

Ashley Thompson  
 Allyson L. Adderley

Darkening time

Mean Celsius temp (t)	minutes	seconds	Kelvin temp, T = t+273.15	Darkening time, t <sub>d</sub> /s (converted)	1/t <sub>d</sub> /s <sup>-1</sup>	1/T /s <sup>-1</sup>	Ln(t <sub>d</sub> )
22			295.15	106.0	0.00943396	0.003388	4.66
34			307.15	31.0	0.03225806	0.003256	3.43
38			311.15	27.0	0.03703704	0.003214	3.30
11			284.15	267.0	0.00374532	0.003519	5.59
9.5			282.65	227.0	0.00440529	0.003538	5.42
6.5			279.65	301.0	0.00332226	0.003576	5.71

$$\text{Intercept } , I = \ln\left(\frac{[S_2O_3^{2-}]_i}{2[S_2O_8^{2-}]_i[I^-]_i A}\right)$$

$$\therefore e^I = \left(\frac{[S_2O_3^{2-}]_i}{2[S_2O_8^{2-}]_i[I^-]_i A}\right)$$

$$\therefore A = \frac{[S_2O_3^{2-}]_i}{2[S_2O_8^{2-}]_i[I^-]_i e^I}$$

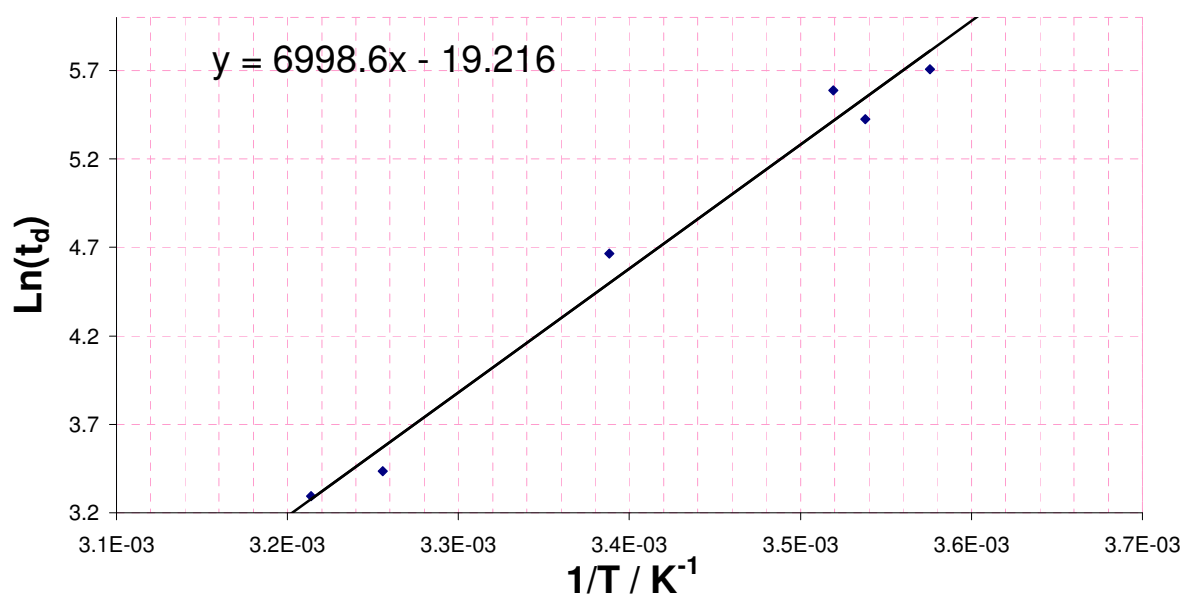
$$= \frac{0.001 / 22}{2 * (10 \times 0.04 / 22) * (4 \times 0.05 / 22) * EXP(I)} = 3.04E+7 \text{ M}^{-1}\text{s}^{-1}$$

Slope = E<sub>a</sub>/R=

Slope = E<sub>a</sub>/R= 6998.58  
 Intercept = -19.2157

E<sub>a</sub> = R x Slope = 58200 J mol<sup>-1</sup>

Graph 1: Plot of Ln(t<sub>d</sub>) against 1/T



Graph 2: Plot of 1/t<sub>d</sub> against T

