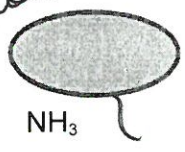
Review

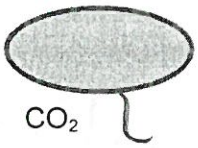
Little Guys and Molar Volume

same V, T + P ∴ same # n!

1. You have a 1.00 L of $NH_3(g)$ and 1.00 L flask of $CO_2(g)$ both 75.0 kPa and 22.0 °C.

17g/mol





44g/mol

same T = same ave EK ∴ lower mm = faster velocity

Compare the two flasks using terms such as >, <, or =.

a) Average Velocity ___>___

b) Average Kinetic Energy ___=___

c) Number of Molecules ___=___

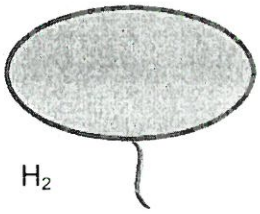
d) Total Mass ___<___

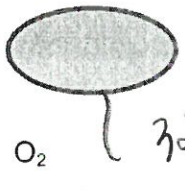
2. You have a 10.0 L flask at 15.0 °C and 96.0 kPa filled with $H_2(g)$ and a second 5.0 L flask at 15.0 °C and 192 kPa filled with $O_2(g)$

same T!

H_2 = $PV = nRT$ $\frac{PV}{RT} = \frac{nRT}{RT}$ $= \frac{(96)(10)}{(8.314)(288)} = 0.4\ mol$

2g/





32g/1mol

$O_2 = \frac{(192)(5)}{(8.314)(288)} = 0.4\ mol$

Compare the two flasks using terms such as >, <, or =.

e) Average Velocity ___>___

f) Average Kinetic Energy ___=___

g) Number of Molecules ___=___

h) Total Mass ___<___

3. Zinc sulfide reacts with oxygen to produce zinc oxide and sulfur dioxide.

BCE: $ZnS + \frac{3}{2}O_2 \rightarrow ZnO + SO_2$

Identify the reactant particles: $ZnS + O_2$

– standard T & P 273 K & 101.3 kPa

If 50.0 g of oxygen gas at STP reacts with zinc sulfide then the:

i) moles of sulfur dioxide produced would be 1.04 mol

ii) mass of sulfur dioxide produced would be 66.6 g

iii) number of molecules of sulfur dioxide would be 6.26×10^{23} molec

iv) volume of sulfur dioxide at STP would be 23.3 L

v) volume of sulfur dioxide at 65.2 kPa and 27.0 °C would be 38.6 L

4. Copper (2) oxide reacts with ammonia to produce water vapour, nitrogen and copper.

BCE: $3CuO + 2NH_3 \rightarrow 3H_2O + N_2 + 3Cu$

Calculate the volume of nitrogen at STP that can be produced from 100.00 g of copper (2) oxide. 9.39 L N_2

5. Calculate the volume of hydrogen chloride at SATP that is needed to produce $1.25\ 10^2$ g of chlorine. 0.79 L