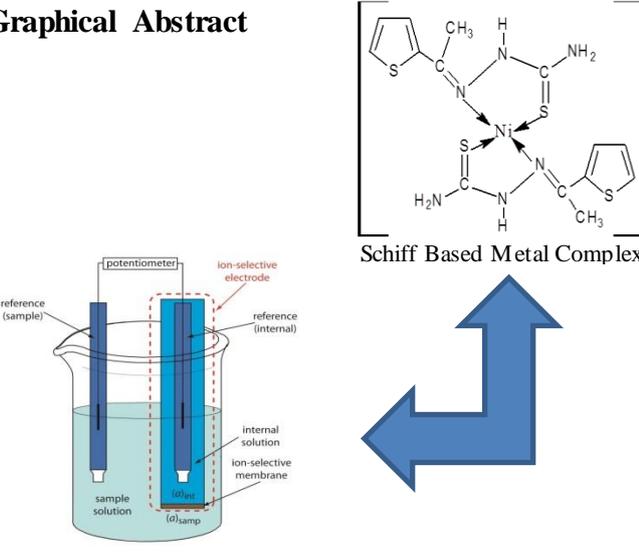


Synthesis and application of Schiff based metal complexes of thiosemicarbazide in electrochemical sensors

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<p>Graphical Abstract</p>  <p>ISE Set-up</p>	<p>Abstract</p> <p>Schiff based metal complexes of thiosemicarbazide with transition metals such as Zn, Cd, Cu, Pb etc. have received much attention because of their significant electrochemical activity in Ion selective electrodes. Thiosemicarbazide based schiff base was synthesised by using acetyl-2-thiophene and thiophene-2-aldehyde in ethanol solvent. These ion selective electrodes can be employed to develop chemical sensors for sensing metal ions in solution. Performance of these sensors can be checked by measuring the effect of pH, response time, lifetime and selectivity study. These sensors found useful in potentiometric titrations and for the determination of ions in water samples.</p>
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Introduction

In recent years there has been a growing need or desire for constructing chemical sensors for fast and economical monitoring of our environmental samples especially for heavy metal ions in real time. Polymeric membrane ion selective electrode (ISEs) provides one of the most powerful sensing methods because it is possible to select various sensory elements. Membrane based Ion Selective Electrodes (ISE) are appropriate for this purpose because they are highly selective for inorganic ions and they are easy to develop. Metal complexes of thiosemicarbazones with transition metals have received attention because of their biological and electrochemical activity including antitumor, antibacterial, fungicidal and anticarcinogenic properties, including as ion selective electrode as well.

Materials and Methods

All the chemicals used were of analytical grade (AR) and of the highest purity. They included 2-acetyl thiophene (CDH), thiophene-2-aldehyde (CDH), thiosemicarbazide (CDH) and semicarbazide (CDH). Metal salts were purchased from E. Merck and were used as received. All standard solutions of metal salts and buffers were freshly prepared in double distilled deionized water.

Results and Discussion

The response of different metal ions was plotted as the negative log of concentration and the potential values obtained for different ions.

The basic characteristic parameters for determining the analytical property of an ion selective electrode were then measured, such as:

- Range of Linear response and Slope
- Effect of pH
- Response time and Reversibility
- Selectivity
- Sensitivity
- Limit of Detection
- Lifetime of ISEs

Conclusions

The ion selective electrode sensors exhibits Nernstian slope and a wide linear working range. These metal complex based sensor electrodes can be used in wide pH range of solutions and can be successfully used to determine the concentration of metal ions in wastewater samples.

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