

Assignment 6. Stoichiometry of Gases

Name:

Be sure to show all your work

1. Calculate the volume of O_2 , at $23.5^\circ C$ and 753 mm Hg, needed to completely combust 125 g of octane (C_8H_{18}) to CO_2 and H_2O .
2. The first step in the process of making nitric acid, ammonia (NH_3) is reacted with oxygen (O_2) to produce nitric oxide (NO) and water.
 - a. Write the balanced chemical equation:
 - b. What volume of NO , measured at 1.00 atm and $1.00 \times 10^3^\circ C$, can be produced from 10.0 L of NH_3 and excess O_2 measured at the same temperature and pressure?
 - c. What volume of O_2 measured at STP is consumed in reacting with 10.0 kg of NH_3
 - d. What mass of NO is produced from the reaction of 5.00×10^2 L of NH_3 , measured at $2.50 \times 10^2^\circ C$ and 3.00 atm, with excess O_2
 - e. What mass of H_2O is produced from the reaction of 65.0 L of NH_3 with 75.0 L of O_2 , both measured in STP?
 - f. What would be the volume of the NO produced in 2d. if the temperature was decreased to $25.0^\circ C$ and the pressure increased to 15.00 atm?

Answers.

1. 336 L O_2 2a. $4 NH_3 + 5 O_2 \rightarrow 4 NO + 6 H_2O$ 2b. 10.0 L NO 2c. 1.64×10^4 L O_2
- 2d. 1.05×10^3 g 2e. 72.4 g H_2O 2f. 57.0 L NO