

## Chemical Reactions Review

### A. Fill in the blanks (use the following list)

aqueous      catalyst      complete combustion      decomposition      double displacement  
 incomplete combustion      law of conservation of mass      precipitate      single displacement      synthesis

1. A clue that a double displacement reaction has occurred is that a precipitate forms from two liquids.
2. A double displacement reaction occurs when cations of two ionic compounds change place.
3. When zinc replaces hydrogen in HCl, this is an example of single displacement reaction.
4. The products of complete combustion are  $\text{CO}_{2(g)}$  and  $\text{H}_2\text{O}_{(g)}$ .
5. A(n) aqueous solution is one in which an ionic solid has been dissolved and ionization has occurred.
6. In addition to  $\text{CO}_{2(g)}$  and  $\text{H}_2\text{O}_{(g)}$ ,  $\text{C}_{(s)}$  and  $\text{CO}_{(g)}$  are produced during incomplete combustion.
7. law of conservation of mass states that the mass of the products must equal the mass of the reactants.
8. A substance that speeds up chemical reactions is called a catalyst.
9. A compound that breaks down into elements or simpler compounds is a decomposition reaction.
10. A synthesis reaction occurs when two or more reactants combine to form a single, different substance.

### B. True or False (If the statement is false, rewrite the statement to make it true)

- T 11. Francium will displace sodium in a single displacement reaction.
- F 12. A catalyst is used up in a chemical reaction.  
 " not "
- F 13. Most chemical reactions occur without needing to add anything extra to them.  
 " " require energy or a catalyst.
- F 14. A non-metal will replace a metal in a single displacement reaction.  
 " " a non-metal "
- F 15. An activity series can be used to determine the state of a product in a double displacement reaction.  
 " A solubility table "
- T 16. Combustion is a type of synthesis reaction.
- F 17. A non-metal oxide dissolved in water will produce a base.  
 " " an oxy acid e.g.  $\text{H}_2\text{SO}_4$ ,  $\text{H}_3\text{PO}_4$ ,  $\text{H}_2\text{CO}_3$

### C. Similarities/Differences (describe similarities/differences between each pair)

- |  |  |
|--|--|
| 18. synthesis/decomposition  | 19. single displacement/double displacement                              |
| - synthesis: 2 or more little bits make 1 big bit.                 | - both involve displacement of an element from a compound                |
| - decomposition: 1 big bit breaks apart into 2 or more little bits | - single: must consult activity series                                   |
| - synthesis & decomposition are complementary reactions            | - double: must consult solubility table                                  |
| 20. precipitate/aqueous  | 21. activity series/solubility table                                     |
| - both are possible states of a d.d. reaction                      | - both are consulted for a displacement rx'n                             |
| - precipitate is an insoluble compound                             | - activity series lists the reactivity of metals & non-metals            |
| - aqueous is a soluble compound                                    | - solubility tables predict the states of a double displacement reaction |

**D. Multiple choice (Choose the best answer)**

22. Which of the following metals is the most reactive?

- a) Mg
- b) Al
- c) Pb
- ☒ d) K

23. Which of the following would make an acid when dissolved in water?

- ☒ a) sulphur trioxide
- b) magnesium oxide
- c) aluminum oxide
- d) copper(I) oxide

24. Which of the following would make a base when dissolved in water?

- a) carbon dioxide
- b) sulphur trioxide
- ☒ c) sodium oxide
- d) nitrogen dioxide

25. What type of reaction occurs between  $\text{NaOH} + \text{HCl}$ ?

- a) synthesis
- b) decomposition
- c) single displacement
- ☒ d) double displacement

26. What type of reaction occurs when  $\text{NaHCO}_3$  is heated?

- a) synthesis
- ☒ b) decomposition
- c) single displacement
- d) double displacement

27. What type of reaction occurs between Cr and SnO?

- a) synthesis
- b) decomposition
- ☒ c) single displacement
- d) double displacement

28. The name of  $\text{MnO}$  is

- a) mercury(II)oxide
- b) magnesium oxide
- c) manganese(I)oxide
- ☒ d) manganese(II)oxide

29. Which pair of names correctly names  $\text{PbHPO}_3$

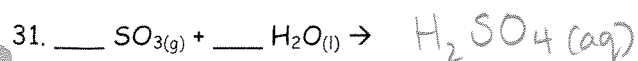
- a) lead(II)phosphate, plumbic phosphate
- b) lead(IV) phosphate, plumbous phosphite
- c) lead(II)biphosphate, plumbous biphosphate
- ☒ d) lead(II)hydrogen phosphate, plumbous biphosphite

## E. Naming

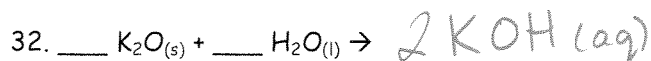
30. (Complete the following chart below)

Formula	Name	Formula	Name
NaF	sodium fluoride	CaO	calcium oxide
P <sub>2</sub> O <sub>3</sub>	diphosphorus trioxide	HgBr	mercurous bromide
Ba(HCO <sub>2</sub> ) <sub>2</sub>	barium bicarbonite	SnBr <sub>2</sub>	tin(II)bromide
NO <sub>2</sub>	nitrogen dioxide	Xe (g)	xenon
Cl <sub>2</sub>	chlorine gas	NH <sub>4</sub> F	ammonium fluoride
Fe(OH) <sub>2</sub>	iron(II) hydroxide ferrous hydroxide	Cu H <sub>2</sub> PO <sub>2</sub>	cuprous dihydrogen hypophosphite
* Ni <sub>2</sub> (CO <sub>3</sub> ) <sub>3</sub>	nickel(III) carbonate nickelic carbonate	ZnCrO <sub>5</sub>	zinc perchromate
Zn(H <sub>2</sub> PO <sub>2</sub> ) <sub>2</sub>	zinc dihydrogen <sup>hypo</sup> phosphite	LiNO <sub>2</sub>	lithium nitrite
Na <sub>2</sub> CrO <sub>4</sub>	sodium chromate	PN	phosphorus mononitride
HgS	mercury(II) sulphide mercuric sulphide	H <sub>2</sub> S	hydrogen sulphide
HNO <sub>2</sub>	hydrogen nitrite	SrCO <sub>4</sub>	strontium percarbonate
Be(BrO <sub>3</sub> ) <sub>2</sub>	beryllium bromate	NH <sub>4</sub> NO <sub>3</sub>	ammonium nitrate
MnO	manganese(II) oxide manganous oxide	HgI <sub>2</sub>	mercuric iodide
CuCl <sub>2</sub>	copper(II) chloride cupric chloride	Au <sub>3</sub> As	aurous arsenide
AgNO <sub>3</sub>	silver nitrate	Co <sub>2</sub> Se <sub>3</sub>	cobaltic selenide
CO	carbon monoxide	BrF	bromine monofluoride
As <sub>2</sub> P <sub>5</sub>	diarsenic pentaphosphide	HClO <sub>3</sub>	hydrogen chlorate
C <sub>2</sub> H <sub>6</sub>	dicarbon hexahydride	HFO	hydrogen hypofluorite
GaF <sub>3</sub>	gallium fluoride	H <sub>2</sub> O <sub>2</sub>	hydrogen peroxide
Sb <sub>3</sub> P <sub>5</sub>	antimony(III) phosphide antimonous phosphide	Sn(CO <sub>4</sub> ) <sub>2</sub>	stannic percarbonate

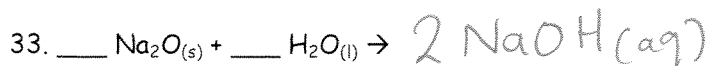
F. Balancing and Types of Reactions (write out the acid or base product and then balance the equation)



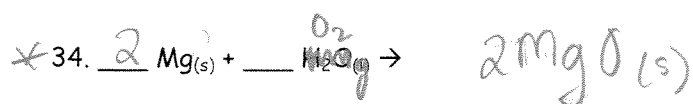
Type: synthesis



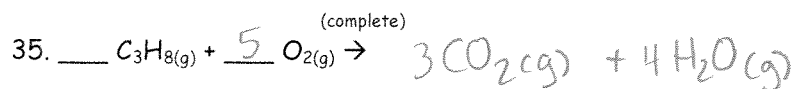
Type: synthesis



Type: synthesis



Type: synthesis



Type: combustion

\* 36. zinc (s) plus (aq) lead nitrate yields (aq) zinc nitrate plus lead (s). Type: single displacement



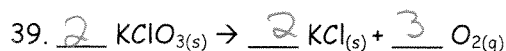
37. silver nitrate (aq) plus zinc chloride (aq) yields

Type: double displacement

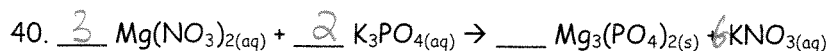


38. sodium (s) plus hydrogen (g) yields

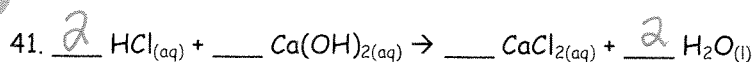
Type: synthesis



Type: decomposition



Type: double displacement



Type: double displacement