

# Spectroscopic Studies of Complex of Poly Aniline with Zinc Ion in Finger Print Region

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**Abstract-** Spectroscopic studies are the most advanced technique and hence has proven as powerful tool for any type of qualitative and quantitative analysis . Infrared spectroscopy is one of the most powerful analytical techniques which offers the possibility of chemical identification. This technique when coupled with intensity measurements may be used for quantitative analysis .one of the most important advantages of infrared spectroscopy over the other usual methods of structural analysis such as X-ray diffraction analysis ,electron spin resonance etc. is that it provides useful information about the structure of compounds and can solve many problems in organic chemistry and coordination chemistry .In present paper ,with the help of Infrared spectroscopy conformation of polymer –metal complex formation has been assured that can help to study of polymer as conducting material to prepare polymer electrodes and polymer electrolytes .This research paper will help to prepare polymer batteries. For this purpose polymer, metal-polymer complex like Poly Aniline and Poly Aniline-Zinc complex have been tested using Potassium Bromide as reference material with the help of Infrared spectrophotometer.

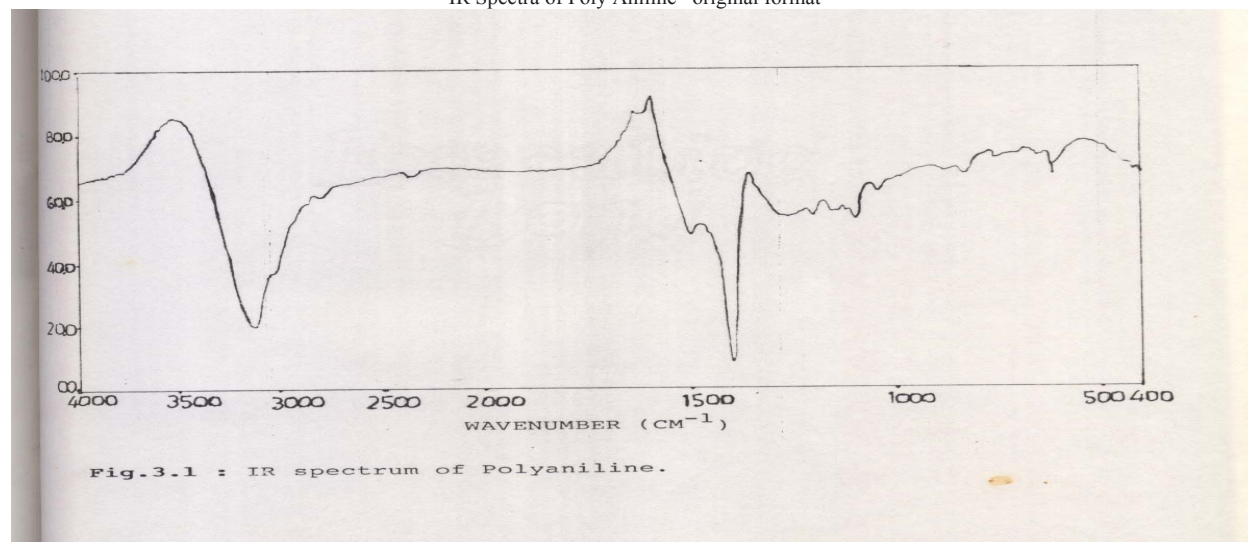
**Keywords -** Selective absorption, IR radiations, Polymer electrolytes, polymer electrodes, conducting poly aniline.

## I. INTRODUCTION

The technique is based on the simple fact that a chemical substance shows marked selective absorption in the infrared region. After absorption of IR radiations the molecule of a chemical substance vibrates at many rates of vibration, giving rise to close packed absorption bands called an IR absorption spectrum which may extend over wide wavelength range. Various bands will be present in IR spectrum which will correspond to the characteristic functional groups and bonds present in a chemical substance are a fingerprint for its identification.

In a complex polymer molecule<sup>1</sup> the number of infrared transition might be expected to be too great to deal with, but fortunately this does not happen as a great, many of these are degenerate, i.e.of the same energy. The advantage of fingerprint region<sup>5</sup> has been taken in the identification of polymers. The spectrum of the unknown sample is matched against that of an authentic sample, peak by peak, and the identity of the compound<sup>6</sup> established.

IR Spectra of Poly Aniline –original format



IR spectra of PANI-Zinc complex-original format

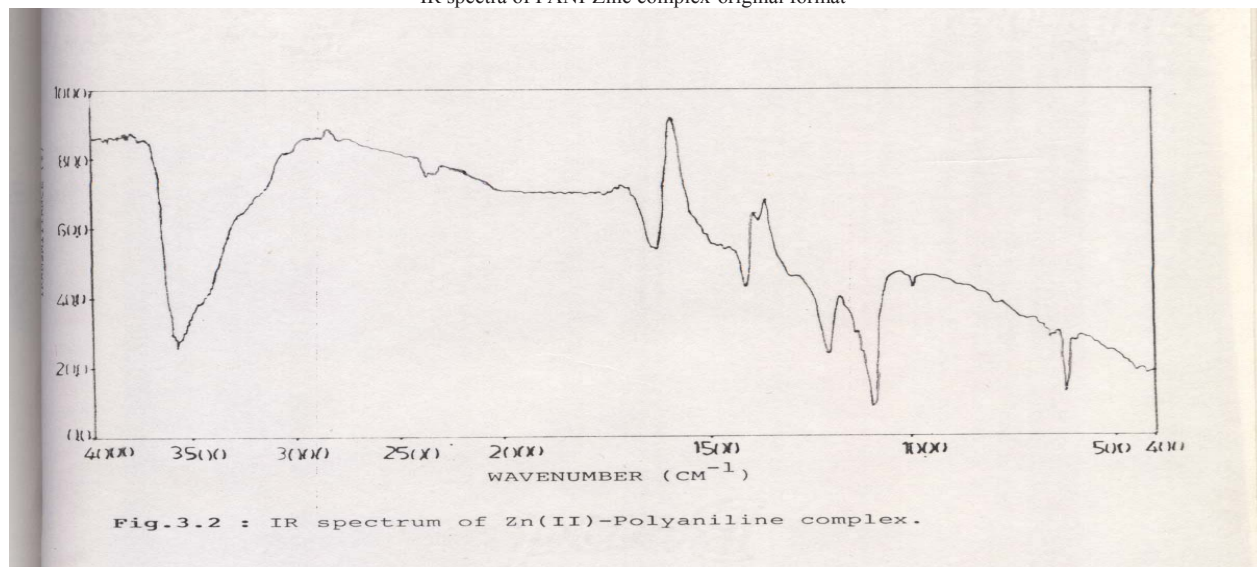


Table-IR Frequencies (cm-1)and their assignments for PANI and its complex

Ligand	assignment	Zn-(II)- PANI Complex
3500 I br	-NH stretching	3565
3300_I	vibration	
1600	-C=C	1626
1500s	-NH-bending	
Aromatic nature	-	
1380 I br	-C-N vibration	
1360_I	aromatic secondary Amine	1402
1100m	CH in plane stretching	
780 I br	CH bending	
620_I	vibration	619

S-sharp,

m-medium,

w-weak,

br-broad

## II. RESULTS AND DISCUSSION

IR Spectra of Polyaniline and its complex with Zinc (II) metal ion has been depicted in figure . The important Infrared signal and their group assignments<sup>4</sup> have been tabulated in table

A perusal of the figure and table reveals that the signals due to NH-stretching vibrations at  $3500\text{-}3300\text{cm}^{-1}$  and –CN aromatic vibration in the ligand spectra undergoes a shift in the spectrum of Zn(II)-PANI complex indicating the involvement of –NH nitrogen complex formation.

## III. SURVEY OF LITERATURE

Infrared spectrum of Polymer such as PolyAniline and its 1/1 blend with PAA : at  $25^{\circ}\text{C}$  before heating and at  $25^{\circ}\text{C}$  after heating to  $80^{\circ}\text{C}$  and other various conditions have been reported by Show-An and Hsun-Tsinglee,<sup>1</sup>. They concluded that for the PANI (termed as PANI/PAA blend), the confinement of carboxylic acid group.

Ming Xiang of China studied Infrared of PVAL (OH, 47mol)/PMMA<sup>2</sup>. He concluded that relatively strong Intermolecular Hydrogen bonding interaction exists between components in the miscible blends. The curve resolving studies of FTIR spectra<sup>2</sup> have suggested that the weakly self associated hydroxyl groups in polyvinyl acetyls are liable to form hydrogen bonds with carbonyl groups in PMMA. IR spectra of Copolymer<sup>7</sup> and blend of bismaleimides with phenolalkyle resin (KBr) have been reported by Liu Quingmin Xingxian<sup>3</sup>.

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