

The Mole and Gases

Gay-Lussac's Law of Combining Gas Volumes

-whenever gases react, their volumes, measured at the same temperature and pressure are in the ratio of small whole numbers

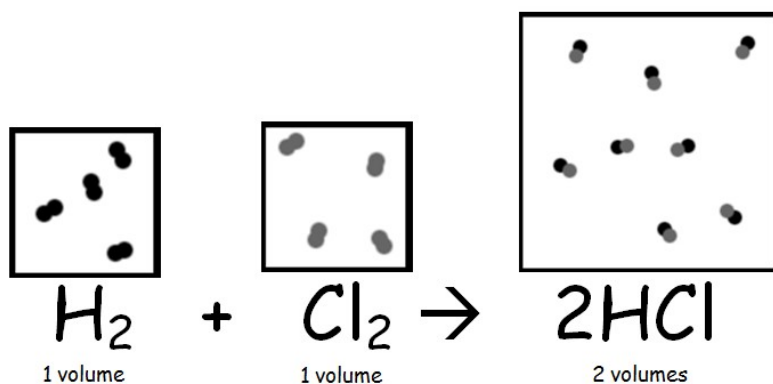
(i.e. the molar ratio).

Avogadro's Law

-equal volumes of gases measured at the same temperature and pressure contain equal numbers of molecules (moles)

(∴ volume is proportional to the number of moles)

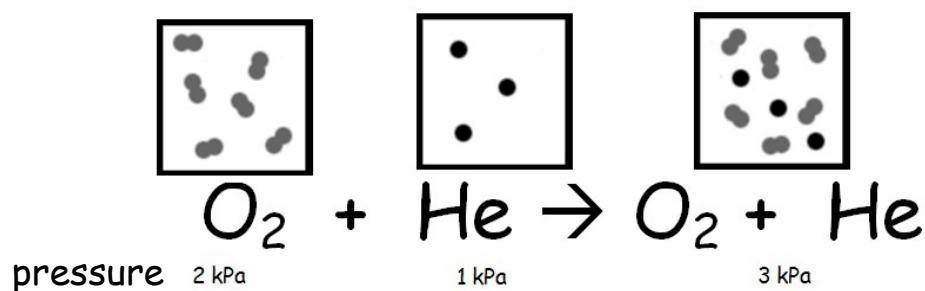
ex.



Dalton's Law of Partial Pressures

-the total pressure of a mixture of non-reacting gases is the sum of the partial pressures of the mixture's component gases.

ex. keeping volume and pressure constant



i.e.
$$P_{TOTAL} = P_A + P_B + P_C + \dots + P_Z$$

e.g. a flask contains H₂ gas at a pressure of 3.8 kPa. This is mixed with N₂ gas to produce a total pressure of 8.5 kPa. What is the partial pressure of the N₂ gas?

$$P_{\text{TOTAL}} = P_A + P_B + P_C + \dots + P_Z$$

$$8.5 \text{ kPa} = 3.8 \text{ kPa} + P_{\text{N}_2}$$

$$8.5 \text{ kPa} - 3.8 \text{ kPa} = P_{\text{N}_2}$$

$$4.7 \text{ kPa} = P_{\text{N}_2}$$