Dalton's Law of Partial Pressure

$$P_{TOTAL} = P_1 + P_2 + \dots$$

$$PV = nRT$$

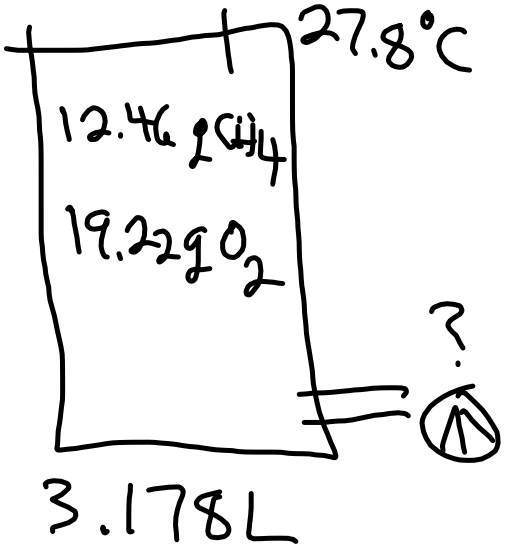
$$P_1V = n_1RT$$

$$P_2V = n_2RT$$

$$\vdots$$

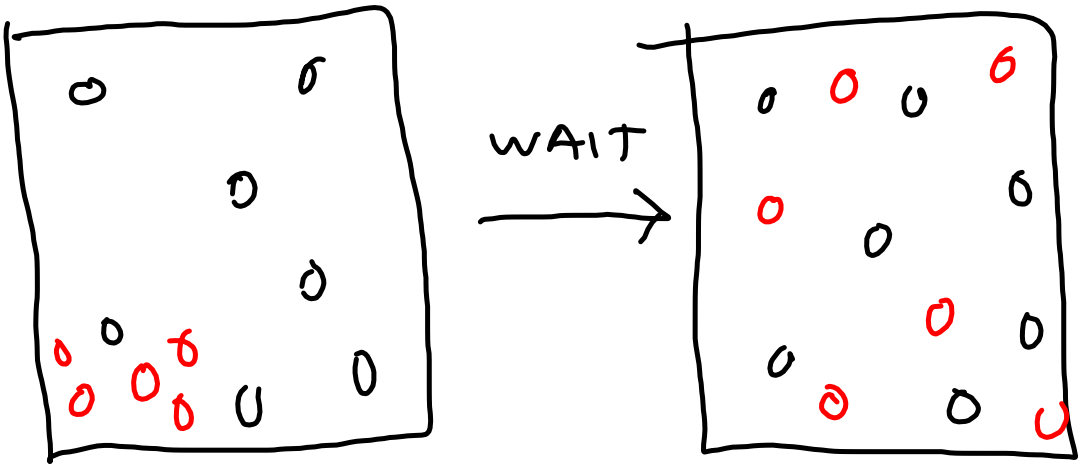
$$P_{TOTAL}V = n_{TOTAL}RT$$

$$n_{TOTAL} = n_1 + n_2 + \dots$$

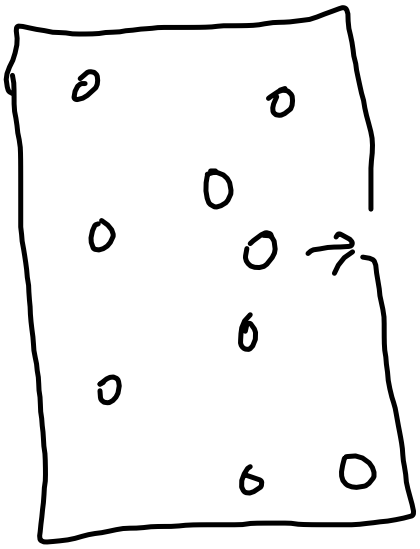


What total pressure is exerted by a gas mixture containing 12.46 g CH_4 and 19.22 g O_2 in a 3.178 L container at 27.8°C?

A steel tank having a volume of 9.133L contains 7.515 g O_2 and an unknown mass of N_2 at 23.6°C. The total pressure exerted by this gas mixture is 9.975 atm. What mass of N_2 is in the tank?



DIFFUSION



VACUUM

H_2 2.016

O_2 32.00

$\overline{KE} \propto T$

$\overline{KE} = \frac{1}{2} m \overline{v^2}$

Graham's Law of Effusion

$$E.R. \propto \frac{1}{\sqrt{MWT}}$$

$$E.T. \propto \sqrt{MWT}$$

$$E.T. = k\sqrt{MWT}$$

$$k = f(P, T, A)$$

$$\frac{E.T._1}{E.T._2} = \frac{k\sqrt{MWT_1}}{k\sqrt{MWT_2}}$$

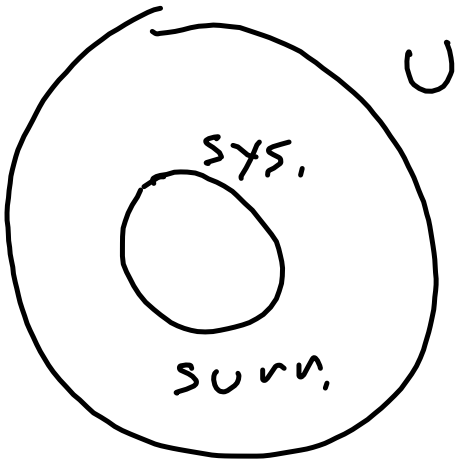
$$\frac{E.T._1}{E.T._2} = \frac{\sqrt{MWT_1}}{\sqrt{MWT_2}} = \sqrt{\frac{MWT_1}{MWT_2}}$$

$$\frac{E.R._1}{E.R._2} = \sqrt{\frac{MWT_2}{MWT_1}}$$

If it takes 37.15 min for CO_2 to effuse through a small hole in its container, how long would it take for NH_3 to effuse under the same conditions of temp and pressure? (comparisons being for the same number of moles of effused gas.)

An unknown gas requires 60.0 minutes to effuse through a small hole in its container. Under the same conditions of temp. and pressure, helium (He) requires 30.0 min. What is the molecular weight of the unknown gas?

THERMOCHEMISTRY



Open system - can exchange both matter and energy with the surroundings

Closed system - can exchange energy, but not matter, with the surroundings.

Isolated system - Exchanges neither matter nor energy with the surroundings.

Chemical reactions can be:

Endothermic - absorb heat

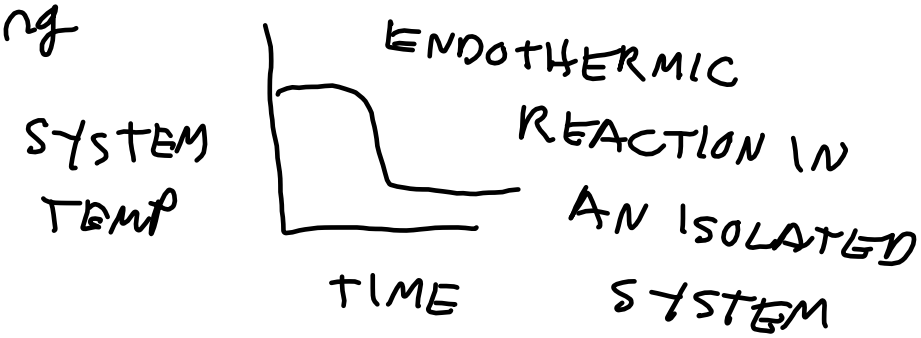
or

Exothermic - release heat

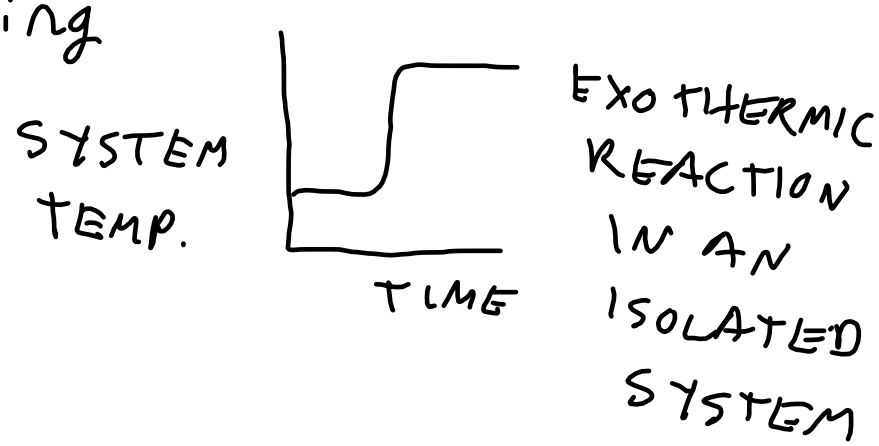
or

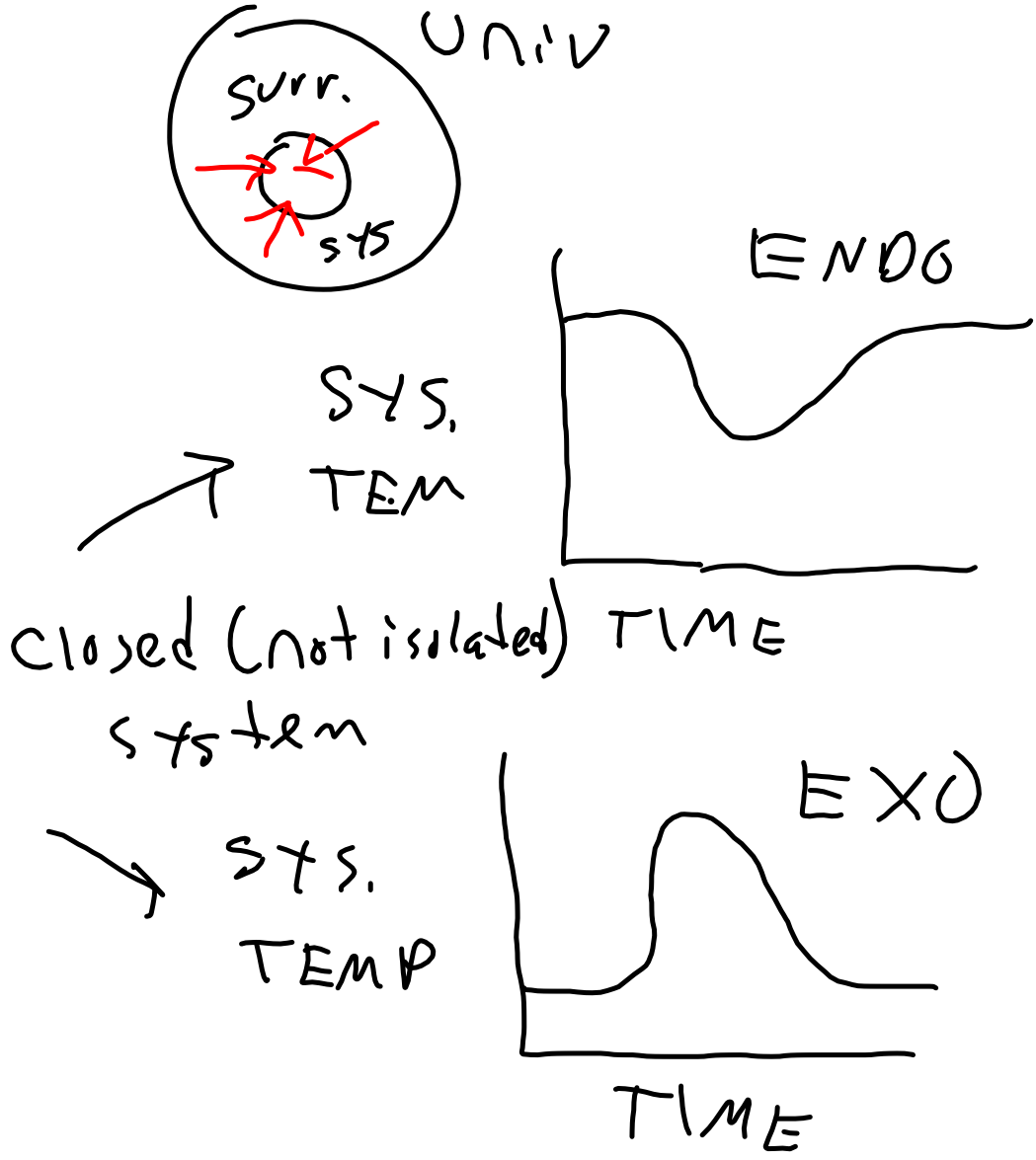
Neither (rare)

Endothermic reactions cause cooling



Exothermic reactions cause warming




univ
surr.
sys
ENDO
SYS. TEM
TIME
closed (not isolated) system
SYS. TEMP
EXO
TIME