CHAPTER 14 – GASES

1. Variable conditions
2. kinetics of gases
3. change temp, expand/contract greatly
4. no part. volume
5. not held together – no van der Waals
6. point masses – so little mass, far apart
7. ideal gas – gas w/ mass, no vol., no attraction
8. volume

a. standard atmospheric press. = 101.325 kPa

1. standard temp = 00 C
2. STP
3. Boyle’s law
4. pressure of a gas is inverse function of volume, if amnt & temp is constant
5. P = k/V or PV = k
6. Boyle’s law application
7. V2 = V1P1 or V2 = V1  P1

P2  P2

1. Dalton’s law of Partial Pressure
2. total pressure in a container is sum of partial pressures of all gases
3. Ptotal = Pgas + Pwater
4. Charles’s Law
5. volume of a gas varies w/ the Kelvin temp.
6. Charles’s Law application
7. V2 = V1 T2

T1

1. More gas considerations
2. combined gas law
3. as temp & pressure change, gas vol. changes
4. to find new vol, need to multiply by each change ratio separately
5. ex:

The volume of a gas measured at 75.6 kPa pressure and 60.00C is to be corrected to correspond to the volume it would occupy at STP. The measured volume of the gas is 10.00C.

\* need to change 75.6 kPa to 101.3 kPa.

\* volume must decrease, ratio < 1

\* temp decreased from 333 K to 273 K.

10.0 cm3 75.6 kPa 273 K = 6.12 cm3 at STP

101.3 kPa 333 K

1. diffusion & Graham’s law
2. diffusion – random scattering of gases
3. rate of diffusion depends on velocities
4. Graham’s law – rates diffusion of 2 gases under same conditions varies inversely as sq. roots of molecular masses of the gases.
5. v1 = m2

v2 m1

1. deviations from ideal behavior
2. **2 assumptions thus far**
3. **gases have no volume**
4. **gases have no attraction for one another**
5. **real gases – particles occupy finite volume, attract one another**
6. **real gases will attract together by decreasing volume, may not always increasing pressure**
7. **as for attraction, results are accurate to 1%**
8. **Joule-Thompson effect – high compression of real gas, allowed to escape a small opening; temp decreases.**
9. **must have a closed (adiabatic) system.**
10. **demonstrated in aerosols, can and contents become cooler**