**Chemistry 20 – Lesson 3**

**Naming compounds**

**/188**

1.

**Name Formula**

e.g. strontium and arsenic strontium arsenide Sr3As2 (s)

a) silver and iodine **silver iodide AgI (s)**

b) magnesium and oxygen **magnesium oxide MgO (s)**

c) magnesium and bromine **magnesium bromide MgBr2 (s)**

d) calcium and nitrogen **calcium nitride Ca3N2 (s)**

e) zinc and selenium **zinc selenide ZnSe (s)**

f) sodium and sulfur **sodium sulfide Na2S (s)**

g) barium and phosphorus **barium phosphide Ba3P2 (s)**

h) aluminium and fluorine **aluminum fluoride AlF3 (s)**

i) potassium and chlorine **potassium chloride KCl (s)**

j) silver and oxygen **silver oxide Ag2O (s)**

2.

**Name** **Formula**

e.g. niobium and oxygen niobium (V) oxide Nb2O5 (s)

a) iron and sulfur **iron (III) sulfide Fe2S3 (s)**

b) copper and oxygen **copper (II) oxide CuO (s)**

c) manganese and fluorine **manganese (II) fluoride MnF2 (s)**

d) gold and nitrogen **gold (III) nitride AuN (s)**

e) chromium and chlorine **chromium (III) chloride CrCl3 (s)**

f) platinum and phosphorus **platinum (IV) phosphide Pt3P4 (s)**

g) nickel and oxygen **nickel (II) oxide NiO (s)**

h) cobalt and bromine **cobalt (II) bromide CoBr2 (s)**

i) tungsten and iodine **tungsten (VI) iodide WI6 (s)**

j) manganese and sulfur **manganese (II) sulfide MnS (s)**

3. Complete the following table.

|  |  |  |
| --- | --- | --- |
| **COMBINE** | **FORMULA** | **NAME** |
| iron (II) & nitrate | Fe(NO3)2 (s) | iron (II) nitrate |
| aluminium & nitrate | **Al(NO3)3 (s)** | **aluminum nitrate** |
| sodium & sulfate | **Na2SO4 (s)** | **sodium sulfate** |
| lead (IV) & sulfate | **Pb(SO4)2 (s)** | **lead (IV) sulfate** |
| magnesium &  carbonate | **MgCO3 (s)** | **magnesium carbonate** |
| gold (III) & sulfite | **Au2(SO3)3 (s)** | **gold (III) sulfite** |
| zinc &  hydrogen carbonate | **Zn(HCO3)2 (s)** | **zinc hydrogen carbonate** |
| ammonium & nitrate | **NH4NO3 (s)** | **ammonium nitrate** |
| copper (I) & phosphate | **Cu3PO4 (s)** | **copper (I) phosphate** |
| silver & hydroxide | **AgOH (s)** | **silver hydroxide** |
| aluminium &  hydroxide | **Al(OH)3 (s)** | **aluminium hydroxide** |
| lead (II) & phosphate | **Pb3(PO4)2 (s)** | **lead (II) phosphate** |
| potassium & acetate | **KCH3COO (s)** | **potassium acetate** |
| manganese (V) &  sulfate | **Mn2(SO4)5 (s)** | **manganese (V) sulfate** |

4. Complete the following table.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Formula** | **Description or Use**  **[*for interest only*]** | | | **Name of Compound** |
|  | e.g., CCl4 | toxic cleaning fluid and solvent | | | carbon tetrachloride |
| 1. | **N2** | composition of air | | 78.03% | nitrogen |
| 2. | **O2** | 20.99% | oxygen |
| 3. | **Ar** | 0.94% | argon |
| 4. | CO2 | 0.035% | **carbon dioxide** |
| 5. | **Ne, Kr** | 0.0016% | other noble gases |
| 6. | NO | air pollutants | in automobile exhaust | | **nitrogen monoxide** |
| 7. | NO2 | ­Los Angeles-type smog | | **nitrogen dioxide** |
| 8. | **SO2** | ­London-type smog | | sulfur dioxide |
| 9. | SO3 | ­becomes sulfuric acid | | **sulphur trioxide** |
| 10. | **CO** | colorless, oderless poison | | carbon monoxide |
| 11. | **O3** | good in upper atmosphere | | ozone |
| 12. | **C2H5OH** | grain alcohol, ethyl alcohol | | | ethanol |
| 13. | **C12H22O11** | table sugar | | | sucrose |
| 14. | **S8** | yellow solid in Group 16 | | | sulfur |
| 15. | P4O10 | oxides formed by burning | | | **tetraphosphorous decaoxide** |
| 16. | P4O6 | white phosphorus in air | | | **tetraphosphorous hexaoxide** |
| 17. | **ClO2** | chlorination of water | | | chlorine dioxide |
| 18. | **CH3OH** | methyl alcohol, methyl hydrate | | | methanol |
| 19. | **P4** | a white solid | | | phosphorus |
| 20. | **NH3** | a cleaner when dissolved in water | | | ammonia |
| 21. | CH4 | 85 - 95% of natural gas | | | **methane** |
| 22. | HCl | a gas; in water is hydrochloric acid | | | **hydrogen chloride** |
| 23. | **N2O** | laughing gas, anaesthetic | | | dinitrogen oxide |
| 24. | **I2** | tincture of iodine in alcohol | | | iodine |
| 25. | H2O | the most common solvent | | | **water** |

5. Complete the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Chemical**  **Formula** | **Description or Use**  **[*for Interest only*]** | **Name of Compound** |
| e.g. | CaCl2 (s) | white solid; wetting agent | calcium chloride |
| 1. | **KI** | dietary supplement for iodine | potassium iodide |
| 2. | MgO (s) | white powder; magnesium ore | **magnesium oxide** |
| 3. | **AlCl3** | antiperspirant | aluminum chloride |
| 4. | NaBr (s) | in Epsom Salts | **sodium bromide** |
| 5. | Al2O3 (s) | whiting; aluminum ore | **aluminum oxide** |
| 6. | **Li3N** | black; lithium reacts with air | lithium nitride |
| 7. | CaO (s) | white powder; quicklime | **calcium oxide** |
| 8. | **BaCl2** | white solid like CaCl2 | barium chloride |
| 9. | **NaCl** | white solid; table salt | sodium chloride |
| 10. | ZnO (s) | protective oxide on zinc metal | **zinc oxide** |
| 11. | **AgBr** | photographic emulsion | silver bromide |
| 12. | **MgH2** | magnesium reacts with hydrogen | magnesium hydride |
| 13. | **MgCl2** | 11 % of minerals in sea water | magnesium chloride |
| 14. | **ZnCl2** | in soldering paste | zinc chloride |
| 15. | Ag2S (s) | argentite (silver ore) | **silver sulfide** |
| 16. | **KCl** | potash (fertilizer) | potassium chloride |
| 17. | CaF2 (s) | fluorite (pretty mauve crystals) | **calcium fluoride** |
| 18. | **Na2S** | for toning pictures brown | sodium sulfide |
| 19. | CaH2 (s) | preparation of hydrogen | **calcium hydride** |
| 20. | **ZnS** | zinc blende (zinc ore) | zinc sulfide |

6. Complete the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Chemical**  **Formula** | **Description or Use**  [*for interest only*] | **Name of Compound** |
| e.g., | Cu2S | copper ore (chalcocite) | copper(I) sulfide |
| 1. | **UO2** | uranium ore (uraninite) | uranium (IV) oxide |
| 2. | **PbS2** | lead ore (galena) | lead (IV) sulfide |
| 3. | SnO2 | tin ore (cassiterite) | **tin (IV) oxide** |
| 4. | **MnO2** | manganese ore (pyrolusite) | manganese (IV) oxide |
| 5. | Sb2S3 | antimony ore (stibnite) | **antimony (III) sulfide** |
| 6. | FeO | iron ore (hematite) | **iron (II) oxide** |
| 7. | HgS | mercury ore (cinnabar) | **mercury (II) sulfide** |
| 8. | MoS2 | molybdenum ore (molybdenite) | **molybdenum (IV) sulfide** |
| 9. | **CuS** | copper ore (chalcopyrite) | copper (II) sulfide |
| 10. | FeS | also in chalcopyrite | **iron (II) sulfide** |
| 11. | **PbO2** | electrode In car battery | lead (IV) oxide |
| 12. | HgO | laboratory preparation of oxygen | **mercury (II) oxide** |
| 13. | V2O5 | a common catalyst | **vanadium (V) oxide** |
| 14. | **SnF2** | toothpaste additive | tin (II) fluoride­ |
| 15. | **Cr2O3** | a green paint pigment | chromium (III) oxide |
| 16. | TiO2 | a white paint pigment | **titanium (IV) oxide** |
| 17. | AuCl3 | gold tinting of pictures | **gold (III) chloride** |
| 18. | **UF6** | separating types of U atoms | uranium (VI) fluoride |
| 19. | NiBr2 | forms a green solution | **nickel (II) bromide** |
| 20. | **CoCl2** | forms a pink solution | cobalt (II) chloride |

7. Complete the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **i or m** | **Chemical Formula** | **Name of Compound** |
| 1. | **i** | K2CO3 | **potassium carbonate** |
| 2. | **i** | (NH4)2S | **ammonium sulfide** |
| 3. | **i** | **Ca(OH)2** | calcium hydroxide |
| 4. | **i** | **MgSiO3** | magnesium silicate |
| 5. | **i** | **Fe(ClO2)2** | iron (II) chlorite |
| 6. | **i** | Cr(NO3)3 | **chromium (III) nitrate** |
| 7. | **i** | **K2Cr2O7** | potassium dichromate |
| 8. | **m** | SO3 | **sulphur trioxide** |
| 9. | **i** | NaNO2 | **sodium nitrite** |
| 10. | **i** | **(NH4)2SO4** | ammonium sulfate |
| 11. | **i** | **NaHCO3** | sodium hydrogen carbonate |
| 12. | **i** | K3PO4 | **potassium phosphate** |
| 13. | **i** | **K2OOCCOO** | potassium oxalate |
| 14. | **m** | NH3 | **ammonia** |
| 15. | **i** | **NaNO3** | sodium nitrate |
| 16. | **i** | KMnO4 | **potassium permanganate** |
| 17. | **i** | **Na2S2O3** | sodium thiosulfate |
| 18. | **m** | CO2 | **carbon dioxide** |
| 19. | **i** | **Ba(ClO4)2** | barium perchlorate |
| 20. | **i** | **RbHS** | rubidium hydrogen sulfide |
| 21. | **i** | **KCN** | potassium cyanide |
| 22. | **i** | NH4H2PO4 | **ammonium dihydrogen phosphate** |
| 23. | **i** | **NaHSO3** | sodium hydrogen sulfite |
| 24. | **i** | Na2SO4 | **sodium sulfate** |
| 25. | **i** | **KSCN** | potassium thiocyanate |

8. Complete the following table.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Name of Hydrate** | **Common Name, Use or Description** | **Formula** |
| e.g., | copper (II) sulfate pentahydrate | blue vitriol, bluestone, copper plating,  blue solid | CuSO4 •5H2O |
| 1. | **magnesium sulphate heptahydrate** | Epsom salts, white solid explosives, matches | MgSO4•7H2O |
| 2. | sodium carbonate decahydrate | washing soda, soda ash, water softener, white solid | **Na2CO3•10H2O** |
| 3. | **magnesium chloride hexahydrate** | white solid, fireproofing wood, disinfectants, parchment paper | MgCl2 •6H2O |
| 4. | barium chloride dihydrate | white solid, pigments, dyeing fabrics, tanning leather | **BaCl2•2H2O** |
| 5. | **cadmium nitrate tetrahydrate** | white solid, photographic emulsions | Cd(NO3)2 •4H2O |
| 6. | **zinc chloride hexahydrate** | white solid, embalming material, fireproofing lumber, vulcanizing | ZnCl2•6H2O |
| 7. | zinc sulfate heptahydrate | white solid, clarifying glue, preserving wood and skins | **ZnSO4•7H2O** |
| 8. | lithium chloride tetrahydrate | white solid, soldering aluminum, in fireworks | **LiCl•4H2O** |
| 9. | **sodium thosulfate pentahydrate** | photographic hypo, antichlor, white solid | Na2S2O3•5H2O |
| 10. | cobalt (II) chloride hexahydrate | pink solid, humidity and water indicator, foam stabilizer in beer | **CoCl2•6H2O** |
| 11. | **aluminum chloride hexahydrate** | white solid, antiperspirant | AlCl3•6H2O |
| 12. | **calcium chloride dihydrate** | de-icer used on icy highways, added to cement mixtures to prevent freezing | CaCl2 •2H2O |
| 13. | barium hydroxide octahydrate | white solid, manufacture of glass, water softener | **Ba(OH)2•8H2O** |
| 14. | nickel (II) chloride hexahydrate | green solid, absorbent for ammonia in gas masks | **NiCl2•6H2O** |
| 15. | **sodium sulphate decahydrate** | Glauber's salt (a medicine), white solid, drying agent | Na2SO4 •10H2O |

9. Complete the following table. Classify the substance as ionic or molecular (i or m) in the first column. Use a subscript to indicate the state of matter of each substance (s, l, or g at room temperature).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **i or m** | **Chemical Formula** | **Name of Compound** |  | **i or m** | **Chemical Formula** | **Name of Compound** |
| 1. | **i** | Al(OH)3 | **aluminum hydroxide** | 26. | **i** | **MgSO4•7H2O** | magnesium sulfate  heptahydrate |
| 2. | **i** | **Na2SO4•10H2O** | sodium sulfate decahydrate | 27. | **i** | Ca(OH)2 | **calcium hydroxide** |
| 3. | **i** | **NaNO3•6H2O** | sodium nitrate hexahydrate | 28. | **i** | **Na2S2O3** | sodium thiosulfate |
| 4. | **i** | Al3(SO4)3 | **aluminum sulphate** | 29. | **i** | CaO | **calcium oxide** |
| 5. | **i** | **CaCl2•6H2O** | calcium chloride hexahydrate | 30. | **i** | **CuSO4•5H2O** | copper (II) sulfate  pentahydrate |
| 6. | **i** | NH4NO3 | **ammonium nitrate** | 31. | **m** | **S8** | sulfur |
| 7. | **m** | **PH3** | phosphorus trihydride | 32. | **m** | BrH6 (g) | **bromine hexahydride** |
| 8. | **m** | N2O4 (g) | **dinitrogen tetraoxide** | 33. | **i** | **K2Cr2O7** | potassium dichromate |
| 9. | **m** | **CH4** | methane | 34. | **m** | **P4** | phosphorus |
| 10. | **i** | K2SO4 | **potassium sulphate** | 35. | **m** | SO3 | **sulphur trioxide** |
| 11. | **i** | Fr3PO4 | **francium phosphate** | 36. | **i** | **NaClO3** | sodium chlorate |
| 12. | **i** | **Bi3(BO3)5** | bismuth (V) borate | 37. | **i** | Na2SiO3 | **sodium silicate** |
| 13. | **i** | (NH4)2SO4 | **ammonium sulphate** | 38. | **m** | **CH3OH** | methanol |
| 14. | **i** | SnF4 | **tin (IV) fluoride** | 39. | **m** | **Cl2** | chlorine |
| 15. | **m** | **XeBr6** | xenon hexabromide | 40. | **i** | **PbSO4** | lead (II) sulfate |
| 16. | **i** | PbO2 | **lead (IV) oxide** | 41. | **i** | Ca(HCO3)2 | **calcium hydrogen carbonate** |
| 17. | **m** | **SiO2** | silicon dioxide | 42. | **m** | **NCl3** | nitrogen trichloride |
| 18. | **i** | NaClO | **sodium hypochlorite** | 43. | **i** | **NaHSO3** | sodium hydrogen sulfite |
| 19. | **i** | **KMnO4** | potassium permanganate | 44. | **m** | CO | **carbon monoxide** |
| 20. | **i** | KNO3 | **potassium nitrate** | 45. | **m** | H2Se | **dihydrogen selenide** |
| 21. | **i** | K2CO3•2H2O | **potassium carbonate dihydrate** | 46. | **m** | **SiC** | silicon carbide |
| 22. | **m** | **HF** | hydrogen fluoride | 47. | **i** | **AlPO4** | aluminum phosphate |
| 23. | **m** | H2S(g ) | **hydrogen sulfide** | 48. | **i** | **LiNO3** | lithium nitrate |
| 24. | **i** | **NaOH** | sodium hydroxide | 49. | **m** | SF2 | **sulphur difluoride** |
| 25. | **i** | NaHSO4 | **sodium hydrogen sulphate** | 50. | **m** | H2O2 (aq) | **hydrogen peroxide** |