Model 2 – Prefixes and Suffixes

Prefix	Numerical Value
mono-	1
di-	2
tri-	3
tetra-	4
penta-	5
hexa-	6
hepta-	7
octa-	8
nona-	9
deca-	10

Molecular Formula	Name of Compound
BCl_3	Boron trichloride
SF_6	Sulfur hexafluoride
IF_7	Iodine heptafluoride
NI_3	Nitrogen triiodide
N_2O_4	Dinitrogen tetroxide
Cl_2O	Dichlorine monoxide
P_4O_{10}	Tetraphosphorus decoxide
B_5H_9	Pentaboron nonahydride
Br_3O_8	Tribromine octoxide
ClF	Chlorine monofluoride

5. Examine the prefixes in Model 2. Fill in the numerical value that corresponds to each prefix.
6. What suffix (ending) do all the compound names in Model 2 have in common?

They all end in "ide".

7. Carefully examine the names of the compounds in Model 2. When is a prefix NOT used in front of the name of an element?

When the first element is one. (Examples: IF_7 - iodine heptafluoride, NI_3 - nitrogen triiodide)

8. Consider the compound NO.
   a. Which element, nitrogen or oxygen, would require a prefix in the molecule name? Explain your answer.

Oxygen would require a prefix of "mono" because it is the second element and there is one oxygen. Nitrogen does not require a prefix because it is the first element and there is one nitrogen.

   b. Name the molecule NO.

Nitrogen monoxide (Notice, the "o" of monoxide dropped) → not monooxide

9. Find two compounds in Model 2 that contain a subscript of "4" in their molecular formula.
   a. List the formulas and names for the two compounds.

N_2O_4 - dinitrogen tetroxide // P_4O_{10} - Tetraphosphorus decoxide

   b. What is different about the spelling of the prefix meaning "four" in these two names?

The "a" has been dropped from the end of the prefix tetra.

Key

NAMING ACIDS

Name Key

Name the following acids.

1. HNO_3 nitric acid
2. HCl hydrochloric acid
3. H_2SO_4 sulfuric acid
4. H_2SO_3 sulfurous acid
5. $HC_2H_3O_2$ acetic acid
6. HBr hydrobromic acid
7. HNO_2 nitrous acid
8. H_3PO_4 phosphoric acid
9. H_2S hydrosulfuric acid
10. H_2CO_3 carbonic acid

Write the formulas of the following acids.

11. sulfuric acid H_2SO_4
12. nitric acid HNO_3
13. hydrochloric acid HCl
14. acetic acid $HC_2H_3O_2$ or CH_3COOH
15. hydrofluoric acid HF
16. phosphorous acid * H_3PO_3
17. carbonic acid H_2CO_3
18. nitrous acid HNO_2
19. phosphoric acid H_3PO_4
20. hydrosulfuric acid H_2S

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