

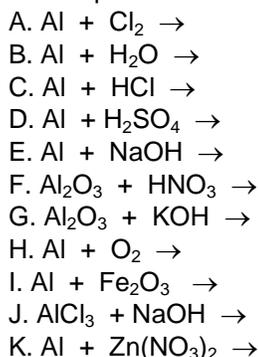
ALUMINUM-2

1. List down three reasons that enable aluminum metal is extensively used.
2. Write down three common chemical properties of aluminum metal.
3. Write down the spdf electron configuration of aluminum.
4. Write down the formula of oxide, hydroxide and a salt of aluminum metal.
5. Explain step by step preparation of aluminum from bauxite mineral.
6. What are the common names of aluminum compounds below?

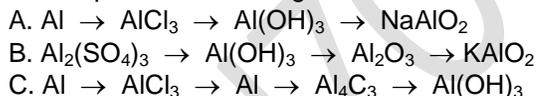


7. List down the common uses of aluminum and its compounds.

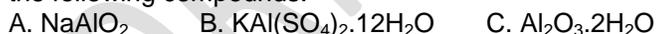
8. Complete the following reactions below,



9. Complete the following transformations below.



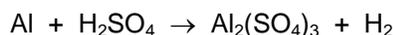
10. Calculate the mass percentage of aluminum metal in the following compounds.



11. Find the oxidation states of C, S, and Cl atoms in the following compounds.



12. Calculate the mass of aluminum required to produce 100.8 L of hydrogen gas at STP according to the reaction below;



13. A 160 g sample of aluminum reacted with excess oxygen gas and 280.5 g of aluminum oxide is obtained. What is the percent purity of the aluminum sample?

14. Pure aluminum in industry is obtained from bauxite mineral, $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$. In order to obtain one tone of aluminum metal how many tones of bauxite mineral must be processed?

15. In the thermite reaction powder of aluminum is reacted with iron (III) oxide in order to produce pure iron. Calculate the mass of iron produced at most when 2.7 kg of aluminum reacts with 9.6 kg of iron (III) oxide.

16. Aluminum bronze is the alloy copper metal with 5% aluminum metal. A 250 g aluminum bronze is treated with excess hydrochloric acid. Calculate the volume of hydrogen gas obtained at STP.

17. Nordic gold is the gold-colored copper alloy containing 5% aluminum is used in making of 50 cent, 20 cent and 10 cent euro coins. If an average 50 cent euro coin is weighing 7.8 g, calculate the mass of aluminum required to prepare 50 cent coins equivalent 100 euro.

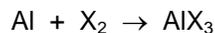
18. Aluminum hydroxide is an insoluble compound and decomposes upon heating. Calculate mass of water obtained from the decomposition of 800 g of aluminum hydroxide with 90% efficiency.

19. Almagel is a kind of medicine applied to relief stomach pains by reducing acid level. A dose of almagel contains 4% aluminum hydroxide by mass. Calculate the mass of almagel in order to neutralize 500 ml hydrochloric acid solution with 0.5% by mass and 1.006 g/ml density.

20. Calculate the mass of potassium sulfate and aluminum sulfate required to obtain 1896 g of potassium alum($\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$).

21. How many liters of air at STP is necessary to burn methane gas obtained by the reaction of 28.8 g of aluminum carbide with enough water?

22. Following reaction of aluminum with a halogen (X_2) is given;



When 8.1 g of aluminum metal is used 80.1 g of AlX_3 is produced. Find the halogen used in the reaction.

23. Research and list down advantages and disadvantages of use of aluminum.

24. Aluminum is an amphoteric metal. Explain the chemical character of "amphoteric" with two reactions.

25. Aluminothermic process is useful method in order to reduce metals like iron and chromium from their oxides. Explain this method by using two reactions.