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Synthesis and Characterization Conducting Polymer Supported CDS-ZNS Nano Composites Used for Various Applications

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Abstract: Keys include undertaking polymer synthesis and physical property research. Conductive is polyaniline. The presence of pristine nano CdS particles in the matrix was demonstrated by X-ray diffraction (XRD).
In this study, four sol-gel techniques are used to prepare nanostructured polyaniline (PANI). PANI molecular structure was characterized using X-ray diffraction to assess the morphology of PANI samples.
The results of the prepared PANI's characterization reveal that the unconventional synthesis methods utilized to create it drastically changed its morphology, chemical composition, crystallinity, conductivity, and surface area. The outcomes of the characterization supported this. The manufacturing and properties of polyaniline conducting polymers are examined in this research. The classic and grafted techniques of polyaniline synthesis have been examined. The relationship between structure and properties is established by this high-accuracy development procedure. In the future, polyaniline with altered structure may be employed.
PANI/CdS nanocomposites have higher DC conductivity than PANI, according to observations.
In situ production of conducting polyaniline nanocomposites with CdS nanoparticles was achieved by oxidizing aniline with cadmium sulphate at 3.5 pH. Electrical conductivity of polyaniline is influenced by CdS-nanoparticles. In contrast to pure polyaniline, the electrical conductivity of polyaniline nano-composite is increased by the homogenous intercalation of CdS nanoparticles, which results in a cooperative phenomenon between polyaniline and the nanoparticles.

Keywords: PANI/CdS nano-composite material, Sol-gel, XRD, ZNS, Polyaniline, Polymer, Nano particle, Characterization,

1. Introduction

Polyaniline (PANI) is a model structure for more advanced research and the basis for a new class of revolutionary materials and composites because of its easy synthetic method, high environmental and thermal stability, large conductivity range, and superior optical, electrochemical, and chemical properties. Polyaniline (PANI) also has a strong environmental and thermal stability.

We were successful in producing a PANI/CdS composite with uniform CdS dispersion. PANI/CdS quantum dots were produced using the in-situ polymerization of aniline within multi-walled CdS.

At the interface of water and toluene, polymerization produces a layer that is both transparent and self-supporting. Conductivity can be introduced into polyaniline composites using plasma pretreatment and in-situ polymerization.

Sensing properties possessed by spin-coated polyaniline–CdS nanocomposites

Conductive polymer photocatalytic degradation increases photo-generated electrons and light absorption. Chemically precipitating Polyaniline (PANI) with CdS, CdS-ZnS, and CdS-TiO2 nanocomposites showed acid blue-29 dye photodegradation. Conductive polymers “PANI” improve composite photocatalysts (CdS, CdS-ZnS, and CdS TiO2).

Charge transfer, molar ratio, surface form, particle size, diffraction pattern, thermal stability, optical, and photo-generated charge carrier recombination were evaluated in nanocomposites. Photocatalytic efficiency and nanocomposite production were observed. PC, CZP, and CTP nanocomposites' photocatalysis is shown using

electron-proton exchange diagrams and formulas. Membranes nanocomposites enhanced photocatalysis and degradation. Unfavorable electron kinetics trap CZP and CTP nanocomposites at Zinc and TiO2 nanoparticle surface defects.

Minimizing charge recombination improves photocatalytic activity over CP with the same nanoparticle loading. Photocatalysts can remove organic contaminants from water because their efficacy decreases with use. CdS's compatibility with Zinc and TiO2 and charge carrier separation may make CZP and CTP photocatalytic membranes more active than CdS-PANI.

Nanoparticles and PANI separate photo-excited charge carriers for improved absorption. High-performance photocatalysts convert solar power and clean the environment. This is the first study to use nanocomposites with polymers and enhanced breakdown rate to degrade AB-29 Dye.

Polymer nanocomposites for AB-29 dye degradation and water filtration are rarely researched. Nanoparticle CdS, ZnS, and TiO2 leach cadmium, making them unsuitable water filtration photocatalysts. For leaching prevention and economic viability, polyaniline matrix contains dangerous cadmium ions. Polyaniline ZnS, TiO2, and CdS photocatalytic activity, stability, and reusability were evaluated. Economically viable nano-composites with increased activity and stability.

All active nanocomposites are UV-IR. This maximizes nanocomposites' profitability and sunlight photocatalyst efficiency.

2. Objectives

- Polyaniline was utilized for the very first time in a search for cadmium sulphate in an aqueous solution. The search was conducted for the very first time.
- The present investigation is the pioneering effort to produce a polyaniline-CdS nano-composite through the application of a method known as in-situ oxidative polymerization.
- Conduct a study of the particle utilization properties of the semiconductors used in the manufacturing of composite films with polyaniline in order to determine the picture resolution. This can be done by combining the results of both of these analyses.
- The thermal and optical properties of a nano-composite consisting of PANI and CdS are the subject of our research

3. Problem statement

Polyaniline was used for the first time to detect cadmium sulphate in water. Indeed, this test was the initial one of its kind. In this research, in-situ oxidative polymerization is used to create a polyaniline-CdS nano-composite for the first time. Determine the picture quality of composite films made with polyaniline by looking at the semiconductors used in their manufacturing and studying their particle utilization properties. These two studies can be combined to get the desired outcome. The nanocomposite of PANI and CdS is analyzed for its thermal and optical properties.

4. Proposed System

XRD validates PANI/CdS crystal structure. SEM and XRD demonstrate composites' changed crystallinity. CdS crystallites develop and impregnate PANI's granular pillar-like structure. The composite absorbs bluer than CdS. PANI's C=C bond alters infrared wave numbers.

PANI switches between base and salt states quickly. PANI has good reduction and oxidation properties, electrical conductivity, a simple manufacturing method, and environmental stability. PANI was oxidatively polymerized from aniline monomers. Different approaches were utilized as PANI research progressed.

- Polymerization using electrochemistry.
- Polymerization by chemicals.
- Polymerization in the vapor phase (VPP).
- started by photochemistry.
- Polymerization facilitated by enzymes.

- Electron acceptor-based polymerization

5. Supplies and Methods

5.1 Synthesis of Polyaniline

The oxidative polymerization process resulted in polyaniline. Aniline at 0.2M (0.8 g), hydrochloric acid at 2 M, and distilled water were combined in a beaker. Ice water in the beaker (between zero and eight degrees Celsius). The glass base was submerged in a liquid.

In a mixture of 2 M HCl and distilled water, ammonium peroxydisulfate was dissolved. While continuously stirring, ammonium peroxydisulfate was slowly added to the aniline.

During the polymerization process, the liquid changes from a pale blue to a blue-green to a greenish black. Emerald salt polyaniline is represented by this colour. We stored it away for the night. HCl and distilled water were used to filter and rinse the water to remove any remaining impurities. For 4 hours, the residue and substrate were dried at 80 degrees Celsius.

There are many applications for the conductive polymer polyaniline. The ring structure and variants with nitrogen substitution are plausible manufacturing routes for this conductive polymer. Different dopants and non-redox, chemical, or electrochemical oxidation are used to provide two oxidation states for each derivative. In order to be useful in technology, these materials must be inexpensive, stable, and simple to synthesize and process.

5.2 Synthesis of cadmium sulphide

We were able to dissolve 6.396 mg of cadmium acetate and 3.648 g of thiourea in 80 ml of pure water. As the cadmium acetate solution was being stirred, thiourea solution was added drop by drop. After 3.5 hours, the solution turns yellow as nanoparticles precipitate out. There was no movement of the solution all night. CdS nanoparticles for bottom stabilization; filtration and rinsing with pure water to remove impurities; a 4-hour drying period at 70 degrees Celsius for the precipitate and substrate.

5.3 PANI-CdS nanocomposites.

PANI-CdS nanocomposites were produced using oxidative polymerization with concentrations of CdS nanoparticles ranging from 10% to 50%. Aniline, 0.97 g, dissolved in 2 M HCl, pure water, 94.3 ml. The mixture was agitated in an ice bath at a temperature of 0 to 8 degrees Celsius. In 94.3 ml of 2 M HCl in distilled water, 4.2 g of ammonium peroxy-disulfate was dissolved. The aniline solution was gradually infused with the ammonium peroxydisulfate solution. After adding 10%, 20%, 30%, 40%, and 50% CdS, the solution was stirred for 12 hours. The precipitate was filtered twice using HCl and distilled water. For 4 hours, we dried the precipitate and the substrate at 800 degrees Celsius.

The impact of iodine on polymer/inorganic nanocomposites is investigated here. Iodine nanoparticles on polyaniline nanofibers (I2@PANI) have been redox-coated. Adding CdS nanoparticles (as electron acceptors) to I2@PANI-CdS boosts photocurrent. Fast charge transfer and low rates of photoelectronic recombination made possible by I2's ability to permeate porous semiconductor sheets also contribute. It's possible that nano-CdS has more charge carriers. Photocurrent is improved in I2@PANI-CdS nanocomposites.

6. Review Of Thesis

Electrical properties of Cadmium Sulfide quantum dots and polyaniline-based nanocomposites Akhtar Rasool, Tasneem Zahra Rizvi, Sana Nayab, Zafar Iqbal, Journal of Alloys and Compounds, 2022

PANI and CdS-QDs nanocomposites were morphologically, structurally, optically, and electrically characterized. CdS-PANI nanocomposites precipitated CdS QDs and polyaniline. UV eV is spectroscopy assessed PANI, CdS-PANI nanocomposites, and CdS quantum dots. Quantum dots change PANI's band gap. PANI and its nanocomposites showed 1-D charge transport in DC conductivity measurements. Temperature and CdS content improve CdS-PANI DC conductivity. CdS-PANI nanocomposites' AC conductivity depends on temperature, frequency, and CdS concentration.

Synthesis, D.C. Electrical Conductivity and Activation Energy of Metal Sulphides Doped Polyaniline-Nanocomposite Bhaiswar JB, Meghe DP, Salunkhe MY and Dongre SP, Der Pharma Chemica, 2020

Using APS as an oxidant, this study aims to create CdS-based PANI nanocomposites. We also analyze chemical structure, morphology, and electrical properties (FT-IR, XRD, DC conductivity). TEM determines nanoparticle shape and composition. Fore Probe measures CdS composite conductivity. Activation energy is calculated with different CdS nanocomposite wt percentages and bulk Polyaniline.

Synthetic route of PANI (II): Enzymatic method Narendra Pal Singh Chauhan, Masoud Mozafari, Synthetic route of PANI (II): Enzymatic method, 2019

Bio-catalytic polymerization is an eco-friendly synthesis process. It uses recyclable, reusable enzymes and yields more than chemical methods. This process is selective, catalytic, efficient, low-energy, etc. under mild circumstances. This method uses organic solvents and enzymes.

Enzyme-catalyzed polymer has a well-defined structure, while others require undesired steps. Solubility and process ability improve with templates. Polyelectrolyte as a template improves para coupling and may provide doping counterions.

Recent advancement in synthesis and properties of Polyaniline Nirmala Kumari Jangid, International Journal of Innovative Research in Science, Engineering and Technology, 2019

This paper examines recent advances in polyaniline conducting polymer production and characteristics. Synthesis of polyaniline by conventional, ultrasonic, Fenton, and grafting techniques has been reviewed. By this high-accuracy development process, structure and properties are directly related.

Structure-modified polyaniline can be used in the future.

Structural Analysis and Enhanced Optoelectronic Properties of PIn/CdS Nanocomposite Ajeet Verma, Ram Bilash Choudhary and Gobind Mandal, 3rd International Conference on Condensed Matter and Applied Physics, 2019

We report PIn/CdS nano-composite's morphology, structure, and optoelectronics. XRD and FT-IR detected CdS in PIn. FESEM and TEM were used to investigate as-synthesized specimens. 2.15 eV optical band gap in PIn/CdS nanocomposite; PIn/CdS PL spectra show electron-hole mobility. Using J-V characteristics, PIn/CdS nanocomposite Ohmic conductance was studied. All these data exhibit optoelectronic PIn/applicability CdSs.

7. Research Methodology

Materials used: aniline, chloroform, Sulphuric acid, ammonium persulphate, cadmium nitrate, methanol, zinc chloride, and titanium tetra Isopropoxide. All chemicals were analytical and used as stated.

PANI/CdS-PANI/ZnS-PANI/TiO2-PANI Nano Composite Synthesis

PANI was made by oxidizing aniline in H2SO4 with APS. The solution transformed from pale to blue-green and dark green when ammonium persulphate was added, showing rapid aniline polymerization into polyaniline. Low temperatures were used to delay polymerization and generate nanoparticles. PANI and its nanocomposites were made using these steps:

Polyaniline Preparation

In 100 mL chloroform, 0.2 M aniline (2.462 M) was made. Another APS (0.05 M) solution (1 M) was made in 100 mL H2SO4 and combined with the original solution to polymerize overnight at 4–5 °C.

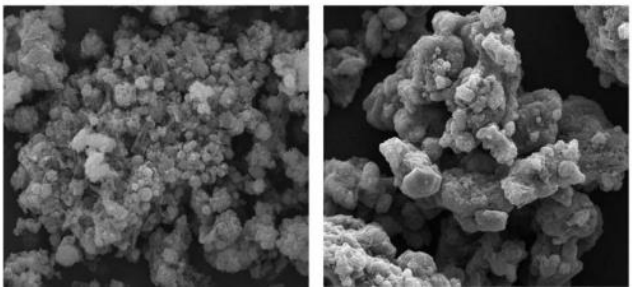

Fig 1: Pure PANI SEM picture

CdS-PANI Nanocomposite Preparation

PC was produced by in situ polymerizing PANI in CdS nanoparticles utilizing a single pot chemical precipitation technique. With vigorous stirring, a 100 mL Cd (NO3)2 (0.085 M) aqueous solution was combined with 50 mL methanol (24.44 M). A 100 mL aniline (0.2 M) solution in chloroform (2.462 M) was added and agitated for 60 min. The process took 1 min in H2S with vigorous stirring, then 2 h. A 0.05 M APS solution was made in 100 mL H2SO4 (1 M) in another jar. This solution was gradually added to the previous one and polymerized overnight at 4–5 °C. The result was dark green.

CdS-ZnS-PANI Nanocomposite Preparation

Dropping 50 mL methanol (24.44 M) into 100 mL aqueous ZnCl2 (0.15 M) while stirring. The hue changed to milky white after 1 min of stirring in H2S and 2 h of other stirring. A magnetic stirrer added 100 mL aqueous Cd (NO3)2 (0.085 M) dropwise to 50 mL methanol (24.44 M) in a separate beaker. The operation was repeated for 2 h after 1 min of stirring in H2S. The solution went from clear to bright yellow. The two solutions were vigorously stirred for 2 h. The solution was yellow. Next, 100 mL aniline (0.2 M) solution from chloroform (2.462 M) was stirred into this reaction mixture for 1 h. A 0.05 M APS solution was made in 100 mL H2SO4 (1 M) in another jar. This solution was gradually added to the previous one and polymerized overnight at 4–5 °C. The result was dark green.

CdS-TiO2-PANI Nanocomposite Preparation

In a typical synthesis, 100 mL aqueous Cd (NO3)2 (0.085 M) was added dropwise with continuous stirring, followed by 50 mL methanol (24.44 M) for 1 min in H2S with a magnetic stirrer, and then the same for 2 h. The solution turned yellow from clear. Next, 3.53 mL TTIP (Titanium Tetra Isopropoxide) (0.1 M) was dropwise added to this solution (20 drops per minute) and stirred for 2 h. The solution turned pale yellow. Next, 100 mL aniline (0.2 M) solution from chloroform (2.462 M) was added to this reaction mixture and agitated for 1 h. A 0.05 M APS solution was made in 100 mL H2SO4 (1 M) in another jar. This solution was gradually added to the previous one and polymerized overnight at 4–5 °C. The result was dark green. All precipitates were repeatedly cleaned with water and acetone before air-drying.

Characterization Methods

Element analysis was performed using energy-dispersive X-ray spectroscopy (EDS, JEOL, JSM6510LV, Tokyo, Japan) and Fourier Transform Infrared Spectroscopy (Spectrum 2, PerkinElmer, Waltham, MA, USA). JEOL JEM2100 and JSM6510LV scanning and transmission electron microscopy characterize surface morphology. Powder X-ray diffraction (Miniflex-TM II Benchtop, Rigaku Co-operation, Tokyo, Japan) examined structural characteristics. Thermal Gravimetric Analysis determined thermal characteristics. Shimadzu UV-1601 (Waltham, MA, USA) UV-Visible Spectroscopy determined optical characteristics.

Photocatalytic Experiment 3.5.7

In visible light photocatalytic studies, PANI and its nanocomposites (PC, CZP, and CTP) decolorized Acid Blue-29 (AB-29). Inner and outer jackets of a typical immersion well photoreactor were used. A 500 W, 9500 Lumen halogen liner light irradiated. For the photocatalytic experiment, 180 mL of dye solution (0.06 mM) and optimized catalyst dose (1 gL−1) were agitated in the shade for 20 min with ambient oxygen to achieve adsorption-desorption equilibrium between dye and catalyst surface.

Synthesis of PANi–CdS nanocomposite

The nanocomposites of CdS with undoped PANi (EB) were prepared by adding CdS in weight percentage (10–50%) into PANi (EB) matrix in m-cresol and stirring it for 11 h. Films of the nanocomposite were prepared on glass substrate by spin coating method at 3000 rpm for 30 s.

Nanocomposites based on conducting polymers and metal nanoparticles

There are four basic strategies for the preparation of the nanocomposites of conducting polymers and metal nanoparticles as mentioned in the review of the commonly used procedures for preparation of nanocomposite are:

Electrochemical method:

The deposition of metal nano particles into the pre-synthesized polymer film, or during the electro polymerization process.

Chemical method

The nanocomposite can also be performed from colloid dispersions of polymers and metal nanoparticles, or in one-step synthesis from mixed solution containing monomer and metal ions. Conducting polymer–metal composites are obtained by oxidizing the conjugated monomer by transition metal cations, which induces the simultaneous formation of both the polymer matrix and the metal nanoparticles. Figure summaries the most procedure used for preparation of these nanocomposite

Structural analysis of PANi, CdS and PANi–CdS nanocomposites

The XRD patterns of pure polyaniline in the emeraldine base form, cadmium sulphide (CdS) and PANi–CdS nanocomposites (10–50 wt%). The XRD pattern of PANi shows a broad peak at 2y¼25.301 which corresponds to (1 1 0) plane of PANi. This broad peak in the XRD pattern of PANi shows that it has some crystallinity. The crystallinity of PANi can be ascribed to the repetition of benzenoid and quinoid rings in PANi chains.

The XRD patterns of nano CdS, PANi–CdS (10–50 wt%) nanocomposites exhibit the characteristic peaks for crystalline CdS of hexagonal wurtzite structure. This indicates the crystal structure of CdS is not modified due to the presence of PANi. The diffraction peaks in XRD patterns of nano CdS powder and PANi–CdS (10–50 wt%) nanocomposites have been indexed to the hexagonally wurtzite structured CdS which are consistent with the standard values for CdS given in JCPDS file (80–006).

The increase in lattice parameters indicate a slight stretching of unit cell of CdS due to the adsorption of PANi molecular chains on the surface of the CdS. The presence of such interaction can also be studied by the crystal aspect ratio which is defined as the ratio of crystallite size in the (1 0 1) and (0 0 2) planes of X-ray diffraction pattern. The crystallite sizes of CdS, PANi–CdS (10–50 wt%) nanocomposites for three prominent peaks (1 0 0), (0 0 2) and (1 0 1) are calculated by Scherrer formula.

The crystallite sizes of CdS in (1 0 0), (0 0 2) and (1 0 1) planes decrease by 21.24, 29.46 and 13.86% in PANi–CdS (10–50 wt%) nanocomposites. This decrease in crystallite sizes of CdS in PANi–CdS (10–50 wt%) nanocomposites shows that the crystallinity of CdS is disturbed by the adsorption of PANi molecular chains on the surface of CdS. For PANi–CdS (10–50 wt%) nanocomposites, the crystal aspect ratio increases by 15.16 and 41.64% in comparison of the pure CdS. These results indicate the interaction between the CdS nano particles and PANi molecular chains due to the adsorption of PANi molecular chains on the surface of the CdS

Instrumentation

Powder X-ray diffraction pattern of the nanoparticles was obtained using a powder X-ray diffractometer (PANalytical Model, Nickel filtered Cu K α radiations with λ= 1.54056 Å at 35 kV, 10 mA). The sample was scanned over the required range for 2Θ values (10-70º). The FTIR spectrum of the sample was recorded using a Shimadzu 8400S spectrometer by the KBr pellet technique in the range 400- 4500 cm^{-1}. The SEM images of the synthesized samples were recorded using a Hitachi Scanning Electron Microscope. The size

and shape of nanoparticles was obtained by high resolution transmission electron microscopy (HRTEM) and HRTEM measurements were carried out on a JOEL JEM 2000.

Table 1: DC conductivity and activation energy for pure PANI and PANI/Cds

Sr. No.	Material	Conductivity'σ (S/cm)	Activation energy, Ea(eV)
1.	Pure PANI	$2.705X10^{-2}$	$3.97X10^{-4}$
2.	5% PANI/CdS	$8.22\ X10^{-2}$	$2.13X10^{-4}$
3.	10% PANI/CdS	$7.974\ X10^{-2}$	$1.2065X10^{-4}$
4.	15% PANI/CdS	$2.835\ X10^{-1}$	$1.226X10^{-4}$
5.	20% PANI/CdS	1.40224	$0.9191X10^{-4}$
6.	25% PANI/CdS	1.96766	$0.6786X10^{-4}$

Conductivity

Directing polymers will be polymers containing a broadened pi conjugated framework, made up of cover of independently possessed p - orbitals in the foundation of the polymer chain. In spite of the fact that directing polymers have a generally extensive number of delocalized pi electrons, a genuinely expansive vitality hole exists between the valence band and the conduction band (more noteworthy than 1 eV), in this manner these polymers are viewed as semi-leading. These polymers must be doped (generally significance modifying the quantity of pi electrons) with the end goal to render the polymers genuinely directing.

Doping the polymers makes new states (contributor or acceptor states), which exist inside the band hole and are vigorously available to the pi electrons, bringing about huge increment in conductivity. Truth be told, the conductivity of doped polymers might be up to ten requests of greatness more prominent than that of the unbiased (undoped) polymers. The idea of conductivity of conjugated polymers was immediately widened from polyacetylene to incorporate a conjugated hydrocarbon and fragrant heterocyclic polymers, for example, poly (p-phenylene) and polythiophene. The conductivity of different doped and undoped polymers, some regular semiconductors and metals are introduced in Table

Table 2: Conductivity of various doped and undoped polymers, some common semiconductors and metals

Material	Conductivity (S/Cm)
Gold, Silver, Copper	$\sim10^{6}$
Doped trans- polyacetylene	$\sim10^{5}$
Doped polyaniline	$\sim10^{1}$
Germanium	$\sim10^{-2}$
Silicon	$\sim10^{-6}$
Undoped trans- polyacetylene	$\sim10^{-6}$
Undoped polyaniline	$\sim10^{-10}$
Glass	$\sim10^{-10}$
Quartz	$\sim10^{-12}$
H_2SO_4 doped polyaniline	$\sim10^{-8}$
Dodecylbenzene sulfonic acid-doped Polyaniline	$\sim10^{-8}$

As the directing polymers might be doped to different degrees, there is a component of control in doping level, consequently the conductivity. This capacity to tailor the polymer's electrical properties embodies the flexibility of directing polymers.

8. Materials and Methods

All chemicals used in this investigation were of analytical reagent grade and used as received. Only aniline was distilled prior to use.

Synthesis of CdS/ZnS nanoparticles

M cadmium salt solution [Cd++] was made by dissolving Cadmium Nitrate in double distilled water and 0.1M Na2S solution [S--] was also made in double **0.1** distilled water. From these stock solutions, 100 ml of Cadmium Nitrate solution was mixed with specific amount of DMF and stirred for 10 minutes. Then 100 ml Na2S solution was added in the mixture dropwise with constant stirring for 1 hour. This results in a cloudy yellow solution. This solution was kept overnight. Later on, it was washed with distilled water several times to eliminate the unreacted molecules. The obtained nanoparticles were filtered and dried in vacuum oven at 60OC for 8 hours. Dry yellow powder of CdS nanoparticles was obtained. The same procedure was used to synthesize ZnS nanoparticles for which zinc acetate was used as a precursor. Powdered CdS and ZnS thus obtained was used to synthesize PANI /CdS and PANI-ZnS nanocomposites.

Synthesis of Polyaniline (PANI)

In 100 ml solution of 0.4 M aniline in 1M sulfuric acid, 100 ml of 0.5 M solution of ammonium persulphate was added dropwise with constant stirring at room temperature at normal condition. After completion of the oxidant addition, stirring was continued for further 2 hours to insure completion of the reaction. During polymerization, the sequence of coloration of the reaction mixture was light blue, blue green and finally greenish black precipitate. This color indicates that the product was in conducting emeraldine salt form. The reaction mixture was kept overnight. Then it was filtered, washed with distilled water until the filtrate become colorless and finally with methanol to remove the impurities and oligomers. The product was dried in vacuum oven at 80OC for overnight. A greenish black salt of polyaniline (PANI) was obtained.

Synthesis of PANI-CdS and PANI-ZnS nanocomposites

PANI-CdS/ZnS nanocomposites have been synthesized by the same procedure used for polyaniline. Powder of synthesized CdS/ZnS nanoparticles in different weight percentage (e.g.,5%) with aniline was added in the aqueous aniline solution followed by the dropwise addition of oxidant. By varying the percentage of CdS/ZnS i.e.,5%, 10%, 15% and 20%, a series of nanocomposites have been obtained. Same synthesis conditions were maintained for all composites as that of pure PANI to compare the results.

Characterizations

X-RD spectra of all samples were taken on Philips PW -1700, Automatic X-ray diffractometer using Cu-Kα radiation of wavelength 1.544 Å, continuous scan of 2o / min., with an accuracy of 0.01 at 35 KV and 20 mA. TEM micrographs of synthesized CdS and ZnS were taken on Transmission Electron Microscope PHILIPS model- CM200 with resolution 2.4Å. TGA thermograms of all samples were recorded on Perkin- Elmer Diamond TGA/DTA in argon atmosphere at a heating rate of 10oC/ min. TGA profile were taken over the temperature range of 30-1000oC.

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