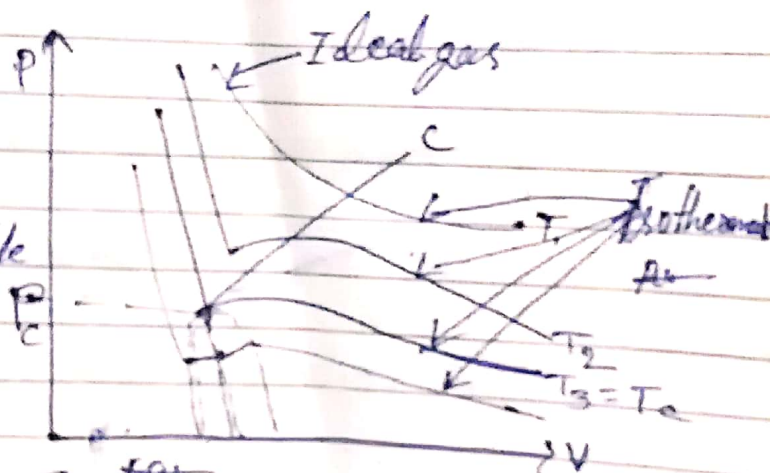


Vander Waals equation of state for real gases.

According to his first modification V is the volume occupied by container and b is the volume occupied by molecules. Thus $(V-b)$ is the empty space available for the gas.



In fact the product of

T is temperature, V is volume, P is pressure
For the ideal gas equation $(PV = nRT)$

number of molecules and volume of molecule is constant b and from 1837 to 1923 Johannes D. Vander Waals introduced second modification, the molecules are close to each other and intermolecular forces are important. This attractive

force is used to reduce the pressure exerted by the molecules on the wall because they are ~~also~~ attracted toward the gas. The total inward force on a molecule is ~~important~~ proportional to the density of molecules or inversely proportional to the volume. The pressure at the wall is proportional to the density of molecules. Therefore the pressure P is replaced by an effective pressure $(P + a/v^2)$, where a is a constant.

So the ideal gas equation for one mole of a gas will be given

$$\text{as, } \left(P + \frac{a}{V^2}\right)(V - b) = RT$$

This equation is van der Waals eqⁿ of state for real gas.