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A Generalized Molecular Velocity of the Real Gas

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ABSTRACT

A generalized equation for the molecular velocity of the real gases has been derived from the momentum of a molecule and the thermodynamic parameters viz. temperature, pressure and volume, and number of the moles, which are used to estimate the reaction rate constant in the gas and solution phase in any reaction. The derived generalized molecular velocity is a function of pressure, temperature, volume, number of moles and molecular weight rather than a function of the temperature and molecular weight only. The generalized molecular velocities of sixteen materials were calculated at different T, P, concentration (n/V). The calculated rate constant for a few bimolecular reactions using the generalized molecular velocity GMV is better fitting experiment than that using kinetic theory velocity KTV.

Keywords: Real gas, molecular velocity, generalized molecular velocity, kinetic theory.