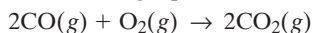
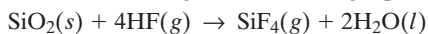


- 312.** Carbon monoxide will burn in air to produce  $\text{CO}_2$  according to the following equation:



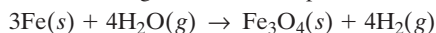
What volume of oxygen at STP will be needed to react with 3500. L of CO measured at  $20.^\circ\text{C}$  and a pressure of 0.953 atm?

- 313.** Silicon tetrafluoride gas can be produced by the action of HF on silica according to the following equation:



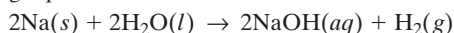
1.00 L of HF gas under pressure at 3.48 atm and a temperature of  $25^\circ\text{C}$  reacts completely with  $\text{SiO}_2$  to form  $\text{SiF}_4$ . What volume of  $\text{SiF}_4$ , measured at  $15^\circ\text{C}$  and 0.940 atm, is produced by this reaction?

- 314.** One method used in the eighteenth century to generate hydrogen was to pass steam through red-hot steel tubes. The following reaction takes place:



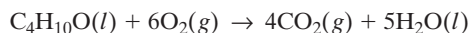
- What volume of hydrogen at STP can be produced by the reaction of 6.28 g of iron?
- What mass of iron will react with 500. L of steam at  $250.^\circ\text{C}$  and 1.00 atm pressure?
- If 285 g of  $\text{Fe}_3\text{O}_4$  are formed, what volume of hydrogen, measured at  $20.^\circ\text{C}$  and 1.06 atm, is produced?

- 315.** Sodium reacts vigorously with water to produce hydrogen and sodium hydroxide according to the following equation:



If 0.027 g of sodium reacts with excess water, what volume of hydrogen at STP is formed?

- 316.** Diethyl ether burns in air according to the following equation:



If 7.15 L of  $\text{CO}_2$  is produced at a temperature of  $125^\circ\text{C}$  and a pressure of 1.02 atm, what volume of oxygen, measured at STP, was consumed and what mass of diethyl ether was burned?

- 317.** When nitroglycerin detonates, it produces large volumes of hot gases almost instantly according to the following equation:



- When 0.100 mol of nitroglycerin explodes, what volume of each gas measured at STP is produced?
- What total volume of gases is produced at  $300.^\circ\text{C}$  and 1.00 atm when 10.0 g of nitroglycerin explodes?

- 318.** Dinitrogen monoxide can be prepared by heating ammonium nitrate, which decomposes according to the following equation:



What mass of ammonium nitrate should be decomposed in order to produce 250. mL of  $\text{N}_2\text{O}$ , measured at STP?

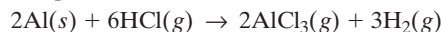
- 319.** Phosphine,  $\text{PH}_3$ , is the phosphorus analogue to ammonia,  $\text{NH}_3$ . It can be produced by the reaction

between calcium phosphide and water according to the following equation:



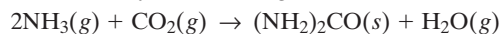
What volume of phosphine, measured at  $18^\circ\text{C}$  and 102.4 kPa, is produced by the reaction of 8.46 g of  $\text{Ca}_3\text{P}_2$ ?

- 320.** In one method of producing aluminum chloride, HCl gas is passed over aluminum and the following reaction takes place:



What mass of Al should be on hand in order to produce  $6.0 \times 10^3$  kg of  $\text{AlCl}_3$ ? What volume of compressed HCl at 4.71 atm and a temperature of  $43^\circ\text{C}$  should be on hand at the same time?

- 321.** Urea,  $(\text{NH}_2)_2\text{CO}$ , is an important fertilizer that is manufactured by the following reaction:



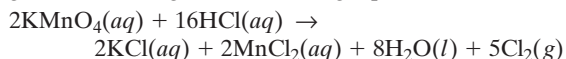
What volume of  $\text{NH}_3$  at STP will be needed to produce  $8.50 \times 10^4$  kg of urea if there is an 89.5% yield in the process?

- 322.** An obsolete method of generating oxygen in the laboratory involves the decomposition of barium peroxide by the following equation:



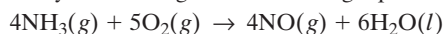
What mass of  $\text{BaO}_2$  reacted if 265 mL of  $\text{O}_2$  is collected by water displacement at 0.975 atm and  $10.^\circ\text{C}$ ?

- 323.** It is possible to generate chlorine gas by dripping concentrated HCl solution onto solid potassium permanganate according to the following equation:

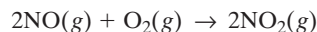


If excess HCl is dripped onto 15.0 g of  $\text{KMnO}_4$ , what volume of  $\text{Cl}_2$  will be produced? The  $\text{Cl}_2$  is measured at  $15^\circ\text{C}$  and 0.959 atm.

- 324.** Ammonia can be oxidized in the presence of a platinum catalyst according to the following equation:



The NO that is produced reacts almost immediately with additional oxygen according to the following equation:



If 35.0 kL of oxygen at STP react in the first reaction, what volume of  $\text{NH}_3$  at STP reacts with it? What volume of  $\text{NO}_2$  at STP will be formed in the second reaction, assuming there is excess oxygen that was not used up in the first reaction?

- 325.** Oxygen can be generated in the laboratory by heating potassium chlorate. The reaction is represented by the following equation:



What mass of  $\text{KClO}_3$  must be used in order to generate 5.00 L of  $\text{O}_2$ , measured at STP?

- 326.** One of the reactions in the Solvay process is used to make sodium hydrogen carbonate. It occurs when car-