Determining reaction order

Use the isolation method to determine the reaction order for the chemical reaction

$$CH_3I + H_2O \rightarrow CH_3OH + HI$$

Rate	$[CH_3I]$	$[H_2O]$
2.30×10^4	0.257	1.2
3.45×10^4	0.385	1.2
4.14×10^4	0.463	1.2
3.22×10^4	0.257	1.68
3.91×10^4	0.257	2.04

Determining reaction order

For the chemical reaction

$$CH_3I + H_2O \rightarrow CH_3OH + HI$$

For $[CH_3I]$ we have

$$a = \frac{\ln\left(\frac{v_2}{v_1}\right)}{\ln\left(\frac{[2]}{[1]}\right)}$$

$$a = \frac{\ln\left(\frac{3.45}{2.30}\right)}{\ln\left(\frac{0.385}{0.257}\right)} = \frac{0.405}{0.404} \approx 1.0$$

Determining reaction order

For the chemical reaction

$$CH_3I + H_2O \rightarrow CH_3OH + HI$$

For $[H_2O]$ we have

$$a = \frac{\ln\left(\frac{v_2}{v_1}\right)}{\ln\left(\frac{[2]}{[1]}\right)}$$

$$a = \frac{\ln\left(\frac{3.91}{3.22}\right)}{\ln\left(\frac{2.04}{1.68}\right)} = \frac{0.194}{0.194} \approx 1.0$$

$$v = k[CH_3I][H_2O]$$