SUMMARY

Chapter-I

Includes importance of chemical kinetics in various fields i.e. chemical kinetics provides useful rate equations to describe the speed of chemical reactions and attempts to describe exactly how each reaction occurs.

It describes the importance of TCICA in oxidation of various compounds and also co-ordination number and stereochemistry of TCICA.

It also includes importance of Ru(III) in oxidation of various compounds. It gives the literature survey and aim of present work.

Chapter-II

Includes the experimental data i.e. it describes the apparatus, technical data, thermostat, preparation of reagents, standardization of TCICA and Ru(III) and selection of filters and describes the kinetics of alcohols in the requisite amounts of alcohols [Alcohols>> TCICA] in presence of catalyst.

Chapter-III

1. **Effect of concentration of substrate**:

   It includes rate of reaction studied between the various alcohols at different concentration of each substrate keeping concentration of oxidant, catalyst, HClO₄ constant.

2. **Effect of concentration of oxidant**:

   It describes the rate of reaction of various alcohols and TCICA at different concentrations of oxidant by keeping concentrations of substrates, catalyst. HClO₄ constant.

3. **Effect of concentration of catalyst**:

   Changing the concentration of catalyst and keeping all other aliquots constant the rate of reaction has been studied.

4. **Effect of concentration of solvent**:

   By keeping concentration of acid HClO₄ varying and all other aliquots constant the rate of reaction has been studied.
5. **Effect of variation of Temperature:**

It is found that the course of reaction, at different temperatures ranging from 20°C to 45°C, keeping concentrations of substrates, acid and catalyst constant.

**Discussion:**

This chapter reports the use of alcohols in various fields.

1. It describes the acidity function and reaction mechanism. The rate of oxidation of alcohols and diols have now effect of increase in concentration of HClO₄.

2. In studying the effect of concentration of [Substrate] under the conditions of [sub] >> [oxidant] > [catalyst] in acid media the rate of reaction increases. The reaction is fractional order in each alcohols and diols.

3. Under the experimental conditions, the plots of (log O.D. Vs. time) were linear with respect to TCICA. The zero order rate constant, \(k_{obs}\) is independent of initial concentration of TCICA.

   With respect to catalyst at fixed TCICA, [alcohol], HClO₄, \(k_{obs}\) increases with increase of [Ru(III)]. Observed reaction order of Ru(III) obtained from the plot of log \(k_{obs}\) Vs log [Ru(III)].

   While studying the solvent effect, the rate of oxidation of reaction has been observed to decrease with increasing solvent contents in the reaction mixture.

   From the study of effect of temperature on rate of reaction, thermodynamic parameters were studied.

   a) The plot of \(\Delta H^\circ\) Vs \(\Delta S^\circ\) is linear giving value of \(\beta\) for the isokinetic temperature which is well below the experimental range (283K to 318K) indicating the reactions are entropy controlled.

   b) \(\Delta G^\circ\) was also calculated. Values of \(\Delta G^\circ\) depends upon the substituent effect.

   From the above results, the rate law and probable mechanism has been proposed.