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Contents

Chapters	Page No.
1. Biological Relevance of Some Metals <i>(Dr. Chitraniva Datta)</i>	01-17
2. Chemistry of Biologically Active Chalcone Linked Quinazolines and Quinazolinones <i>(Anirudh Singh Bhathiwal, Aditi Tiwari, G.B. Dharma Rao and Anjaneyulu Bendi)</i>	19-39
3. Recent Advances in Biofuels <i>(Lokesh Baloat)</i>	41-58
4. Kinetics and Mechanism of Oxidation of 3-Hydroxyl Benzoic acid Hydrazide by Bromate Catalyzed by Vanadium (IV) in Aqueous Acidic Medium <i>(Santosh R. Kshirsagar, Sandip P Gondake, Sagar I. Shinde, Shripad M. Patil and Swapna S. Patil)</i>	59-70
5. Synthesis of Acids from Alcohols via Noble Metal-Catalyzed Acceptorless Dehydrogenation Reaction <i>(Dhurbajit Borah and Bibekananda Gogoi)</i>	71-87

Chapter - 4
**Kinetics and Mechanism of Oxidation of 3-
Hydroxyl Benzoic acid Hydrazone by Bromate
Catalyzed by Vanadium (IV) in Aqueous Acidic
Medium**

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Chapter - 4

Kinetics and Mechanism of Oxidation of 3-Hydroxyl Benzoic acid Hydrazide by Bromate Catalyzed by Vanadium (IV) in Aqueous Acidic Medium

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Abstract

The present work is focused on the use of per halogenated porphyrins and Vanadium salen compounds as catalysts. The reaction between 3- hydroxyl benzoic acid hydrazide and potassium bromate catalyzed by vanadium (IV) was studied under pseudo-first-order condition keeping large excess of hydrazide concentration over that of the oxidant. The initiation of the reaction occurs through oxidation of the catalyst vanadium (IV), VO^{2+} , to vanadium(V), VO^{+2} which then reacts with hydrazide to give N, N¹-diacyl hydrazine and benzoic acid as the products. The order in $[H^+]$ is found to be two, and its effect is due to protonation and hydrolysis of oxidized form of the catalyst to form HVO_3 . Kinetic runs were carried out under pseudo first order condition keeping hydrazide concentration in large excess. The solution containing the substrate, catalyst, oxidant and all other constituents were thermally equilibrated at 27°C. The solution was mixed and reaction mixture was analyzed for unreacted potassium bromate iodometrically. The values of rate constants were determined. The pseudo-first order plots were found to be linear and pseudo-first order rate constants k - observed were fairly constant. The detailed mechanism and the rate equation are proposed for the reaction.

Keywords: 3-hydroxyl benzoic acid hydrazide, Vanadium (IV), iodometry, potassium bromate, pseudo-first order

Introduction

Hydrazides are derivatives of both carboxylic acid and hydrazine have been utilized as starting material in organic synthesis ^[1]. The oxidative transformation of hydrazides with most oxidants gives corresponding acids ^[2] and in some cases esters or amides ^[3]. Hydrazides have also converted into N, N-di-acylhydrazines with various oxidant ^[4]. Potassium bromated is strong