iJRASET
International Journal For Research in Applied Science and Engineering Technology

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 8 **Issue:** IX **Month of publication:** September 2020

**DOI:** https://doi.org/10.22214/ijraset.2020.31283

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429*
*Volume 8 Issue IX Sep 2020- Available at www.ijraset.com*

# PH- Metric Studies of Cu (II) Complexes of 3(4-Nitrophenyl)-4-Benzoyl 5(2-Hydroxy-4-Bromo-Phenyl) Pyrazole and 3(4-Chlorophenyl)-4-Benzoyl 5(2-Hydroxy-4-Nitro-Phenyl) Pyrazole

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***Abstract: In this Present investigation is attempted to make a methodical elucidations of the complex formation of Cu (II)ions with the pyrazole derived from 3(4-nitrophenyl)-4-benzoyl 5(2-hydroxy-4-bromo-phenyl) pyrazole and 3(4-chlorophenyl)-4-benzoyl 5(2-hydroxy-4-nitro-phenyl) pyrazole.The stability constants of their complexes with Cu (II) ions, have been studied by using Irving-Rossotti method at constant temperature 300K and ionic strength 0.01 M.***
***Keywords: Cu (II) ions, Binary Complexes, Stability Constants, Ligand, pH metric titration***

## I. INTRODUCTION

Binary complexes of transition and inner transition metal ions have been studied by pH-metrically. Metal complexes of Pyrazole deriavative have been extensively studied because Pyrazole possess good in synthons shows activeness towards the central metal atom and some pyrazole derivatives are reported as an antibiotic agent. Some of pyrazole derivatives show biological activity,some are commercial products or compounds.They shows some very important characteristics like antipyretic, antirheumatic and antimicrobial[1-3] behavior. Some derivatives are active ingredients of antitumor activity[4–6]. In agricultural use as pesticides[7–9].The literature history shows a good data on the transition metal complexes but complexes of some derivatives of Pyrazole have been less investigated as ligands. So in present work we proposed some derivaties of substituted pyrazole as a ligand and their Cu(II) complexes,. The stability constants of 3(4-nitrophenyl)-4-benzoyl 5(2-hydroxy-4-bromo-phenyl)pyrazole and 3(4-chlorophenyl)-4-benzoyl 5(2-hydroxy-4-nitro-phenyl) pyrazole have been studied pH-metrically by Irving and Rossotti method [10].

## II. EXPERIMENTAL

In the present work,the 3(4-nitrophenyl)-4-benzoyl 5(2-hydroxy-4-bromo-phenyl)pyrazole[L1] and 3(4-chlorophenyl)-4-benzoyl 5(2-hydroxy-4-nitro-phenyl) pyrazole[L2] used as ligands. All chemicals are analytical reagent (AR) grade was used with were obtained from sd fine chemicals India, without any further purification. Solutions were prepared in distilled water. The pH-metric titration was done by using ELICO-pH meter-L1-10 (accuracy ±0.05 units). For calibrating of pH meter pH 4, 7 and 10 buffer tablet (sd fine chemicals India ) were used.The metal solution was prepared by dissolving metal salts in distilled water and standardized by KMnO4.The Proton ligand and metal ligand formation constant of binary system were evaluated by pH metrically by using Bjerrum and Calvin as modified by Irving and Rossotti titration technique. The metal ligand ratio was taken as 1:5. The total volume was maintained at 50 ml. The solutions were titrated against 0.01 M NaOH solution.The logpK and logK values were determined from titration curves which are taken by plotting pH Vs volume of alkali in ml similarly the proton-ligand formation curves are obtained on plotting ñA versus pH and the metal- ligand formation curves were obtained on plotting ñ versus pL.The value of proton ligand stability were determined by plot of pH versus of log ñA/ 1 – ñA. Metal -ligand stability constant were determined by the plot of log ñ / 1 – ñ versus pL and 1/2 ñ values.

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## III. RESULT AND DISCUSSION

The substituted pyrazoles pK values shows the deprotonation of phenolic –OH group . The acid dissociation constants and formation constants were determined, are presented in table-I. It was recognized that the binding of proton is affecting the strength of hydrogen bonding between Oxygen of hydroxy group. We know that stronger the hydrogen bond, lesser will be the dissociation and hence less is the acid character of –OH group. The displacement of metal titration curve from ligand titration curve is in between 4.0-8.2 pH. The highest values of ñ obtained were about 2.0 indicating the formation of both 1:1 and1:2 complexes in solution.

Table-I: Proton ligand and binary metal ligand stability constants of metal complexes at temperature 3000K

| Metal – ligand Formation Constants | |
|---|---|
| $L_1$ | $L_2$ |
| $LogK_1$ = 11.99 | $LogK_1$ = 12.09 |
| $LogK_2$ =10.37 | $LogK_2$ = 10.34 |
| Log = 21.35 | Log = 23.04 |
| Ligand $pK^H$ Values | |
| Log $pK^H_1$ = 11.99 | Log $pK^H_1$ = 12.11 |
| Log $pK^H_2$ = 4.28 | Log $pK^H_2$ =4.46 |

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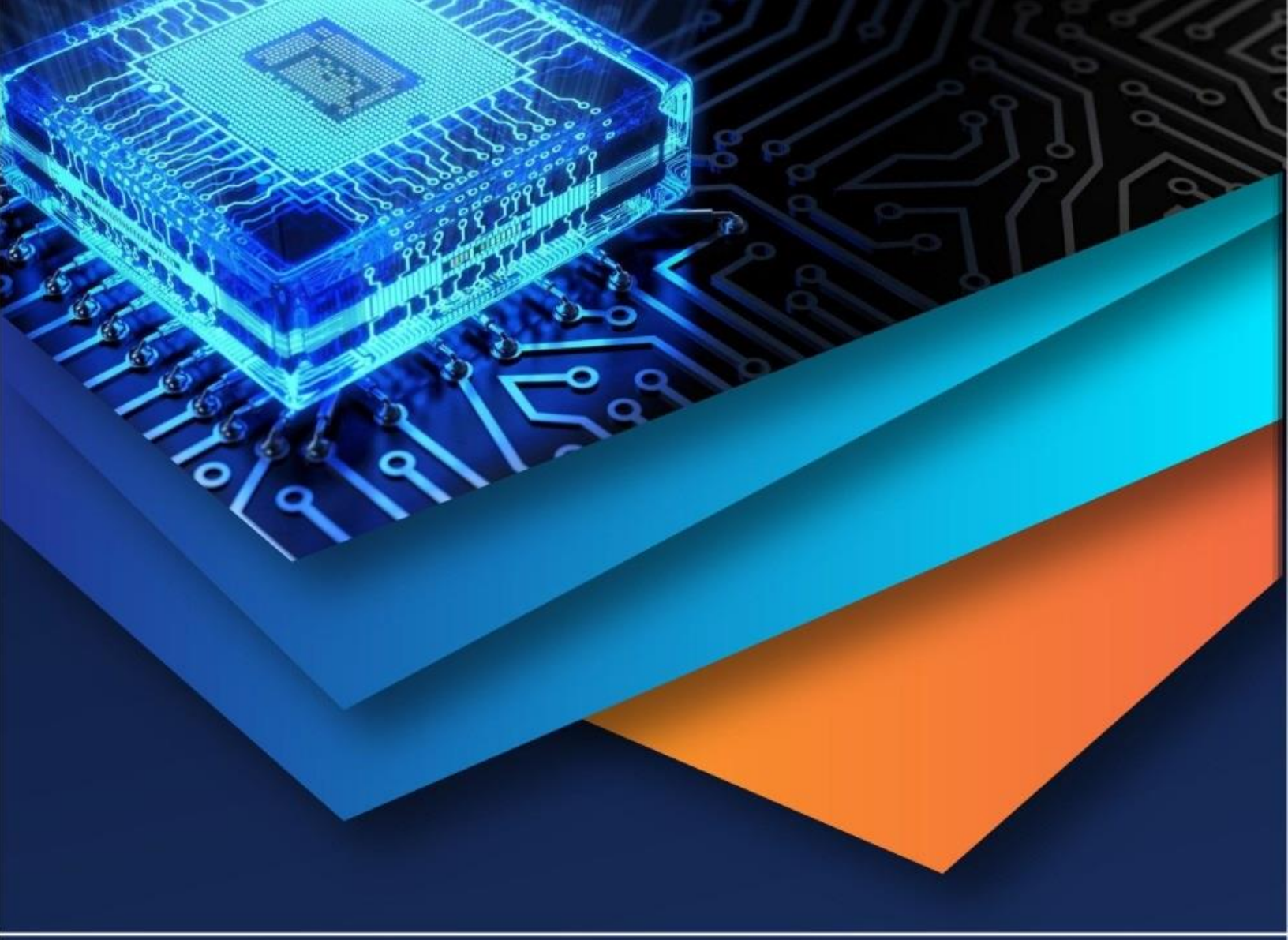

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