Optoelectronic and Photoacoustic Studies of an Organic Dye Synthesized through Green Route

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Apart from the established applications of azobenzene molecules in optical data storage, optical limiting, waveguides, biomedical engineering, sensors and organic light emitting devices [1], recently they are being considered as an alternate material for dye-sensitized solar cells [2]. When it comes to choice of sensitizer synthesis, environmental and toxicological concerns, and economically feasibility should be taken into consideration. We synthesized azobenzene with cardanol as a starting material and studied its optical properties. Cardanol is a cost-effective and renewable natural source obtained from Cashew Nut Shell Liquid (CNSL), a by-product of the cashew industry. The dye is prepared through green synthesis method by diazotization of anthranilic acid and coupling with cardanol, and physically characterized by IR, UV-Vis, NMR and fluorescence studies. The dye showed a bathochromic shift when switching over from less polar to polar solvents. A polar solvent decreases the energy of $\pi \rightarrow \pi^*$ transition and absorption maxima appears red shift. Fluorescence behavior of the dyes in $CHCl_3$ at 293K, excited at 350-400nm, shows a high intense fluorescent emissions in the range ~600-700nm. In agreement with these results, the material will be suitable for using as fluorescent markers and light emitters in organic light emitting devices.

Optical properties were studied using frequency doubled Nd:YAG laser producing 532 nm laser pulses of 3 ns pulse width. Figure. 1 shows the normalized open aperture (OA), closed aperture (CA) transmittance, and PA curve of the sample. CA curve shows self-defocusing effect which tends to negative nonlinear refractive index. We evaluated the values of nonlinear absorption coefficient (β) with different input intensities from 1.1×10^{13} W/m^2 to 1.70×10^{13} W/m^2 and found that there is a decrease of β values from 5.8×10^{-10} m/W to 3.21×10^{-10} m/W. This result along with positive value of β suggests that reverse saturable absorption (RSA) be the principal mechanism for absorption, which finds applications in optoelectronics. Further, its photoacoustic response can be exploited as a contrast agent in photoacoustic imaging.

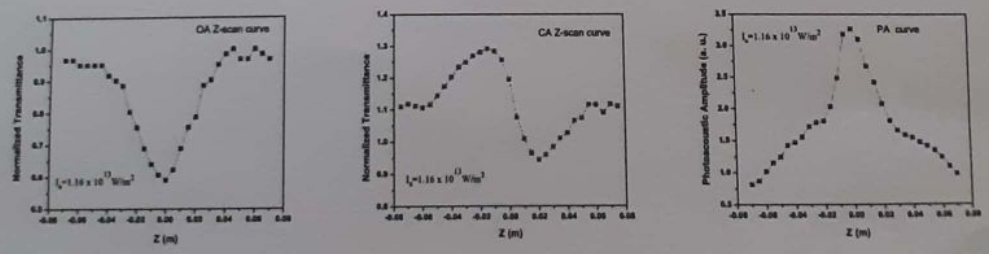

Fig. 1. PAZ-scan curves

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CH PP 10

Studies on the Adsorption of Methylene Blue by Natural clay

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India is well-known for its deposits of excellent quality minerals. Different types of natural clays are available in India. These clays have a very high surface area, which could be utilised for adsoprtion and water purification. Valorization of locally available clay materials could offer advantage of easy availability and its development as a potential adsorbent opens the new possibilities for our mineral resources. Kerala, a state in India, is rich in clay and clay minerals but its activity in terms of adsorption is less studied. Clay was collected from the coastal area of Alleppey district, Kerala. Black organic rich clay was obtained from ~10-25 m below the surface and purified. Clay was characterized by P-XRD to determine the phases present. Clay was a mixture of Kaolinite, Gibbsite, Feldspar, illite and quartz. TGA measurment showed a 30% weight loss and stable above 650°C. BET surface area was 108 m^2/g.

Methylene blue was chosen as a representative dye for adsorption studies. Clay showed excellent adsorption of methylene blue. Langmuir and Freundlich models were used to fit the experimental data. Both raw and calcined clay samples showed Langmuir fit with high value of correlation coefficient. The monolayer capacity and Langmuir adsorption constants were determined from the value of slope and intercept. The result shows that the clay used have an excellent property of adsorption. This can be developed to a commercially viable adsorbent for cationic pollutants.

CH PP 11

Synthesis, spectral and thermal studies of some dioxouranium(VI) complexes of Schiff base and an azo dye derived from 4-aminoantipyrine

Anju S Appukuttan* and Harikumaran Nair M L

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Synthesis of some novel dioxouranium(VI) complexes with a Schiff base derived from 4-aminoantipyrine and 3-ethoxysalicylaldehyde and an azo dye isoeuginolazoantipyrine are reported. The complexes have been characterized by elemental analyses, molar conductance, magnetic susceptibility data, IR, UV-Vis, ^1H NMR, FAB mass spectral studies, powder X-ray diffraction and thermogravimetric techniques. The physicochemical studies and spectral data indicate that ligand act as a neutral bidentate chelating ligand. The complexes have the general formulae $[UO_2(APES)_2(X)_2]$and $UO_2(IEAP)(X)_2]$.where X = NO_3, Ac, NCS, Cl or Br. Hexagonal bipyramidal geometry has

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precursor and controls the particle growth so that nanocrystalline Y-Fe2O3 is obtained.

25. Synthesis and photocatalytic studies of ZnO, ZnS and CdS nanoparticles

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Abstract

As the properties of nanoparticles are strongly dependant on its size, it is important to synthesize nanoparticles of nearly uniform size. This enables each of the particles to show similar properties. The approach for monodispersed nanoparticle synthesis is based on the reaction between metal salt and ammonium carbonate to form thermally unstable water soluble precursor. Surfactants used are long chain carboxylic or sulfonic acids which are solubilised in situ by the ammonia liberated from the precursor during reaction condition. Size and shape of the materials will be controlled by varying the nature of additives and also reaction time, temperature, concentration of the precursor. Using this procedure, monodispersed nanoparticles of ZnO, ZnS and CdS were synthesized successfully in aqueous medium. The material was characterized by P-XRD and was studied for photocatalytic degradation of methylene blue under sunlight. Both ZnS and CdS were active with a degradation >90%, ZnO was lesser active with 52% after 5.5 h. Lower activity of ZnO was due to the higher band gap which place it in the UV region. CdS had higher activity of these three because of its lower band gap and hence is an active photocatalyst in the visible region.

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Short Presentation

Synthesis, Characterization and Photocatalytic Studies of Spinel Zinc Ferrite Catalyst

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Department of Chemistry, N. S. S. College, Pandalam, Pathanamthitta - 689 501, Kerala, India

Abstract: Heterogeneous catalysis has been widely explored over the last few decades for various applications. Of these, heterogeneous catalyst having photocatalytic activity has a wider application in concern with environmental issues. This technology allows removing toxic organic compounds from the environment by photocatalytic degradation, ideally to CO_2 and water. Spinnel zinc ferrites have band gap in the region of visible light and can be developed as a photocatalyst under visible light. It was synthesized by co-precipitation method and characterized by XRD and FT-IR. Methylene blue is a potent cationic dye used as a reference sample for degradation studies with maximum absorption of light around 670 nm. The photocatalytic activity of zinc ferrite was studied using methylene blue in presence of visible light. White LED was used as a light source as it helps indoor application. It was found that zinc ferrite is an excellent photocatalyst under LED irradiation. About 46% of methylene blue was degraded within 30 minutes under LED irradiation.

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Mass transfer in porous catalysts – Effect on Hydroformylation reaction

N. Sudheesh*, P. K. Sreekumar

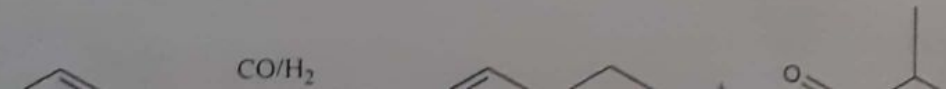
Department of Chemistry, N. S. S. College, Pandalam, Pathanamthitta, Kerala, India

Abstract

Hydroformylation is a reaction that is industrialized in homogenous conditions. Attempts for heterogenization by using porous supports are recent trend in this area. Mass transfer limitation affects the rates and selectivity of a reaction. Therefore it is necessary to ensure the reaction is in kinetic regime to upscale the process. It is important to study mass transfer effects in such systems. Rhodium complex encapsulated in hexagonal mesoporous silica was used as catalyst for hydroformylation of propene. In a heterogeneously catalyzed hydroformylation there are two diffusion factors that can affect the kinetics. The external mass transfer is for the liquid/solid interface and internal mass transfer for the diffusion into the pores. The mass transfer resistance should be negligible for the reaction to be not diffusion controlled. The use of Carberry number (Ca) and Wheeler-Weisz criterion ($\eta\phi^2$) are taken into consideration to study the extent of mass transfer limitation in the studied catalyst system. The Carberry number with a value less than 0.05 indicates the negligible external mass transfer resistance. When $\eta\phi^2$ is less than 1, the kinetics of reaction is not influenced by the pore diffusion; the reaction goes with negligible internal mass transfer resistance. The value obtained for Ca and $\eta\phi^2$ are 5×10^{-9} and 0.137 respectively. The values being low were indicative of the negligible mass transfer resistance on the kinetics.

Introduction

Synthesis of aldehydes by hydroformylation of olefin is one of the industrially important homogeneous catalyzed reactions [1]. The world production of hydroformylated products approaches 8.8 million metric tons per year [2]. Industrially, hydroformylation process is performed mainly in homogeneous conditions. However homogeneous system has limitations of the separation and recycling of the catalyst. To overcome such drawbacks investigations are focused on the heterogenization of homogeneous catalysis [3,4] and biphasic catalysis [5]. In a heterogeneously catalyzed hydroformylation there are two diffusion factors that can affect the kinetics. A diffusion controlled process may not be good for scale up of the process. Therefore such studies are necessary for a heterogeneous catalysis. In this study, heterogenized $HRh(CO)(PPh_3)_3$ (Rh-complex) in the mesopores of HMS has been investigated for the hydroformylation of propene (Scheme 1). The studies on mass transfer in the pores of the catalysts were conducted.



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PLANT-MEDIATED GREEN SYNTHESIS OF La_2O_3 NANOPARTICLES

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tract

In the recent years, nanotechnology has emerged as a state-of-the-art and cutting technology with multifarious applications in a wide array of fields. It is a very broad comprising of nanomaterials, nanotools, and nanodevices. Interest in developing mentally benign procedures for the synthesis of metallic nanoparticles has been ed. The purpose is to minimize the negative impacts of synthetic procedures, their panying chemicals and derivative compounds. The synthesis of metal oxide rticles with certain morphologies and sizes has become the matter of great interest ent experimental protocols. Bio synthesis production of metal oxide nanoparticles plants is more desirable than physical and chemical methods due to its eco-ness. The objectives of this study were to report the potential of green chemistry to size metal oxide nanoparticles. In the present study La_2O_3 nano particles have been sized by using aqueous plant extract. Synthesized nanoparticles were characterized UV-visible, IR, XRD and SEM methods. Novelty of this present study is that the extract is very cost effective and eco friendly and thus can be economic and effective ive for the large scale synthesis of La_2O_3 nanoparticles.

rds

hesis; lanthanum oxide nanoparticles; morphology, SEM, XRD.

TRODUCTION

Water used in industry creates wastewater that has a potential hazard for our ment because of introducing various contaminants such as heavy metals into soil r resources. Heavy metal ions are nowadays among the most important pollutants ce and ground water [1]. The safe and effective disposal of industrial wastewater is challenging task for industrialists and environmentalists. Nowadays, with the tial increase in population, measures for controlling heavy metal emissions into the ent are essential [2]. Lead causes many serious disorders like, anemia, kidney nervous disorders, and even death, it heads the toxic element list of 2008 [3]. New es based on the use of natural inexpensive adsorbents for treatment have been

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PP 19

Synthesis, characterization and antibacterial studies on transition metal complexes of thiosemicarbazone ligand

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Abstract

The Cu(II) and Cd(II) complexes of thiosemicarbazone ligand derived from di-2-pyridyl ketone and thiosemicarbazide have been synthesised and physico-chemically characterized by CHN analysis, molar conductance, magnetic susceptibility measurements, IR spectral data and UV spectral data. The complexes are represented as $[CuL.NCS].4H_2O$ *(1)*, $[CuLN_3].H_2O.CH_3OH$ *(2)*, $[CdLN_3]$ *(3)*, $[CdL_2]$ *(4)*. The molar conductance values indicate that all the complexes are non electrolytic in nature. Hence all the ionic groups are present inside the coordination sphere. In all the complexes the ligand deprotonates and chelates in thiolate form as evidenced by IR spectroscopy. The synthesized ligand and its complexes were tested for their antibacterial activity and found that the metal complexes have higher antibacterial activity than the free ligand.

Keywords: *thiosemicarbazide, di-2-pyridyl ketone, complex, antibacterial activity*

1. INTRODUCTION

Thiosemicarbazones and their metal complexes are nowadays widely explored due to their versatile biological activity and prospective use as drugs [1]. The potential anticancer, chemotherapeutic and superoxide dismutase-like activity of copper complexes with various thiosemicarbazones were first reported during 1950s. Thiosemicarbazones are emerging moiety with wide spectrum of biological activity and having sound scope in research and developing process in pharmaceutical and medicinal chemistry [2]. The biological activities of thiosemicarbazones are considered to be due to their ability to form chelates with metals. Biological activities of metal complexes differ from those of either ligands or the metal ions, and increased or decreased biological activities are reported for several transition metal complexes. One of the most promising areas in which thiosemicarbazone compounds are

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Synthesis and Spectral Studies of Dimeric and Binuclear Cu(II) Complexes of Di-2-pyridyl ketone N(4)-ethyl thiosemicarbazone.

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Abstract

The syntheses and characterization by various physicochemical methods of five copper(II) complexes of di-2-pyridyl ketone *N*(4)-ethylthiosemicarbazone (HDpyETsc) are reported. The complexes are represented as $[Cu(DpyETsc)N_3]_2 \cdot H_2O$ (**1**), $[Cu(DpyETsc)Cl]_2 \cdot H_2O$ (**2**), $[Cu_2(DpyETsc)_2SO_4]_2 \cdot 4H_2O$ (**3**), $[Cu_2(DpyETsc)_2](ClO_4)_2 \cdot H_2O$ (**4**), $[Cu(DpyETsc)(NCS)]_2$ (**5**). One of them is found to be a 1:2 electrolyte. EPR studies indicate dimeric nature of (**3**) and binuclear nature of (**1**), (**2**), (**3**), (**4**) and (**5**).

Keywords: Thiosemicarbazone; Cu(II) complex; Di-2-pyridyl ketone; EPR spectra.

1. Introduction

Thiosemicarbazide and thiosemicarbazone complexes of copper have attracted particular attention over the past decades in the context of their wide spectrum of biological activity and applications as radiopharmaceuticals. Thiosemicarbazones are versatile ligands that can coordinate as neutral ligands or in their deprotonated form [1,2]. The activity of thiosemicarbazones depends very much on the parent aldehyde or ketone and is affected also by *N*(4) substitution [3]. Thiosemicarbazones derived from di-2-pyridyl ketone are potentially tetradentate. However in majority of cases they function as tridentate ligands only.

Copper(II) is a biologically active, essential ion; its chelating ability and positive redox potential allow participation in biological transport reactions. Also, copper(II) forms the active centers of more than a dozen metalloproteins. Further, copper(II) complexes possess a wide range of biological activity and are among the most potent antiviral, antitumor and anti-inflammatory agents [4]. Pseudohalide anions like azides and thiocyanate are found to be versatile ligands in terminal and bridging modes. They are found to inhibit various enzymes like ATPases, human carboxy peptidases etc. Here we report the synthesis of five copper complexes with the ligand, di-2-pyridyl ketone *N*(4) -ethyl thiosemicarbazone (HDpyETsc) and their characterization by physicochemical methods.

2. Experimental

2.1. Materials

Di-2-pyridyl ketone, *N*(4)-ethyl thiosemicarbazide, copper(II) acetate monohydrate, copper(II) chloride dihydrate, copper(II) sulphate pentahydrate, copper(II) perchlorate hexahydrate, sodium azide

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Cyanobacteria in Temple Ponds of Kottarakkara Taluk

Shyama Nair , S. Renjusha
Department of Chemistry, N.S.S. College, Pandalam, Kerala

Abstract

Cyanobacterias also called blue green algae are the primary producers and have high nutritive value. Water quality parameters were analysed as per recommended procedures and the cyanobacteria were enumerated by matching and elimination method. Analysis of water samples showed the presence of cyanobacteria , which is an indication of nutrient enriched water. Most of the water parameters were within the permissible limits.

Key words – *Cyanobacteria, Cyanotoxins, water quality parameters etc.*

Introduction

Cyanobacteria are photosynthetic prokaryotes , called blue green algae, are said to be the first oxygen releasing organism of our planet. They are important primary producers and have high nutritive value. More than forty species of cyanobacteria are known for their potential toxicity. Cyanotoxins are categorized on the basis of their chemical structure and pathological impact. WHO considers that fresh water contamination by cyanobacteria , the toxin synthesized by them, causes major threat that can limit utilization of water resources. Cyanobacteria are not visible on the water surface. Their visibility increases when present in large numbers in an area. Cyanobacteria produce blooms and HABs(harmful algal blooms) which look like foam, scum or mats or like paint floating on the surface of water. The blooms are not always green, they can be blue and some are brownish –red. Hydrological disturbances like presence of pesticides

[illegible] are chemicals of biological origin and their

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Eco Friendly Sorbent For The Removal Of Iron And Lead

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Abstract

The use of these locally available agricultural for removal of lead and iron from aqueous solutions at different experimental conditions is an alternative waste management or environmental conservation. The adsorption capacity of epicarp of Atrocarpus heterophyllus for the removal of heavy metals, lead and iron were determined by batch adsorption studies. Adsorption of heavy metals were studied till equilibrium was reached. Studies were carried by using different doses of adorbent, varying the conditions of adsorption and contact time. The results obtained shows that, the adsorption of the metal ions is contact time and adsorbent dosage dependent. The optimum contact time and adsorbent dosage are found to be at 72 hrs and 3 g respectively. Adsorption studies obeys both Langmuir isotherm model and Freundlich models. Adsorption can be at unimolecular or at bimolecular levels. The goal for this work is to develop inexpensive, highly available, effective adsorbents from epicarp of jackfruit as alternative to existing commercial adsorbents.

Keywords

Heavy metal; Low cost adsorbent; Wastewater: Adsorption isotherm

1. Introduction

Water used in industry creates wastewater that has a potential hazard for our environment because of introducing various contaminants such as heavy metals into soil and water resources. Heavy metal ions are nowadays among the most important pollutants in surface and ground water [1]. The safe and effective disposal of industrial wastewater is thus a challenging task for industrialists and environmentalists. Nowadays, with the exponential increase in population, measures for controlling heavy metal emissions into the environment are essential [2]. Lead causes many serious disorders like, anemia, kidney disease, nervous disorders, and even death, it heads the toxic element list of 2008 [3]. New approaches based on the use of natural inexpensive adsorbents for treatment have been reported [4]. In general, an adsorbent can be termed as a low cost adsorbent if it requires little processing, is abundant in nature, or is a by-product or waste material from another industry [5].

To avoid health hazards it is essential to remove toxic heavy metals from waste water before its disposal. Adsorption process is widely used in the removal of heavy metals. Understanding the sorption of metal ions from aqueous solution is important in water pollution control. Therefore there is an urgent need that all possible sources of agro-based inexpensive adsorbents should be explored and their feasibility for the removal of heavy metals should be studied in detail [6]. The objective of this study is to contribute in the search for less expensive adsorbents and their utilization possibilities

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Poster Presentation - 1

Comparison of photocatalytic and antibacterial activities of zinc oxide and copper oxide nanoparticles synthesised by sol-gel method

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In the present work zinc oxide nanoparticles (ZnO) and copper oxide nanoparticles were successfully synthesized by sol-gel method where zinc acetate and cupric acetate were used as the precursor materials. Sodium hydroxide takes care for the homogeneity and pH value of the solution and helps to make a stoichiometric solution to get zinc oxide nanoparticles and copper oxide nanoparticles. The ZnO powder and CuO powder obtained from this method were calcined at 400°C temperatures. The samples were characterized by X-ray diffraction (XRD) and Scanning Electron Microscopy (SEM). The XRD spectra indicate that the ZnO nanoparticle has a hexagonal wurtzite structure and CuO nanoparticles has a monoclinic structure. The photocatalytic activities of the metal oxide nanoparticles on the degradation of methylene blue were studied. The results show that ZnO nanoparticles were far more superior to CuO in degrading methylene blue. The antibacterial activities of the nanoparticles against both Gram positive and Gram negative bacterial strains shows that both ZnO and CuO can be used as effective antibacterials.

Key words: Nanoparticles; ZnO; CuO; catalytic; antibacterial

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Antibacterial Studies of Metal Complexes of Bio based Azo Dyes from Substituted Anilines

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The coordination compounds including azo ligands are of significant importance and play a pivotal role in industry, technology and life processes[1]. The azo compound possesses suitable bonding characteristics due to presence of –N=N- group and can form varieties of metal complexes with transition metal ion with unusual structural and magnetic properties[2,3].

The present work deals with the synthesis, characterization and study of antibacterial activities of new azo complexes of Co (II) and Ni (II) with diazotized m-nitro aniline cardanol dye as Ligand (I) and diazotized anthranilic acid cardanol dye as ligand (II). The complexes were characterized by various physio-chemical methods. He proposed structures are as given in Figures 1 and 2.The synthesized ligands and its complexes were tested for antibacterial activity by using paper disc diffusion techniques by measuring the zone of inhibition. Both gram positive and Gram negative bacterial strains were used for the studies. ligand (L_1) shows greater activity than the complex CoL_1 and complex NiL_1 against the bacterial strain *Klebsiella pneumonia subsp*. But for *bacillus cereus*, ligand (L_1) shows more activity than complex CoL_1 and less activity than complex NiL_1. Ligand (L_2) shows lesser activity than complex CoL_2 and complex NiL_2 against both the bacterial strains.

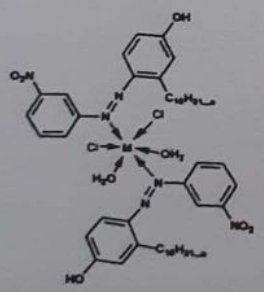

Fig. 1 L_1 -metal complex

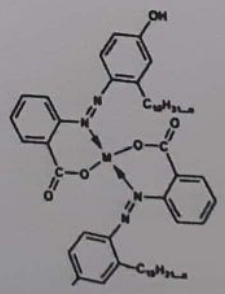

Fig 2: L_2 metal complex

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Evaluation of Protein-Pollutant binding using Experimental and Theoretical methods

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ABSTRACT

Environmental pollutants are of great concern to the society as they are responsible for causing various health issues. Once they enter the human body, its fate is determined by the carrier proteins. These small molecules interact with proteins causing conformational changes in the protein and subsequently change its physiological activities.

Proteins are bio-molecules which are essential for regulating many bodily activities. The function of a protein depends on its structure and conformation. Among proteins, serum albumins are the most abundant and soluble constituent of blood, which play a major role in the transportation of molecules. The properties and structural aspects of albumins have been well studied and they are known to bind to many endogenous and exogenous materials. Serum albumins can effectively solubilize ligands in plasma and can regulate their delivery to the cells. The transportation and toxicological actions of the pollutants are closely related to their proteins binding efficiency, which can change protein structure and function. So it is very important to investigate the interaction between the ligands and protein.

In the present talk, applications of spectroscopic and theoretical techniques for understanding protein-ligand interaction will be discussed. Study of the interaction of ligands with model transport proteins: bovine serum albumin (BSA), and human serum albumin (HSA) are illustrated. Binding parameters and mechanism of interactions are explored using multi-spectroscopic techniques. The effect of ligand binding on protein secondary structure, probable ligand binding site etc. are examined with the aid of theoretical predictions and spectroscopy.

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ABSTRACTS & PAPERS

PROBING PROTEIN-SMALL MOLECULE INTERACTION

S. Sreedhanya*[a,b], Reshma Rajan[a], U. K. Aravind[c], and C. T. Aravindakumar[d]
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Introduction

Proteins are bio macromolecules which regulate many bodily activities. The function of a protein depends on its structure and conformation. Many ligands are found to have profound influence on protein structure and functions [1, 2]. Thus, the protein-small molecule interaction studies have become an important research field in life science, chemistry, and clinical medicine. Among proteins, serum albumins play an important role in the transport and deposition of a variety of molecules [3]. Bovine serum albumin (BSA) is widely used in biophysical studies due to its structural similarity to Human Serum Albumin (HSA). BSA is known to bind with many different categories of small molecules including dyes, drugs and toxic chemicals [4, 5].

Proteins display intrinsic fluorescence due to the presence of tryptophan, tyrosine, and phenylalanine residues in the polypeptide chain [6]. Therefore, fluorescence techniques are commonly applied to study the protein-ligand binding and the conformational changes associated with the binding process [7].

Para-nitroaniline (PNA) is a chromogenic molecule used in enzyme catalysis for the colorimetric determination of the enzyme activity and is used in the design of biopolymer drug delivery systems. PNA is also a solvatochromic dye that has been identified as a reactive chemical which can cause mutations and can act as a photo initiator [8]. Although, a large number of studies on protein small molecule interactions are available, detailed investigations on the effects of potentially toxic molecules on functional proteins are quite essential.

Therefore in the present study, the binding interaction of PNA with BSA is monitored by the fluorescence quenching of BSA. Fluorescence energy transfer (FRET) calculations are also done to find the distance between donor (BSA) and acceptor pair.

Materials and Methods

BSA (1×10^{-5} M) and PNA were prepared in an aqueous solution of Tris HCl buffer (pH 7.4) was used for steady state measurements. The ground state studies were carried out using a UV-1700 (Shimadzu) spectrophotometer at a wavelength range of 240-500 nm at 298 K. The steady state fluorescence spectra (for binding studies) were recorded on a LS55 (Perkin

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Multi Spectroscopic Evaluation of Protein Binding Modes

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Abstract: Proteins are the biological molecules that monitor several bodily activities. They are the immediate targets of exogeneous molecules in the body. The exogenous ligands can alter the functions of protein. The loss of protein structure and function can lead to several disease conditions like Alzheimer's, Parkinson's etc.and thus the protein binding studies are of great significance.

The present study focuses the use of various spectroscopic techniques to decipher protein-ligand binding. Serum albumins (BSA and HSA) were selected as model proteins and different classes of photo active molecules were chosen as ligands. Fluorescence spectroscopy is a promising and sensitive technique to monitor the protein-ligand binding and the conformational changes associated with the binding process. Thenature of binding and number of binding sites for the system were obtained from the quenching of protein fluorescence in the presence of ligands. The fluorescence resonance energy transfer phenomenon (FRET)gave the distance between the interacting species and also helped to understand theeffectiveness of the binding interactions. UV-Vis spectroscopy provided an idea about the ground state structural changesthat has taken place in protein as a result of interaction with different ligands. Time-resolved fluorescence spectroscopy (TCSPC) and combined synchronous fluorescence, circular dichroism (CD) and FTIR techniques were used to look into the excited state phenomena and the perturbation in the secondary structure of proteins. A detailed idea about ligand-protein binding was obtained with the help of multi spectroscopic techniques.

***Keywords**: Fluorescence, binding, TCSPC, circular dichroism*

Novel bio based resin for the removal of lead from industrial effluents

P-40

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The presence of lead in drinking water due to increased use of lead in industry has become a major problem in urban areas. So it is important to have effective measures to control the discharge of lead like heavy metal into water bodies. A new bio-based lead selective ion exchange resin was prepared by the poly condensation of cardanol, obtained from cashew nut shell liquid (CNSL) with mandelic acid and formaldehyde in acid medium. The characterization of the resin was done using instrumental methods such as FTIR, XRD, TG, DTA and SEM. The physico-chemical properties such as percentage moisture content, stability in various solvents, base exchange capacity etc. were determined. The chelating ion exchange property of the resin was determined for various metal ions such as Cu^{2}, Pb^{2+}, Mg^{2+}, Zn^{2+}, Ca^{2+}, Cd^{2+}, Ni^{2+}, Hg^{2+}, Al^{3+} and Th^{4+} using batch equilibration method involving the distribution of the metal ion between the resin and a solution containing the metal ion. The effect of pH and metal ion concentration on the ion exchange capacity were also determined. Ion exchange studies were carried out from the distribution coefficient determined at various pH. It was found that the exchanger shows greater affinity for lead ions at pH 6 and cadmium ions at pH 5. The sorption and desorption studies have been carried out using a column of the resin without any loss in column performance which indicates the reusability of the resin. The exchanger was effectively used for the removal of lead from a synthetic lead solution. The recovery ranged from 95-100%, with a variation of ±1% for repetitive measurements. Lead, being a highly toxic environmental pollutant, the exchanger may find application in lead recovery processes and environment-friendly pollution control methods.

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P-41

LbL enhanced natural fiber surface for the removal of biological contaminants

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Bacterial contamination is the major cause of water-borne diseases. It is also of foremost concern in Kerala as the state is facing issues of improper sanitation practices at many places. As per the study of CWRDM, more than 80 percent of the people in Kuttanad, which is known for its paddy and fish cultivations, depend on the contaminated canal water for their daily water requirements. In recent years, contamination of water causes many water-borne diseases resulting in the loss of several lives in Kuttanad. The coliform bacteria have vital role for this disaster. In order to solve these problems, we need an efficient treatment method for potable water which can be done at household level. In the initial field work, we found that most of the regions in our study area in Kuttanad have traditional coir industry which is mainly run by women's groups. In the present study, the surface of the natural fibre, coir was coated with polyelectrolytes such as chitosan (known for its antibacterial property) and polyacrylic acid utilising the technique, layer-by-layer assembly. The coated fiber was characterised and was further used for the adhesion assays. The efficiency of packed fiber columns (PCF) for the

25	Smt. Sreedhanya S		Novel bio-based resin for the removal of lead from industrial effluents. Proceedings of the third International conference on Water: From Poluution to Purification	Proceedings of the third International conference on Water: From Poluution to Purification 2018	ICW 2018	Internation al	2018
26	Dr. Sreelatha S		Antibacterial studies of Metal complexes of Bio based azo dyes from substituted anilines. (poster)	Proceedings of "International conference on Tropical plants and Drug design	TKM chemistry conference-2017	Internation al	2017
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