6/10/20

Lab Report #3

$R = k[I^-]^a[S_2O_8^{-2}]^b$

Equations

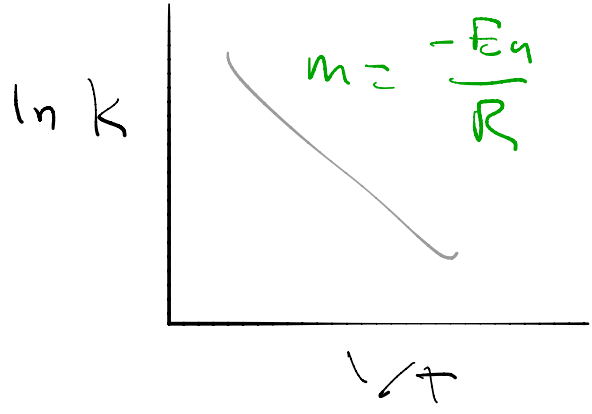
- rate : $R = 0.00063/t$
  - 16 rates (rxns 1-8, trials 1+2)
- order : a or b = $\frac{\ln \frac{R_1}{R_2}}{\ln 2}$ sequential reactions
  - for a ; compare 1,2 ; 2,3 ; 3,4
    - 6 comparisons (3 pairs, 2 trials)
  - for b ; compare 5,6 ; 6,7 ; 7,8
    - 6 comparisons (3 pairs, 2 trials)
  - complete calculations for each trial separately, then average the two trials, then round at the end.
- dilution : $[x]_{used} = \frac{V_{used}}{V_{total}} \cdot [x]_{stock}$
  - 10 dilutions (same in both trials)
- rate constant : $k = \frac{R}{[I^-][S_2O_8^{-2}]}$
  - 16 rate constants (8 rxns, 2 trials)
  - average all 16 constants

→ rate law with k

Parts a+b

Part C- Activation energy

- 4 rates (one trial, 4 temperatures)
- no a or b calculations (rate law known)
- 2 dilutions (concentrations same in all reactions)
- 4 rate constants



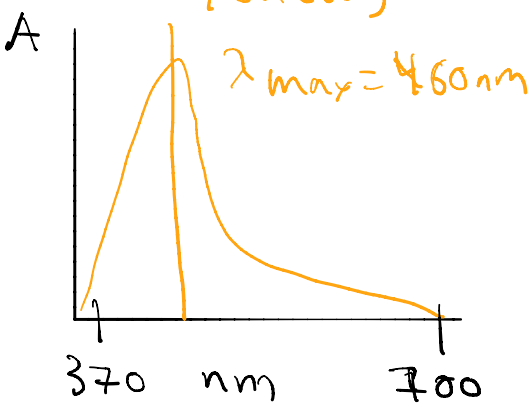
- activation energy $E_a = -mR$

slope 8.314

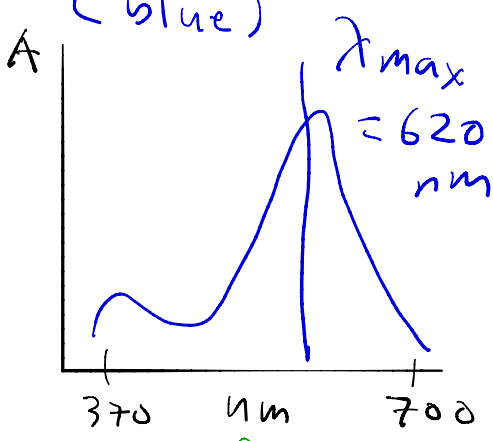
Indicators

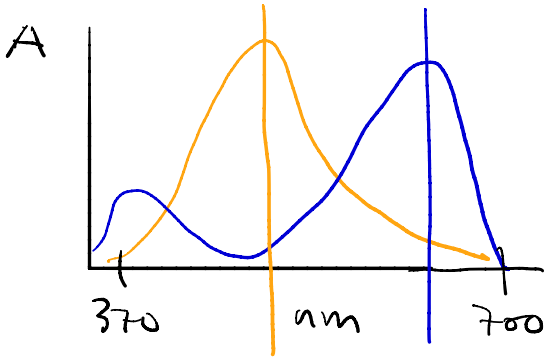
Indicators normally change color when the pH=pKa, since this is the point at which the concentrations of the indicator and its conjugate are equal,

$In-H$ acidic (yellow)

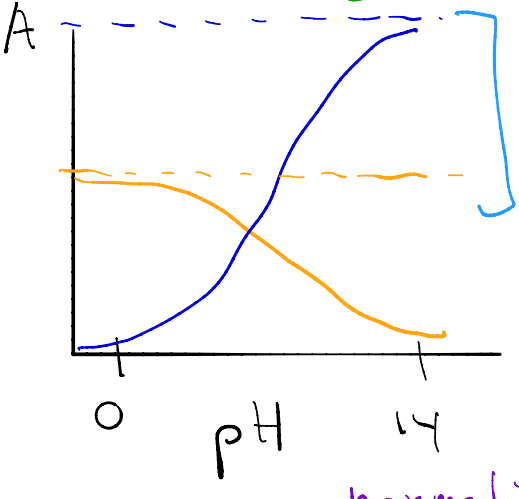


In^- basic (blue)





In order for the two conjugates to be separately detectable, they must absorb light at completely different regions of the spectum.



The two conjugates have different extinction coefficients (ε)

normalization ⇒