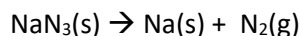


## Learning Target 8.2: Gas Stoichiometry Worksheet

- How many liters of propane ( $C_3H_6$ ) will undergo complete combustion with 34.0 L of oxygen gas at STP? **Ans: 7.5 L  $C_3H_6$**
- Ammonium nitrate ( $NH_4NO_3$ ) is a common ingredient in chemical fertilizers. Use the reaction shown to calculate the mass of solid ammonium nitrate that must be used to obtain 0.100 L of dinitrogen monoxide gas at STP.  
 $NH_4NO_3 \rightarrow N_2O + H_2O$  **Ans: 0.357 g  $NH_4NO_3$**
- Determine the volume of hydrogen gas needed to react completely with 5.00 L of oxygen gas to form water at STP. **Ans: 10.0 L  $H_2$**
- When solid calcium carbonate is heated, it decomposes to form solid calcium oxide and carbon dioxide. How many liters of carbon dioxide will be produced a STP if 2.38 Kg of calcium carbonate reacts completely? **Ans: 533 L  $CO_2$**
- What volume of oxygen is needed to completely combust 2.36 L of methane gas ( $CH_4$ )? **Ans: 4.72 L  $O_2$**
- When iron rusts, it undergoes a reaction with oxygen to form iron (II) oxide. Calculate the volume of oxygen gas at STP that is required to completely react with 52.0 g iron? **Ans: 15.6 L  $O_2$**
- Nitrogen and oxygen gases react to form dinitrogen monoxide. What volume of  $O_2$  is needed to produce 34 L of  $N_2O$  at STP? **Ans: 17 L  $O_2$**
- An excess of acetic acid is added to 28 g of sodium bicarbonate at 25° C and 1 atm pressure. During the reaction, the gas cools to 20° C. What volume of carbon dioxide will be produced? The balanced equation for the reaction is shown below. **Ans: 7.9 L  $CO_2$**

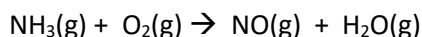


- If 5.00 L of hydrogen gas, measured at a temperature of 20° C and a pressure of 80.1 KPa, is burned in excess oxygen to form water, what mass of oxygen will be consumed? Assume temperature and pressure remain constant. **Ans: 2.63 g**
- The safety air bags in automobiles are inflated by nitrogen gas generated by the rapid decomposition of sodium azide,  $NaN_3$ :



If an airbag has volume of 36 L and is to be filled with nitrogen gas at a pressure of 1.15 atm at a temperature of 26.0°C, how many grams of  $NaN_3$  must be decomposed. **Ans: 72 g  $NaN_3$**

- In the first step in the industrial process for making nitric acid, ammonia reacts with oxygen in the presence of a suitable catalyst to form nitric oxide and water vapor:



How many liters of  $NH_3(g)$  at 850°C and 5.00 atm are required to react with 1.00 mol  $O_2(g)$  in this reaction? **Ans: 14.8 L**