

# An Analytical Studies of Selective Monovalent sensors Metal Ion based on Heterogeneous membrane Of Macrocyclic Compounds

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**Abstract - The metal Ion Pollution are big challenges for environment and Health Effects . The major concern health hazards metals are lead , Arsenic, Mercury, Chromium,Cadmium,Silver, Anti mony and their compounds. The air, water , and soil or the living places may be contaminated with toxic chemicals and substances. In the current scenario the human beings Facing the many environmental issues and challengs due to the adverse effect of toxic metals and chemicals on our air, water, and soil quality also. The india is a developing country and have facing different – different problems on our ecological and environmentalissues . Hence I will decided to make an analytical Chemist , and then my current work to form the sensors based on heterogeneous membrane of macrocyclic compounds.**

**The Macrocyclic compounds are those molecules and ions containing a ring of twelve or more atoms. Like –Lactem, Lactones, Ligands, Porphyrinsetc.The God have already gifted five sensors to human being like –eyes, Ears, Nose, Tongue and Skin etc.**

**Keywords - MacrocyclicCompounds,Toxic Chemical, Heterogeneous membrane , lactam, ligand, Lactones, porphyrins etc.**

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## INTRODUCTION

The silver metal is very good for our beautiful earth planet. Silver metal has a ductile properties and malleable characteristics. It is a commonly coin metal. It has the White bright colors. The silver metal is a very good Electrically Conductor even better than the Copper metal. But due to the higher cost of Silver is not commonly used as well as silver metal is not easily available everywhere. It was firstly obtained by the of ores before 3001 BCE by the Reduction of lead(pb). The silver metal name and symbol are coming from the 'Latin words' "Argentum"."Ag" is the symbol of Silver. The South American deposits of silver ores are the Origin of the Name "Argentina" this is the only country named for an Elements. The silver metal has the higher value of optical Reasoning as well as higher value of Thermal Conductivity. The silver metal is Replaced by Aluminum in Visible Electromagnetic Radiation Or a Spectrum. Silver metal is not a very good mirror or Reflector of Ultraviolet Radiation. Silver metal shows the very low contact Protection or Resistance. Silver metal is Generally found in atmosphere, but it will be reacted with Air, water, ozone and Hydrogen Sulfides to form black color layer of silver sulfides. This black color of silver metal or jewelry will be diminishes by the Hydrochloric Acid. The silver is a coin metal.

Generally the common oxidation state of Silver is +1 , example like AgNO<sub>3</sub>, but it' also shows the +2 Oxidation state in silver fluoride and as well as shows +3 oxidation state and +4 oxidation state in different molecules. The silver metal is very useful for making of Jewellery and Imported house Furniture. The silver metal also used in the Electrically Instruments or Apparatus or more thing. The Silver" Amalgams" are used in Medical fields. The Dentist is used the "Amalgams "(it is the alloys of silver, mercury and tin) for the filling of Teeth . The teeth cavity is filled by amalgams, it is quickly set in cavity and take a very low time for hardness. Silver metal neither toxic nor the essential for the human beings. The silver metal salts are Generally carcinogen. The silver salts are absorbed by the circulatory system in our body and causes very Dangerous diseases may be skin disease, and cyanosis etc. The silver salts are used for making the Ointments like silver sulfadiazine ointment(SSO) for the burn wounds. The high contamination of silver ion also affected the our body organ like kidney, liver, circulatory system and Skin also.

The Atomic Absorption spectroscopy (AAS) , Inductively Coupled Plasma Massspectroscopy (ICP-MS), Inductively Coupled Plasma-Atomic emission spectroscopy (ICP-AES) the Gravimetric

analysis And quantitative analysis method like- isotopic dilution mass spectroscopy are most valuable and important method or technique for the detection of silver metal. But most of above methods or techniques are time taken process but my concern being an analytical chemist to require a method or technique , tools to take very little time, fast responses, cheap in cost and simply handled and giving definite or valuable results . most of the extensive chemistry Literature we founded that ionophore may be carrier ionophore or channel forming ionophore , Generally ionophore has a hole (Hydrophilic cavity) that forms bonds for a specially or selective ions . The most common example of Ionophore like-1. P- tertiary -butyltrithia calixarene, 2. Hexathia - 18 crown -6-2C-8,C-14,C-20, tetra Butyl 1-4,6,10,12,16,18,22,24-octoacetyl resource arene , 3. Bis - pyridine tetramide macrocycle. 4. Calix (4 Arene . 5. 3,3 dithia-1-(p-Methyl) Phenyl-2-prpen-1.6. P- tertiary Butyl calix (4Arenes.Schiff base are used to for the selective analysis of silver metal. But most of the Ionophore Reporting time is very low ,low selectivity less concentration less pH criteria and higher analysis limit.in my current search areas for the analysiing of very minimum amount of silver (1) Ion in various environmental and real sample will be taken in different areas by highly selective and highly sensitive Poly vinyl chloride (PVC) membrane is 1,2 bis- [2'-(8"-Oxyisoquinoline) ethyl]-benzene new synthesized sensor. The Electrode show the NernstainReacted for the Silver (1) ion with very less or detection perimeter.The Electrode obtained very Quicklyreaction time and highly selective or sensitivity . This electrode is important for the silver(1) cations compare then the other Inorganic cations.

## INVESTIGATIONAL

### Chemical

All the Chemicals and Reagent will be purchased from extensive suppliers of chemicals like CDH Pharmaceuticals limited, Merck limited, Reidel limited, Rare Earth Chemicals limited India. All the Metal Nitrates will be taken from Rare Earth Chemicals limited India. The Poly vinyl chloride (PVC) of (High molecular weight) , sodium tetraphenyl borate (NaTPB) , Tetrahydrofuran (THF), Ethyl Alcohol, Chloroform, Acetone and Potassium carbonate were bought from Reidel limited. 1,2 - di(2-chloro) ethyl benzene, 8-hydroxyisoquinoline were taken from Merck limited. The di- butyl phthalate (DBP), dioctylphthalate(DOP), O-nitrophenyl octylether (O-NPOE) , tri-n-butyl phosphate (TBP), and di-butyl-butyl phosphonate (DBBP), Oleic Acid (OA), or 1-Chloro naphthalene (CN), weretaken from . CDH Pharmaceuticals limited.There is no Compromise the quality of Reagent. All the Reagent were fine quality and aboutly hundred percent pure, it is used without any Purification process. The deionized water will be used for the preparation of Freshly Standard solution.

### Instruments Used

The silver (1) selective membranes of Sensor in combination with Electronic Corporation of India(ECIL) at 20+- 1 degree centigrade, of all potentiometric measurement with anElectric potentiometer. The Reference Electrode is India double Junction calomel electrode containing 8 PercentKNO<sub>3</sub>solution in the external cavity.

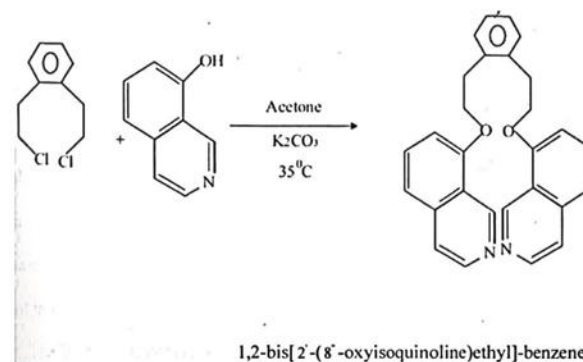
### Preparation of Ionosphere

Taken the 1,2 di-(2-Chloro) ethyl benzene (1.2 MMole) (in 25 ML Acetone) , add 0.15 M k<sub>2</sub>cr<sub>2</sub>O<sub>3</sub> (15 ML) , and Now add it with 8- Hydroxyisoquinoline (1.2MMole in 25 ML Acetone), then mix and stirring it and finally Reflux aboutly Two and Half Hour. Then we found the Oily Liquid. Now Dehydrated the solution in vacuum and got glue like liquid. The Ligand are founded in the form of light brown microcrystals. Firstly filtered the microcrystals, then washed of cooled ethyl Alcohol and further Recrystallized from CH<sub>3</sub>COCH<sub>3</sub>or Chloroform. The Result and obtained Chemicalobservation of ionosphere- Is given below .

Molecular FormulaC<sub>38</sub>H<sub>24</sub>N<sub>2</sub>O<sub>2</sub> ,Yield : 80 Percent.

Analysis : <sup>1</sup>H-NMR (CDCl<sub>3</sub>, ppm) :s =7.74(d, 2H-aromatic), 7.48(d, 2H, aromatic), 6.70(d, 2H aromatic), 6.80(s, 4H, aromatic), 6.82(d, 4H, aromatic), 6.84(s,2H, aromatic), 4.00(t, 4H, Ch<sub>2</sub> Aliphatic).

<sup>13</sup>C-NMR[ (CD<sub>3</sub>CN), PPM]: & = (38 C, aromatic), 172:90, 174:12, 175:14, 170:76, 169:36, 165:65, 166:66, 164:63, 160:95, 145:46, 143:40, 141:42, 140:42, 132:60, 122:70, 120:19, 119:05, 119:10, 118:12, 117:16, 107:46, 102:10, 98:15, 95:69, 91:79, 90:25, 80:25, 70:26, 60:45, 59:69, 55:46, 46:47, 42:41, 34:39, 32:16, 31:69, 31:45, 30:15.



### Electrode preparation

Craggs and other member suggested the preparation method for Electrode. The membrane have been formed by the following Mixture jn their Respective Percentage like 30 / poly vinyl chloride, 60 / of plasticizers[like- O-NPOE, DBP, DOP, DBBP, TBP, 1-CN, OA ] and 3/ percentage of ( NaTBP), then 7/ percentage of Ionosphere in Tetrahydrofuran (THF). These component will be taken as Reference of weight percentage. The obtained membrane have

uniform Thickness and the stickiness of solution or solvent Dehydration Process occur in under supervision. The Electrode Response for membrane sensors may be variable output. The membrane thickness about 0.1mm and diameter is about 10 mm were detached from the Glass apparatus or plate and the one end of plate is fixed by adhesive chemical or reagent. The membrane Electrode dipping in a 0.15M  $\text{AgNO}_3$  solution for one week for a proper supervision. A Tube contain two saturated silver Electrode, where one electrode was inserted the electric purpose and other electrode act as a Reference External Electrode. The potassium chloride (KCL) Saturated solution help to maintain the Ionic Strength of different solution. If the Electrode membrane will be stay in 0.05 M  $\text{AgNO}_3$  solution for cracking controlled of membrane.

## RESULT

The preparation of silver(1) selective membrane Electrode (in PVC) with the help of 1,2- bis [(2'-(8"-oxyisoquinoline) ethyl)-benzene Ionosphere. The Properties of Ion selective Electrode of Silver(1) depend on the Nature of plasticizers and membrane composition function or quantity of Ionosphere and the Responded Result. According to the Experiment the Best sensor Will be developed by selective various plasticizers in the following composition -plasticizers (Na-TBP), Ionosphere, PVC of 60:7:3:30(percentage, w/w). The membrane Electrode of Ag(1) cation has the potentially Responsible for the proposed Ionosphere with various are given in below

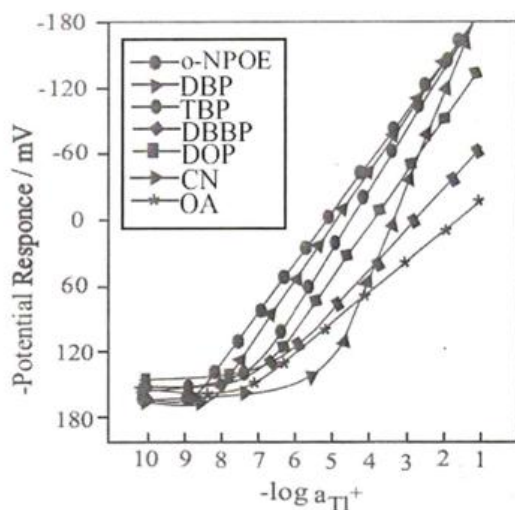


Figure1- variation if potential of PVC based membrane with solvent mediators o-NPOE, DBP, TBP, DBBP, CN, OA respectively with Ag(I) concentration

## REFERENCES

1. M. Mazloun, M.S. Niassary, S.H. MirhoseiniChahooki and M.K. Amini, *Electroanalysis*, 14, (2002) 376.
2. A Craggs, G.J. Moody, J.D.R. Thomas, *J. Chem. Educ.* 51 (1974)541.

3. M. Telting-Diaz and E. Bakker, *Anal. Chem.*, 73, (2001), 5582.
4. P. Debye and E. Huckel, *Phys. Z.* 24, (1923), 305.
5. K. Mittal, A. Kumar, N. Gupta, S. Kaur and S. Kumar, *Anal. Chim. Acta* 585, (2007) 161.
6. M. Yanming and E. Bakker, *Anal. Chem.*, 71, (1999), 5279.
7. Y. Umezawa, P. Buhlmann, K. Umezawa, N. Hamada, H. Aokli, J. Nakanishli, M. Sato, K. P. Xiao, Y. Nishimura, *Pure Appl. Chem.* 74, 6, (2002) 923-994

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