Chapter 14

2/15/19

tics

this chapter, A → B

tics: the study of reaction rates

llows us to predict whether a reaction occurs on a reasonable time ale

llows us to determine how long until equilibrium

Allows us to see how a reaction proceeds from reactants to oducts, to better harness useful reactions

s vs. Fast Reactions

$H_2O_2(l) \rightarrow O_2(g) + 2H_2O(l)$: slow reaction

Adding a catalyst: fast reaction

here equilibrium lies is determined by whether products are nhill/uphill in energy relative to reactants

All reactions have an uphill barrier to get the ball rolling. Small barrier, fast reaction

a. k = rate constant

ΔE is the energy difference for reactants and products

Determines K, the equilibrium constant

E_a: the energy barrier for reactants to products

Determines k, the rate of reaction

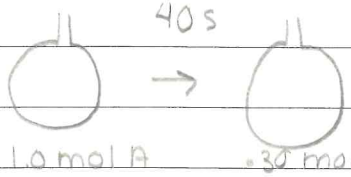
a. Rate = $\frac{\text{concentration}}{\text{time}} \rightarrow \frac{\Delta \text{ concentration}}{\Delta \text{ time}}$

b. Types of rates measured: average, instantaneous, initial

i. In initial, ignore back reaction

Rates are always positive!

Rate: $-\frac{\Delta[A]}{\Delta t} = +\frac{\Delta[B]}{\Delta t}$

2. 

$$\frac{.70 \text{ mol B} - 0 \text{ mol B}}{40 \text{ s}} = .18 \text{ mol/s}$$

. Instantaneous Rate

ⴱ. Slope of the line (derivative) = instaneous rate

1. Reactions slow down over time
2. Rate depends on stoichiometry
   a. Divide by coefficient of reaction stoichiometry

ⴱ. $aA + bB \rightarrow cC + dD$

1. Rate $= -\frac{1}{a}\frac{\Delta[A]}{\Delta t}$