

# Experiment 273

## ACID CATALYSIS OF THE REACTION OF IODINE WITH HYDROGEN PEROXIDE

$k = Ae^{-\frac{E_a}{RT}}$

$2H^+ + H_2O_2 + 2I^- \rightarrow I_2 + 2H_2O$

$I_2 + 2S_2O_3^{2-} \rightarrow 2I^- + S_4O_6^{2-}$  THEN  $I_2 + \text{starch}$

$\log(\text{rate}) = x \log[H_2O_2] + y \log[I^-] + \log k_{cat}$

$\text{rate} = k_{\text{noncat}} [H_2O_2][I^-] + [H^+] k_{\text{cat}} [H_2O_2][I^-]$

$H_2O_2 \xrightleftharpoons[k_i]{k_1} H_2O_2^+$

$I^- + H_2O_2^+ \xrightarrow{k_2} HOI + OH^-$

$OH^- + H^+ \xrightarrow{k_3} H_2O$  acetate buffer

**Safety**

HARMFUL

irritant

gloves

Corrosive

25 mL LABEL

Label Me

**TEAM**

# Experiment 171

## Phase Equilibrium!

**Disposal: IODINE / CYCLOHEXANE**

oil

water

1: 15ml  $I_2$  (4M) also  $C_6H_{12}$  150ml  $H_2O$

2: 10ml  $I_2$  (4M) 10ml  $C_6H_{12}$  150ml  $H_2O$

3: 5ml  $I_2$  (4M) 10ml  $C_6H_{12}$  150ml  $H_2O$

Gibbs energy  $\Delta_d G^\circ$ ?

$I_{2(aq)} \rightleftharpoons I_{2(c_6h_{12})}$

$\Delta_d G = \Delta_d G^\circ + RT \ln(Q_d)$

$\Delta_d G^\circ = 0$

$\Delta_d G^\circ = -RT \ln(K_d)$

How do we know how much  $I_2$ ?

Starch

$I_2 + 2S_2O_3^{2-} \rightarrow S_4O_6^{2-} + 2I^-$

Vibrations needs to be aqueous.

$I_{2(aq)} + I_{2(aq)} \rightarrow I_3^-(aq)$  from KI 2018

$K_d = \frac{m_{ch}(I_2)}{m_{aq}(I_2)}$