Ideal Gas Law

Unit 4 Advanced Topic

Real vs. Ideal Gas

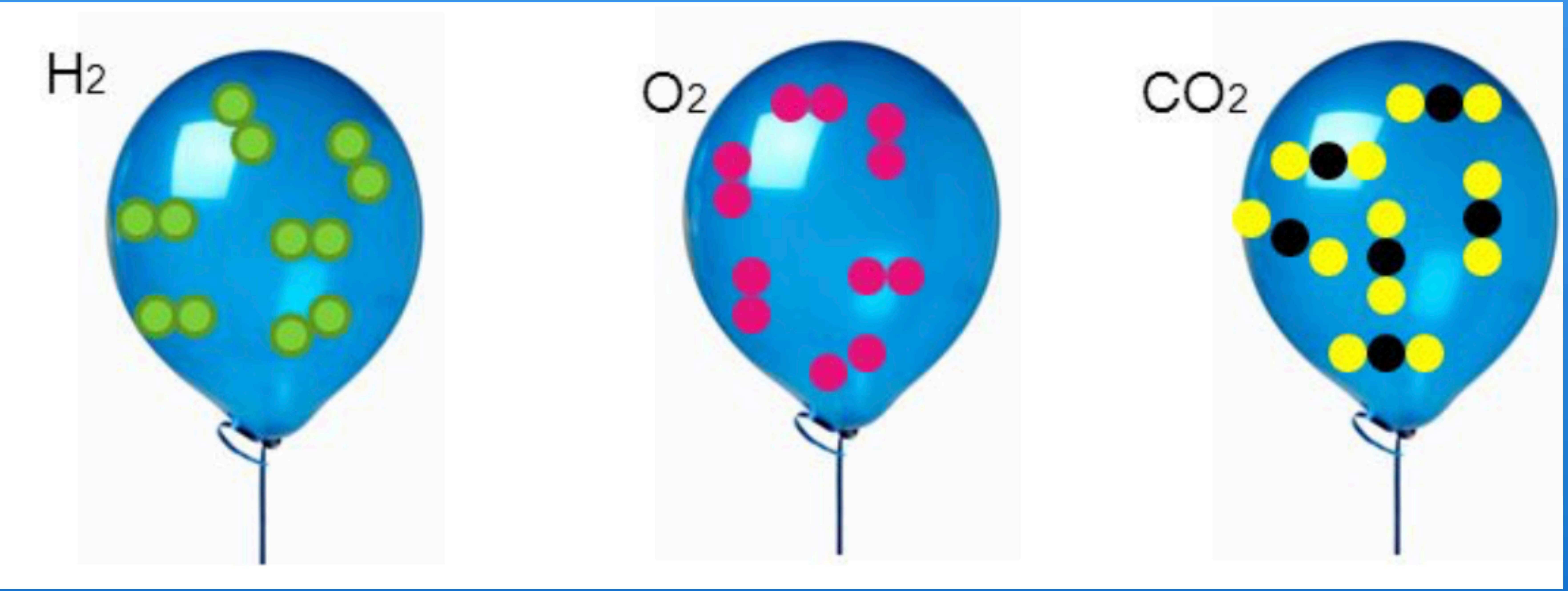
- KMT describes IDEAL gases.
- This works for most gases … mostly
- REAL gases are different because they have

Electrostatic Attractions

Volume

Avogadro's Law

Equal volumes of *different* gases at the *same* temperature and pressure contain the *same* number of moles of particles!



1 mole of a gas = 22.7 L

(at standard pressure)

Ideal Gas Law…

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$$PV = nRT$$

P = pressure (atm, kPa, mm Hg)

V = volume (L or dm^3)

n = # of moles of gas

R = ideal gas constant

T = temperature (K)

You will be given these:

$R = 0.0821\ L\ atm\ mol^{-1}\ K^{-1}$

$R = 8.314\ dm^3\ kPa\ mol^{-1}\ K^{-1}$

$R = 62.4\ L\ mm\ Hg\ mol^{-1}\ K^{-1}$

Example Problem

$$PV = nRT$$

Calculate the volume of 10.0 moles of He gas at a pressure of 300 kPa and 50.0 ˚C.

$R = 8.314\ dm^3\ kPa\ mol^{-1}\ K^{-1}$

Maxwell-Boltzmann Distribution

- Distribution of the kinetic energy of particles.
- # of particles = constant
- Higher temperature = higher kinetic energy of particles