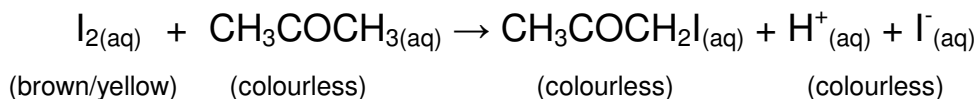


## Iodination of propanone

Acid catalyses the reaction between propanone and iodine



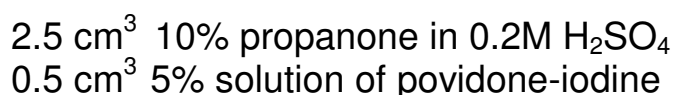
The rate equation can be written as

$$\text{Rate} = k [\text{H}^+]^m [\text{CH}_3\text{COCH}_3]^n [\text{I}_2]^p$$

Where  $m$ ,  $n$ , and  $p$  are the rate orders with respect to acid, propanone and iodine.

Note: In the experiments reported here the iodine used is not a solution of iodine in potassium iodide. It is Povidone-iodine, the formulation sold for use as a topical antiseptic. This works at much lower concentrations of acid and propanone than KI-I so minimises safety aspects. You can also use the blue starch-iodine complex with KI-I for this experiment in which case even lower concentrations of acid and propanone will be required.

At room temperature (approx 20°C) the following mixture in a standard 4cm<sup>3</sup> cuvette gave a linear drop in absorbance for 1 to 0A in about 1 minute.



Varying the concentration of acid or propanone gave reaction rates consistent with the reaction being first order for either reactant. Varying the iodine concentration did not affect the rate, the reaction is zero order for iodine.

*Safety: Safety glasses and lab coats should be worn but the concentrations and volumes of the solutions used are such that there are no significant hazards.*

*Concentrations of sulphuric acid lower than 0.5M do not require an 'Irritant' label.*

*Propanone is a significant fire hazard but is used in solution here.*

*Commercial nail polish removers are likely to contain 60% propanone.*

*Povidone-iodine is used as a topical antiseptic and the solutions used here are diluted to 5% or lower.*

*The product of the reaction (iodopropane) is irritant to the eyes but the quantities produced here are minimal.*