

Kinetic Energy Dependence of some Ion-Neutral Reaction
Rate Constants

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A number of ion-molecule reactions have been measured from thermal to several volts relative kinetic energy in a Flow-Drift-Tube. Large differences in rate constants for some molecular ion reactions are found in different buffer gases at elevated kinetic energy. This is attributed to different degrees of vibrational excitation in different buffer gases leading to different rate constants because of the large effect of vibration on rate constant. Endothermic and exothermic proton transfer reactions and exothermic charge-transfer reactions have been found to demonstrate this effect. Atomic ion reactions show only small differences in different buffers due to the different velocity distributions.

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