

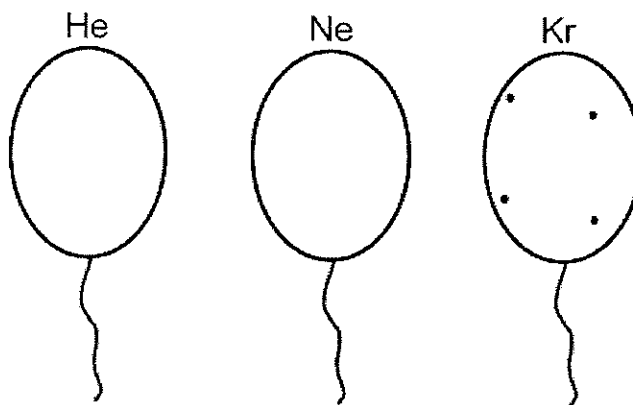
Gas--Kinetic molecular Theory

1. (last modified 5-18-04)
(brown375) A sample of O₂ gas initially at STP is compressed to a smaller volume at constant temperature. What effect does this change have on A) the average kinetic energy of O₂ molecules, B) the average speed of O₂ molecules; C) the total number of collisions; D) the number of collisions of O₂ with a unit area of container wall in a unit time?

- a) NONE - equal temp
b) NONE - no temp change
c) more, less area
d) more, this is called pressure.

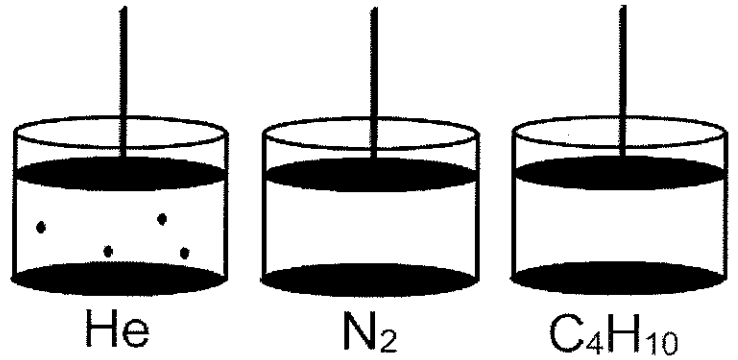
2.

- a. Which balloon has the highest average kinetic energy? - same
b. Which balloon has the highest molecular velocity? - He
c. Which balloon has the highest density? Kr
d. Which balloon is most likely to deviate from an ideal gas? Kr, ↑ LDF
e. Which balloon has the most particle/wall of container collisions per second? He
f. If the temperature were reduced, how would the following change?
i. average kinetic energy ↓
ii. molecular velocity ↓
iii. space between particles ↓
iv. attraction between particles ↑
v. size of the container ↓



Balloons: 2.2L @ STP

3.



a. Which container has the most particles?

$$PV = nRT \quad n = \frac{PV}{RT} \quad \left. \begin{array}{l} \text{Same } P \\ \text{Same } V \\ \text{Same } T \end{array} \right\} \text{ Same } = \text{ Same } n$$

b. Each of these containers are considered ideal gases. What does this mean?

No Coulombic attractions between particles

c. Which is least likely to behave as an ideal gas? Justify.

C₄H₁₀ - long chains ↑ LDF

d. If the temperature were reduced, how would the following change?

- i. average kinetic energy ↓
- ii. molecular velocity ↓
- iii. space between particles ↓ (assuming same P applied)
- iv. attraction between particles ↑ closer.
- v. size of the container ↓

e. If the pressure on the piston were to be increased at a constant temperature, how would the following change?

- i. average kinetic energy —
- ii. molecular velocity —
- iii. space between particles ↓ less room
- iv. attraction between particles ↑ closer
- v. size of the container ↓