

# Gas Stoichiometry



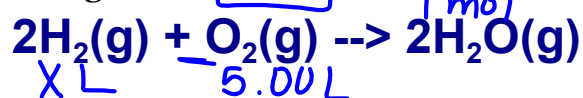
- When the reactants and products are solids (s), liquids (l) or aqueous (aq), the coefficients represent:
  - > the number of moles
- When the reactants and products are gases (g) the coefficients represent:
  - > the number of moles
  - > volumes of gases in liters

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# Gas Stoichiometry Practice

Determine the volume of hydrogen gas needed to react completely with 5.00 L of oxygen gas to form water vapor.

Conditions for the gases are STP. -  $\frac{22.4 \text{ L}}{1 \text{ mol}}$



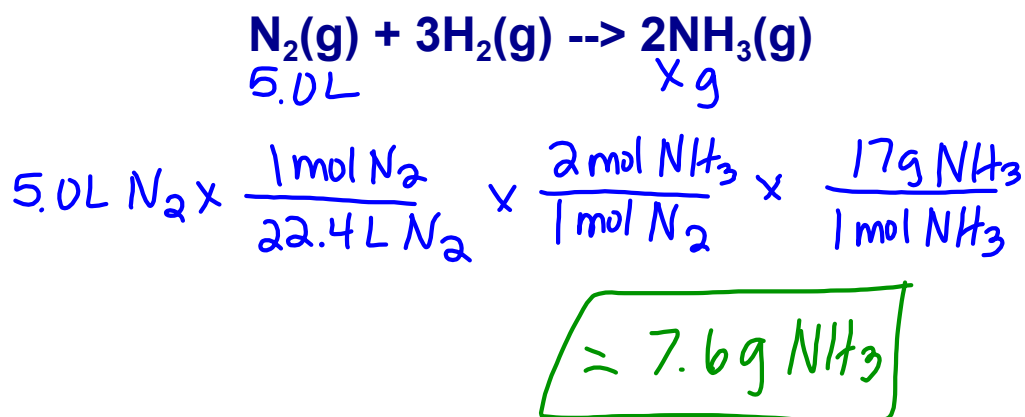
*Why can we use the coefficients as volume ratio?*

$$5.00 \text{ L O}_2 \times \frac{1 \text{ mol O}_2}{22.4 \text{ L}} \times \frac{2 \text{ mol H}_2}{1 \text{ mol O}_2} \times \frac{22.4 \text{ L H}_2}{1 \text{ mol H}_2} = 10.0 \text{ L H}_2$$

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# Gas Stoichiometry Practice

If 5.0 L of  $N_2$  reacts at STP, how many grams of  $NH_3$  are produced? (Show all work)

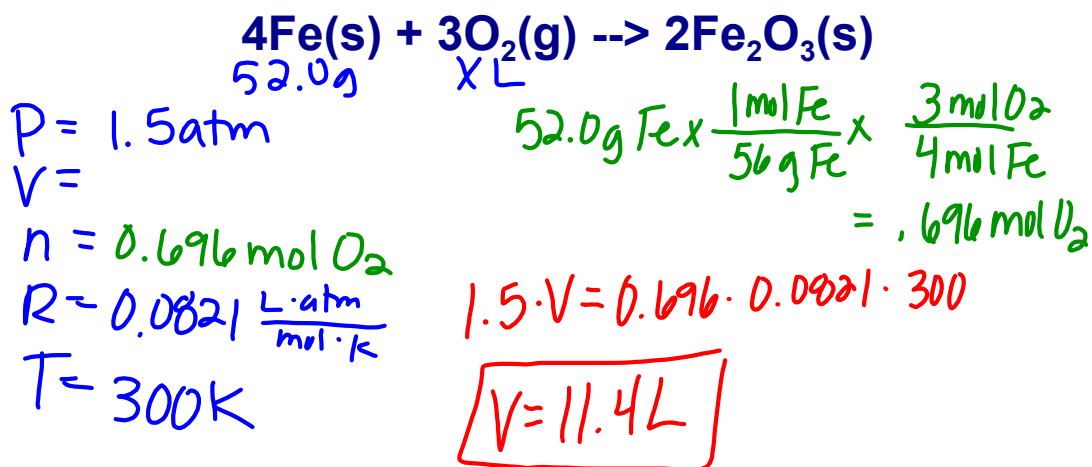


Why did we use 22.4 L?

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# Gas Stoichiometry Practice

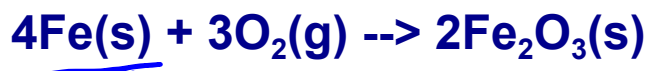
Calculate the volume of oxygen gas at 300 K and 1.5 atm that is required to completely react with 52.0 g of iron. (Show all work)



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# Gas Stoichiometry Practice

Calculate the volume of oxygen gas at 300. K and 1.5 atm that is required to completely react with 52.0 g of iron. (Show all work)



Why did we use stoichiometry first in this problem? Fe is a solid

Why do we have to use the ideal gas law for this problem? not @ STP

Why couldn't we use the molar volume in this problem? not @ STP

When you aren't sure how to solve the problems, what will always work?

ideal gas law

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