3610 Midterm Exam 4 Equations and Constants

Gas Constant Values

8.314	$\frac{J}{mole\ K}$	0.08314	$\frac{L\ bar}{mole\ K}$
0.08206	$\frac{L\ atm}{mole\ K}$	8.314	$\frac{m^3\ Pa}{mole\ K}$

Boltzmann Constant Values

1.381×10^{-23}	$\frac{J}{K}$	0.6950	$\frac{cm^{-1}}{K}$

Conversions

$1\ L\ atm$	$=$	$101.325\ J$
$1\ atm$	$=$	$1.01325\ bar$
$1\ atm$	$=$	$760\ torr$
$1\ atm$	$=$	$101,325\ Pa$

$$v = \frac{\mathrm{d}\left[\mathrm{A}\right]}{\nu_A \mathrm{d}t} = \frac{1}{V}\frac{\mathrm{d}\xi}{\mathrm{d}t}$$

$$\ln\left(\frac{v_2}{v_1}\right) = m \ln\left(\frac{\left[\mathrm{A}\right]_2}{\left[\mathrm{A}\right]_1}\right)$$

$$\chi = \chi_0 e^{-t/\tau}$$

$$\tau = \frac{1}{k_r + k_r'}$$

$$k = A e^{-\frac{E_a}{RT}}$$

$$\ln\left(\frac{k_2}{k_1}\right) = -\frac{E_a}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$v_{\text{Lind.}-\text{Hinsh.}} = \frac{k_a k_b [A]^2}{k_b + k_a'[A]}$$

$$\tau_0 = \frac{1}{k_F + k_{IC} + k_{ISC}}$$

$$\phi_{F,0} = \frac{k_F}{k_F + k_{IC} + k_{ISC}} = k_F \tau$$

$$\frac{\phi_0}{\phi} = 1 + \tau_0 k_Q [Q]$$

$$\eta_T = 1 - \frac{\phi_F}{\phi_{F,0}} = \frac{R_0^6}{R_0^6 + R^6}$$

$$\frac{1}{v} = \frac{1}{v_{max}} + \left(\frac{K_M}{v_{max}}\right)\frac{1}{\left[\mathrm{S}\right]_0}$$

$$v = P\sigma v_{rel} N_A^2 e^{-\frac{E_a}{RT}} [A][B]$$

$$k_d = \frac{8RT}{3\eta}$$

$$k \propto e^{\Delta S^{\ddagger}/R} e^{\Delta H^{\ddagger}/RT}$$