CT Chem Unit 10 Gases
Avogadro's Law Notes

Avogadro's Law: Volume and moles relationships in gases

Review:

- There are four variables related to gases: P, V, T, and n (moles)
- Boyle's Law deals with P & V $P_1V_1 = P_2V_2$
- Charles' Law covers T & V $V_1 / T_1 = V_2 / T_2$

Notes:

- The next gas law is very simple. It is called Avogadro's Law and deals with the relationship between V and n (number of moles)
- If P and T are kept constant, then increasing the number of moles of a gas will increase it volume proportionally. (diagram p. 413)
- Mathematically: $V_1 / n_1 = V_2 / n_2$

Cautions:

1. Always watch your units … use the same P, V on both sides.
2. Use common sense … think about your answer!

Examples:

1. $n_1 = 3.2$ mol, $V_1 = 2.5$ L, $V_2 = ?$, $n_2 = 2.0$ mol

2. $V_1 = 3.25$ L at $n_1 = 5.25$ mol, $V_2 = 4.45$ L at $n_2 = ?$ mol

3. V= 475 mL at n = 12.2 g (He), V = ? at n = 4.50 g (He)

4. If 0.214 moles of argon gas occupies a volume of 652 mL at a particular temperature and pressure, what volume would 0.375 moles of argon occupy under the same conditions?

5. If 46.2 g of oxygen gas occupies a volume of 100. L at a particular temperature and pressure, what volume will 5.00 g of oxygen gas occupy under the same conditions?