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Mechanistic Study of Ruthenium (III) Catalyzed Oxidation of 4-methoxy benzyl alcohol by a Copper (III) periodate Complex in Aqueous alkaline medium

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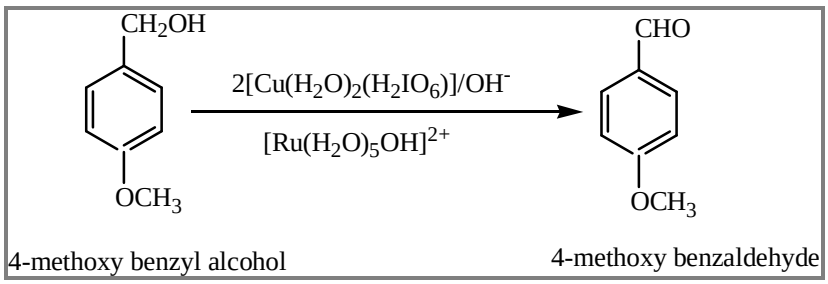
ABSTRACT

Ruthenium(III) chloride catalyzed oxidation of 4-methoxy benzyl alcohol by Copper(III) complex in aqueous alkaline medium at constant ionic strength of the medium was studied. Rate showed direct proportionality in oxidant, organic substrate, catalyst and hydroxyl ion concentrations while periodate ions, added externally, retard the reaction velocity. Increase in ionic strength of the medium has a positive effect on the rate. Thermodynamic parameters like energy of activation, free energy of activation, entropy of activation values were calculated. Oxidation products were identified with the help of IR and NMR spectral studies and on the basis of the experimental findings a probable mechanism was proposed which explains all the experimental findings. Comparatively simple, economical, less tedious and environmentally acceptable methodologies used in copper (III) oxidations have opened new avenues for the growth of oxidation chemistry.

Graphical Abstract



Keywords: Ruthenium(III) chloride, Alkaline Diperiodatocuprate(III), Catalysis.