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Synthesis of Polyaniline for Detection Metal ions

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Abstract
Polyaniline (PANI) receives greater attention as a conducting organic material due to its good environmental stability and suitable for number of practical application. Polyaniline is synthesized electrochemical method were characterized by using electrochemical technique, conductivity measurement, UV-visible spectroscopy, Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). Polyaniline having amine functional group can be utilised for detection of metal ions for environmental monitoring.
Keywords: Polaniline, Electrochemical Method, UV-visible spectroscopy, FTIR and SEM.
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Introduction

Polyaniline is a important conducting polymer due to its unique electrical, electrochemical, and optical properties. The remarkable switching capability of these electro active materials between the conducting oxidized (doped) and the insulating-reduced (undoped) state is the basis of many applications. The conducting polymers fulfil both these requirements. The synthesis and characterization of electro active polymers have become two of the most important areas of research in polymer and materials science [1].Amongst conducting polymers, polyaniline (PANI) receives greater attention as a conducting organic material due to its good environmental stability [2-3]. Polyaniline has many advantages, which include simplicity and rapidity of preparation by electrochemical methods and the ability to be formed in aqueous electrolytic solutions [4-5]. PANI is recognized to be an air-stable organic conducting polymer with interesting electrochemical properties which make it suitable for number of practical applications, such as in biosensors, electronic devices [6-8].

Experimental

The electro polymerization of aniline was carried out by Galvanostatic technique, in one compartment electrochemical cell. The PANI-HCl synthesized from an aqueous solution of distilled water containing 0.2 M aniline and 1 M of Hydrochloric acid (HCl) using electrochemical deposition method. After synthesis, polymer coated electrodes were rinsed thoroughly in distilled water and dried in cold air and then used for subsequent characterization.

Result and Discussion:

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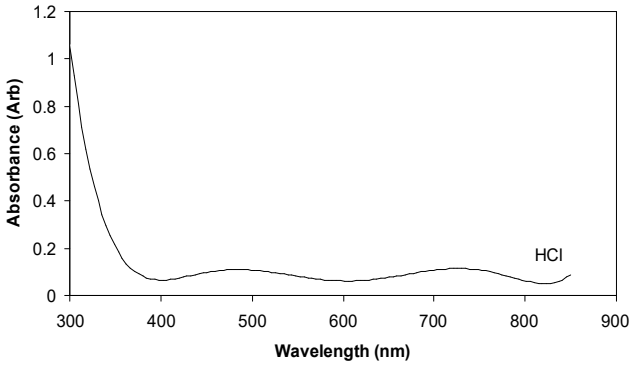

Fig.1. UV-visible spectra of PANI-HCl .

A green colored matrix showed two absorption peaks for PANI-HCl . The peak at 475 nm is because of π-π^* transition and a broad peak at 750 nm is due to formation of Emeraldine salt corresponds to the conducting phase for PANI-HCl matrix.

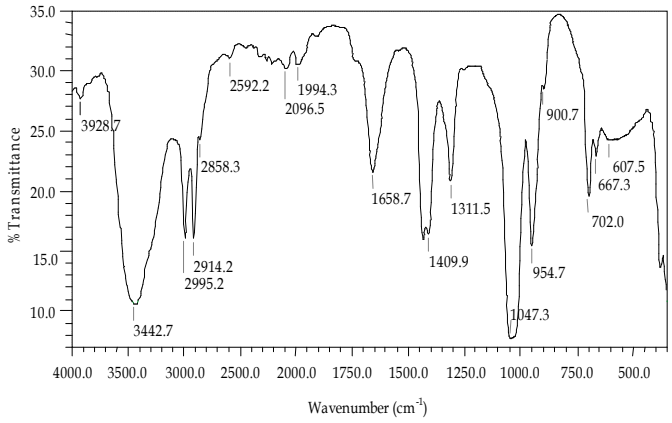

Fig. 2. FTIR spectra of PANI-HCl .

The peak at 3442.7 cm^{-1} corresponding to N-H starching. The peak at 2995.2 cm^{-1} is due to C-H stretching and similarly the C-N stretching is observed at 1311.5 cm^{-1}. Thus, the FTIR spectral results confirm the structure of polyaniline.

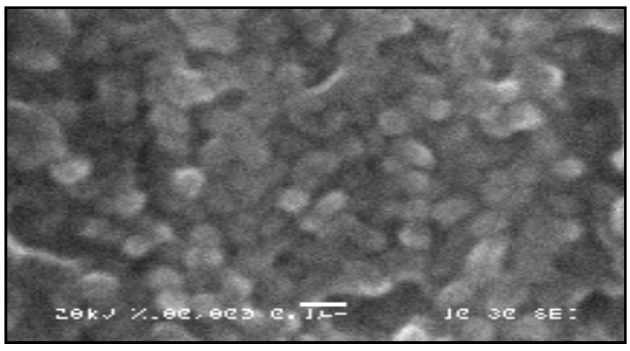

Fig.4. Scanning electron micrograph of PANI-HCl

It is granular like structure, it show very good uniformity and porosity.

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Conclusion

The Synthesized PANI-HCl is used for detection of metal ions for environmental Monitoring.

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