3 parameter Arrhenius form

(T) is the temperature dependent reaction rate constant

Where

EA is units of cal/mol (1 calorie = 41840000 erg)

T is Kelvin

The reference temperature: T0 = 1 Kelvin

B is dimensionless

The universal gas constant: RU = 83145100 erg/(mol\*K)

Units of A are cgs (cm, sec, K, mol), the exact units depend on the reaction order

Sample Reaction

H+O2=O+OH

A = 3.547\*1015 units?

B = -0.406

EA = 1.6599\*104 cal/mol

the reaction order with respect to reactant H is 1, the overall reaction order is 2

needs units mol/(cm^3\*sec)

[ ] is mole concentration of species in units mol/cm^3

Therefore for this second order reaction A has units of

(For a first order reaction it has units of s-1, for that reason it is often called frequency factor.)

Equilibrium constant gives us

The following relations express the net production rate of each species in a multistep mechanism:

is the production rate of the j-th species, with units of mol/(cm^3\*sec)

i is reaction #, II is total number of reactions

j is species #, KK is total number of species

is the net stoichiometric coefficient matrix, is reactants, is products, (unit dimensionless)

is the rate-of-progress variable, with units of mol/(cm^3\*sec)