



Preparation of thin films from conductive polymer PANI and study of their applications as a gas sensor

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Abstract : The aim of this paper is to study the D.C electrical properties of poly aniline and methanol gas . For that purpose, the polyaniline and methanol gas was prepared by drop coating . Noted the decrease in accounts receivable electrical connectivity to all concentrations, this decline was due to the chemical adsorption process occurs that leads to a new links between methanol and poly aniline surface poly aniline which impede molecular particles movement and a clear decreased values appear in the values of connectivity. Increased gas concentrations are most likely, chemical adsorption occurs indoors more and this leads to an increased amount of bonds and interdependencies between gas molecules and molecules of poly aniline thus diminishing in more connectivity. Response of gas methanol gas signifying grabs all the tarnish of sample ions into insulator, when focusing 500ppm.

Key words : Thin films from conductive polymer PANI, gas sensor.

1. Introduction

A **polymer** (/ˈpɒlɪmər/;¹⁻³ Greek *poly-*, "many" + *-mer*, "parts") is a large molecule, or macromolecule, composed of many repeated subunits. Because of their broad range of properties,⁴Both synthetic and natural polymers play an essential and ubiquitous role in everyday life.⁵ Polymers range from familiar synthetic plastics such as polystyrene to natural biopolymers such as DNA and proteins that are fundamental to biological structure and function. Polymers, both natural and synthetic, are created via polymerization of many small molecules, known as monomers. Their consequently large molecular mass relative to small molecule compounds produces unique physical properties, including toughness, viscoelasticity, and a tendency to form glasses and semicrystalline structures rather than crystals.

The term "polymer" derives from the ancient Greek word *πολύς* (*polus*, meaning "many, much") and *μέρος* (*meros*, meaning "parts"), and refers to a molecule whose structure is composed of multiple repeating units, from which originates a characteristic of high relative molecular mass and attendant properties.⁶ The units composing polymers derive, actually or conceptually, from molecules of low relative molecular mass.⁷ The term was coined in 1833 by Jöns Jacob Berzelius, though with a definition distinct from the modern IUPAC definition.^{8,9}The modern concept of polymers as covalently bonded macromolecular structures was proposed in 1920 by Hermann Staudinger,¹⁰ who spent the next decade finding experimental evidence for this hypothesis.¹¹

Polymers are studied in the fields of biophysics and macromolecular science, and polymer science (which includes polymer chemistry and polymer physics). Historically, products arising from the linkage of repeating units by covalent chemical bonds have been the primary focus of polymer science; emerging important areas of the science now focus on non-covalent links. Polyisoprene of latexrubber and the polystyrene of styrofoam are examples of polymeric natural/biological and synthetic polymers, respectively. In biological contexts, essentially all biological macromolecules—i.e., proteins (polyamides), nucleic acids (polynucleotides), and polysaccharides—are purely polymeric, or are composed in large part of polymeric components—e.g., isoprenylated/ lipid-modified glycoproteins, where small lipidic molecules and oligosaccharide modifications occur on the polyamide backbone of the protein.¹²

Experimental Section

In this paper, the materials used are Poly aniline (Pani) by (1.5 gm) with a chloroform solution by (5 ml) and then placed on the magnetic stirrer device for (8 h) was the solution on abase interdigitated manner drop-coating was installed poles by silver paste and then the sample was placed in the system manufacture linked to the system to Keithley device. Then methanol gas was added at different rates and took readings of presence of gas and not its existence.

Results and Discussion

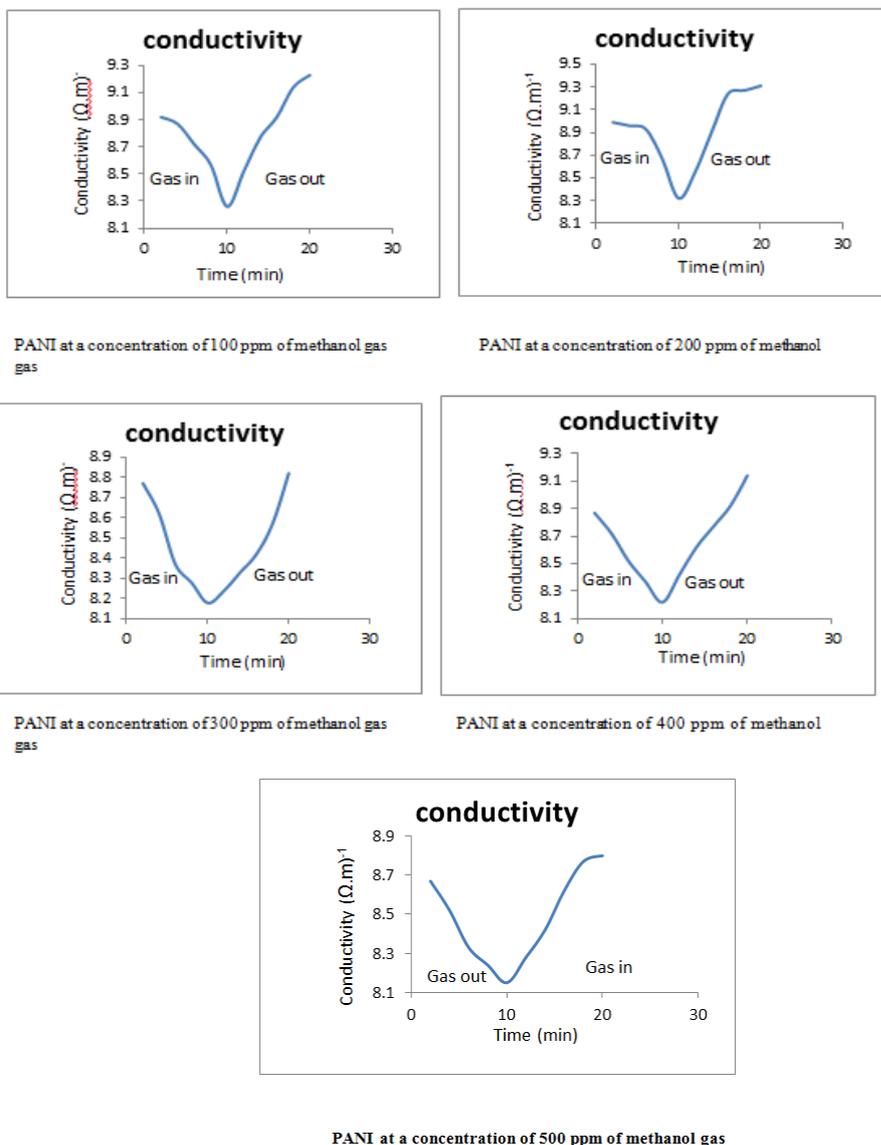
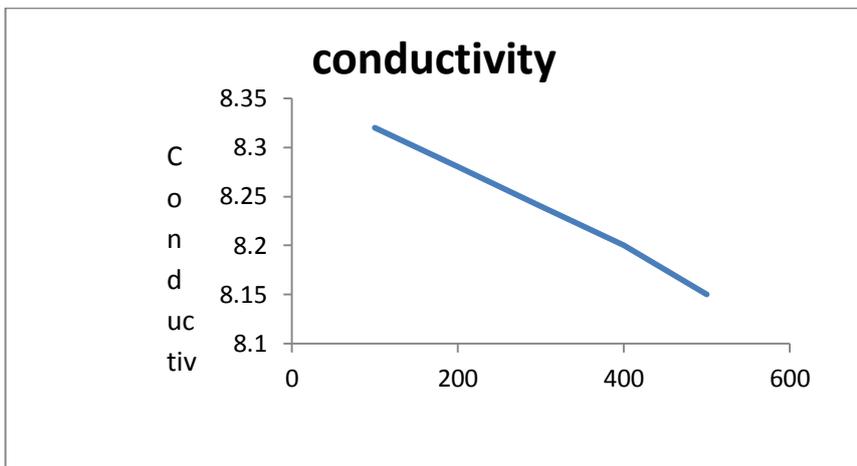


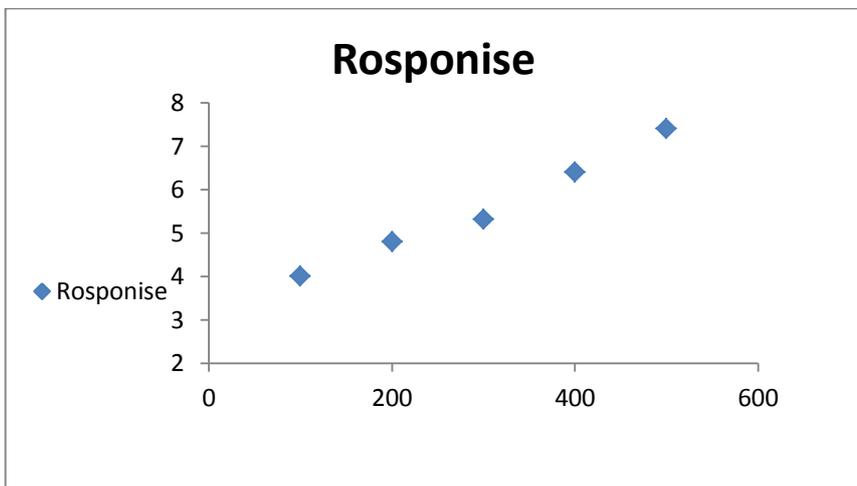
Figure (1): The relationship between electrical conductivity of poly Aniline and different concentrations of methanol gas

Electrical conductivity process by shedding an external electric field leads to cargo transmission charge (electrons and holes). Ion conduction, as a result of the movement of cargo carrier's positive or negative ions when an external electric field shed. Electrical conductivity characteristics depend on having a shipment carriers. The polymer is usually containing Ionic impurities include remnants of cofactors, antioxidants, and outputs disconnected terminal totals and little cargo carriers. Noted the decrease in accounts receivable electrical connectivity to all concentrations, this decline is due to the chemical adsorption process occurs that leads to a new links between methanol and poly aniline surface poly aniline which impede molecular particles movement . A clear decrease values appear in the values of connectivity. Increased gas concentrations are most likely chemical adsorption occurs indoors more and this leads to an increased amount of bonds and interdependencies between gas molecules and molecules of poly aniline thus diminishing in more connectivity. That we observe in figure (1) so the results show how declining between values and connectivity between concentrations and proportionality, reverses. Connectivity in polymer connector depends entirely on molecular interrelationships. When you add the methanol gas, it breaks bonds and configure new bonds between molecules of poly aniline, thereby increasing the energy difference between the empty level stocked level and increase in electrical resistance after exposure to methanol gas. Large energy difference increases in urinary system poly aniline means a decrease in the increase connectivity in resistance as in Figure(2).

Figure (3) shows response at different concentrates poly aniline urinary methanol gas and observed a particular concentration established. Responses of gas methanol signifying grab all the tarnish of sample ions into insulator, and it when focusing 500ppm.



Figure(2) the relationship between the electrical conductivity of the poly-aniline with different concentrations of methanol gas at a certain time



Figure(3) the relationship between the response of the poly-aniline with different concentrations of methanol gas

Conclusions

1. The films content of poly aniline and methanol gas and prepared by drop coating.
2. A clear decrease values appear in the values of connectivity.
3. Responses of gas methanol signifying grab all the tarnish of sample ions into insulator, and it when focusing 500ppm.

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