

Unit 8: Ch 14 – Gas Stoichiometry

IDEAL vs REAL GASES:

➤ IDEAL GASES:

- Particles take up little to _____ and have _____.
- Operates under _____ and _____.
- Follows **ALL** assumptions of the _____.

➤ REAL GASES:

- Has _____ and intermolecular forces (_____).
- Operates under ***extremely*** _____ and _____.

1) REVIEW OF AVOGADRO'S LAW:

- Gases under the ***same*** _____ and _____ contain _____ number of _____ (***particles***) and _____.
 - This number is at _____ → ***Temp:*** _____ & ***Pressure :*** _____
 - _____
 - _____

2) VOLUME RATIO:

- _____
- Example: _____ $\text{C}_4\text{H}_{10}(\text{g})$ + _____ $\text{O}_2(\text{g}) \rightarrow$ _____ $\text{CO}_2(\text{g})$ + _____ $\text{H}_2\text{O}(\text{g})$
 - If _____ of $\text{C}_4\text{H}_{10}(\text{g})$ reacts with _____ of $\text{O}_2(\text{g})$, then _____ of $\text{CO}_2(\text{g})$ and _____ of $\text{H}_2\text{O}(\text{g})$ are produced.

GAS STOICHIOMETRY:

Volume & Mass: @ STP OR @ NON-STEP:

➤ REQUIREMENTS:

- 1. _____ equation.
- 2. Determine if _____ OR _____ conditions.

- ** 3. _____ use _____ (**1 mol = 22.4 L of gas**) and _____ (**vol coeff "A" = vol coeff "B"**) IF at _____.
- ** 4. Can use _____ (**Ideal Gas Law**) under **BOTH** _____ **AND** _____.
- 5. _____ use _____ for _____.
 - **Use STOICH CALCULATIONS to CONVERT if NOT a gas.**

PRACTICE EXAMPLES:

1. **VOLUME ONLY @ STP:** _____ CH₄ (g) + _____ O₂ (g) → _____ CO₂ (g) + _____ H₂O (g)
 - a. What volume of methane gas (CH₄) is needed to produce 26.0 L of water vapor assuming STP?

2. **VOLUME & MASS @STP:** _____ K + _____ Cl₂ (g) → _____ KCl
 - a. How many liters of chlorine gas are needed to completely react with 0.204 grams of potassium to produce potassium chloride at STP?

3. **@ NON-STP:** _____ N₂ (g) + _____ H₂ (g) → _____ NH₃ (g)
 - a. If 5.00 L of nitrogen gas reacts completely with hydrogen gas at 3.00 atm and 298 K, how many grams of ammonia are produced?

4. **@ NON-STP:** _____ CaC₂ + _____ H₂O → _____ C₂H₂ (g) + _____ Ca(OH)₂
 - a. 3.25 grams of calcium carbide (CaC₂) reacts with water to produce acetylene (C₂H₂) gas and calcium hydroxide. If acetylene was collected over water at 17.0 °C and 740 mmHg, how many liters of acetylene are produced?