

Molar Volumes Practice: I

GAS	molar volume at STP (L mol ⁻¹)	Volume at STP (L)	Moles	Mass (g)	Molar Mass (g mol ⁻¹)	# of molecules
NO ₂		22.7				
NH ₃						6.02 x 10 ²³
SO ₂		11.35				
N ₂		45.4				
CH ₄				3.20		
O ₂			3.00			
H ₂ S			0.100			
SO ₃			0.250			
CO ₂			1.50			
Ne						3.10 x 10 ²⁴
H ₂				4.00		
CO				2.80		
NO				45.0		
N ₂ O						3.00 x 10 ²³
C ₂ H ₆				6.00		

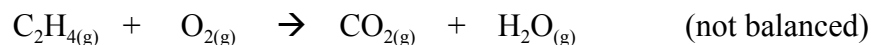
At STP: no. mols = $\frac{\text{volume (V)}}{\text{molar volume (22.7)}}$

no. mols = $\frac{\text{mass}}{\text{molar mass}}$ = $\frac{\text{\# of molecules}}{\text{Avagadro's \#}}$

no. mols = concentration x volume (L)

Molar Volume: Practice II

1. Ethene gas burns to produce $\text{CO}_2(\text{g})$ and water vapour :



From the balanced equation

Given

- a) 56.0 g C_2H_4
- b) 227 L C_2H_4
- c) 192 g O_2
- d) 34.1 L C_2H_4
- e) 4.00 moles C_2H_4
- f) 0.500 moles O_2
- g) 53.0 L O_2
- h) 3.01×10^{23} molecules O_2
- i) 84.7 L C_2H_4
- j) 82.3 L O_2

Calculate (all gas volumes at STP)

- Volume of O_2 consumed in litres
- Volume of O_2 consumed in litres
- Volume of CO_2 produced in litres
- Mass of H_2O produced in grams
- Volume of O_2 consumed in litres
- Volume of CO_2 produced in litres
- Moles of H_2O produced
- Volume of CO_2 produced in litres
- Molecules of O_2 consumed
- Volume of H_2O produced in litres

2. Calculate the volume of $\text{CO}(\text{g})$ produced at STP when 36.0 g of carbon burn completely:



Molar Volume: Practice III

1. What volume, measured at STP, would each of the following gas occupy:

- a) 8.80 g $\text{CO}_2(\text{g})$
- b) 10.0 g $\text{H}_2(\text{g})$
- c) 6.00 g $\text{C}_2\text{H}_6(\text{g})$

2. What is the molar volume of a gas at 100 kPa and 25 °C (sometimes referred to as ambient standard temperature and pressure or SATP),?

3. Given the equation: $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) \rightarrow \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$

a. What volume of CO_2 , measured at STP, would be obtained by burning 8.00 g methane, CH_4 ?

b. What volume of oxygen gas, at STP would be used if 72.0 g of water are produced?

4. Given the equation: $\text{CaH}_2 + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{H}_2$

a. Balance the equation

b. What volume of hydrogen gas (at STP) would be obtained from 84.0 g CaH_2 ?

c. What volume of hydrogen, measure at STP, would be obtained from 1 kg of CaH_2 ?

d. What volume would be obtained from 84.0 g of CaH_2 , if the hydrogen is measured at 50.0 kPa and 25 °C?

5. What volume of CO_2 at 227°C and 90.8 kPa can be produced from the burning of 66.0 g of C_3H_8 ?
(Think: $PV = nRT$, stoichiometry)

