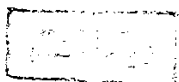
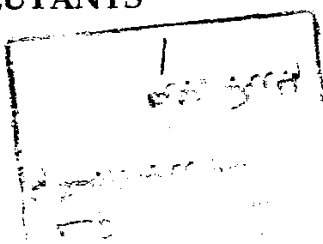


**MODERN TECHNIQUES AND NEW SENSORS
FOR CHARACTERIZATION AND DETERMINATION
OF SOME IONIC SPECIES AND
ENVIRONMENTAL POLLUTANTS**

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**Modern Techniques And New Sensors For
Characterization And Determination Of Some Ionic
Species And Environmental Pollutants**

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DEDICATION

To the Muslims-brotherhood, specially whom are kept behind the bars for nothing but calling for love, just and honor.

I. H. A. Badr

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Ibrahim H. A. Badr

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ABSTRACT

Modern Techniques And New Sensors For Characterization And Determination Of Some Ionic Species And Environmental Pollutants

by

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The studies presented in this dissertation were designed to develop novel anion sensors for environmentally and clinically relevant species. In addition, understanding the response mechanism of the anion-ionophore interactions was one of the fundamental aims of this dissertation.

In this work, novel liquid polymeric membrane anion sensors were developed utilizing metal ion-complexes as anion carriers. In chapter two, lipophilic palladium(II)organo-phosphine complexes were employed as nitrite carriers in polymer membrane. Such sensors exhibit significantly enhanced response towards nitrite with selectivity deviates clearly from the Hofmeister pattern. A highly selective HBHA (a drug used as anti-kidney stones) liquid/polymer membrane electrode based on Sn(IV)porphyrin is described in chapter IV.

The response mechanisms of the developed sensors were studied in detail. A dual charged/neutral carrier mode mechanism was proposed for benzylbis(triphenyl)phosphine based nitrite sensor. In chapter III, a unique potentiometric response mechanism is postulated for the sulfite sensor based on Hg(II)dithiocarbamates. Such postulated redox mechanisms

were supported by a host of experimental evidences such as the effect of lipophilic ionic additives on potentiometric selectivity.

Finally, the optimum set up suitable for analytical applications of the developed membrane systems was studied. For instance, sulfite sensor was used in FIA mode to quantitate sulfite in beverage samples, HBHA sensor was used to assay HBHA-drug in its pharmaceutical preparation, and tetraphenylborate sensors (chapter V) were used to monitor separate and sequential titrations of alkaline earth and transition-metal ions.

Key words:

Ion-Selective Electrodes, Polymer Membrane Electrodes, Anion Sensors, Drug Sensors, Response Mechanism, Flow-Injection Analysis, Potentiometric Titration, Mercury(II)Dithiocarbamate Complexes, Palladium(II) Organo-Phosphine Complexes, Metalloporphyrins, Sulfite/Hydrogen Sulfite, Nitrite, 2-Hydroxybenzhydroxamate, Tetraphenylborate.

TABLE OF CONTENTS

DEDICATION.....	iii
ACKNOWLEDGMENT.....	iv
PUBLICATIONS.....	v
ABSTRACT.....	vi
TABLE OF CONTENTS.....	viii
LIST OF FIGURES.....	xiii
LIST OF TABLES.....	xx

CHAPTER I

General Introduction

1.1 SENSORS.....	2
1.2 PRINCIPLE OF ION-SELECTIVE ELECTRODES.....	5
1.3 HISTORY AND FUNDAMENTALS OF ANION -SELECTIVE MEMBRANE ELECTRODES.....	9
1.3.1 Solid-State anion membrane electrodes.....	9
1.3.2 Liquid/polymeric anion-selective membrane electrodes.....	11
1.3.2.1 Anion-Exchangers.....	14
1.3.2.2 Electrically Charged Anion-carriers.....	15
1.3.2.3. Electrically Neutral Anion-carriers.....	18
1.3.2.4 Influence of lipophilic Ionic Additives on Potentiometric Selectivity	19
1.4 LITERATURE CITED.....	24

CHAPTER II

Palladium Organo-Phosphine Complexes Based Nitrite Sensors

2.1 INTRODUCTION.....	27
2.2 EXPERIMENTAL SECTION.....	30
2.2.1 Reagents.....	30
2.2.2 Preparation of Membrane Electrodes and Potentiometric Measurements.....	31
2.2.3 Evaluation of Potentiometric Anion Selectivity and pH Response.....	32
2.2.4 Electrodialysis experiments.....	32
2.2.5 FIA measurements of nitrite.....	33
2.3 RESULTS AND DISCUSSION.....	36
2.3.1 Response Characteristics of Membranes Doped with BPP-Pd.....	38
2.3.2 Nitrite FIA sensing system	54
2.4 CONCLUSIONS.....	57
2.5 LITERATURE CITED.....	58

CHAPTER III

Mercury(II)Dithiocarbamates Based Sulfite Sensors; Novel Response Mechanism and Application

3.1 INTRODUCTION.....	61
3.2 EXPERIMENTAL.....	65
3.2.1 Reagents.....	65
3.2.2 Preparation of membrane electrodes and static mode potentiometric measurements.....	66

3.2.3 FIA measurements of sulfite	67
3.3 RESULTS AND DISCUSSION.....	67
3.3.1 Response characteristics	67
3.3.2. Response mechanism.....	80
3.3.3 Sulfite/hydrogen sulfite FIA sensing system	89
3.4 CONCLUSIONS.....	94
3.5 LITERATURE CITED.....	95

CHAPTER IV

Metalloporphyrin-Based Polymer Membrane Electrode with High Selectivity for 2-Hydroxybenzhydroxamate

4.1 INTRODUCTION.....	99
4.2 EXPERIMENTAL.....	104
4.2.1 Reagents.....	104
4.2.2 Preparation of Membrane Electrodes and Potentiometric Measurements.....	105
4.2.3 Evaluation of Potentiometric Anion Selectivity.....	106
4.2.4 Assay of HBHA in Pharmaceutical Preparations.....	107
4.2.5 Spectrophotometric Studies of Sn(IV)TPP.....	107
4.2.5.1 Spectrophotometric Titration.....	107
4.2.5.2 Specrophotometric Studies of Anion-Sn-TPP Interactions.....	108
4.2.6 Preparation of Solutions for ^1H -NMR.....	108
4.2.7 HPLC Experimental Set Up.....	109

4.2.7.1 Preparation of the Sn-porphyrin-Based Stationary Phase.....	109
4.2.7.2 Column Packing and HPLC instrumentation.....	109
4.3 RESULTS AND DISCUSSION.....	111
4.3.1 Response Characteristics of HBHA Selective Membrane Electrode.....	111
4.3.2 Studies of the Interaction of HBHA with Sn(IV)-Porphyrins.....	124
4.3.3 Application to pharmaceutical preparations.....	129
4.4 CONCLUSIONS.....	131
4.5 LITERATURE CITED.....	132

CHAPTER V

Liquid/Polymeric Membrane for Manual and Flow-Injection Determination of Tetraphenylborate

5.1 INTRODUCTION.....	135
5.2 EXPERIMENTAL.....	136
5.2.1 Reagents and materials.....	136
5.2.2 Apparatus.....	137
5.2.3 Electroactive TPB-ion pair complexes.....	138
5.2.4 Tetraphenylborate poly(vinyl chloride) membranes.....	140
5.2.5 Tetraphenylborate poly(vinyl chloride) membrane electrodes.....	140
5.2.6 Direct potentiometric determination of TPB.....	141

5.2.7 Potentiometric titration of TPB.....	141
5.2.8 Flow -injection determination of TPB.....	142
5.2.9 Solubility products of TPB derivatives.....	142
5.2.10 Potentiometric titration of monovalent metal ions with TPB.....	143
5.2.11 Separate and sequential potentiometric titrations of transition metal ions.....	144
5.2.12 Separate and sequential titrations of alkaline earth metal ions.....	144
5.3 RESULTS AND DISCUSSION.....	145
5.3.1 Tetraphenylborate-PVC membrane electrodes.....	145
5.3.1.1 Performance characteristics.....	145
5.3.1.2 Effect of pH and foreign ions.....	148
5.3.1.3 Determination of TPB.....	154
5.3.2 Separate and sequential titrations of metal ions with TPB.....	156
5.3.2.1 Monovalent metals.....	156
5.3.2.2 Alkaline earth metals.....	160
5.3.2.3 Transition metals.....	163
5.4 CONCLUSIONS.....	168
5.5 LITERATURE CITED.....	169

CHAPTER VI

Summary And Conclusion.....	171
Arabic Summary	

LIST OF FIGURES

<u>Figure</u>	
1.1	Schematic representation of the basic units of chemical sensors.....3
1.2	Schematic diagram of membrane electrode measuring circuit and cell assembly.....6
1.3	Structure of poly(vinyl chloride) (PVC), Tecoflex polyurethane (PU), dioctyl sebacate (DOS) and <i>o</i> -nitrophenyl octyl ether (<i>o</i> -NPOE).....12
1.4	Different kinds of anion-selective species that can be doped in a conventional polymer membrane anion sensor.....13
1.5	Correlation between the EMF response of anion-sensitive membrane electrode to 10 mM solutions of different anions and the corresponding free energies of hydration.....16
1.6	Chemical structure of tridodecylmethyl ammonium (TDMA), tetrakis[<i>p</i> -chlorophenylborate] (TCIPB) and tetrakis[3,5-bis(trifluoromethyl)phenylborate] (TFPB).....20
1.7	Schematic representation of charged and neutral carrier mechanisms with ionic additives in the membrane phase.....23
2.1	Structure of palladium complexes tested as anion carriers.....29
2.2	Schematic diagram of electrodialysis cell assembly with expanded view of the membrane stack.....34