

STUDIES ON MIXED HALOANTIMONATES (III)

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CERTIFICATE

This is to certify that thesis entitled " Studies on Mixed Haloantimonates(III)", being submitted by Miss Amrita Kumari to the Indian Institute of Technology, Delhi, for the award of the degree of Doctor of Philosophy in Chemistry, is a record of bonafide research work carried out by her. Miss Amrita Kumari has worked under my guidance and supervision and has fulfilled the requirements for the submission of her thesis.

The results contained in this thesis have not been submitted, in part or full, to any other University or Institute for the award of any degree or diploma.



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ABSTRACT

The present work reports the isolation and characterization of some mixed haloantimonates(III) which include mixed tetra-, mixed penta-, and mixed hexahaloantimonates(III) and also mixed nonahalodiantimonates(III). These complexes have been characterized by i.r., far i.r., and u.v. spectral studies, conductance measurements, x-ray powder diffraction and thermogravimetric analysis (T.G.A.)

The i.r. data (4000-400 cm^{-1}) have confirmed the presence of cations in these complexes and also (Sb-F) stretches in the fluorohaloantimonates(III). In general, the spectral assignments in far i.r. region (400-50 cm^{-1}) for mixed tetra-, mixed penta-, and mixed hexahaloantimonates(III) have been made on the basis of distorted tetrahedral, square pyramidal and slightly distorted octahedral geometries, respectively. The electronic spectral data have been interpreted on the basis of $d^{10}s^2$ model. Molar conductance values at $\sim 10^{-3}\text{M}$ in different solvents have shown that these tetra-, penta-, and hexahaloantimonates(III) behave as 1:1, 1:2 and 1:3 electrolytes respectively. In case of mixed tetrahaloantimonates(III) Debye-Hückel-Onsager equation has been used to confirm them to be 1:1 electrolytes. Unit cell dimensions for two mixed haloantimonates(III) have been found out from x-ray powder diffraction data. T.G.A. study has indicated that all the complexes behave in a similar manner showing one step decomposition.

CONTENTS

	Page
CERTIFICATE	i
ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
LIST OF FIGURES	vii
LIST OF TABLES	ix
CHAPTER I INTRODUCTION	1-38
1.1 Trihalides of Antimony	1
1.1.1 Structure	1
1.1.2 Solvent Properties	3
1.1.3 Donor-Acceptor Properties	3
1.2 Tetrahaloantimonates (III)	5
1.2.1 Simple tetrahaloantimonates (III)	5
1.2.2 Mixed tetrahaloantimonates (III)	14
1.3 Pentahaloantimonates (III)	16
1.3.1 Simple pentahaloantimonates (III)	16
1.3.2 Mixed pentahaloantimonates (III)	22
1.4 Hexahaloantimonates (III)	22
1.4.1 Simple hexahaloantimonates (III)	22
1.4.2 Mixed hexahaloantimonates (III)	27
1.5 Multinuclear haloantimonates (III)	28
1.5.1 Nonahalodiantimonates (III)	28
1.5.2 Other multinuclear haloantimonates (III)	34

	Page
1.6 Applications of Haloantimonates (III)	36
CHAPTER II PREPARATIVE INVESTIGATIONS	39-82
2.1 Introduction	39
2.2 Experiments and Results	40
2.2.1 Reagents	40
2.2.2 Preparation	45
2.2.2.1 Mixed tetrahaloantimonates (III)	45
2.2.2.2 Mixed pentahaloantimonates (III)	47
2.2.2.3 Mixed hexahaloantimonates (III)	50
2.2.2.4 Mixed nonahalodiantimonates (III)	53
2.2.3 Analysis	54
2.2.4 General Properties	56
2.2.5 Metathetical Reactions	57
2.2.6 Conductimetric Titrations	62
2.3 Discussion	64
2.3.1 Preparation	64
2.3.2 Metathetical Reactions	66
2.3.3 Conductimetric Titration	68
CHAPTER III STRUCTURAL STUDIES	83-160
3.1 Infrared Spectra	83
3.1.1 Introduction	83
3.1.2 Experimental	83
3.1.3 Results and Discussion	84
3.1.3.1 Mixed tetrahaloantimonates (III)	84

	Page
3.1.3.2 Mixed pentahaloantimonates (III)	98
3.1.3.3 Mixed hexahaloantimonates (III)	112
3.1.3.4 Mixed nonahaloantimonates (III)	120
3.2 Electronic Spectra	124
3.2.1 Introduction	124
3.2.2 Experimental	124
3.2.3 Results and Discussion	125
3.3 Conductance Measurements	129
3.3.1 Introduction	129
3.3.2 Experimental	130
3.3.3 Treatment of Data	130
3.3.4 Results and Discussion	133
3.4 X-ray Powder Diffraction	145
3.4.1 Introduction	145
3.4.2 Experimental	146
3.4.3 Results and Discussion	146
3.5 Thermogravimetric Analysis	156
3.5.1 Introduction	156
3.5.2 Experimental	156
3.5.3 Results and Discussion	157
CHAPTER IV SUMMARY AND FURTHER SCOPE OF WORK	161-165
4.1 Summary	161
4.2 Further Scope	164
REFERENCES	166
LIST OF PUBLICATIONS	177
BIO- DATA	178