

# Ideal Gas Laws

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## Ideal Gas Law

1) Graph the relationship of P vs V (Boyle's Law), V vs T (Charles' Law), and V vs n (Avogadro's hypothesis). Explain the relationship

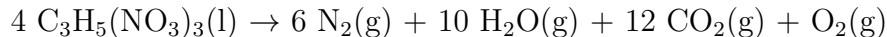
2) Assuming constant temperature. Determine the final pressure when 8.00mL krypton at 1.97atm is transferred to a vessel of volume 1.0L.

3) An outdoor storage container for hydrogen gas with a volume of 300kL is at 2.0 atm and 10°C. The temperature rises to 40°C. What is the new pressure of the hydrogen in the container?

4) What is the density of chloroform (CHCl<sub>3</sub>) with a vapor pressure at 0.267atm and 300K?

5) What mass of ammonia (NH<sub>3</sub>) will exert the same pressure as 10mg of hydrogen sulfide (H<sub>2</sub>S) in the same container under the same conditions?

6) Nitroglycerin (C<sub>3</sub>H<sub>5</sub>(NO<sub>3</sub>)<sub>3</sub>) is highly sensitive and detonates by the reaction



Calculate the total volume of product gases at 2.12atm and 300°C from the detonation of 450g of nitroglycerin.

Dalton's Law of Partial Pressure explains that for a mixture of gases, the total pressure is the sum of the partial pressure of each component. In another way, the partial pressure of each component can be determined

$$P_A = \chi_A P_{\text{Total}} = \frac{n_A}{n_{\text{Total}}} P_{\text{Total}} \quad (1)$$

where  $P_A$  is the partial pressure for a component A,  $P_{\text{Total}}$  is the total pressure, and  $n$  is the amount of moles.

7) Practice: Dalton's Law of Partial Pressures A flask contains a mixture of 1.25 mols of hydrogen gas and 2.90 moles of oxygen gas. If the total pressure is 104.kPa, what is the partial pressure of each gas?