**GASES**

**Properties of gases:**

**Are**

**explained**

**by**

**Kinetic-Molecular Theory:**

1. **A gas consists of very small particles, each of which has mass.**
2. **The distances separating gas particles are relatively large. The volume of the gas particles themselves is assumed to be zero because it is negligible compared with the total volume in which the gas is contained.**
3. **Gas particles are in constant, rapid, random motion.**
4. **Collisions of gas particles with each other or with the walls of the container are perfectly elastic.**

1. **The average kinetic energy of gas particles depends only on the temperature of the gas. (The higher the temp, the higher the KE.)**
2. **Gas particles exert no pressure on each other. (The attractive forces between gas particles are so weak they are assumed to be zero.)**

**Ideal gas – perfectly fits all the assumptions of the K-M theory.**

**Under normal conditions, most gases behave ideally.**

**Real gas – does not behave completely as an ideal gas.**

**Low T and high P result in greater deviation from ideal behavior.**

**Temperature Scales**

373 K

273 K

absolute

0 K zero

100◦C

0◦C

-273◦C

Celsius Kelvin

**Pressure**

**Pressure = Force/Area**

|  |  |  |
| --- | --- | --- |
| **Unit** | **Symbol** | **Relationship** |
| pascal  kilopascal | Pa  kPa | 1 Pa = 1 N/m  1 kPa = 1000 Pa |
| millimeter of mercury | mmHg | pressure that supports a 1 mm mercury column in a barometer |
| torr | torr | 1 torr = 1 mmHg |
| atmosphere | atm | average atmospheric pressure at sea level and 0◦C. |

**STP = standard temperature and pressure**

**Standard temperature = 0 Celsius**

**Standard pressure = average atmospheric pressure at sea level**

**760 mm Hg = 1 atm = 101.3 kPa**

**Barometer – instrument used to measure atmospheric pressure**

vacuum

Atmospheric pressure

***BAROMETER***

***Invented in 1643 by Evangelista Torricelli***

***He used a column of water in a tube 34 feet (10.4 m) long. This inconvenient water column was soon replaced by mercury which requires a tube about 3 ft. (0.9m) long.***

***Most barometers used today are aneroid barometers. It consists of a metallic box so made that when the air has been partially removed from the box the surface depresses or expands with variation of air pressure on it. This motion is transmitted by a train of levers to a pointer which shows the pressure on a graduated scale.***

**Manometer – instrument used to measure pressure of a confined gas.**

closed-end open-end