International Journal of Creative Research Thoughts
Volume 3,Issue 6,June 2015 ISSN: 2320-2882(online)

ORIGINAL ARTICLE

Impact Factor:-0.345(GIF)
www.ijcrt.net

EFFECT OF $CUSO_4$ AND $MNSO_4$ ON THE REACTION RATE OF N-CHLOROPHTHALIMIDE WITH CYCLIC ALCOHOLS IN ACETIC ACID MEDIUM

Sachchidanand Tiwari,[1] H.P.Dwivedi,[1] Kshboo Khan,[1] Nusarat Babey Khan,[1] and R.P.S.Chauhan[2]

[1]Department of Chemistry, S.G.S. Govt. Autonomous P.G. College, Sidhi 486661 (M.P.) India
[2] P.G. Depatment of Chemistry, Gaya College (Magadh University) Gaya 823001 (Bihar) India

ABSTRACT

The effect of catalyst on the reaction of rate N-Chlorophthalimide with cyclic alcohols was carried out at 308^0K. The follows pseudo first order kinetics each in [NCP] and [cyclic alcohols], and reaction is acid catalyzed. Oxidation reductions are very sensitive to metal catalyst. In order to study the effect of catalyst ions were chosen as $CuSO_4$ and $MnSO_4$ were taken as the cat ions sources of Cu^{++} and Mn^{++} ions. The effects of these ions were studied by adding varying concentration of $Cu^{++}$and Mn^{++} to the reaction mixtures, keeping the concentration of substrate, oxidant and composition of acetic acid water and temperature constant. Effect of $CuSO_4$ and $MnSO_4$ (catalyst) on the reaction of rate NCP with cyclopentanol, cyclohexanol and cycloheptanol were study in present study.

Key words: Involvement, consistent, composition, deterioration, catalyst

INTRODUCTION

Chemical kinetics is the branch of physical chemistry which concerns itself with the study of velocity of chemical reaction and with the elucidation of the mechanism by which they proceed. Thermodynamics considers how far a reaction will proceed. The study completely discarded the form at ion of complex and rules out involvement of cations. Catalytic oxidation methods, which employ a variety of metal-containing catalyst such as Cu(I)[1,2], Ni(II)[3,4], Co(II)[5,6], Pd(II) and manganese oxide[7,8] developed quickly in recent decades. However, most of the metal catalysts are expensive and may led to the environmental pollution with the overgrowing environmental and economic concerns the development of benign catalytic process for alcohol oxidation is becoming increasingly important.[9-11]

EXPERIMENTAL

All the chemicals employed in this investigation were of analytical grade. The solution of N-chlorophthalimide was obtained by (99% purity) whose melting point was found to be 481^0K was obtained by dissolving its weighed quantity in 100% acetic acid and kept in either amber colored flask or black paper wrapped around it to save it from the action of diffused day light which alters appreciably its concentration i.e. to avoid occurrence of photochemical deterioration. Other solutions required in the study such as $CuSO_4$, $MnSO_4$, CH_3COOH, KI, hypo $K_2Cr_2O_7$ acrylo nitrile prepared and standardized as laid methods prescribed in analytical chemistry.

RESULTS AND DISCUSSION

Redox reaction is very sensitive to metal ion catalysts. In order to study the effect of catalyst Cu^{++} and Mn^{++} ions were chosen. The effects of these ions were studied by adding varying concentration of $Cu^{++}$and Mn^{++} to the reaction mixtures, keeping the concentration of substrate, oxidant and composition of acetic acid-water and temperature constant. The results of the effects of Cu^{++} and Mn^{++} ions on the rate of reaction of N-chlorophthalimide with cyclopentanol, cyclohexanol and cycloheptanol are summarized in following table:

Dependence of rate on the concentration of metal ion catalyst Cu^{++} and Mn^{++}

10^3 [NCP] (mol dm^{-3}) = 2.50 (1, 2, 3) ;

10^2 [Substrate] (mol dm^{-3}) = 2.50 (1, 2) ; 2.00 (3)

10^2 [H^+] (mol dm^{-3}) = 1.0 (1, 2, 3) ;

HO-Ac-H_2O, % v/v = 30 (1, 2, 3) ;

Temperature^o K = 308 (1, 2, 3)

Table: 1

Sr. No.	[Cu^{++}] $\times 10^3$ (mol dm^{-3})	Cyclopentanol (1)	Cyclohexanol (2)	Cycloheptanol (3)
		←	10^4 k_1 (s^{-1})	→
1.	0.00	3.71	4.14	4.91
2.	0.50	3.96	4.32	5.43
3.	1.25	4.01	4.55	5.63
4.	2.00	4.51	4.79	5.77
5.	2.50	4.69	4.91	5.90
6.	4.00	4.98	5.47	6.22
7.	5.00	5.03	5.83	6.51

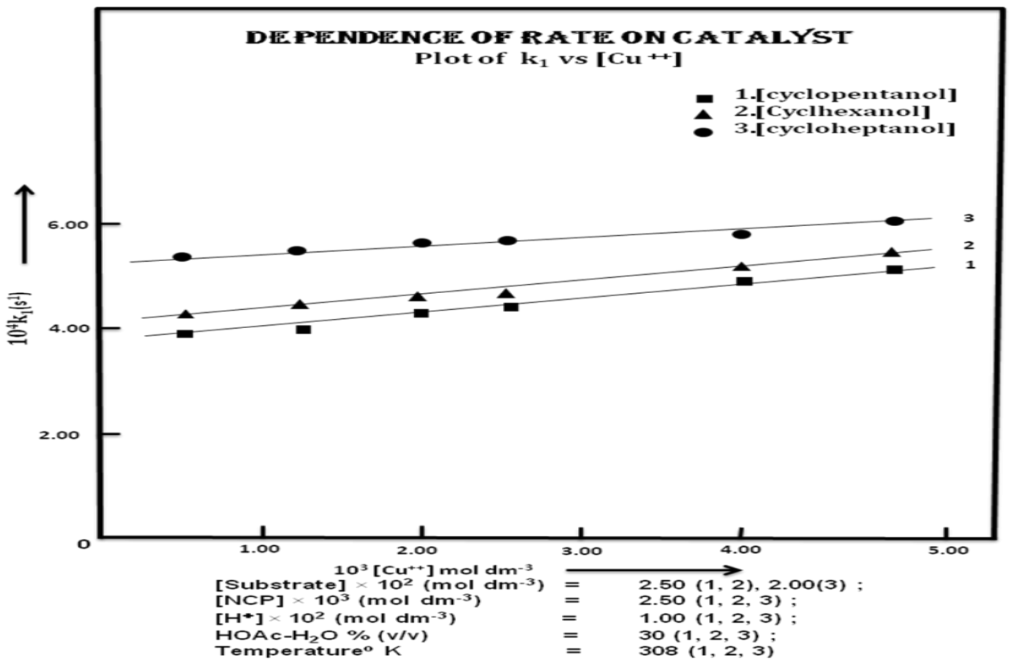

Fig .1

Table: 2

Sr. No.	$[Mn^{++}] \times 10^3$ (mol dm^{-3})	cyclopentanol (1)	cyclohexanol (2) $\leftarrow$ $10^4 k_1$ (s^{-1}) $\rightarrow$	cycloheptanol (3)
1.	0.00	3.71	4.14	4.91
2.	1.00	3.53	3.75	4.14
3.	2.00	3.35	3.56	3.94
4.	2.50	3.22	3.43	3.81
5.	4.00	3.13	3.36	3.73
6.	5.00	3.07	3.29	3.67

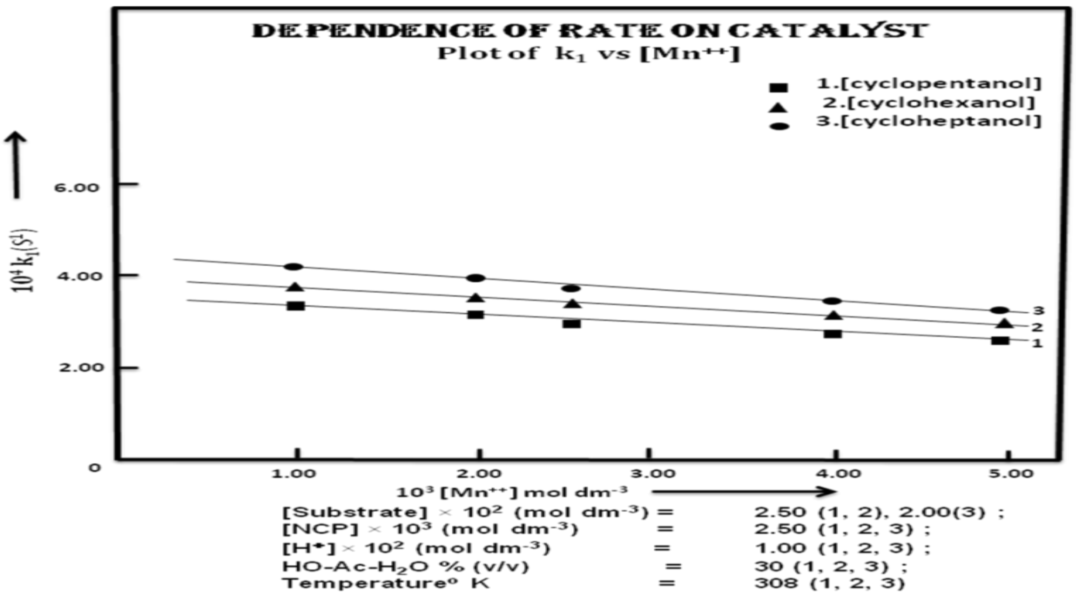

Fig .2

CONCLUSION

The effect of these ions were studied by adding varying concentration of $CuSO_4$ and $MnSO_4$ to the reaction mixture, keeping the concentration of substrate, oxidant and composition of acetic acid and temperature constant. From above Table:1 and Table: 2 it is clear that the effect of increasing concentration of Cu^{++} ions show acceleration in the reaction velocity while Mn^{++} ions show retardation in the rate of oxidation reaction as shown in Fig.1 and Fig. 2 The effect of increasing concentration of Cu^{++} ion shows an acceleration in the reaction velsocity and Mn^{++} ions was found to retard in the rate of reaction.

REFERENCES

1. Meng; X.J., Lin; K.F., Yang; X.Y., Sun; Z.H., Jiang; D.Z., and Xino; F.S.: Catalytic oxidation of olefins and alcohols by molecular oxygen under air pressure over Cu_2 (OH) PO_4 and Cu_4O $(PO_4)_2$ catalysts. J. Catal., **218**, 460, (2003).
2. Ferguson; G., Ajjou; A.N.: Tetrahedron Lett., **44**, 9139, (2003).
3. Zaera; F.: Book for Catal. Today, **81**, 149, (2003).
4. Xavier; K.O., Chacko; J., Mohammed Yusuff, K.K., and Mol; J.: Nanoparticles and Catalysis Catal. A. Chem., 178, 275, (2002).
5. Das; S., Punniyamurthy; T.: The Chemistry of Peroxides Tetrahedron Lett.,44, 6033, (2003).
6. Fernandez; I., Pedro; J.R., Rosello; A.I., Ruiz; R., Castro; I., Ottenwealder; X., and Journaux; Y.: Eur. J. Org. Chem., 1235, (2001).
7. Remias; J.E., and Sen; A.: Energy Production and Storage J. Mol. Catal. A. Chem., 189, 151, (2002).
8. Shvo; Y., Goldman-Lev; V.,: J. Organomet. Chem., **650**, 151, (2002).
9. Stuchinskaya; T.L., and Kozhevniko; I.V.,: Catal. Commun. ,**4,** 417, (2003).
10. Brinksma; J., and Rispens; M.T., Hage; R., Feringa; B.L.: Inorg. Chim. Acta, **337**, 75, (2002).
11. Wang; Z.W., Kang; O.X., Quan; F., and Lei; Z.O.: J. Mol. Catal. A. Chem., **261**, 190, (2006).