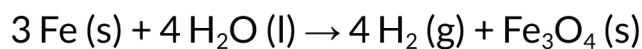


# ← STOICHIOMETRY Worksheet →

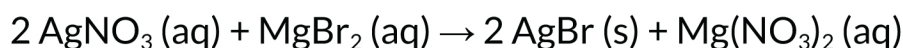
1. Hydrogen is generated by passing pot steam over iron, which oxidizes to form  $\text{Fe}_3\text{O}_4$ , in the following equation.



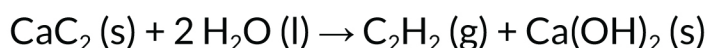
a. If 625 g of  $\text{Fe}_3\text{O}_4$  is produced in the reaction, how many moles of hydrogen are produced simultaneously?

b. How many moles of iron would be needed to generate 27 g of  $\text{H}_2$ ?

2. Calculate the mass of silver bromide produced from 22.5 g of silver nitrate in the following reaction:



3. What mass of acetylene,  $\text{C}_2\text{H}_2$ , can be produced from the reaction of 90 g of calcium carbide,  $\text{CaC}_2$ , with water in the following reaction?



4. Chlorine gas can be produced in the laboratory by adding concentrated hydrochloric acid to manganese (IV) oxide in the following reaction:



a. Calculate the mass of  $\text{MnO}_2$  needed to produce 25 g of  $\text{Cl}_2$ .

b. What mass of  $\text{MnCl}_2$  is produced when 0.091 g of  $\text{Cl}_2$  is generated?

# ← STOICHIOMETRY Worksheet →

## Answers

1. Hydrogen is generated by passing pot steam over iron, which oxidizes to form  $\text{Fe}_3\text{O}_4$ , in the following equation.



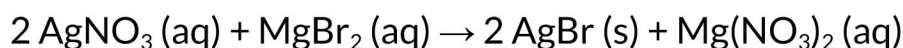
a. If 625 g of  $\text{Fe}_3\text{O}_4$  is produced in the reaction, how many moles of hydrogen are produced simultaneously?

$$625 \text{ g Fe}_3\text{O}_4 \times (1 \text{ mol Fe}_3\text{O}_4/232 \text{ g Fe}_3\text{O}_4) \times (4 \text{ mol H}_2/1 \text{ mol Fe}_3\text{O}_4) = 10.8 \text{ mol H}_2$$

b. How many moles of iron would be needed to generate 27 g of  $\text{H}_2$ ?

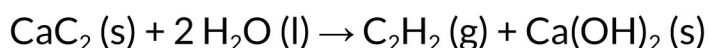
$$27 \text{ g H}_2 \times (1 \text{ mol H}_2/2 \text{ g H}_2) \times (3 \text{ mol Fe}/4 \text{ mol H}_2) = 10.1 \text{ mol Fe}$$

2. Calculate the mass of silver bromide produced from 22.5 g of silver nitrate in the following reaction:



$$22 \text{ g AgNO}_3 \times (1 \text{ mol AgNO}_3/170 \text{ g AgNO}_3) \times (2 \text{ mol AgBr}/2 \text{ mol AgNO}_3) \times (188 \text{ g AgBr}/1 \text{ mol AgBr}) = 24.3 \text{ g}$$

3. What mass of acetylene,  $\text{C}_2\text{H}_2$ , can be produced from the reaction of 90 g of calcium carbide,  $\text{CaC}_2$ , with water in the following reaction?



$$90 \text{ g CaC}_2 \times (1 \text{ mol CaC}_2/64 \text{ g CaC}_2) \times (1 \text{ mol C}_2\text{H}_2/1 \text{ mol CaC}_2) \times (26 \text{ g C}_2\text{H}_2/1 \text{ mol C}_2\text{H}_2) = 36.6 \text{ g C}_2\text{H}_2$$

4. Chlorine gas can be produced in the laboratory by adding concentrated hydrochloric acid to manganese (IV) oxide in the following reaction:



a. Calculate the mass of  $\text{MnO}_2$  needed to produce 25 g of  $\text{Cl}_2$ .

$$25 \text{ g Cl}_2 \times (1 \text{ mol Cl}_2/71 \text{ g Cl}_2) \times (1 \text{ mol MnO}_2/1 \text{ mol Cl}_2) \times (87 \text{ g MnO}_2/1 \text{ mol MnO}_2) = 30.6 \text{ g MnO}_2$$

b. What mass of  $\text{MnCl}_2$  is produced when 0.091 g of  $\text{Cl}_2$  is generated?

$$0.091 \text{ g Cl}_2 \times (1 \text{ mol Cl}_2/71 \text{ g Cl}_2) \times (1 \text{ mol MnCl}_2/1 \text{ mol Cl}_2) \times 125.84 \text{ g MnCl}_2/1 \text{ mol MnCl}_2 = 0.161 \text{ g MnCl}_2$$