International Refereed Journal of Engineering and Science (IRJES)
ISSN (Online) 2319-183X, (Print) 2319-1821
Volume 1, Issue 3(November 2012), PP.27-29
www.irjes.com

Optical Properties of Polyaniline Doped with KBr and Picric Acid

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Abstract: *Polyaniline is one of the oldest of conducting polymers amongst the various conducting polymers. Pani has rapidly become the subject of considerable interest for physicists, chemists and material scientist. In this paper we have carried out the optical properties of polyaniline doped with KBr and Picric acid at 20% and 40% concentration. The reflection spectra of Polyaniline doped with KBr and Picric acid was measured at room temperature in the wave length range of 300-800nm.*

Keywords: *Polyaniline (PANI), Polymers, Optical properties, doping, Reflection spectra*

I. INTRODUCTION

The unique properties of conducting polymers not only provide great scope for their applications but also have led to the development of new models to explain their observed properties, particularly various mechanisms of charge transport (Kaiser et al 1995, 1997) [1-2]. Among different conducting polymers, polyaniline are the most extensively studied material (Kumar et al 1996) [3] and also known as a P-type semiconductor [4]. However, when they are taken in the composite form their electrical as well as dielectric properties are altered from those of basic materials. A number of groups have reported studies on the electrical conductivity and dielectric of composites of a variety of conducting polymers (Yoon et al 1995, Yang et al 1996, Gangopadhay et al 2001, Murugesan et al 2003) [5-8]. It has been shown that the conductivity of these heterogeneous system depends on a number of factors such as the concentration of conducting fillers, their shape, size, orientation and interaction between filler molecules and host matrix (Kryszewaski 1991, Brosseau et al 2001[9-10]. The geometrical shape of the dispersant governs the ability of conductive network formation which results in the large increase in the conductivity (Troung et al 1994) [11].In this paper we have reported optical properties of polyaniline with 20% and 40% of KBr and Picric acid.

II. SAMPLE PREPARATION OF PANI

Thin film of KBr, Picric Acid, doped Polyaniline have been prepared by vacuum evaporation technique. Polyaniline was usually prepared by redox polymerization of aniline using ammonium perdisulphate, $(NH_4)_2\ S_2O_8$ as the oxidant. Distilled aniline (0. 2 M) was dissolved in 300 ml of pre-cooled HC1 (l.OM) solution and maintained at 0-5° C. A calculated amount of ammonium perdisulphate (0. 5M) dissolved in 200 ml of HC1 (1M), pre-coated to 0-5° C, is added to the above solution. The dark green precipitate (ppt) resulting from this reaction is washed with HC1 (l.OM) until the green color disappears. This ppt is further extracted with tetra-hydofuran and NMP (N-Methyl Pyrolidinone) solution by soxhelf extraction and dried to yield the emeraldine salt. Emeraldine base can be obtained by heating the emeraldine salt with ammonia solution. Simultaneously, separate salt solution is prepared by dissolving the MX conducting (M=Metal and X=Halide) in distilled water. The solution is then slowly added to the precooled polymer solution with constant stirring. The composite was then dried in an oven, at 60-70 ^{O}C temperature, to get the polymer in the powder form. This powder is vacuum evaporated on to highly cleaned glass substrate as well as metallic substrate. Doping of the polyaniline was done with KBr, Picric Acid, (20 % & 40 % by wt.). After doping thin film of polyaniline were prepared.

III. RESULTS AND DISCUSSION

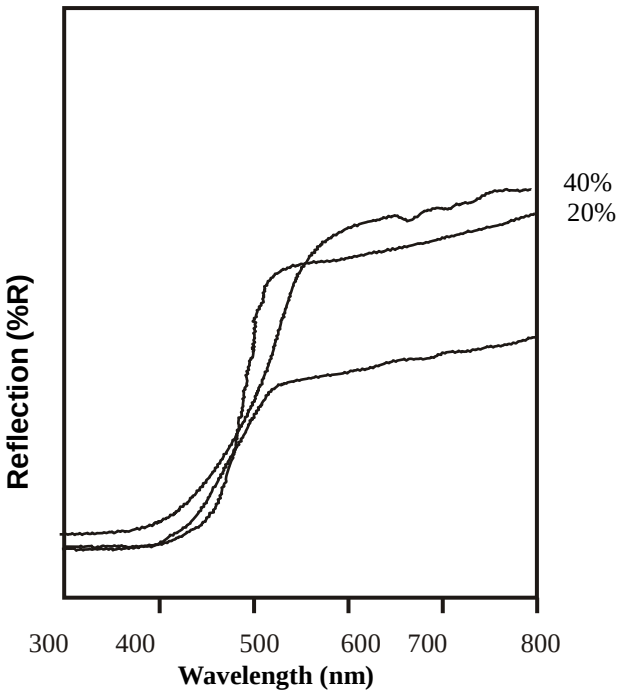

Fig.1-Reflection Spectra of Polyaniline with 20% & 40% KBr

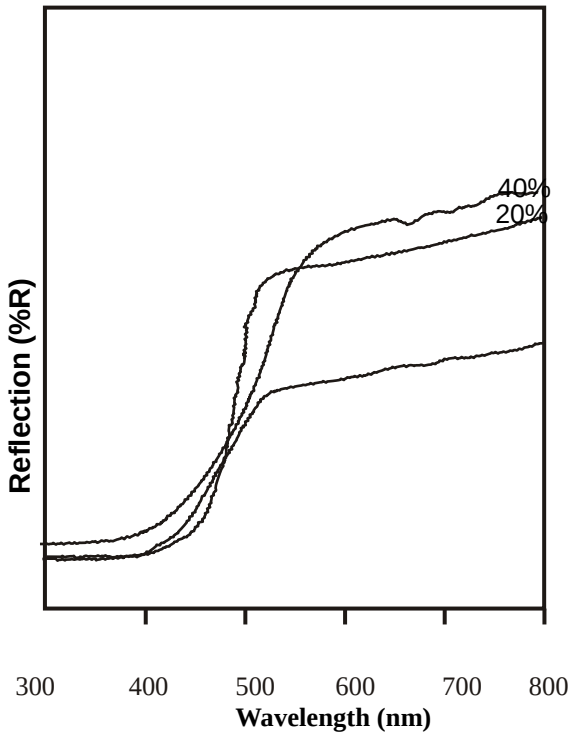

Fig.2-Reflection Spectra of Polyaniline with 20% & 40% Picric Acid

Figure-1 shows the relation between the reflection spectra and the wavelength For Pani with 20% and 40% KBr content. From this figure, it is clear that both samples have the same behaviour.The reflectance spectra increases sharply with increasing wave length to a maximum value, and then increases gradually with increasing wavelength.

Figure-2 shows the relation between the reflection spectra and the wavelengthFor Pani with 20% and 40% Picric acid content it can be seen that both samples have the same behaviour.The reflectance spectra increases sharply with increasing wave length to a maximum value, then increases very slowly with increasing wavelength.

IV. CONCLUSION

In this paper we have reported the reflection spectra of different samples of Pani with 20% and 40% of KBr and picric acid were measured at room temperature at wave length from 300-800 nm. We observe that all the samples have the similar behavior.

V. ACKNOWLEDGEMENT

All the persons directly or indirectly linked with this research are highly acknowledged by the author.

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