

Synthesis and Decomposition Practice

Practice Problems

Predict the product that is likely to form in each reaction, and write a balanced chemical equation for the reaction.

21. lithium and oxygen
22. strontium and fluorine
23. iron and bromine
24. phosphorus and hydrogen, forming gaseous phosphorus trihydride
25. calcium and iodine
26. tin and oxygen
27. bismuth and sulfur
28. aluminum and iodine
29. silver and oxygen
30. nitrogen and oxygen, forming nitrogen dioxide

Practice Problems

Determine the products that are likely to form in the decomposition of each compound, and write a balanced chemical equation for the reaction.

31. potassium bromide
32. aluminum oxide
33. magnesium hydroxide
34. calcium nitrate
35. copper(II) carbonate
36. chromium(III) chloride
37. barium carbonate
38. rubidium nitrate
39. lithium hydroxide
40. magnesium chloride

Learning Check

7. What is the general form of a synthesis reaction?
8. When a metal reacts with a non-metal during a synthesis reaction, what type of compound forms?
9. **Figure 3.9** shows a synthesis reaction between solid sodium and chlorine gas.
 - a. What main characteristic of this chemical reaction causes it to be classified as a synthesis reaction?
 - b. Write a balanced chemical equation for this reaction.
10. Solid calcium and chlorine gas can produce a solid product in a synthesis reaction.
 - a. Predict the product of this reaction.
 - b. Write a balanced chemical equation for this reaction.
11. As you have learned, three chemical reactions involving sulfur are associated with the formation of acid precipitation. Create a graphic organizer to compare the types of reactants in these reactions.
12. A product of the chemical reaction of ethane, $C_2H_6(g)$, with oxygen is carbon dioxide. Could this reaction be a synthesis reaction? Explain.

Learning Check

13. What type of product forms when a metal oxide reacts with water?
14. Make a graphic organizer to compare the solutions formed when water reacts with a metal oxide and with a non-metal oxide.
15. Give the general form of a decomposition reaction. Describe the main characteristic of this type of reaction.
16. Is it possible for a decomposition reaction to have an element as a reactant? Explain.
17. In what state, other than the liquid state, is electrolysis possible? Explain your reasoning.
18. Describe the role of thermal decomposition in the isolation of elemental mercury, and give two examples of how mercury is used.