

Reflecting on Chapter 4

Summarize this chapter in the format of your choice. Here are a few ideas to use as guidelines.

- Distinguish between chemical reactions and nuclear reactions.
- Summarize guidelines for balancing chemical equations.
- Summarize the different types of chemical reactions.
- Summarize the types of nuclear decay.
- Explain why knowing the solubility of compounds is important to predicting double displacement reactions.
- Summarize guidelines for balancing nuclear equations
- Describe how to use the activity series of metals and the activity series of halogens.

Reviewing Key Terms

For each of the following terms, write a sentence that shows your understanding of its meaning.

activity series

neutralization
reactions

alpha () particle

emission

balanced chemical
equation

beta particle

beta () decay

chemical equations

chemical reactions

combustion reaction

decomposition reaction

double displacement
reaction

gamma () radiation

incomplete combustion

law of conservation
of mass

nuclear equation

nuclear fission

nuclear fusion

nuclear reactions

precipitate

product

reactant

single displacement
reactions

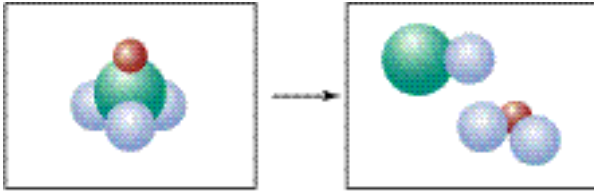
skeleton equation

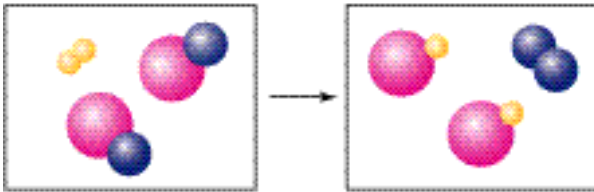
synthesis reaction

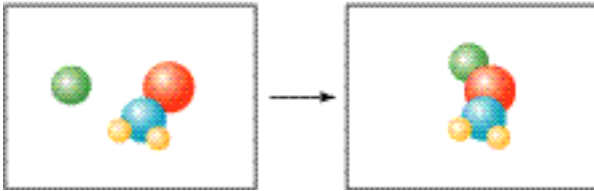
word equation











Knowledge/Understanding

- How can you tell if a chemical reaction has occurred?
- Explain why the mixing of red paint with white paint does not constitute a chemical reaction, even though the "product" has a different appearance.
- Explain how balancing a chemical equation satisfies the law of conservation of mass.
- Copy each chemical equation into your notebook, and balance it.
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 -
 -
- What type of chemical reaction is illustrated in each diagram below?






- Classify each reaction as synthesis, decomposition, single displacement, double displacement, or combustion. Also, balance each chemical equation.
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 -
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 -
- Why is the solubility chart useful for analyzing double displacement reactions?
- Nitrogen dioxide is a component of smog. It is produced in an automobile engine's combustion chamber. When exposed to sunlight, nitrogen dioxide forms nitrogen monoxide and oxygen. What type of reaction is this?

9. Write a balanced chemical equation corresponding to each word equation.
 - (a) The reaction between aqueous potassium hydroxide and sulfuric acid produces a precipitate.
 - (b) Powdered antimony reacts with chlorine gas to produce antimony trichloride.
 - (c) Mercury(II) oxide is prepared from its elements.
 - (d) Ammonium nitrite decomposes into nitrogen gas and water.
 - (e) Aluminum metal reacts with a solution of zinc sulfate to produce aluminum sulfate and metallic zinc.
10. Consider the unbalanced chemical equation corresponding to the formation of solid lead(II) chromate, :
 - (a) What type of chemical reaction is this?
 - (b) Balance the equation.
11. In general, what is formed when an oxide of a non-metal reacts with water? Give an example.
12. In general, what is formed when an oxide of a metal reacts with water? Give an example.
13. Complete and balance each nuclear equation. Then classify the reaction.
 - (a) 
 - (b)  +
 - (c) + 
 - (d) +  +
14. Write the product(s) for each reaction. If you predict that there will be no reaction, write "NR." Balance each chemical equation.
 - (a) 
 - (b) 
 - (c) 
 - (d) 
 - (e) 
 - (f) 
15. Iron often occurs as an oxide, such as . In the steel industry, is reacted with carbon monoxide to produce iron metal and carbon dioxide. Write the balanced chemical equation for this reaction, and classify it.
16. Calcium chloride is often used to melt ice on roads and sidewalks, or to prevent it from forming. Calcium chloride can be made by

reacting hydrochloric acid with calcium carbonate. Write the balanced chemical equation corresponding to this reaction, and classify it.

Inquiry

17. An American penny is composed of a zinc core clad in copper. Some of the copper is filed away, exposing the zinc, and placed in a solution of hydrochloric acid. Describe what will occur.
18. What will happen to a silver earring that is accidentally dropped into toilet bowl cleaner that contains hydrochloric acid?

Communication

19. Explain why it is advisable to store chemicals in tightly sealed bottles out of direct sunlight.
20. Why is smoking not allowed near an oxygen source? What would happen if a match were struck in an oxygen-rich atmosphere?
21. Even if a smoker is very careful not to let a lighted cigarette come in contact with liquid gasoline, why is it very dangerous to smoke when refuelling an automobile?
22. Solutions that have been used to process film contain silver ions, .
 - (a) Explain how you could recover the silver, in the form of an ionic compound.
 - (b) How could you recover the silver as silver metal?

Making Connections

23. Calcium oxide, CaO (lime), is used to make mortar and cement.
 - (a) State two reactions that could be used to make lime. Classify each reaction, based on the types of reactions studied in this chapter.
 - (b) In construction, cement is prepared by mixing the powdered cement with water. Write the chemical equation that represents the reaction of calcium oxide with water. Why are we cautioned not to expose skin to dry cement mix *and* wet cement? It may help you to know that bases are often corrosive. They can burn exposed skin.

Answers to Practice Problems and

Short Answers to Section Review Questions

Practice Problems: 1.(a) calcium + fluorine (reactants) calcium fluoride (product) (b) barium chloride + hydrogen sulfate hydrogen chloride + barium sulfate (c) calcium carbonate + carbon dioxide + water calcium hydrogen carbonate (d) hydrogen peroxide water + oxygen (e) sulfur dioxide + oxygen sulfur trioxide 2. Sugar ethanol + carbon dioxide

3.(a) (b) (c) (d) 4.(a) (b) (c) 5.(a) (b) (c) (d) 6.(a) balanced (b) (c) (d) balanced 7.(a) (b) 8. 9.(a) (b) (c) (d) 10.(a) (b)

(c) (d) 11.(a) products are Fe_2O_3 , FeO (b) possible products: (c) possible products: 12.(a) (b)

(c) (d)

13. 14.

15.(a) (b)

(c) (d)

16.(a) (b)

17.

18. 19. 20.

21.(a) (b) (c) (d) (e) (f) (g) (h)

22.(a) NR (b) (c) (d) (e) NR

(f) NR (g) (h) 23.(a) NR (b)

24.(a) (b) (c) NR (d) (e) NR (f) 25.(a) (b) NR (c) NR (d) 26.(a)

(b) 27.(a) (b) (c) 28.(a) (b) (c) 29. 30. 31. 32. 33. 34.

35. 36. 37. 5 38. 4

39.

Section Review: 4.1: 2.(a)

(b) (c) 4.(a) (b) (c)

(d) (e) (f) 5. 4.2: 1.(a) (b)

(c) (d) 2.(a) (b) (c) (d) (e)

3.(a)

(b) (c) 5. 4.3: 1. (a) (b)

(c) (d) (e) (f) 2.(a) (b) (c) (d)

3.(b) 4.(a) incomplete combustion (b) single displacement (c) double displacement (d) complete combustion (e) decomposition (f) synthesis

(g) decomposition 5.4: 2.(a) (b)

(c) (d) (e) (f)