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1D MoO_3 Nanorods Decorated by Palladium Nanoparticles: Surface Plasmon Resonance Promoted Photodegradation of Congo Red Dye

L.T. PARVATHI[1,2] and S. KARUTHAPANDIAN[1,*]

[1]Department of Chemistry, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar-626001, India
[2]Department of Chemistry, Sri Kaliswari College (Autonomous), Sivakasi-626123, India

*Corresponding author: E-mail: drpandianskvhnsnc2007@gmail.com

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In this work, 1D, MoO_3 palm leaf shaped nanorods decorated by palladium nanoparticle for the photodegradation of organic pollutant. The Pd loaded MoO_3 ratio were optimized and 2% Pd loaded MoO_3 shows excellent photodegradation towards the organic pollutants. The synthesized Pd decorated MoO_3 nanorods were characterized by various analytical tools such as TEM, SEM, BET, EDX, XRD, UV-DRS *etc*., The TEM and SEM results revealed that the palm leaf shaped MoO_3 nanorods was well decorated by Pd metals. The crystallite size of MoO_3 was decreased when increases the palladium loading percentage. The surface area of MoO_3 lowered when palladium loaded. The prepared nanocomposites were in high purity confirmed by EDX analysis. The energy gap tailored into visible region by loaded palladium. The catalytic efficiency of the prepared nanocomposites were tested against the photo degradation of organic pollutant within 60 min and rate constant also calculated. The catalyst was not much lower their activity even five reusability. The OH^- and h^+ (holes) were the active species involved in the photodegradation mechanism.

Keywords: Pd@MoO_3, Surface plasmon, Photocatalyst, Photodegradation, Visible light.

INTRODUCTION

Wastewater effluents discharged from textile industries is a severe threat not only on human life but also on the environment and hence demand suitable remediation technology [1-3]. Especially organic dyes are the compounds that are more stable and most easily recognizable in water system and hence create life threatening situation [4,5]. In this regards, various techniques such as adsorption, membrane filtration, chemical oxidation, biological digestion, electrochemical and advanced oxidation process (AOPs) broadly recognized for the abatement of organic pollutant from water [6-8]. Among these methods, AOPs based semiconductor photocatalytic degradation process has proved to be an efficient and eco-friendly technique compared to the other techniques.

Molybdenum trioxide (MoO_3) is a most noticeable star nanomaterial for environmental treatment due to their structural stability and unique electronic surface properties [9]. MoO_3 is a wide band gap n-type transition metal oxide semiconductor whose conductivity is due to vacant oxygen orbitals [10-12]. In addition, MoO_3 is a polymorph material with at least four crystalline phases such as thermodynamically stable orthorhombic (α-MoO_3), hexagonal (h-MoO_3), metastable monoclinic (β-MoO_3) and high pressure monoclinic (MoO_3-II) [13,14]. Compared to other phases, α-MoO_3 is one of the unique materials because of its excellent electrochemical performance and photocatalytic activities as well as the promising stability [15-17]. However, low quantum yield and higher recombination rate of photogenerated charge carriers (electron-hole pairs), which hampered the wastewater remediation application of MoO_3 in photocatalyst. To solve this problem, several strategies are including heterostructure formation with other semiconductor, metal or non-metal doping and surface modification have been conducted to design or develop new MoO_3 photocatalytic material.

Lately, doping of noble metals (Ag, Au, Pd and Pt) with semiconductor has been receiving considerable attention because it is easy, convenient and effective method for the delay/prevent the recombination and enhancing the stability of MoO_3 [18]. Among them, palladium is one of the promising metals, which

A green solid acid catalyst 12-tungstophosphoric acid $H_3[PW_{12}O_{40}]$ supported on g-C_3N_4 for synthesis of quinoxalines

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Murugan Kumaresan, Vadivel Saravanan, Ponnusamy Sami & Meenakshisundaram Swaminathan

Abstract

A green Keggin-type heteropoly-12-tungstophosphoric acid, ($H_3[PW_{12}O_{40}].12H_2O$) supported on graphitic carbon nitride g-C_3N_4 (HPW/g-C_3N_4-40), was developed for one-pot synthesis of quinoxaline derivatives from 1,2-diketone and 1,2-diamines. Use of green solvent, heterogeneous reaction condition, simple workup procedure, short reaction time and reusability of the catalyst are the advantages of this protocol.

A Mathematical Analysis Of Radiation And Thermal Diffusion Effect On A Steady MHD Free Convection Heat And Mass Transfer Flow Past An Inclined Stretching Sheet

[1]T. Nithya, [2]V. Ananthaswamy[*] & [3]V. K. Santhi

[1]Department of Mathematics, V. H. N. Senthikumara Nadar College, Virudhunagar, India.

[2]Research Centre and PG Department of Mathematics, The Madura College, Madurai, India.

[3]Department of Mathematics, Sri Meenakshi Govt. Arts College for women, Madurai, India.

[*]Corresponding author e-mail: ananthu9777@gmail.com

Abstract

This paper investigates the radiation and thermal diffusion effect on a steady MHD free convection heat and mass transfer flow past an inclined stretching sheet with Hall current and heat generation. The non-linear differential equations governing the model are solved analytically using Modified Homotopy analysis method. The primary velocity, the secondary velocity, temperature profile and concentration profile are derived and their effects on varying the parameters like Magnetic parameter, Hall parameter, Heat generation, Radiation parameter, Dufour number, Local thermal Grashof number, Local solutal Grashof number, Prandtl number, Soret number, Schmidt number and angle of inclination are observed graphically. The obtained expressions are utilized to get the skin friction coefficient, the local Nusselt number and the local Sherwood number and are compared with the numerical results.

Keywords

Hall current, Heat generation, Non-Linear differential equations, Energy, Primary and secondary velocity, Modified Homotopy analysis method.

1. Introduction

The study of MHD flow plays an important role in various industrial applications. Some important applications are cooling of nuclear reactors, liquid metals fluid, power generation system and aero dynamics. The problems of heat and mass transfer past an inclined stretching sheet with Hall current and heat generation have attracted considerable attention during the last few decades. It is important in connection with many engineering problems, such as wire

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A novel In_2S_3/Gd_2O_3 p-n type visible light-driven heterojunction photocatalyst for dual role of Cr(VI) reduction and oxytetracycline degradation

M. Murugalakshmi [a c], G. Mamba [b], V. Muthuraj [a]

[a] Department of Chemistry, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar 626 001, Tamil Nadu, India
[b] Nanotechnology and Water Sustainability Research Unit, College of Science, Engineering and Technology, University of South Africa, Florida, 1709 Johannesburg, South Africa
[c] Department of Chemistry, Sri Kaliswari College (Autonomous), Sivakasi 626 123, Tamil Nadu, India

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A Review on Green Synthesis of Metal and Metal Oxide Nanoparticles

D. Gnanasangeetha*† and M. Suresh**
*Department of Chemistry, PSNA College of Engineering and Technology, Dindigul, Tamil Nadu, India
**Department of Botany, Virudhunagar Hindu Nadars' Senthikumara Nadar College, Virudhunagar, Tamil Nadu, India
†Corresponding author: D. Gnanasangeetha; sangithprakash@psnacet.edu.in

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Key Words:
Metal oxide nanoparticles
Green synthesis
Eco-friendliness

ABSTRACT

Metal oxide nanoparticles have captivated scrupulous research interest because of its major relevance in the field of medicine, catalysis, pigment, electronics, biotechnology, sensors, optical devices, adsorption, DNA labelling, drug delivery, kinetics, spintronics and piezoelectricity. Nanoparticles (NPs) became more significant for its reasonable property as a heterogeneous non-toxic catalyst with environmental reimbursement. The biogenic innovation of metal oxide NPs is an enhanced alternative owing to eco-friendliness. In the biological field, the probable efficacy of NPs has been reported by scores of scholars in the treatment of cancer. Owed to munificent returns, NPs explored as a powerful catalyst for several organic transformations. This section unlocks with a short course on to synthesize metal oxide NPs on a natural scale.

INTRODUCTION

Nanotechnology is the greatest dynamic area of exploration in modern material science and has established as the great innovation of things at the nanoscale of 1 to 100 nm. Nano is a Greek word symbolizing "dwarf" in the one-billionth scale (10^{-9}). To synthesis nanomaterial of various shapes and dimensions, two different methods of approaches have been widely used namely bottom-up and top-down approaches (Fig. 1).

Building up of nanomaterials from an atom by atom is a bottom-up approach while trimming down bulk material to smaller nano size is a top-down approach. Some methods of bottom-up approaches are spray pyrolysis, laser pyrolysis chemical vapour deposition, atomic/molecular condensation and sol-gel processes. Mechanical milling, hydrothermal synthesis, photolithographic processing, electron beam lithography, laser ablation, micromachining, electron beam machining, etching and sputtering are the methods of top-down approaches in exploitation. The physical and chemical methods of synthesis utilize high reactive agents, high temperature, pressure, hazardous chemical vapours and defile environment. In general, different reducing agents such as sodium citrate, ascorbate, sodium borohydride, elemental hydrogen, polyol, Tollen's reagent, N, N-dimethylformamide (DMF) and poly (ethylene glycol)-block copolymers are used in NPs synthesis. The main factor about NPs is its surface to volume ratio, which makes NPs very primitive in the field of technology with specific applications in respective fields like catalysis, adsorption, drug delivery, biotechnology and DNA modelling. NPs are virtualized in its application by its dimension, shape, morphology and size (Vijayaraghavan et al. 2012, Khin et al. 2012, Dimkpa et al. 2012 and Ain et al. 2013) It can be one dimensional (1D), 2D or 3D. NPs used in electronic gadgets and sensing devices are thin-film 1D. 2D carbon nanotubes (CNTs) have more application in the field of catalysis because of its stableness and a high degree of adsorption. Quantum dots and clusters are grouped as 3D NPs. Metal NPs like Ag, Au, Pd, Pt, Zn, Fe are mainly formed from its salt solutions like $AgNO_3$, $AuCl_4$, $PdCl_4$, $PtCl_4$, $ZnSO_4$ by physical and chemical methods. Based on its chemical nature NPs are grouped as metals, metal oxides, silicates, non-oxide ceramics, polymers, organics, carbon and biomolecules. Correct exploitation of ecologically benevolent solvents and nontoxic chemicals are some of the core subjects in the green synthesis approach contemplations. This review implies the importance of green synthesis of metal NPs in a benign greener way following the 12 principles of green chemistry without defiling the environment (Fig. 2).

MATERIALS AND METHODS

Characterization of Metal and Metal Oxide NPs

Techniques used for structural characterization (size, shape, lattice constants and crystallinity) of NPs are X-ray diffraction technique, electron microscopy, scanning electron microscopy (SEM), transmission electron microscopy (TEM), high resolution transmission electron microscopy

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A Study of Use of E-Journals Among Research Scholars at Vhnsn College Library, Virudhunagar

V. Senthur Velmurugan[1]* and G. Amudha[2]

[1]Librarian, Library and Information Science, AAA College of Engineering and Technology, City: Sivakasi–626105, Tamil Nadu
[2]Librarian, Library and Information Science, VHNSN College, Virudhunagar–626 001, Tamil Nadu, India
*Corresponding author email id: srisenthur85@gmail.com

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ABSTRACT

The reason for this paper is to decide the degree to which look into researchers at VHNSN COLLEGE LIBRARY, VIRUDHUNAGAR know and make utilization of e-diaries. A review was intended to gather fundamental data about the level of utilization of e-diaries and in addition different elements adding to a related with their utilization. A very much organized poll was controlled among look into researchers to gather the important essential information, keeping in see the destinations of the investigation. More than 62 for every penny of clients in the VHNSN College Library are utilizing e-diaries day by day. More than 92 for every penny of research researchers know about the e-diaries consortia accessible in their library. The PDF design is observed to be the most favored online configuration for re3ading articles. Moderate downloading of PDF documents is the real issue that would debilitate clients from utilizing e-diaries. The lion's share of clients (39.81 for each penny) utilizes prevalent web search tools while seeking data through e-diaries, trailed by the library's e-diaries website pages (31.48 for each penny). The most well-known scan strategy for looking e-diaries is catchphrase (36.11 for each penny) trailed by the creator (25.92 for every penny), and the last utilized is the date of distribution (4.62 for every penny). The present paper comprises just e-diary clients and the topographical region is confined to the VHNSN COLLEGE LIBRARY, Virudhunagar. The extent of the paper could be stretched out to extra midway subsidized school. There are number of the examinations on the utilization of e-diaries, however, this is first of its kind inside VHNSN COLLEGE LIBRARY, Virudhunagar. In that capacity, it should prepare for the look into different schools and in addition somewhere else.

Keywords: College library, Electronic journals, Usage, Virudhunagar

INTRODUCTION

Electronic diaries, otherwise called diaries, e-diaries, and electronic serials, are insightful diaries or scholarly magazines that can be gotten to by means of electronic transmission. By and by, this implies they are typically distributed on the Web. It is accordingly likely that in this cutting-edge period of innovation one can assume nearly everyone approaches e-diaries because of the straightforward actuality that the Internet in its most genuine nature is essential, free. The presentation of electronic diaries has empowered library analysts to completely utilize ponders on a significantly more point by point level and with considerably less exertion that has been conceivable in the print condition. As of late, electronic diaries (e-diaries) have come to be viewed

A STUDY ON CONSUMER CREDIT BASE TOWARDS PURCHASING HOME WITH SPECIAL REFERENCE TO MADURAI CITY

S.KASTHURIPRIYA[1] and Dr.M.JAISUN[2]
[1]Ph.D Full Time Research Scholar
[2]Assistant Professor, Department of Business Administration,
V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar.

Abstract
The aim of this research paper is to study the consumer credit base on estimating level of purchasing home. However, unlike traditional home-equity loans, these lines of credit are revolving meaning that the consumer may borrow a lump sum, repay a portion of the loan, and then borrow again. It's kind of like a credit card that has a credit limit based on your home's equity. The research categorizes some factors that affect consumer credit. These factors encompass those of the loan elements (Education loan, Personal loan, Vehicle loan and Home loan) and the researcher focus on consumer credit base towards purchase housing.
Keywords: Consumer credit and purchasing home.

I. INTRODUCTION

The social- economic role of commercial banks in the present times, the RBI advised the banks to encourage the flow of credit for housing finance. Consumer loan is when a person borrows money from a lender, either unsecured or secured. There are several types of consumer loans and some of the most popular ones include mortgages, refinances, home equity lines of credit, credit cards, auto loans, student loans, and personal loans. Homeowners may borrow against the equity they've built up in their residence using a home-equity loan. In other words, the homeowner is borrowing against the value of his or her home. A good method of determining the amount of home equity available for a loan would be to take the difference between the home's market value and the amount still owing on the mortgage. The loan proceeds may be used for any number of reasons, but are typically used to build additions or for debt consolidation. The interest rates on home-equity loans are very reasonable as well. In addition, the terms of these loans typically range from 15 to 20 years, making them particularly attractive for those looking to borrow large amounts of money. But perhaps the most attractive feature of the home-equity loan is that the interest is usually tax deductible.

The downside to these loans is that consumers can easily get in over their heads by mortgaging their homes to the hilt. Furthermore, home-equity loans are particularly dangerous in situations where only one family member is the breadwinner and the family's ability to keep up payments might be hindered by that person's death or disability. In situations like these, life/disability insurance is frequently used to help protect against the possibility of default. Consumer is borrowing against his or her home's equity. These loans may be tax deductible and are typically repayable over a period of 10 to 20 years, making them attractive for larger projects. Because specific amounts may be borrowed at different

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A Study on Dynamic Relationship between Indian Gold Price and Sensex

Dr. S. C. B. Samuel Anbu Selvan[1], Ram Raj G[2]
[1]Associate Professor and Research supervisor, Department of Commerce, The American college Madurai.
[2]Assistant Professor and Research scholar, Department of Commerce, VHNSN College, Virudhunagar

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Abstract:
This paper examines the dynamic relationship between Gold price, and stock market returns with particular reference to Bombay stock market index (SENSEX) by using various time series econometric models from the period of almost 20 years from January 2000 to November 2019 (4903 daily observation). The study finds that there is a unidirectional relationship exists in between gold price and Sensex returns. This study witnessed there is a long-run equilibrium relationship between both the variables and they are moving together. The stock price can be used to predict the gold price in India. Hence, investors have the opportunity to reap the benefit of the portfolio diversification by gaining knowledge from this study.

Keywords:*Gold Price, SENSEX, Granger Causality, Co-integration, ADF.*

1. Introduction

World economic history reveals that the Gold was the first metal which excavated by human beings, and it was used as a medium of exchange in ancient eras. From those Golden days to till today the modern era, the gold has some unique character among all other metals. From the investor's point of view, gold is one of the best attractive investment avenues and it has a notable place in the world monetary system. Most of the counties are used as security against the loan when they have had a deficit in their balance of payments. So, there is no credit risk attached to gold.

Moreover, during the financial crisis, the gold price was increased by 6 percent at that time other portfolios like equity dropped by around 40 percent and this is the only investment avenue which maintains its liquidity even at the time of financial hikes and inflations, so investors can easily convert into money at any time which they want. Few studies stated that gold price is one of the macroeconomic variables for countries economic growth. Some of the reviews suggest that gold investment is the best investment diversification. That all caused as the Gold as the best and 'safe heaven' asset in all over the world. Especially countries like in India will believes that holding gold is a pride for their family and its traditional customs believes. The recent study mentioned that more than 1000 tons of gold consumed in Indian families, and they are trading every day. Since its frequently traded, the gold price has significantly had an impact on the stock price also its necessary to find the relationship between them. Therefore, gold has become the main focus of the research in the field of finance today. This research article aims to examine the relationship between Indian gold price and Sensex.

Review of Literature

A wide variety of studies has been done to understand the relationship between stock price and gold price. Some of them are referred to as the

A Study on Peoples' Perception About Comforting Services in e-Governance Centres at Kovilpatti and Its Environs

R. Thanga Ganesh & K. Pushpa Veni

Conference paper | First Online: 07 November 2019

Part of the Lecture Notes on Data Engineering and Communications Technologies book series (LNDECT,volume 35)

Abstract

Electronic Governance is an uplift for traditional government activities in a new platform i.e., computer applications with the world wide website network. Transparency and the good governance with the simplicity of work is the great objective of this e-Governance program. The success of e-Governance depends upon the people's perception about the utilization of e-Governance services as a beneficiary. This paper discusses and presents a part of the pilot study about the people's perception about comforting services in e-Governance centre at kovilpatti and its environs with 75 respondents classified under the factor analysis. Further, the study helps to find the impact in various areas for further improvement in rendering services through e-Governance centres in kovilpatti and its environs.

Keywords

E-Governance Transparency Technology Perception Spiritual intelligence

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A STUDY ON POLICYHOLDER'S ATTITUDE TOWARDS SOCIAL INSURANCE SCHEME – WITH SPECIAL REFERENCE TO PMJJBY AND PMSBY SCHEME IN VIRUDHUNAGAR DISTRICT

M.J. Senthil Kumar[1] and P. Sundara Pandian[2]
[1]*Department of Commerce, Sri Kaliswari College, India*
[2]*Virudhunagar Hindu Nadars Senthikumara Nadar College, India*

Abstract

In India, a large proportion of India's population is without insurance of any kind, that is, health, accident or life. In order to facilitate penetration of insurance to the lower income and unorganized employee, Government of India launched two innovative term insurance schemes namely Pradhan Mantri Jeevan Jyoti BimaYojna (PMJJBY) and Pradhan Mantri Suraksha Bima Yojana (PMSBY) on 09 May, 2015 from Kolkata with the motto of "Jan Dhan se Jan Suraksha" Social inclusion through financial inclusion. The primary motto of these schemes is to creating a universal social insurance system, targeted especially for the poor and the under-privileged people. The number of beneficiary during the financial year 2019-2020 was 18.22 crores and 6.85 crore in PMSBY and PMJJBY, respectively. The number of subscribers under these schemes is raises at increasing pace. Therefore it is necessary to investigate about the policyholder's attitude towards the social insurance scheme. The study found that, publication of social insurance scheme performance, extending the risk coverage like medi-claim benefits, temporary sickness benefits in addition to the existing coverage, offering concessional premium amount to existing policyholders to renew their policy of the scheme, joint policy features, will definitely attract many people and increase the insurance penetration rate.

Keywords:

Penetration, PMJJBY, PMSBY, Social Inclusion, Unorganized Employee

1. INTRODUCTION

There are numerous risks in everyday life of human being. The chances of occurrences of the events causing losses are uncertain because the risk may or may not be taken place. Insurance is assurance against instabilities of life. It provides assured sum as recompense to misfortunes emerging out happening of unforeseen events, protected under the strategy of insurance. Insurance is a financial instrument in which losses of few are compensated out of funds collected (insurance premium) from many insured (insurance policyholders). Insurance provides economic security to the insured from the losses arising out of happening of insured events for example in personal accident policy death due to accident. In India a large part of the population lives in rural areas. Many of the rural populations do not have any kind of security/ insurance scheme [1].

As per the statistics of Ministry of Finance's, only 20% of Indian citizens have Life Insurance, 11% workers are registered under Pension Schemes and only 4% citizens are taking Accidental Insurance schemes [15]. In order to provides the insurance coverage to all people especially to rural and unorganized workers the Government of India launched insurance schemes namely Pradhan Mantri Suraksha Bima Yojana (for Accidental Death and Disability), Pradhan Mantri Jeevan Jyoti Bima Yojana (for life insurance). The motto of the scheme is covering the uncovered, serving the unserved and blessing the unblessed segment of the society and ensure in India no citizen will never worry about illness, accidents or penury in old age [2].

1.1 PMJJBY AND PMSBY SCHEME

The Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) is term insurance scheme. It is a non-participating, non-linked, yearly renewable, which provides a risk cover against death on the life of the policyholder for any reasons. PMJJBY scheme provides risk coverage of Rs.2 lakh in case of death of the insured, due to any reason including suicide and murder with a nominal premium of Rs.330 for a period of one year commencing from June 1 to May 31 [3].

Pradhan Mantri Suraksha Bima Yojana (PMSBY) is an accident Insurance Scheme providing accidental death and disability cover to the insured for death or disability due to accident with an affordable/ very nominal insurance premium of Rs.12/- per annum per member. The risk coverage under the scheme is Rs.2 lakh for accidental death and full disability and Rs.1 lakh for partial disability. In brief it is a Government-backed accident insurance scheme and it covers accidental death, permanent disability, and partial disablement. It offers one year insurance coverage for accident risk and it is renewable from year to year [4].

1.2 STATEMENT OF THE PROBLEM

The term social security means collective action by the society to help a member against misfortunes and wants; he/she cannot meet with their own resources [11]. It is not a new term, its mention in the early Vedic hymns which wishes everyone to be happy, enjoy a bright future free from ill-health and suffer no sorrow [12]. However, in modern days, it is based on the "ideals of human dignity and social justice". A large proportion of Indian populations are down-trodden and they do not have insurance of any kind like life, health or accidental [13] [16]. As per the statistics of Ministry of Finance's, only 20% of Indian citizens have Life Insurance, 11% workers are registered under Pension Schemes and only 4% citizens are taking Accidental Insurance schemes [14]. In order to provide the insurance services to all the citizen, on 9th May, 2015, Government of India (GOI) introduced ambitious Social Security Schemes [17] [18] pertaining to the Insurance namely Pradhan Mantri Suraksha Bima Yojana (PMSBY) as accidental death and disability scheme, Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) as a term life insurance, to move towards creating a universal social security system, targeted especially for the poor and the under-privileged citizen. The present study analyzes the attitude of the

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A STUDY ON SOCIAL INSURANCE SCHEMES IN INDIA WITH SPECIAL REFERENCE TO PRADHAN MANTRI SURAKSHA BIMA YOJANA SCHEME

M.J. Senthil Kumar[1], P. Sundara Pandian[2] and N.R. Nagarajan[3]
[1,3]Department of Commerce, Sri Kaliswari College, India
[2]Virudhunagar Hindu Nadars' Senthikumara Nadar College, India

Abstract

There are numerous risks in everyday life of human beings. The chances of occurrences of the events causing losses are uncertain because the risk may or may not take place. Insurance is assurance against these instabilities of life.

Many of the rural populations do not have any kind of security/ insurance scheme. In order to provide the accidental insurance coverage to all people especially to rural and unorganized workers, the Government of India launched insurance scheme namely Pradhan Mantri Suraksha Bima Yojana (PMSBY). The motto of the scheme is covering the uncovered, serving the unserved and blessing the unblessed segment of the society and ensure that no Indian citizen will ever worry about accidents or disabilities.

Nearly 18.22 crore Indians were benefited by this scheme during the financial year 2019-2020. By implementing PMSBY scheme the Government is heading towards the vision of "New India-Swasthse Samriddhi". This article highlights the details of the PMSBY scheme and its progress.

Keywords:

Uncertain, risk, Insurance, Unorganized Workers, PMSBY

1. INTRODUCTION

Today we live in an era of globalization and digitalization. The physical expansion of the geographical domain increases the scale and volume of global flows and the numerous global factors that affect human beings in their day to day lives. India like any other country of the world could not afford itself to remain outside the clutches of the impact of globalization on its economy, social and industrial relations [1]. In the present competitive world, the working class has a dominant role to play because no system can work smoothly by neglecting this important segment of the society. Most of the employees in India depend on the day's work for a day's wages. If they are unable to work, they find themselves in financial difficulties [5].

In the ancient days, India is famous for their joint family system that took care of the social security needs of their family members provided it had ownership of material assets like land. In keeping with its cultural traditions, the family members and their relatives have always discharged a sense of shared responsibility towards one another [6]. To the great extent that the family has resources to draw upon, this is often the best relief for the special needs and care required by the aged and those in poor health. Due to migration, urbanization and demographic changes there has been a decrease in joint family system and nuclear family system [7].

Social security is one of the fundamental needs for the modern human society. It is devised to provide alternative sources of income to the workers at the time of contingencies through a concerted effort of the most appropriate organizations. The main motto of the social security measure is to appropriately meet the socio-economic contingencies of individuals and families, thereby providing the confidence that their standard of living will not be eroded [8].

1.1 SOCIAL SECURITY

Social security is paramount for the well-being of people and society. Social security is the basic human right (though not one of the constitutional fundamental rights), and its fulfillment will contribute to achieving various developmental goals of the nation. It is a far reaching benefit in the form of reducing infant and maternity mortality rates, improving productivity and promoting sense of pride and self-respect amongst the citizens. Social security measures also help to eradicate poverty to some extent. Apart from providing protection against health and life hazards in work situations, social security measures progressively cater to the welfare measures involving provision of better health care, maternity care, old age provisions, etc [9].

1.2 COMPONENTS OF SOCIAL SECURITY

Social security programme is a more comprehensive and broader term. It is an indispensable and essential scheme for any developing economy, especially India, when it comes to the welfare of the state. The two important modes for offering social security schemes are social assistance and social insurance. Thus, social assistance and social insurance are referred as the two faces of the same coin. Both of these are part of a social security system.

1.2.1 Social Assistance:

Social assistance means the voluntary assistance provided by the society to needy persons, especially to the poor people without any obligation on them to pay any contribution for receiving benefits like sickness benefit, maternity benefit, old age pension, workmen's compensation, etc. In simple, social assistance programmes provide benefits for persons of small means with an amount that is adequate to meet a basic standard of living and it is exempted by the Government from taxation.

1.2.2 Social Insurance:

Social insurance is a co-operative device. It aims at providing adequate benefits to the insured on a compulsory basis in times of unemployment, ill-health, disablement and other emergencies. It is one of the important modes to prevent individuals from dying because of poverty or misery, and to provide necessary assistance during times of emergency.

1.3 STATEMENT OF THE PROBLEM

India is one of the young and fast developing economies in the world having declared social and economic justice to all in the preamble of the Constitution and also being a welfare state. Most of the people in India do not have access to formal sources of

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A STUDY ON WORK LIFE BALANCE ISSUES OF WOMEN ENTREPRENEURS

R. Indumathi
Assistant Professor, Department of Management Studies, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar

ABSTRACT
Many women entrepreneurs are now emerging because of financial needs and social needs. At the same time some women take this profession as a self achievement. The work life balance is seen as a women issue because as per our traditional practices, woman is the primary responsible person for the family to the day to day activities of the family. So, the women have to manage their family as well as the work in a successful way. There are 100 women entrepreneurs taken for the study. Married women entrepreneurs only taken for this study. This study aims to find the issues faced by the women entrepreneurs and to suggest some ways to improve the work life balance.

Keywords: Women entrepreneurs, Work life balance.

INTRODUCTION
Many women entrepreneurs are recently emerged and contribute to the growth of our nation. Nowadays there are many women operating their own business for their financial and social needs and some women take this profession as a self achievement. The increasing demand in the society, cost of living and expenses for children's education etc. pushes the women to earn and share equally in the financial needs of the family. But, as per our tradition woman is the sole responsibility person for the family and childcare, cooking and other household activities. This twin role of the women in work and family coincide with each other leads to imbalance.

The women entrepreneurs faced lot of struggles and issues in their work and life. This role conflict of the women causes stress and affects their health. If it happens continuously it leads to poor efficiency of women in both work and family. This present study aims to find the issues and stress faced by the women entrepreneurs and also to give some remedial measures to reduce stress and maintain work life balance.

REVIEW OF LITERATURE
Vossenberg (2013) in her paper "Women Entrepreneurship Promotion in Developing Countries: What explains the gender gap in entrepreneurship and how to close it?" addresses the persistence of gender gap in entrepreneurship and the best ways to promote women entrepreneurship. This paper reveals that current women entrepreneurship promotion policies undoubtedly benefit individual women but when the gender bias in the context in which entrepreneurship was embedded; efforts may remain in vain and without any significant macroeconomic or social impact. **Hariharaputhiran(2014)** in the paper "Women Entrepreneurship Scenario In India" endeavours to study the concept of women entrepreneur. The transformation of social fabric of the Indian society, in terms of increased educational status of women and varied aspirations for better living, necessitated a change in the life style of Indian women. Women were competed with man and successfully stood up with him in every walk of life and business is no exception for this. These women leaders are assertive, persuasive and willing to take risks. **Sharif (2015)** in the paper "Glass Ceiling, the Prime Driver of Women Entrepreneurship in Malaysia: A Phenomenological Study of Women Lawyers" aim to present some findings on the construct of glass ceiling in organizations and its role in driving women professionals in Malaysia to venture into business as entrepreneurs. The researcher used the qualitative method known as "phenomenology" to explore the phenomenon of glass ceiling. **Humbert and Brindley (2015)** in the paper "Challenging the concept of risk in relation to women's entrepreneurship" aims to challenge the myth of risk-averseness among women entrepreneurs and analyses risk in the context of gender. The paper develops an understanding of risk among women entrepreneurs in their socio-economic context. It challenges the view point of seeing women entrepreneurs as risk-averse and thus leading to low-growth prospects for their business ventures.

STATEMENT OF THE PROBLEM
The women entrepreneurs were recently emerged and contribute for the economic growth of the country and also to satisfy their financial and social needs of the family. At the same time they have the family responsibilities and child care and it leads to role conflict. This role conflict of women entrepreneurs disturbs their work life balance and causes stress.

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Research Article

Pharmaceutics for effective drug dosage

A Synergism of Eco-Friendly Dyeing of Cotton Fabric and Therapeutic Benefits of *Bixa Orellana* Seed

Kannam Marikani[1], Abirami Sasi[2], Venkatesan Srinivasan[3], Sugapriya Dhanasekaran[4*], Noura Al-Dayan[5] and Divya Venugopal[4]

[1]Research Department Of Zoology, V.H.N. Senthikumara Nadar College (Autonomus) Virudhunagar – 626001.Tamil Nadu, India.
[2]Department Of Microbiology, Kamaraj College, Thoothukudi, TN, India.
[3]Department Of Environmental Sciences, Periyar University, Salem. Tamil Nadu, India..
[4]Department Of Medical Lab Sciences, College Of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Wadi Ad Dawasir Campus, Kingdom Of Saudi Arabia.
[5]Department Of Medical Lab Sciences, College Of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Al Kharj, Kingdom Of Saudi Arabia.

Abstract: Background and objectives: The present research is aimed to study the eco-friendly nature and therapeutic application of the natural dye from the seed extract of *Bixa orellana* for maximizing the benefits of cotton fabric. Materials and methods: A natural dye was extracted from *Bixa orellana* seeds by hot water and ethanolic extraction method. This dye was examined for its ability with pre-mordanting and post-mordanting of cotton fabrics with ferrous sulphate, hydrated double sulphate and tamarind seed powder in order to improve the aesthetics and natural color shades on cotton fabrics. Furthermore, the dyed cotton fabric was used to analyze the antibacterial efficacy of cotton fabric against bacterial culture such as *Bacillus cereus, Escherichia coli, Proteus mirabilis, Salmonella typhi* and *Klebsiella pneumoniae*. Results: Our results suggest that pre-mordanting of cotton fabric with ferrous sulphate, alum and tamarind seed shows good dye fixation rate and stronger color than post-mordanting. Dyeing of cotton fabric with the ethanol extract of *Bixa orellana* seeds gave excellent and beautiful shades than the ones extracted with hot water. Furthermore, cotton fabric dyed with ethanol extracted was found significantly active against human pathogens compared to cloth dyed with hot water extract. The results evidenced that cotton knitted fabrics showed an increase in dye uptake with natural mordant and strength with a considerable reduction in antimicrobial activity. Conclusion: This research adumbrated developing a greener technology to cabalistic use of *Bixa orellana* seed extract applied on cotton cloths for coloring and in future find commercial use as a functional finishing agent (for newborns, clothing for burns, injured soldiers and hospitals) for health protection with semi-durable therapeutic properties.

Keywords: *Bixa orellana;* Antimicrobial activity; Natural dye; Cotton fabrics; Health protection.

***Corresponding Author**

Sugapriya Dhanasekaran , Department Of Medical Lab Sciences, College Of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Wadi Ad Dawasir Campus, Kingdom Of Saudi Arabia.

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An Expository Study on Pradhan Mantri Mudra Yojana

Dr. P.Bharathi[1], Dr. T.Vijayakumar[2]

[1,2]Assistant Professor in Economics, V.H.N.S.N College, Virudhunagar

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ABSTRACT

Government has initiated several programmes to encourage entrepreneurship in our country. MUDRA Yojana is being an initiative for developing and promoting micro enterprises among the new generation aspiring youth. This programme fit well with Make in India Programme and would make efforts to synergies National Rural Livelihood Mission by the way of enabling poor and backward community by providing gainful Self -Employment. Behind this background the present study aims to overview the performance of MUDRA Yojana based on loan disbursement. To achieve the objectives of the study the researcher uses secondary data and employs simple statistical tools. Attempt also made by the researcher to pinpoint the challenges behind this programme.

Keywords: MUDRA, loan disbursement, challenges

I. INTRODUCTION

Government has initiated several schemes for encouraging enterprise creation in our country. Among these MUDRA being an initiative for developing and promoting enterprises. To promote entrepreneurship among the new generation aspiring youth and to support micro enteprises sector in the economy MUDRA has been introduced by the government in the year 2015. MUDRA enables the framework for support to 'Small Business Finance Entities'.

MUDRA fits well with make in India Programme for initiating self-entrepreneurship and would make efforts to synergies National Rural Livelihood Mission by the way of enabling poor and backward community to create gainful self – employment and skilled wage employment opportunities.

II. Objectives of the study

1. To analyze the performance of MUDRA scheme
2. To trace out the inherent flaws in MUDRA scheme.

III. RESEARCH METHODOLOGY

The study is based on secondary data. The data is collected from various sources such as newspapers, magazines and websites. The data related to MUDRA Yojana mainly sourced from annual reports of MUDRA. To achieve the objectives of the present study simple statistical tool like percentage analysis and growth rate has been used.

IV. PERFORMANCE ASSESSMENT OF MUDRA YOJANA

Loan Sanctioned and Disbursement

The comparative position of sanction and disbursement of loans under MUDRA in the last three financial year is depicted in the following table.

Table No. 1 Loan Sanctioned and Disbursement under MUDRA Scheme

Financial Year	2015-2016	2016-2017	2017-2018
No. of PMMY Loans Sanctioned	34880924	39701047	48130593

ARUN JOSHI: LITERALLY AN EXISTENTIAL WRITER

Dr. M. Muthuvel
Assistant Professor, Department of English
VHN Senthikumara Nadar College, Virudhunagar

Abstract

Arun Joshi's fiction explores the self and brings to pivotal concentrate the way in which the self has to appraise its disaffected from the family and society. Arun Joshi deals with the modern man who has no sense of existing to society during which he lives. He finds his own continuation a burden. Firelight gives two alternatives for the present day man with his tragic predicament:" Modern man may try or adjust to the others, to society, to the system, relinquish his true self or he may endeavor to keep and develop his individually and thus alienate him form society."

Keywords*: rootlessness, alienation, predicament, existentialism.*

Although the Indian English fiction prepare at an experimental level, it has taken "firm and deep roots in the Indian soil". Realism is both its roots and foliage. Novelists like Mulk Raj Anand, R.K.Narayan, Bhabani Bhattacharya, Manohar Malgonkar, Kamala Markandaya, Khushwant Singh and a few others portray Indian life in its full socio-cultural, commercial and legislative milieu, advocating the element of the have knots and the under indulged. Mulk Raj Anand is the first writer to give Indian English novel a precise tone and texture.

The mass annihilation in the two world wars element by nuclear weapons brought envy, unrest and boredom all over the world. These wacky footing gave rise to psycho-social disorders and loss of moral values in humankind and basically confused man's mental peace and harmony and brought restlessness, desperation and irritation. With the loss of religious faith, man is spiritually uprooted, self-divert and socially disaffected. Self-estrangement is wrought by the sense of uncertainty in the face of the opaque and indifferent world. He is uprooted when he falls into the world of objects. There is a abandoned today in his mind, which stubborn fundamentalist religious are helpless to fill. When the old gods and the old values fade, life itself becomes dim and its form mock. In modern times individuals are preoccupied with their own limited selves. The mere complication and the pace of modern living tend to overburden people mentally. The stress of living under such highly problematic and stringent environments can play great havoc on man's biological, psychological, cultural and religious experiences and make them frustrated. Such conditions require a lot of arrangement. The hopelessness and helplessness of the situation lead to relapse. The relationships that the people in this sort of impasse establish are negative and damaging. The development of modern society has led to the dissolution of the primary bonds of human relationship. Modern man is necessarily alone; he is put on his own feet, conventional to stand by all himself. The words of Paul Tillich are worth remembering in this observance: "man is drawn into the world of objects and has lost or is continually losing."

Arun Joshi is anxious with the impasse of modern man and is sensitivity alive to the different dimensionality of pressure, exerted by the complex character and demands of the society in which contemporary man is destined to live. The combatant of his novels is abject outsiders and stark intruder. The awareness of man's rootlessness and strangeness and the substantial quest for a meaningful self is the keynote of Arun Joshi novels. According to Jasbir Jain, "Arun Joshi Combatant is all hooked in the search for meaning in life. They are desolate and ill at ease in the world in which they have to live". His characters are mentally confused and filled with despair, self-hatred and self-pity, for they observance themselves as intruder in this physical world.

The chief concern in this paper is to examine the sense of disaffected and abandoned in the novels of Arun Joshi. Modern man finds himself divert not only from his fellow men, but also from himself, having nothing to fall

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ARTICLE

Bactericidal activity of skin mucus and skin extracts of *Catla catla* and *Channa striatus*

Shanmugavel Ranjini[1], Samuthirapandi Muniasamy[2], Ganesan Rameshkumar[3], Thangavel Rajagopal[4], Thangavel Sivakumar[2], Ponnirul Ponmanickam[5]*

[1]Department of Biotechnology, Arulmigu Kalasalingam Arts and Science College, Krishnan Kovil – 626 126, Tamil Nadu, India.
[2]Department of Microbiology, Ayya Nadar Janaki Ammal College (Autonomous), Sivakasi-626 124, Tamil Nadu, India.
[3]Department of Zoology, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar 626 001, Tamil Nadu, India.
[4]Department of Zoology, Thiagarajar College (Autonomous), Madurai- 625 009, Tamil Nadu, India.
[5]Department of Zoology, Ayya Nadar Janaki Ammal College (Autonomous), Sivakasi-626 124, Tamil Nadu, India.

ABSTRACT Fishes counteract certain microbial attacks in water by producing antimicrobial proteins/peptides in their skin surface. The present study focused on screening the bactericidal activity of skin and skin mucus extracts of *Catla catla* and *Channa striatus*. The bactericidal activity was assessed against *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Proteus vulgaris*, *Aeromonas hydrophila*, *Staphylococcus aureus* and *Bacillus coagulans* by disc diffusion method. The minimal inhibitory concentration was also determined. Protein profiles in skin and skin mucus extracts were analyzed by SDS-PAGE. Samples from both fishes showed antibacterial activity. Detailed analysis of individual protein and peptide would throw light on their medicinal importance to be used against pathogenic microbes. **Acta Biol Szeged 64(1):11-16 (2020)**

KEY WORDS
antimicrobial proteins
Catla catla
Channa striatus
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***Corresponding author**
E-mail: ponmanickam_ts228@anjaconline.org

Introduction

Fishes have great economic value due to their taste and rich protein content. In an aquatic environment, a myriad of pathogenic and non-pathogenic organisms is present. Occasionally, fish cultivation results in enormous loss because of infectious diseases caused by the pathogenic microorganisms. Antibiotics are being utilized to manage these diseases; however, pathogens develop resistance against several antibiotics (Lalumera et al. 2004). At the same time, fishes possess excellent defense system against the pathogens by producing biochemically diverse secretions which mainly act on bacterial membranes and induce cell lysis.

The mucus layer on the surface of the fish is constantly replaced, which possibly prevents stable colonization by parasites, bacteria and fungi. Skin secretions have a broad range of polypeptides with antimicrobial properties (Uthayakumar et al. 2012). The bioactive substances like lysozyme, lectins, proteolytic enzymes, flavoenzymes, immunoglobins, C-reactive proteins, apolipoprotein A-1 and antimicrobial peptides are constitutively expressed in the mucus to provide immediate protection to fish against potential pathogens (Kitani et al. 2008).

Further, the mucus layer of the fish skin is presumed to perform several other functions, viz., acts as a lubricant, serves as a barrier for microbial entry, maintains osmoregulation, plays a role in locomotion and pheromone communication (Hellio et al. 2002). By nature, antimicrobial peptides (AMPs) are secreted by the fish skin and function as a first line defense against the microbial attacks. They protect the fish against a wide variety of bacterial, fungal, viral, and other pathogenic infections by disruptive "lytic" or pore-forming "ionophoric" actions (Smith et al. 2010). Fish epidermal mucus AMPs have demonstrated a broad spectrum of activity that is 10-100 times more potent than that of their amphibian counterparts against various fish and human pathogens (Park et al. 1998).

Proteins or peptides present in the fish skin mucus form pores on the bacterial membrane that cause oozing out of cellular contents. This alters the regular ionic gradients of membrane and eventually leads to the death

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Bi-functional catalytic performance of silver manganite/polypyrrole nanocomposite for electrocatalytic sensing and photocatalytic degradation

Manickavasagan Abinaya, Velluchamy Muthuraj

Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar, 626 001, Tamil Nadu, India

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Review

Biological response of Schiff base metal complexes incorporating amino acids – a short review

Alagarraj Arunadevi & Natarajan Raman

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Abstract

Metal complexes have more biological activities than their corresponding ligands. In particular, Schiff base complexes are of great interest due to their stability, electron donating ability, catalytic, photochromic, optical nonlinearity properties and biological activities. These are all based on the coordination of Schiff bases to metal ions. Amino acids are functionally involved in a number of biological processes and have coordinating sites of $-NH_2$ and -COOH which are condensed with aldehydes or ketones to form Schiff bases which are easily coordinated to metal ions. Most amino acid derived Schiff bases and their metal complexes exhibit different pharmacological activities. This review focuses on the research of Schiff base complexes of amino acid derivatives from the past five years. We highlight the antimicrobial, anticancer and antioxidant responses of some Schiff base coordination compounds incorporating amino acids having nitrogen, oxygen and sulfur donors and different metal ions.

Keywords: Amino acids | antimicrobial | antioxidant | anticancer | Schiff base complexes

Biologically active Co (II), Cu (II), Zn (II) centered water soluble novel isoniazid grafted O–carboxymethyl chitosan Schiff base ligand metal complexes: Synthesis, spectral characterisation and DNA nuclease activity

Murugaiyan Manimohan [1], Rajakkani Paulpandiyan [2], Sivashanmugam Pugalmani [3], Mohamed Aboobucker Sithique [4]

Affiliations + expand

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Abstract

In this study, the new N, N, O tridentate donor water soluble isoniazid based biopolymer Schiff base ligand and their Co (II), Cu (II), Zn (II) metal complexes were prepared. The compounds were designed for potential biological application such as antibacterial, antifungal, anti-inflammatory, total antioxidant, antidiabetic and DNA binding studies. The synthesized compounds were illuminated in different light sources of various spectra were used to explore the functional groups of Biopolymer derivatives. Thermal degradation, thermal stability and percentage of mass loss for the prepared compounds were investigated through thermo gravimetric and differential thermal (TGA-DTA) analyses. Crystalline structure of synthesized biopolymer derivatives were explored by X-ray diffraction (XRD) studies, the crystallinity of chitosan is gradually decreased after the Schiff base and complex formation. Surface morphology and structures of the prepared compounds were examined using SEM analysis. The magnetic moment and magnetism of the metal complexes were studied using Vibrating-sample magnetometer (VSM). Antidiabetic studies of Biopolymer Schiff base and metal complexes were carried out by α-amylose inhibitory method. DNA nuclease activities of synthesized metal complexes were investigated by Ultra-Violet (UV) and viscometry methods. The Cu (II) complexes showed better DNA binding results than Co (II) and Zn (II) complexes.

Keywords: Antidiabetic; Biological macromolecule; Surface morphology; Thermal stability; Viscometry.

Materials Science in Semiconductor Processing
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CdS microspheres as promising electrode materials for high performance supercapacitors

I. Rathinamala [a], I.Manohara Babu [b], J. Johnson William [b], G. Muralidharan [b], N. Prithivikumaran [c]

[a] Department of Physics, V. V. Vanniaperumal College for Women, Virudhunagar, Tamil Nadu, India
[b] Department of Physics, The Gandhigram Rural Institute (Deemed to be University), Gandhigram, Tamil Nadu, India
[c] Department of Physics, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar, Tamil Nadu, India

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Construction of novel n-type semiconductor anchor on 2D honey comb like $FeNbO_4$/RGO for visible light drive photocatalytic degradation of norfloxacin

Benjamin Moses Filip Jones [a], Duraisamy Maruthamani [b], Velluchamy Muthuraj [a]

[a] Department of Chemistry, V.H. N. Senthikumara Nadar College (Autonomous), Virudhunagar, 626 001, Tamil Nadu, India
[b] Department of Chemistry, PSG College of Technology, Coimbatore, 641 004, India

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CONSUMERS' PERCEPTIONS TOWARDS INTERNET TICKETING IN TAMILNADU

***S.SELVANATHAN**
Assistant Professor, Department of Commerce (SF)
VHNSN College (Autonomous), Virudhunagar

****Dr.V.MANOHAR**
Associate Professor, Department of Commerce,
VHNSN College (Autonomous), Virudhunagar

ABSTRACT

IRCTC is the only entity authorised by Indian Railways to offer railway tickets online through its website and mobile application. As years passed electronic ticket has been the most important part of ticket booking. An electronic ticket which is often called as digital ticket has become a travel card or transit pass. It is equivalent to paper ticket.

Keywords: Passenger Satisfaction, Technology, Internet Ticketing, NGET

INTRODUCTION

IRCTC was established on September 27, 1999 and came into effect from April 2001. The company has been incorporated under the Companies Act of 1956, with an authorised capital of Rs. 50 crores, as a public sector undertaking fully owned by the Ministry of Railways, Government of India. The company is set up by the Indian Railways as a part of its long term strategy towards organisational reforms and restructuring to induct professionalism into its stream and divest its peripheral areas of operation connected to its core business of transportation, and to strengthen its links with the travel and tourism industry.

In 2014, IRCTC has upgraded the website e-ticketing system (NGeT) which was launched in the year of 2014 to handle increased ticket booking. The capacity was increased from 2000 tickets to 7200 tickets per minute. The capacity of New Generation E-Ticketing (NGeT) was further increased to 15,000 tickets 2015 to book tickets per minute fast and easily. The e-tickets may be booked easily and faster through website and the IRCTC website is able to handle 15000 tickets per minute at present. The concurrent user connections were increased from 40,000 to 1,20,000 in New Generation E-Ticketing (NGeT), which has further been increased to 3,00,000. The enquiries in New Generation E-Ticketing (NGeT) have also been increased from 1000 per second to 3000 per second. Capacity in New Generation E-Ticketing (NGeT) was increased this year. This research paper will discuss the factors influencing the E-ticket booking.

IRCTC's e-ticketing service has continued to go from strength to strength ever since it came into the market and now accounts for 65.83% of reserved tickets on Indian Railways booked online, leaving behind several high profile e-commerce sites worldwide. On an average, more than 6.75 lakhs tickets were sold daily through IRCTC's website during 2017-18. The site offers round the clock ticket booking services except for 35 minutes from 23:45 hrs to 00:20 hrs. The site offers booking facilities of various full fare and concessional tickets.

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COVID-19 EFFECT ON HERDING BEHAVIOUR IN INDIAN CAPITAL MARKET

S.C.B. Samuel Anbu Selvan[1], Ramraj G[2],

[1]Department of Commerce, The American college Madurai.

[2]Department of Commerce, VHNSN College, Virudhunagar.

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Keywords: COVID-19, Herding Behaviour, Emerging Markets, BSE, NSE, CSAD.

ABSTRACT

This study aims to test whether the pandemic of COVID-19 has an effect on herding behaviour on the Indian capital market. Using the data on a daily basis and using Cross-Sectional Absolute Deviation (CSAD) Approach for a sample of the Bombay stock exchange (BSE) and National stock exchange (NSE), for the period from November 2015, to November 2020 (1246 daily data). The results reveal a non-linear link between the cross-sectional absolute deviation of stock returns and the market portfolio return. This decreases the dispersion with the rise in the market rates of return, which means that investors emulated market performance during the study period without paying attention to stock risk and return characteristics, suggesting that the pandemic COVID-19 increases herding behaviour in the capital markets of India.

INTRODUCTION

The coronavirus (COVID-19) outbreaks in December 2019 in China, in the city of Wuhan (Hubei region). From the sellers of live fish, poultry and animals to the public consumption. Later it continues to spread across the world. On January 20, 2020, the World Health Organisation (WHO monitored the situation and released daily reports about the new cases of infection and death numbers in the Chinese region and outside of China. WHO has an international concern declared emergency? Due to this announcement, very first in Shanghai stock market rushed 8% low on the first week of February 2020, and the shock rapidly spread over international financial markets. Initially ignored by most of the countries, the COVID-19 effect raised severe concern since the infection rapidly propagated outside of China. The first week of February 2020, WHO declared more the 90,000 people are affected in more than 60 countries. In India, January 30, 2020, was the first case of coronavirus identified in the state of Kerala by an

Dominating Factors Of Work Life Balance And Productivity - Special Reference To It Sector - Chennai City

G.Venkateshwaran, Dr.R.V.Suganya

Abstract

Work life balance is the necessity for every individual in order to manage professional and personal life. Chennai being IT hub after Bangalore has more number of employees in IT sector. The present study is proposed to identify the dominating factors of work life balance and productivity with special reference to IT sector in Chennai. A sample of 324 software employees working in Chennai were identified and a structured questionnaire was circulated to collect their perception about the dominating factors of balancing work and life along with and productivity. The result proved that: the dominating factors of work life balance were : Work hour driven factors, Positive stress driven factors, Organization driven factors, factors related to Life satisfaction and happiness& motivation.

Issue

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Section

Articles

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Eco-friendly heteropoly acid supported on natural clay for the synthesis of calix[4]resorcinarene derivatives

Karuppaiah Selvakumar[1], Murugan Kumaresan[2], Ponnusamy Sami*[,2] & Meenakshisundaram Swaminathan*[,1]

[1]Nanomaterials Laboratory, Department of Chemistry, International Research Centre, Kalasalingam Academy of Research and Education (Deemed to be University), Krishnankoil – 626 126, Tamilnadu, India.

[2]Department of Chemistry, V.H.N. Senthikumara Nadar College (Autonomous),Virudhunagar-626 001, Tamilnadu, India.

E-mail: m.swaminathan@klu.ac.in

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The catalytic activity of green catalyst heteropoly-11-tungsto-1-vanadophosphoric acid, $H_4[PVW_{11}O_{40}]$ (HPV) supported on activated natural clay (HPVAC) has been tested towards the synthesis of calix[4]resorcinarene under solvent-free condition. It is a one-pot multi-component condensation reaction of four moles of aromatic aldehydes with four moles of resorcinol. The advantages of the protocol, solvent-free heterogeneous reaction condition, simple workup procedure, short reaction time, high yield of products and reusability of the catalyst make this method to declare as green approach for synthesis of calix[4]resorcinarene.

Keywords: Heteropoly acid, Activated Natural Clay, Calix[4]-resorcinarene, Green synthesis, Heterogeneous reaction

The calix[4]resorcinarene, a subclass of calixarenes, has macrocyclic structure of cyclic tetramers. calix[4]resorcinarene and its derivatives as macrocyclic receptors possess a variety of applications as dendrimers in biological systems[1], nanoparticles[2], nano-capsule[3], supramolecular tectons[4], optical chemosensors[5], host molecules[6], components in liquid crystals[7], selective membranes[8,9], HPLC stationary phases[10], surface reforming agents[11], ion channel mimics[12] and metal ion extraction agents[13]. Besides, some calix[4]arenes show metal ion recognition properties[14, 15].

A number of synthetic routes have been reported for the preparation of calix[4]resorcinarene derivatives by employing some Lewis acid catalyst such as $[Yb(H_2O)_9](OTf)_3$[16], $H_3[PW_{12}O_{40}]$ / Conc. HCl[17], Conc. HCl under microwave irradiations[18, 19] and Fe_3O_4 nanoparticle[20]. However, the methods using these catalysts suffer from the drawbacks such as low product yield, cumbersome product isolation and long reaction time. Here is an attempt to synthesize and characterize calix[4]resorcinarene derivatives using a green eco-friendly catalyst ,heteropoly acid supported on activated natural clay minerals (HPVAC) .

Experimental Section

Materials

All commercially available chemicals were obtained from Sigma Aldrich and used without further purification. A series of HPV supported activated natural clay catalysts (HPVAC) were prepared by varying the loading amount of HPV *viz.* 10, 20, and 30% (w/w) on to the activated natural clay and characterized by the reported literature procedure from our laboratory[21]. FT-IR spectra were recorded using Shimadzu IR Affinity-1 FT-IR Spectrophotometer as KBr discs. ^{1}H and ^{13}C-NMR spectra were recorded by Bruker 300 and 100 MHz NMR instrument with DMSO-d_6 as solvent and TMS as internal reference. Elemental analysis was performed on Elementar Vario EL III equipment.

General procedure for the preparation of calix[4]resorcinarene

A mixture of aldehyde (4 mmol), resorcinol (4 mmol) and HPVAC-20 (catalyst) were heated in oil bath at 120°C for 30 min. The completion of reaction was ascertained by TLC (ethyl acetate / n-hexane: 7:3) and after completion, 15 mL of ethanol was added to dissolve the crude product. The catalyst was recovered by simple filtration. And the ethanol solution was poured into cold water to get precipitate. The product was filtered and washed with 30 mL of water. The product was dried in an air oven (Scheme 1). The product was analyzed and identified by melting point, FT-IR, ^{1}H-NMR and ^{13}C-NMR analysis.

Results and Discussion

Optimization of catalytic condition

Condensation of four moles of 4-chloro-benzaldehyde with four moles of resorcinol in the presence of catalyst was taken as a standard reaction for the optimization study in the synthesis of 2,4,6, 8-tetrakis(4-chlorophenyl)-1,3,5,7(1,3)-tetrabenzena-cyclooctaphan-14,16,34,36,54,56, 74,76-octaol. This

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Electrochemical Biosensors for Point-of-care Applications

Chandran Karunakaran[#,*], Murugesan Karthikeyan[#], Marimuthu Dhinesh Kumar[#], Ganesan Kaniraja[#], and Kalpana Bhargava[@]

[#]*Department of Chemistry, VHNSN College, Virudhunagar - 626 001, India*
[@]*DRDO-High Energy Material Research Laboratory, Pune, India*
[*]*E-mail: ckaru2020@gmail.com*

ABSTRACT

Biosensor refers to powerful and innovative analytical tool involving biological sensing element and transducer with broad range of applications, such as diagnosis, drug discovery, biomedicine, food safety and processing, environmental monitoring, security and defense. Recent advances in the field of biotechnology, microelectronics, and nanotechnology have improved the development of biosensors. Glucometers utilizing the electrochemical determination of oxygen or hydrogen peroxide employing immobilised glucose oxidase electrode seeded the discovery and development of biosensors. Molecular recognition based on geometry and forces of interaction play an important role in the biosensor development. The advent of nanotechnology led to highly efficient and sensitive biosensors. They also provide an effective immobilisation matrix for the various bioreceptors. Enzymatic and their mimetic (metalloporphyrin)-based biosensors for reactive oxygen, nitrogen species and cytochrome *c* will also be discussed. The role of antibodies and their applications in immunosensors development for cytochrome *c* and superoxide dismutase will be highlighted. The electrochemical biosensors are less expensive, miniaturised and used for point-of-care applications. Further, the fabrication of labVIEW based virtual biosensor instrumentation and microcontroller based portable biosensor for wide variety of applications also devices will be presented.

Keywords: Superoxide dismutase; Cytochrome *c*; Polypyrrole; Nitrate Reductase; Simultaneous determination; Nanoparticles; Biosensors; Point-of-care

1. INTRODUCTION

This review is an attempt to describe the recent advancements in biosensing technology for point-of-care applications. A biosensor is an analytical tool used to find analytes, It consists of three parts: (i) the bioreceptor, (ii) the transducer or the detector portion, and (iii) the reader. A biomolecule that recognizes the target analyte is a bioreceptor or biorecognition element[1]. The biomarker serves as predictor of a regular biological pathogenic process. A biomarker indicates a clear physical trait or a biologically induced observable improvement in the body that is related to a particular disease or health condition. Consequently, quantification of various biomarkers can be great importance in the therapeutic research and clinical diagnosis.

To estimate biomarker proteins various existing techniques such as enzyme-linked immunosorbent assays (ELISA), Western blot, high performance liquid chromatography (HPLC), flow cytometry and spectrophotometry were used. Due to longer analysis time, expensive tools and the expertise needed for operation, the implementation of these techniques at POC application is limited. Hence notable efforts are being made to overcome these challenges, to develop electrochemical biosensing technologies for quick, precise, sensitive and selective finding of biomarker proteins. So, we have reviewed here the point-of-care biosensors for various diseases, especially hypoxia, oxidative stress and apoptosis biomarkers proteins. Also, the design and fabrication of virtual biosensor instrumentation and microcontroller based portable and cost effective biosensor devices will be reviewed. Such biosensors that would be of interest to biologist and therapists to obtain informatics required in real time to assess the development of diseases progression, therapeutics and also applications for POC.

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2. ENZYMATIC BIOSENSOR FOR CYT C

Cyt c is a significant biomarker of apoptosis. The identification of cyt c release is therefore critically significant as this not only offers useful information about the existence and nature of apoptosis but also act as a preclinical marker of various pathologies, therapeutic treatment and medical diagnostics. The apoptosis/mitochondrial and DNA damage have been implicated in disease that are connected to oxidative stress and hypoxia[2]. This Cyt c used to measure cell death in hypoxia/oxidative stress. Cyt c present in an oxidized (ferric) or reduced (ferrous) form. However the structures of the two kinds of cyt c are identical, the difference in oxidation states does make major difference in binding and biochemical properties. Cyt c oxidase (CcO) based cyt c

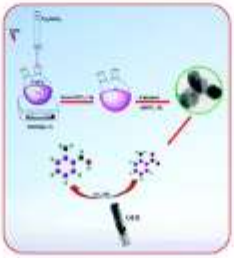
Electrochemical detection of 2-nitroaniline at a novel sphere-like Co_2SnO_4 modified glassy carbon electrode

Karuppaiya Palpandi [a] and Natarajan Raman [a,*]

Author affiliations

Abstract

A novel electrochemical sensor, based on a Co_2SnO_4 (CoSnO) modified glassy carbon electrode (GCE), has been successfully developed for the determination of 2-nitroaniline (2-NA). The CoSnO was synthesized by a simple co-precipitation method and characterized by FE-SEM, HR-TEM, EDX, FT-IR and XRD. The electrochemical performance of the CoSnO modified GCE towards the reduction of 2-NA was investigated by cyclic voltammetry (CV) and differential pulse voltammetry (DPV). CoSnO/GCE exhibits strong electrocatalytic activity towards the reduction of 2-NA. The electrochemical studies show that the CoSnO/GCE has superior electrocatalytic activity, whereas the unmodified GCE has lower reduction potential response. Under the optimal conditions, the proposed sensor responses were in a wide linear range from 0.04 µM to 856.14 µM with a low detection limit of 0.062 µM. Moreover, the as-synthesised CoSnO is studied for selectivity, stability, reproducibility and repeatability. In the presence of interfering species like nitro groups and inorganic species (cationic and anionic), the reduction peak current response doesn't cause any variation in results and discloses good selectivity towards the detection of 2-NA. Finally, it is made clear that the proposed sensor CoSnO/GCE exhibits excellent electrochemical behaviour for electrochemical determination towards reduction of 2-NA.



Enhanced photoactivity of cerium tungstate–modified graphitic carbon nitride heterojunction photocatalyst for the photodegradation of moxifloxacin

Published: 31 May 2020

Volume 31, pages 11434–11447, (2020) Cite this article

S. Lakshmi Prabavathi, K. Saravanakumar, T. T. I. Nkambule, V. Muthuraj & G. Mamba

Abstract

Design and optimization of visible-light-driven photocatalysts for degradation of organic pollutants is an important step towards environmental decontamination. In this study, wolframite cerium tungstate ($Ce_2(WO_4)_3$, (CW)) hybridized with g-C_3N_4 (CN) nanosheets was synthesized via a simple hydrothermal route followed by an ultrasound-assisted synthesis method. The prepared $Ce_2(WO_4)_3$@ g-C_3N_4 (CW@CN) heterojunction was investigated for photocatalytic degradation of the antibiotic moxifloxacin (MXF) under visible light irradiation. Structural, morphological, and optical properties as well as chemical composition of the as-synthesized heterojunction were investigated by transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), UV–Vis diffuse reflectance spectroscopy (UV–Vis DRS) and photoluminescence (PL). MXF photocatalytic degradation by the binary nanostructure ($Ce_2(WO_4)_3$@ g-C_3N_4) (94.1%) was the highest compared to g-C_3N_4 (53.6%) and $Ce_2(WO_4)_3$ (46.4%). Such enhanced activity could be ascribed to efficient suppression of the charge carriers' recombination, leading to adequate formation of the reactive species responsible for MXF degradation. Furthermore, the $Ce_2(WO_4)_3$@ g-C_3N_4 heterojunction showed remarkable stability over five consecutive cycles, with only 11.5% reduction after the 5th cycle. This work established the potential applicability of $Ce_2(WO_4)_3$@ g-C_3N_4 nanostructures towards photocatalytic removal of MXF.

ETHNIC REMOTENESS AND SANDWICH CULTURE IN AMULYAMALLADI'S *THE MANGO SEASON*

Mrs.R.Rajanandhini[1], Ph.D Research scholar, Research Centre in English,
VHN Senthikumara Nadar College, Virudhunagar.

Dr. Y.Vidya[2], Assistant Professor of English,
VHN Senthikumara Nadar College, Virudhunagar.

ABSTRACT

Diasporic literature, in general deals with alienation, displacement, nostalgia and quest for identity. In an endeavor to integrate the adopted culture while maintaining the inheritance, the dispersal fraternities develop a dual identity, and their culture becomes a sandwich culture. All these universal places of cultural displacement are on exhibit in *The Mango Season*, the novel by AmulyaMalladi. *The Mango Season* is very realistic in its presentation of dilemmas experienced by Priya, the protagonist. The novel describes the home coming event of the female teenager, Priyawho hides her engagement to a black American man from her traditional Brahmin family. The conflict is between satisfying the claims of the Indian Priya and the American Priya. This paper endeavors to portray the psychological push and pull of the cultural clashes, dilemmas and remoteness faced by the foreign returned Priya in her homeland. The characters depicted in this novel are well drawn and the clashes of cultures portrayed are not only genuine, but tear-jerking, as well.

Key words: Diaspora, cultural displacement, dilemma, patriarchal society, dual identity

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Diasporic writer AmulyaMalladi explores especially the cultural dilemmas, displacement and cultural clashes suffered by immigrants in the various parts of the world. The experience of being caught between two cultures with cultural dilemmas and clashes has remained a prominent theme of her writings. *The Mango Season*is a panorama of Indian tradition. It deals with an Indian who movesto America and lives a multi-cultural existence, which goes against the ideology of her extendedfamily. It is about an Indian woman who hides her engagement to a black American man from hertraditional Brahmin family. Malladi artfully places Priya in a situation between two oppositeworlds. She has to go with either dogmatic tradition of her family or her heartfelt emotion.AmulyaMalladi demonstrates all the commonplaces of cultural conflicts in this novel. For instance, ideological conflicts, clash of an olden way of life with the western ideas, diverse caste system, patriarchal norms, arranged

Evaluation of phytochemical and antibacterial activity of the crude extracts of Senna auriculata (L)

Author: THAMIL V, N. BALASUBRAMANIAN, V. SHANMUGAIAH, C. KARUNAKARAN

Abstract: The present work has been shown phytochemical presence and antibacterial (human pathogens) activity of the medicinal plant of Senna auriculata (L). S. auriculata plant crude extracts were obtained using Ethanol, Acetone, Benzene, Ethyl acetate and Diethyl ether. Among five solvents used Diethylether followed by Ethanol, is the most favorable solvent to obtain more amount of plant extract. The crude extract was tested for antibacterial activity against various human pathogens such as Escherichia coli, Salmonella typhi, Bacillus cereus, Klebsielle pneumonia, Staphylococcus epidermidis, Serratia marcescens, Staphylococcus aureus, Streptococcus agalactiae, Streptococcus dysgalactiae and Streptococcus pyogenes. The antibacterial activities were tested on Muller- Hinton agar with and without 5% sheep blood by the well diffusion method. The maximum antibacterial activity was observed in Diethyl ether extract followed by the Ethyl acetate extract. On the whole, Streptococcus species (S. dysgalactiae, S. pyogenes, followed by S. agalactiae) were highly inhibited by Diethyl ether extract than other human pathogens tested. We found eight phytochemical in S. auriculata extract such as tannin, alkaloids, flavanoids, glycosides and phenols were detected. Petroleum ether, Ethyl acetate (4:1 ratio), was appropriate for TLC analysis and we found 6 major spots by TLC method. Our next approach is to purify and identify the active compound for pharmacological applications.

Keyword: antibacterial activity, crude extracts, phytochemical, Senna auriculata, TLC analysis

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Experimental investigation on varying flame characteristics of benzoic resin solid fuel pellets

Ravikumar Sankaralingam [a c], Balasubramanian Sengottuvelan [b], Pranesh Venkat [c], Mahalingam Selvaraj [d], Velmurugan Arunachalam [e f], Jeyakumaran Natarajan [g]

[a] Department of Mechanical Engineering, Jeppiaar Maamallan Engineering College, Sriperumbudur, Tamil Nadu, 602108, India
[b] Department of Inorganic Chemistry, University of Madras, Chennai, Tamil Nadu, 600025, India
[c] Minerals and Chemicals Division, Dawn Calorific Exports, Chennai, Tamil Nadu, 600033, India
[d] Department of Mechanical Engineering, Sona College of Technology, Salem, Tamil Nadu, 636005, India
[e] Department of Mechanical Engineering, Annamalai University, Chidambaram, Tamil Nadu, 608002, India
[f] Department of Mechanical Engineering, Government College of Engineering, Dharmapuri, Tamil Nadu, 636704, India
[g] Department of Physics, V.H.N. Senthikumara Nadar College, Virudhunagar, Tamil Nadu, 626001, India

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Extra-Durable Hybrid Supercapacitor Based on Cobalt Sulfide and Carbon (MWCNT) Matrix Electrodes

I. Rathinamala [a], I. Manohara Babu [b], J. Johnson William [c], G. Muralidharan [c], N. Prithivikumaran [d]

[a] Department of Physics, V. V. Vanniaperumal College for Women (Autonomous), Virudhunagar, Tamilnadu, India
[b] Department of Physics, V. S. B. Engineering College, Karur, Tamilnadu, India
[c] Department of Physics, The Gandhigram Rural Institute - Deemed to be University, Gandhigram-624302, Tamilnadu, India
[d] Department of Physics, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar, Tamilnadu, India

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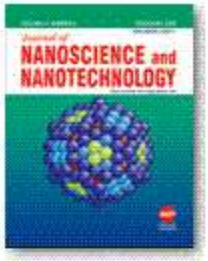

Fabrication of Al–TiO_2 Thin Film Electrode by Spray Pyrolysis Technique for Urea Sensing

Authors: Mathi Vathani, A. [1]; Dhanalakshmi, S. [2]; Jeyakumaran, N. [1]; Prithivikumaran, N. [1];
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Abstract | References | Citations | Supplementary Data | Suggestions

A simple cost effective Al–TiO_2 thin film electrode was fabricated for urea sensing. Urea is the key end product of nitrogen metabolism in humans. Increased level of urea leads to loss of kidney function. Thus determination of urea is important in analysis of kidney diseases. Al–TiO_2 thin films were deposited with different concentration of Al by Spray pyrolysis technique. The X-ray diffraction (XRD) pattern reveals the anatase phase of the Al–TiO_2 thin films with tetragonal structure. A shift is observed in the XRD peak position compared to as prepared TiO_2 thin film indicates the incorporation of Al ions into Ti ions. The UV-Vis spectroscopy study shows that the absorption increases and the absorption peak shifts towards the visible region for Al–TiO_2 thin films compared with that of the as prepared TiO_2 thin film. The optical band gap values changes with the change in the Al concentration in TiO_2 thin films. The electrochemical analysis for optimized Al–TiO_2 thin film electrode was carried out by cyclic voltammetry (CV) method. CV studies of Al–TiO_2 thin film electrode show the good stability and linearity which is essential to fabricate biosensor. The sensor response to urea is linear with correlation coefficient of 0.944 and the sensitivity is 3.17 $\mu A\ mM^{-1}\ cm^{-2}$.

Keywords: Al–TiO2; Electrochemical Analysis; Sensing; Spray Pyrolysis; Thin Films; Urea

GROUND WATER STATUS OF TAMILNADU

Dr. J. JAYALAKSHMI,

Assistant Professor of Economics, V.H.N.S.N College, Virudhuangar - 626001, Tamil Nadu.

Email: karthijaya4@gmail.com

ABSTRACT

Water is inevitable as it is an elixir and life sustaining liquid. Ground water forms a vital natural resources. Ground water is the water that seeps through rock and soil as it is stored in aquifers. Aquifers are typically made up of gravel, sand and sand stones. Being the largest liquid fresh water resources of the planet earth it supports irrigations to agriculture to lead a sustained life and secure food for the globe. India covers more than 30 per cent of the global irrigation and consumption. Based on the above background, an attempt has been made to study the ground water management and challenges in India and Tamilnadu.

Key words: Ground water, Aquifers, utilisable

INTRODUCTION

Water is inevitable as it is an elixir and life sustaining liquid. Ground water forms a vital natural resources. Ground water is the water that seeps through rock and soil as it is stored in aquifers. Aquifers are typically made up of gravel, sand and sand stones. Being the largest liquid fresh water resources of the planet earth it supports irrigations to agriculture to lead a sustained life and secure food for the globe. India covers more than 30 per cent of the global irrigation and consumption.

Sustainable use of ground water resources is very challenging as there is a high unplanned and non-scientific development of ground water. The alarming bell already sound that water level is depleting. Consequently developing ground water resources for sustainable uses and management is a great challenge.

Based on the above background, an attempt has been made to study the ground water management and challenges in India and Tamilnadu.

HAPPY EMPLOYEES ARE COMMITTED EMPLOYEES

*Mrs.K.Jotheswari, **Dr.D.Vijayalakshmi
*Part Time Research Scholar in the Research Department of Management studies, Imayam College of Arts and Science, Thuraiyur, Trichy Affiliated to Bharathidasan University
** Research Supervisor, Principal, Imayam College of Arts and Science, Thuraiyur, Trichy Affiliated to Bharathidasan University

Abstract
Organizational commitment is one of the determinant of the Happiness at work of employees. If the employees are committed with the organization, it is implied that they are ready to stay with the organization and it implies that the employees are satisfied and happy with their job and its roles. Under this paper, we attempted to study the relationship between organizational commitment and the Happiness at Work (HAW). The study was conducted among the support staff members of the educational institutions and universities. The organizational commitment of these employees were measured using various factors and analyzed whether the committed employees are also happy. The committed employees are happy employees. The sample size taken was 216 support staff members working in various educational institutions and universities. The findings of this study tells that the factors that determine organizational commitment invariably impacts the happiness at work. Few factors such organizational values and goals shows positively significant effect on the commitment of employees in the organization. The relationship among the employees in the organization that is superior subordinate relationship acts as a challenge, which if fulfilled, would enable the employees to gain more confidence and bond with the organization. The career growth and meaningfulness of job creates more opportunities for the organization to win the commitment of employees. This study gives a good understanding about the relationship between the organizational commitment and the happiness at work.

Keywords Organizational commitment, happy employees, happiness at work, committed employees

Introduction

"To win in the marketplace, you must first win in the workplace." – Doug Canant

When the employees are happy, the customers will also be happy. The employee engagement and commitment are the significant achievement for any organization. Once this is achieved, the organization can reach any heights in performance. The committed employees are those who either loyal to the organization or bonded with the organization. These committed employees would also be happy employees. Happiness at work comes when the needs of the employees are satisfied; when they engage themselves with the organizational goals and values; when learning, development and career advancement opportunities are given to them; and when emotional bond is strengthened with the organization. Under this study, we have analyzed the relationship between the organizational commitment and happiness at work. This study also attempts to examine whether committed are all happy employees. The factors that determine the commitment of employees has been identified and attempt have been made whether these employees are actually happy at work. If they are working happily, there can be always better productivity in the organization. Happiness at work of employees not only enhances employee's well-being but also organizational improvement. This study has been conducted among the support staff members of the in educational institutions and universities.

Industry profile

According to the Indian Brand Equity Foundation (IBEF), the following information

International Conference on Mining Intelligence and Knowledge Exploration

MIKE 2019: **Mining Intelligence and Knowledge Exploration** pp 120–130

Haralick Features from Wavelet Domain in Recognizing Fingerprints Using Neural Network

K. S. Jeyalakshmi & T. Kathirvalavakumar

Conference paper | First Online: 20 December 2020

Part of the book series: Lecture Notes in Computer Science ((LNAI,volume 11987))

Abstract

Towards digitalization in the world, fingerprints are captured for personal identification and most of the recognitions of these captured fingerprints are having wide range of preprocessing tasks such as segmentation for extracting region of interest, enhancement for better visualization of minutiae features, orientation field estimation for fingerprint classification and minutiae matching. It is not worthy if recognition spends more time in

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Archaea
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https://doi.org/10.1155/2020/8844811

Research Article

Identification and Characterization of a Newly Isolated Chitinase-Producing Strain *Bacillus licheniformis* SSCL-10 for Chitin Degradation

Abirami Sasi,[1] **Nagarajan Duraipandiyan**,[2] **Kannan Marikani**,[3] **Sugapriya Dhanasekaran**,[4] **Noura Al-Dayan**,[5] **and Divya Venugopal**[4]

[1]*Department of Microbiology, Kamaraj College, Thoothukudi, India*
[2]*Department of Zoology, Kamaraj College, Thoothukudi, India*
[3]*Department of Zoology, V.H.N.S.N.College (Autonomous), Virudhunagar626001, TN, India*
[4]*Department of Medical Lab Sciences, College of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Wadi ad-Dawasir Campus, Saudi Arabia*
[5]*Department of Medical Lab Sciences, College of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Al Kharj, Saudi Arabia*

Correspondence should be addressed to Sugapriya Dhanasekaran; sughaphd@yahoo.com

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Chitinases or chitinolytic enzymes have different applications in the field of medicine, agriculture, and industry. The present study is aimed at developing an effective hyperchitinase-producing mutant strain of novel *Bacillus licheniformis*. A simple and rapid methodology was used for screening potential chitinolytic microbiota by chemical mutagenesis with ethylmethane sulfonate and irradiation with UV. There were 16 mutant strains exhibiting chitinase activity. Out of the chitinase-producing strains, the strain with maximum chitinase activity was selected, the protein was partially purified by SDS-PAGE, and the strain was identified as *Bacillus licheniformis* (SSCL-10) with the highest specific activity of 3.4 U/mL. The induced mutation model has been successfully implemented in the mutant EMS-13 (20.2 U/mL) that produces 5-6-fold higher yield of chitinase, whereas the mutant UV-11 (13.3 U/mL) has 3-4-fold greater chitinase activity compared to the wild strain. The partially purified chitinase has a molecular weight of 66 kDa. The wild strain (SSCL-10) was identified as *Bacillus licheniformis* using 16S rRNA sequence analysis. This study explores the potential applications of hyperchitinase-producing bacteria in recycling and processing chitin wastes from crustaceans and shrimp, thereby adding value to the crustacean industry.

1. Introduction

Shrimp production in India was estimated to be 700,000 tons in 2019, with the state of Tamil Nadu being one of the main producers. The seafood industry makes a significant contribution to the global food supply providing an essential source of protein. The commercialization of this aquaculture has generated economic profits while the wastes produced by these industries have had an adverse effect on the ecosystem [1, 2]. The global fish production is estimated to rise from 154 million tons in 2011 to 186 million tons in 2030 [3]. Approximately 5% of shrimp wastes are processed into flours and extracts which form a base for animal feed [4]. Shrimp wastes consist of 40% chitin, a polysaccharide made up of N-acetylglucosamine units [5] and a significant primary resource for the source of bioactive molecules [6].

Chitin is degraded most frequently by the chemical pathway to generate oligosaccharides. However, this involves adverse consequences such as processing costs and harmful effects on the ecosystem with the use of highly corrosive chemical reagents [7, 8]. On the other hand, the biotechnological pathway is an ecofriendly approach [9] where

IMPACT OF FINANCIAL LITERACY ON SAVINGS BEHAVIOUR OF YOUNG ADULTS IN VIRUDHUNAGAR DISTRICT

V. MUTHULAKSHMI[1] and Dr. M.JAISUN[2]

[1]Ph.D. Full Time Research Scholar

[2]Assistant Professor, Department of Business Administration,

V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar.

Abstract: The rapidly increasing awareness of the personal financial planning has drawn vast interests in financial services industry. People invest their assets and income efficiently so that their economic security is guaranteed, not only during their working life but also after their retirement. Most economists are with a belief that an increase in savings will raise the growth of economic performance and additionally strengthening the wealth of that particular country. In regard to savings behaviour, the necessity of savings amongst individuals varies from one another because of different mind-set, behaviour, knowledge, and social environment. Recently, a report stated that household debts in Virudhunagar district have gradually risen, as a result of that, total household savings remained insufficient and that they are extremely under prepared for retirement. What is more agonizing is that the young adults are said to be the main group caught into this financial complexity. This problem has raised alarm on the needs to educate the young adults the basic understanding of financial literacy in order to ensure adequacy of their future retirement income. The current study focuses on determining the impact of financial literacy on the savings behaviour among young adults in Virudhunagar district.

Key Words: Financial Literacy, Investment Decision, Financial Decision, Financial Planning, Savings Behaviour.

I. INTRODUCTION

Finance is the backbone of each and everyone whether individual, business or government. All individuals, business houses and government demand funds for operating their activities. According to The Australians Securities and Investments Commission (ASIC, 2003) and Noctor, Stoney, Stradling (1992), Financial literacy can be defined as the ability of an individual to generate informed judgments and to make effective decisions regarding the use and management of money. Financial literacy is defined as the possession of knowledge and understanding of financial matters and is primarily used in association with personal finance matters. Savings behaviour is the ability and practice of setting aside the excess of money or resources of profits or income one earns; being able to utilize resources wisely; becoming thrifty.

Indole-derived water-soluble N, O bi-dentate ligand-based mononuclear transition metal complexes: *in silico* and *in vitro* biological screening, molecular docking and macromolecule interaction studies

Alagarraj Arunadevi & Natarajan Raman

Pages 1499-1513 | Received 06 Mar 2019, Accepted 16 Apr 2019, Published online: 09 May 2019

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Abstract

A novel tryptophan-derived Schiff base ligand (potassium (E)-2-((4-chloro-3-nitrobenzylidene)amino)-3-(1H-indol-3-yl)propanoate) and a series of its transition metal complexes of the types [ML_2] and [$ML(1,10\text{-phen})_2$]Cl where M = Cu(II), Co(II), Ni(II) and Zn(II) were prepared. They were analyzed by various spectral and physicochemical studies. The XRD data were also used to determine the average lattice parameters and crystalline size of the compounds. All the synthesized compounds were tested against a series of five bacterial and fungal strains. The obtained results showed that the biological activity of free ligand was increased on complexation. PASS online software predicts the various biological activities of ligand such as enzyme inhibitor, antiviral, analgesic and antituberculosis. The *in silico* theoretical prediction of synthesized compounds is also deliberated by Swiss ADME predictor which gives the properties of molecular hydrophobicity (log P), topological polar surface area (TPSA) and oral bioavailability score. The binding energy of the docked molecule with macromolecules 1BNA and 3EQM is also determined by using Hex 8.0 software. The ligand has the least binding energy score which signifies that the potential of binding is greater in the receptor. Moreover, the interactions of complexes with DNA have been explored by electronic absorption titration, fluorescence emission titration, viscosity measurements and gel electrophoresis.

International Journal of Thin Films Science and Technology

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Influence of Molar Concentration on Nano Tin Disulphide Thin Films Grown by Spray Pyrolysis Technique

P. Gopalakrishnan[1,3,*], *L. Amalraj* [2] *and K. Vijayakumar* [1]

[1]Department of physics, H.H.Rajah's College, Pudukottai-622 001,Tamilnadu,India.
[2]Department of physics, V.H.N.S.N College, Virudhunagar-626001, Tamilnadu, India.
[3]Department of physics, P.S.R Engineering College, Sivakasi- 626 140, Tamilnadu, India.

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Abstract: Tin disulphide (SnS2) thin films has been prepared on glass substrates by chemical spray pyrolysis technique, using the precursor solutions of SnCl2.2H2O and thiourea with different molar concentration of 0.1 M – 0.4 M in steps of 0.1 M, at the substrate temperature of 548 K. The Structural properties have been determined by X-ray diffraction (XRD), and surface morphology have been observed on the surface of these films using Scanning Electron Microscope (SEM). The optical properties of the thin film deposited was obtained, using experimentally recorded absorption spectral data as functions of the wavelength in the range of 400– 800 nm at different molar concentrations. An analysis of the spectral absorption of the deposited film revealed optical direct and indirect band gap energy for SnS2 layer. A Fourier Transform Infrared Spectroscopy (FTIR) study confirms the presence of Sn–S bonds in SnS2 film in the molecular structure.
Keywords: Thin Flm, Diffraction, Optical, Absorption, Band Gap, Crystallite.

1 Introduction

Metal chalcogenides thin films have been extensively studied due to their potential application in electronic, optical and superconducting devices [1-2]. Tin chalcogenide belonging to IV–VI compound semiconductors has been attracting considerable interest in the field of photovoltaic energy conversion [3-7]. SnS_2 is considered to be one of the most useful group semiconducting tin chalcogenides, which has found applications in opto-electronic devices, a part of solar collectors. The different phases of tin sulfide compounds such as SnS, SnS_2, Sn_2S_3, Sn_3S_4, etc. due to versatile coordinating characteristics of tin and sulfur [8-10]. Each preparation technique has its own characteristics merits and demerits in producing a homogeneous and defect free thin film. Among them, spray pyrolysis method is principal to prepare tin disulphide thin film, which is low cost and can be used to deposit uniform coatings on a large surface area [6,20].Thin films of SnS_2 have been deposited using different techniques such as vacuum evaporation [11], electro- deposition [12], electroless deposition [13,14], chemical melt growth [15], chemical vapour deposition (CVD) [16], plasma-enhanced CVD [17] and spray pyrolysis [18,19]. Each preparation technique has its own characteristics merits and demerits in producing homogeneous and defect free thin film nano materials, and new preparation methods are being evolved to produce controlled size and shape of desired morphology. The intention of this present paper is to prepare and characterize the SnS_2 thin films with different molar concentrations using $SnCl_2$ and thiourea as a starting material by chemical spray pyrolysis technique.

2 Experimental Method

The precursor solutions of $SnCl_2.2H_2O$ and thiourea were dissolved separately in a solution containing deionised water and isopropyl alcohol in a proper ratio. A few drops of concentrated hydrochloric acid were added for a complete dissolution. Equal volume of these two solutions were mixed together and sprayed on the hot glass substrates with an area of 75 x 25 mm^2. The precursor solutions were sprayed at different molar concentration (0.1 M – 0.4 M in steps of 0.1 M) and their films were prepared. The gas pressure monitoring gauge was connected to the other side of the spray head. The spray head was allowed to move

*Corresponding author E-mail: daniepappu@gmail.com

Influence of Ni-Doping in ZnO Thin Films Coated on Porous Silicon Substrates and ZnO|PS Based Hetero-Junction Diodes

SURFACES, INTERFACES, AND THIN FILMS | Published: 03 June 2020
Volume 54, pages 634–640, (2020) Cite this article

V. L. Priya & N. Prithivikumaran

Abstract

Ni^{2+}-doped ZnO thin films were prepared for various Ni concentration on the porous silicon substrates. The residual stress in the ZnO thin film is relaxed with increase in the concentration of Ni. FESEM images show the growth of pillar-like nanostructures over the entire porous silicon substrates. The variation of resistivity due to UV illumination was observed for the Ni-doped ZnO thin films. Ideality factor value is less for the ZnO:Ni|PS hetero-junction diode than ZnO|PS hetero-junction, Ni doping in ZnO improves the rectifying behavior.

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INFORMATION LITERACY IMPACT ON MAGAZINE READING INTEREST OF SCHOOL STUDENTS OF VIRUDHUNAGAR: A CASE STUDY

B. Senthil Krishnan, Research Scholar, Department of Library and Information Science, Madurai Kamaraj University, Madurai
Dr.G.Amudha, Librarian, VHNSN College, Virudhunagar. :: libraryvhnsnc@gmail.com

Abstract
This paper reports the study conducted on the impact of information literacy on the magazine reading interest of school students of Virudhunagar. At the very outset of the study, the pre-test data was collected to know the existing level of magazine reading habits of the school students under study. The respondents were package (ILRP). Finally, the post-test data was collected from the respondents to find out the difference in the magazine reading interest of the students. The result of the study revealed that there is a big difference in the magazine reading interest of the respondents when compared the pre-test with that of the post-test data in quality as well as in quantity.

Keywords: *Information Literacy, Reading Habits, Magazines Reading Habits, School Students.*

Introduction

Besides the other information resources available abundantly in a variety of formats in this information age, magazines are also one of them which can provide with valuable and good information to the readers. Magazines are good sources of educational, political, personal, health care, entertainment, sports, choice of careers, environment, and current awareness information. Reading magazines regularly is beneficial for everyone but mostly for students. They can update and expand their existing knowledge. Thus, developing the habit of magazine reading among students right at the lower level of education is essential. The students should be aware of the different kinds of magazines available in the market and develop the interest to read them. In short, we can say that information literacy skills are important to be imparted to students right at school level or primary level of education so that they will be aware of different kinds of information resources available and will be able to correctly select the right choice of reading materials in order to expand their knowledge and thereby improve their reading habits.

Information Literacy

The term Information Literacy was first coined by Paul G.Zurkowski in 1974. The Association of College and Research Libraries (ACRL, 2000) defined Information Literacy as the ability to find out the needed information, access and retrieve o the needed information successfully, evaluate the retrieved information carefully and use it with proper understanding of its ethical and legal issues.

The UNESCO in its manifesto Information for all Programme (IFAP, 2008) defined that Information Literacy is the capacity of people to recognize their information needs, locate and evaluate the quality of information, store and retrieve information, make effective and ethical use of information and apply to create and communicate knowledge.

Information Literacy Skills

Competency in handling information-related problems which include-ability in identifying and accessing to the required information available in various source and channels and in various formats, ability to evaluate available information and fruitful utilization of the information with complete understanding and appreciation on the ethical and legal issues.

Objectives

The present study was carried out with the following objectives:

1) To find out the existing magazine reading habits of school students under study

Insight into the *in vitro* anticancer screening, molecular docking and biological efficiency of pyridine-based transition metal(II) complexes

Natarajan Raman, Ponnukalai Ponya Utthra & Thangapandi Chellapandi

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Abstract

The undesirable effects caused by the chemotherapeutic drugs are already in use, mainly the platinated compounds requiring amendments for which many potential scaffolds resembling the activity of cisplatin are explored. Herein, the DNA binding, cleavage, molecular docking, antimicrobial proficiency, and cytotoxic nature of four non-platinated transition metal(II) complexes incorporating pyridine moiety were investigated. The complexes adopted octahedral geometry, and the mode of interaction with DNA was explored by absorption spectroscopy, fluorescence spectroscopy, electrochemical technique, and viscosity measurements. These studies indicate a groove-binding mode of the complexes to CT DNA. The stability of the synthesized complexes was investigated at physiological pH. All the complexes exhibited single-strand scission of the supercoiled pBR322 DNA where copper(II) complex (**1**) showed double-strand DNA prominently by converting the supercoiled DNA to linear form. The antimicrobial screening of the complexes yielded expected results. The complexes selectively showed activity against cancer cell lines and less toxicity toward the noncancerous NHDF cell line. Overall, **1** showed superior activity in the biological investigation. These studies reveal that the coordination of transition metal(II) ion with the ligand plays a pivotal role in the enhancement of the biological potential of the complexes.

Article

Investigation on synthesis of SnO_2 nano-particles using sol–gel process for energy storage application

Sudha Periathai R., Pon Vengatesh R., Jeyakumaran N. & Prithivikumaran N.

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ABSTRACT

One of the greatest challenges in the twenty-first century is unquestionably energy storage. It is now essential that new, low-cost and environmentally friendly energy conversion and storage systems are to be found. Metals that store Lithium are the most appealing and competitive candidates for new types of anode (negative electrodes) in Lithium ion rechargeable batteries. SnO_2has been demonstrated to be one of the most promising anode materials for high performance Lithium-ion batteries (LIBs) due to its high theoretical specific storage capacity (782 mAh/g) as compared with the commercially used graphite. In the present work, secondary Li-ion battery was fabricated using SnO_2 nanoparticles synthesised by Sol-gel process as anode material without any surface modification. TEM analysis confirmed the nanometric size of the synthesised SnO_2 nanoparticles. Electrochemical impedance study has been carried out for the assembled cell of configuration SnO_2 electrode sheet/ 1 M LiPF6 PC:DME 1:1/ Li metal. The ohmic resistance (R_Ω) and the charge-transfer resistance (R_{ct}) are found to be 2.28Ω and 52Ω respectively.The Galvanostatic charge/discharge profile was studied at three current rates such as 0.44C, 0.88C and 1Cin the potential window between 0.1 V to 1.2 Vand their coulombic efficiencies were analysed.

KEYWORDS: SnO_2 | anode material | lithium-ion battery | sol–gel process

Chemical Physics Letters
Volume 745, 16 April 2020, 137285

Research paper

Iridium nanoparticles anchored WO_3 nanocubes as an efficient photocatalyst for removal of refractory contaminants (crystal violet and methylene blue)

M. Dhanalakshmi [a b], S. Lakshmi Prabavathi [b], K. Saravanakumar [b], B. Filip Jones [b], V. Muthuraj [b]

[a] Department of Chemistry, V. V. Vanniaperumal College for Women (Autonomous), Virudhunagar 626 001, Tamil Nadu, India
[b] Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar 626 001, Tamil Nadu, India

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Jatropha Oil Cake Based Activated Carbon for Symmetric Supercapacitor Application: A Comparative Study on Conventional and Hydrothermal Carbonization Processes

M. Siva Sankari, S. Vivekanandhan

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Graphical Abstract

The Jatropha oilcake was effectively converted into pristine and activated biocarbons employing conventional and hydrothermal carbonizations. Activation process enhanced the specific surface area of Jatropha oilcake based carbon materials, which showed higher specific surface area. The synthesized pristine and activated biocarbons were explored for supercapacitor applications. Activated biocarbon derived through hydrothermal carbonization showed highest specific capacity of 174.78 F/g.

Mathematical analysis of the Navier-Stokes equations for steady Magnetohydrodynamic flow

[1]V. Ananthaswamy*, [2]T. Nithya, , [3]V. K. Santhi

[1] Research Centre & PG Department of Mathematics, The Madura College, Madurai Tamil Nadu, India

[2]Department of Mathematics, V. H. N. Senthikumara Nadar College, Virudhunagar Tamil Nadu, India

[3]Department of Mathematics, Sri Meenakshi Govt. Arts college for women, Madurai Tamil Nadu, India

[*]Corresponding Author e-mail: ananthu9777@rediffmail.com

Abstract

The objective of this paper is to solve the Navier-Stokes equations for a steady magnetohydrodynamic (MHD) flow between two parallel porous plates. The q-Homotopy analysis method is exercised to solve the non-linear differential equation and the derived dimensionless velocity is plotted for varying parameters that influence the flow. The impact of the dimensionless function obtained using Q-Homotopy Analysis method is compared with the numerical solution graphically.

Key words:

Navier-Stokes equation; Angular velocity; Non-linear differential equations; *q*-Homotopy analysis method.

1. Introduction

In recent years, the flow of magnetohydrodynamic fluid between two parallel porous plate has become an important topic because of its wide range of applications in oil industry, MHD generators, MHD pumps, refinement of petroleum and so on. [2] in his work elaborated the features of a electrically conducting fluid that is treated in a homogenous magnetic field. The effect of heat transfer and transverse magnetic field were described by [4]. The impact of an unsteady flow of the fluid between two parallel plates plays a vital role in engineering field. This phenomenon was analyzed by[3], [5] to [7]. The effect of suction and injection on the unsteady flow was studied by [9]. The hall effect of the MHD flow was taken into account by [8]. With the knowledge of earlier works [2] to [11], [1] developed a model which gives the Navier-Stokes equations for steady magnetohydrodynamic flow between two parallel porous plates.

The main objective searched in this work is to apply the most important method for highly nonlinear problems, the well-known Q-Homotopy Analysis method to solve the Navier-Stokes equation given by [1] analytically. A comparison between the analytical results thus obtained and the numerical solution is provided graphically.

Mesoporous Gd_2O_3/NiS_2 microspheres: a novel electrode for energy storage applications

Published: 10 January 2020

Volume 31, pages 3119–3129, (2020) Cite this article

S. Dhanalakshmi, A. Mathi Vathani, V. Muthuraj, N. Prithivikumaran & S. Karuthapandian

Abstract

Development of novel Faradic electrode with excellent rate capability and long-lasting characteristics determines the performance of supercapacitor (SC) in current scenario. Rare-earth metal oxides have received considerable attention in SC domain with high volumetric energy density and capacitive performance. In this context, we have fabricated gadolinia/nickel sulphide nanocomposite via simple chemistry approach followed by two step hydrothermal method. Especially, the gadolinia/nickel sulphide nanocomposite synthesized in the current study offers high specific capacitance (354 F g^{-1} at a constant current density of 0.5 A g^{-1}), low charge transfer resistance (6.37 Ω) and outstanding cycle life (1.3% loss capacitance loss even after 5000 continuous charge/discharge cycles). Such enduring energy characteristics of gadolinia based nanocomposite will create a huge impact in the future energy storage systems

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Modification techniques to improve the capacitive performance of biocarbon materials

Natarajan Sumangala Devi, Muruganandham Hariram, Singaravelu Vivekanandhan

Sustainable Materials and Nanotechnology Lab (SMNL), Department of Physics, V. H. N. S. N. College (Autonomous), Virudhunagar, 626 001, Tamil Nadu, India

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MULTICULTURALISM IN THE SELECT PLAYS OF RABINDRANATH TAGORE

M.S. Pradeep
Assistant Professor, Department of English
VHN Senthikumara Nadar College, Virudhunagar

Abstract

The present study examines the select plays of Rabindranath Tagore under the literary dimension of American Sociologist, George Herbert Meed's Symbolic Interactionism. In other words, it is a frame of reference used in the present research to analyse how the literary characters interact with one another to create symbolic worlds, and in return, how these worlds shape human behaviours. Symbols are culturally derived social objects having shared meanings that are created and maintained in social interaction. Through language and communication, symbols provide the means by which the invisible language of self is comprehended and thereby, reality is constructed.

Keywords: culture, sociology, psychology, interactionism

Significance of the Present Study

The present paper examines the integration of sociological, psychological and literary domains in the select works of Tagore. Though early research has explored the extension of these interdisciplinary realms, no body of research has focused on Symbolic Interactionism from the characters' point of view in literature. Therefore, it is essential to address the actual psychological transformation that occurs in the personas of literatures in the process of interacting with the symbols and interpreting them in reality. Postmodern writings especially Indian discourse in English literature also demonstrates an exemplary responsiveness to self-complexity. A socio-cultural explanation is crucial to analyze the characterisation as well as its developmental conceptualization. Meed's concept of self and symbolic interactionism has more application to Tagore's psychological narratives its base of mythical representations.

The basic tenets of symbolic interactionism state that: (1) individuals act based on the meanings objects have for them; (2) interaction occurs within a particular social and cultural context in which physical and social objects (persons), as well as situations, must be defined or categorized based on individual meanings; (3) meanings emerge from interactions with other individuals and with society and (4) meanings are continuously created and recreated through interpreting processes during interaction with others (Blumer, 1969). The symbolic interactionism understands the human being as a thinking being who defines the environment where it acts. The environment does exist, but what matters is one's definition about it. These definitions do not occur occasionally, but as a result from the constant social and individual interactions. The environment with which the individual acts and interacts is symbolic. Symbols are produced through interaction and may or may not be altered in the course of the interaction.

Origin of the Study

One of the aims of literary text is to convey as much as possible in minimum words to achieve maximum impact on the readers. As a result, Tagore has employed a variety of significant symbols; those interact with one another on the basis of its Universal meanings and characters' manifestation. Their responses to one another depend on the interpretation of symbols rather than merely on the enactment of responses they have been conditioned to make. Thus, they engage in symbolic interaction. Ostensibly, the interdisciplinary and the patterns of symbolic interactions in Tagore's plays across both time and space make it a medium to understand human behaviours -artistic, aesthetic, literary, linguistic and social. The present study sees the relevance and significance of symbolic interactions as meaningful and progressive. The study is an attempt to perceive such human and non-

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"NANO MATERIAL AND ECOSYSTEM: POTENTIAL EFFECT AND INVOLVED PROCESS"

[1]S.UMA SUBBULAKSHMI

Ph.D Research scholar

Dept of Botany

V.H.N.Senthikumara Nadar College (Autonomous)

Virudhunagar-626001, Tamilnadu-India

umasuubulakshmi1985@gmail.com

[2]Dr.N.Nirmal kumar,

Assistant professor

[3]Dr.P.Mehalingam palanichamy

Assistant professor

Dept of Botany

V.H.N.Senthikumara Nadar College (Autonomous)

Virudhunagar-626001, Tamilnadu-India

S.UMA SUBBULAKSHMI, Dr.N.Nirmal kumar, "Nano Material and Ecosystem: PotentialEffect and Involved Process"-Palarch's Journal Of Archaeology Of Egypt/Egyptology17(6), ISSN 1567-214x

"Nano Material and Ecosystem: Potential Effect and Involved Process"

Abstract: *There is the decline of environmental quality due to human action and natural processes. The quality of the environment is degraded due to the erosion of natural ecosystems due to human or natural processes as well as depletion of resources like air, water, soil. According to the United Nations, environmental degradation is the decline in the ability to meet social and ecological goals and needs. There are many nano particles in the environment which has effects in both way i.e. potential positive effects and*

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NON-SPLIT PERFECT TRIPLE CONNECTED DOMINATION NUMBER OF SEMI PRODUCT OF PATHS AND CYCLES

G. MAHADEVAN[1], T. PONNUCHAMY, AND SELVAM AVADAYAPPAN

ABSTRACT. Recently the concept of non-split Perfect Triple connected domination number was introduced by G. Mahadevan et.al., and obtained many interesting results along with some product related graphs. A subset *S* of *V* of a non-trivial graph *G* is said to be non-split perfect triple connected dominating set, if *S* is a triple connected dominating set and <*V-S*> is connected and has at least one perfect matching. The minimum cardinality taken over all non-split perfect triple connected dominating sets in *G* is called the non-split perfect triple connected domination number of *G* and is denoted by $\gamma_{nsptc}(G)$. In this paper, we investigate this parameter for various semi product of paths and cycles

1. INTRODUCTION

By a graph we mean a finite, simple, connected and undirected graph G(V,E), where V denotes its vertex set and E its edge set. Unless otherwise stated, the graph G has p vertices and q edges. We denote a path on *m* vertices by P_m. The concept of triple connected graphs was introduced by J. Paulraj Joseph et.al., A graph G is said to be triple connected if any three vertices lie on a path in G. A dominating set S is said to be triple connected dominating set, if the sub graph <S> is triple connected. The minimum cardinality taken over all triple

[1]*corresponding author*

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Key words and phrases. Non-split perfect triple connected domination number, Cartesian product, Strong product, Semi Strong Product, Lexicographic product, Semi Lexicographic Product.

On the effective temperature of AlC molecular lines in sunspot umbral spectra

Original Article | Published: 30 September 2020
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R. Sindhan, P. Sriramachandran, R. Shanmugavel & S. Ramaswamy

Abstract

In the present work, a significant rotational lines of the $B^4\Sigma^- - X^4\Sigma^-$ (0, 0) band system of the AlC molecule were identified in high resolution FTS sunspot umbral spectra in the region from 22,450 to 22,600 cm^{-1}. Among the well-resolved identified lines, the rotational temperatures have been estimated to be 4018 K for photosphere and 3722 K for a hot umbra. Hence, the estimated effective rotational temperatures provide evidence for the possible presence of the AlC molecule in a sunspot umbra. The radiative transition parameters for $A^4\Pi^- - X^4\Sigma^-$ and $B^4\Sigma^- - X^4\Sigma^-$ systems of the AlC molecule have been estimated for experimentally known vibrational levels using the Rydberg–Klein–Rees (RKR) potential. The Franck-Condon (FC) factor of $B^4\Sigma^- - X^4\Sigma^-$ (0, 0) band system is most intense ($q_{v'v''} = 0.741$). For the $B^4\Sigma^-$ state, the radiative lifetime of $v' = 0$ level is found as 103.93 ns. The effective vibrational temperature of the $A^4\Pi^- - X^4\Sigma^-$ and $B^4\Sigma^- - X^4\Sigma^-$ band systems of the AlC molecule is 3981 K and 2706 K, respectively. Therefore, the effective vibrational temperature and radiative transition parameters help us to ascertain the possible presence of the AlC molecule in the solar atmosphere.

Optimization of a Liquid Culture System for Shoot Regeneration and Achieving an Enriched Level of Scopadulcic Acid B in the Leaf Organ Cultures of *Scoparia dulcis* L. by Response Surface Methodology

Plant Development/Regeneration | Published: 03 January 2020
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Gandhi Premkumar, Thirupathi Karuppanapandian, Chandran Sureshpandian, Neelakanda Arumugam, Avadayappan Selvam & Kaniappan Rajarathinam

Abstract

Response surface methodology (RSM) approach was utilized in the present investigation to optimize the constituents of Murashige and Skoog's (MS) liquid medium to enrich the scopadulcic acid B (SDB) content in *Scoparia dulcis* L. RSM approach using the central composite design (CCD) was employed to identify the precise concentration of growth regulators of medium and substantiated in shake-flask cultivation. CCD-RSM model revealed a strong agreement, with a predicted coefficient of determination (R^2) values of 0.881 and 0.872 for the shoot regeneration percentage (Y_1) and the average number of shoots per explant (Y_2), respectively. RSM predicted augmented conditions of MS liquid medium considerably influence the shoot proliferation (Y_1 and Y_2) in the leaf explants of *S. duclis*. The medium was fortified with 3.59 µM kinetin (KN; X_1), 6.00 µM 6-benzylaminopurine (BAP; X_2), 3.93 µM indole-3-acetic acid (IAA; X_3), and 25.84 g L^{-1} of sucrose (X_4). The present investigation conquered a maximal response of Y_1 and Y_2 with 91.28 ± 3.85 and 82.26 ± 2.13, respectively. The experimentally detected values are in close agreement with the predicted values of 90.07 and 79.70, respectively. This proposed that the developed design using CCD had efficacy in the optimization of medium components. The enhanced level of SDB, 9.89 ± 0.98 mg g^{-1} FW (*ca.* 5-fold), in the plantlets grown on liquid medium was significantly greater than those accomplished in the other tested plant tissues, comprises of field-grown parent plant leaves and *in vitro* developed callus and micropropagated plants on MS solid medium. For the first time, the methodology was developed effectively using RSM to promote the shoot proliferation and enhance the SDB production in the leaf organ culture of *S. dulcis* on MS liquid medium.

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Periconium sp. (endophytic fungi) extract mediated sol-gel synthesis of ZnO nanoparticles for antimicrobial and antioxidant applications

V. Ganesan [a], M. Hariram [b c], S. Vivekanandhan [b], S. Muthuramkumar [a]

[a] Department of Botany, V.H.N.S.N. College (Autonomous), Virudhunagar, 626001, Tamil Nadu, India
[b] Sustainable Materials and Nanotechnology Lab, Department of Physics, V.H.N.S.N. College (Autonomous), Virudhunagar, 626001, Tamil Nadu, India
[c] Department of Physics, Bharathidasan University, Palkalaiperur, Tiruchirappalli, 620024, Tamil Nadu, India

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RESEARCH ARTICLE OPEN ACCESS

Phyotochemical Properties of *Acalypha indica* (L), and its Antimicrobial Potential against Human Pathogens

V. Thamil Priya[1]*, N. Balasubramanian[2], V. Shanmugaiah[3] and C. Karunakaran[1]*

[1]Department of Chemistry, VHNSN College, Viruthunagar - 626 001, Tamil Nadu, India. [2]Department of Immunology, [3]Department of Microbial Technology, School of Biological Sciences, Madurai Kamaraj University, Madurai - 625021, Tamil Nadu, India.

Abstract

The present work has been investigated for important medicinal properties of *Acalypha indica* (L). *A. indica* crude extract was obtained, significant phytochemicals and antibacterial activity substance for the control of numerous antibiotic resistance bacteria such as *Escherichia coli, Salmonella typhi, Staphylococcus epidermidis, Bacillus cereus, Staphylococcus marcescens, Staphylococcus aureus, Streptococcus agalactiae, Streptococcus pyogenes* and *Streptococcus dysgalactiae*. Antibacterial activity of *A. indica* was performed using the crude extract on Muller- Hinton agar with and without 5% sheep blood by the well diffusion method. We found Ethanol is the most favorable solvent for maximum amount of *A. indica* extract followed by Acetone, however acetone has more antimicrobial activity. Furthermore, we found Benzene and Diethyl ether are low yielding solvent for *A. indica* extract. *A. indica* extract on antimicrobial activity showed remarkable activity in *S. typhi, B. cereus* followed by *S. epidermidis.* Eight, phytochemicals tested in *A. indica* extract showed the existence of tannin, saponin, alkaloid, flavonoid and phenol. Petroleum ether and ethyl acetate solvent (4.2:0.8), was most optimum for the separation of more compounds by TLC analysis. In *A. indica* four major spots were detected, of these, two major spots were scrabbled from the TLC plates and checked for antimicrobial activity against *B. cereus* pathogen. *B. cereus* was selected based on our preliminary results, which showed significant activity among other pathogens.

Keywords: *A. indica,* antimicrobial activity, crude extract, human pathogens, phytochemicals

***Correspondence:** bthamilpriya@gmail.com; ckarunakaran2000@gmail.com

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Polyaniline intercalated with $Ag_{1.2}V_3O_8$ nanorods based electrochemical sensor

Karunamoorthy Saravanakumar [a b], Vellaichamy Balakumar [c], Kadarkarai Govindan [d], Am Jang [d], Giehyeon Lee [b], Velluchamy Muthuraj [a]

[a] Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar 626 001, Tamil Nadu, India
[b] Department of Earth System Sciences, Yonsei University, Yonsei-ro 50, Sinchon-dong, Seodaemun-gu, Seoul 03722, Republic of Korea
[c] Department of Chemistry & National Centre of Excellence, MHRD, Thiagarajar College, Madurai 625 009, Tamil Nadu, India
[d] Graduate School of Water Resources, Sungkyunkwan University (SKKU), 2066 Seobu-ro, Jangan-gu, Suwon, Gyeonggi-do 16419, Republic of Korea

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Polyhydroxybutrate Production Using Groundnut Shell as Substrate by *Bacillus circulans* (MTCC 8167) †

Susithra K. [1], Ramesh U. [2], Kannan M. [3], Varatharaju G. [4], Premkumar G. [1], Rajarathinam K. [1,*]

[1] Department of Botany., V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar – 626 001
[2] Department of Molecular Biology, School of Biological Sciences, Madurai Kamaraj University, Madurai – 625 021
[3] Department of Zoology, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar – 626 001
[4] Department of Botany, Sri Kaliswari College (Autonomous), Sivakasi – 626 123
* Correspondence: krrathinam@yahoo.co.in;
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Abstract: Groundnut shell is considered to agro-industrial waste product and is rich in lignocellulose materials. It is obtained after the removal of groundnut seed from its pod and used as fodder for cattle. Duc *et al*., (2019) elaborately reviewed beneficial uses groundnut shells for commercial and industrial purposes and listed production of various bio-products such as biodiesel, bioethanol, and nano-sheet. The aim of this work was to study the production of polyhydroxy butyrate (PHB) using groundnut shells as the carbon source after hydrolysate. Groundnut shell was pre-treated with alkaline reagent with 0.5M, 1M, and 1.5M, of potassium hydroxide and acid hydrolysis with 30%, 50%, and 70%, of sulphuric acid. Combined alkali (1M of potassium hydroxide) and acid (70% sulphuric acid) pre-treatment of groundnut shell yield maximum reducing sugar. In addition, with pre-treated groundnut shell, various pH level (6, 7, & 8), KH_2PO_4 (100mg/l, 200mg/l and 300mg/l), and temperature (25^0C, 30^0C and 35^0C) are also test for PHB production. *Bacillus circulans* (MTCC 8167) significantly utilized the hydrolysate substrate and produced the maximum amount PHB (7.6 ± 0.2 g L^{-}l) with pH level 7 and 30^0C with 100mg/l of KH_2PO_4. A detailed study of the functional group was also done using FTIR and NMR. Through biochemical pre-treatment, an in-expensive groundnut shell was converted into a valuable bio-product in order to achieve the minimum waste production.

Keywords: Polyhydroxybutrate; Groundnut shell; Agro-industrial waste; lignocellulose.

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Conflicts of Interest

The authors declare no conflict of interest.

Journal of Hazardous Materials
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Reduction of hexavalent chromium and degradation of tetracycline using a novel indium-doped Mn_2O_3 nanorod photocatalyst

Manickavasagan Abinaya [a 1], Kadarkarai Govindan [b 1], Murugesan Kalpana [c], Karunamoorthy Saravanakumar [a], Seenivasan Laskhmi Prabavathi [a], Velluchamy Muthuraj [a], Am Jang [b]

[a] Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar 626 001, Tamil Nadu, India
[b] Graduate School of Water Resources, Sungkyunkwan University (SKKU), 2066 Seobu-ro, Jangan-gu, Suwon, Gyeonggi-do 16419, Republic of Korea
[c] Department of Engineering Design, Indian Institute of Technology Madras, Chennai 600 036, Tamil Nadu, India

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Spectroscopic, SOD, anticancer, antimicrobial, molecular docking and DNA binding properties of bioactive VO(IV), Cu(II), Zn(II), Co(II), Mn(II) and Ni(II) complexes obtained from 3-(2-hydroxy-3-methoxybenzylidene)pentane-2,4-dione

A Sakthivel [1], B Thangagiri [1], N Raman [2], J Joseph [3], Ramu Guda [4], Mamatha Kasula [4], L Mitu [5]

Affiliations + expand

PMID: 32794423 DOI: 10.1080/07391102.2020.1801508

Abstract

Novel macrocyclic Schiff base complexes [[ML]X; where M = Cu(II), Co(II), Ni(II), Zn(II), Mn(II) and VO(IV); L = macrocyclic ligand; X = Cl_2 and SO_4^{2-}] have been synthesized and characterized by microanalytical, ^1H, ^{13}C NMR, IR, Mass, UV-Vis, EPR spectral studies, as well as conductivity data. All the complexes exhibit square-planar geometry except vanadium complex. Magnetic susceptibility measurements and high conductance data reveal the monomeric and electrolytic nature of the complexes. Electronic absorption, cyclic voltammetry, viscosity measurements have been carried out on the interaction of the complexes with DNA. The results suggest that the complexes bind to DNA by intercalation *via* the aromatic ring of the macrocycle into the base pairs of DNA. Using gel electrophoresis experiment in the presence and absence of oxidant (H_2O_2) the nuclease cleavage activity of the complexes has been performed on plasmid DNA. The results demonstrate that most of the complexes have promising superoxide dismutase (SOD)-mimetic activity. The *in vitro* cytotoxicity of ligand and its complexes has also been evaluated against human breast and colon carcinoma cells. Binding interactions and energies of ligand and its metal complexes $[ML]^{2+}$ (M = VO(IV), Mn(II), Co(II), Ni(II), Cu(II), Zn(II)) against the receptors EGFR and HER2 are performed using the Auto dock module. Consequently, it is found that the ligand is strong inhibitor for EGFR and HER2 while [VOL]SO_4 is good inhibitor for EGFR and [ZnL]Cl_2 is moderate inhibitor for HER2. The antimicrobial activity of the ligand and its complexes against bacteria *Salmonella typhi*, *Staphylococcus aureus*, *Escherichia coli* and *Bacillus subtilis* and fungi *Aspergillus niger*, *Aspergillus flavus*, *Candida Albicans* and *Rhizoctonia bataicola*. The complexes have higher activities than the macrocyclic free Schiff base. Communicated by Ramaswamy H. Sarma.

Keywords: DNA cleavage; SOD; antimicrobial activities; intrinsic binding constant.

Journal of Environmental Chemical Engineering
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State of the art on the photocatalytic applications of graphene based nanostructures: From elimination of hazardous pollutants to disinfection and fuel generation

G. Mamba [a], G. Gangashe [a], L. Moss [a], S. Hariganesh [b], S. Thakur [c d], S. Vadivel [b], A.K. Mishra [a], G.D. Vilakati [e], V. Muthuraj [f], T.T.I. Nkambule [a]

[a] Nanotechnology and Water Sustainability Research Unit, College of Science, Engineering and Technology, University Of South Africa, Florida 1709, Roodepoort, Johannesburg, South Africa
[b] Department of Chemistry, PSG College of Technology, Peelamedu, Coimbatore, 641004 Tamil Nadu, India
[c] Institute of Materials Science of Kaunas University of Technology, Kaunas, Lithuania
[d] School of Chemistry, Shoolini University, Solan, Himachal Pradesh, India
[e] Department of Chemistry, University of Swaziland, Private Bag 4, Kwaluseni, M201, Swaziland
[f] Department of Chemistry, VHNSN College, Virudhunagar, 626001, Tamil Nadu, India

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Journal of Molecular Structure
Volume 1221, 5 December 2020, 128778

Structural, cytotoxicity and molecular docking studies of some quinoline schiff bases and their Pd(II), Mn(II) and Ru(II) complexes

M. Umadevi [a], V. Muthuraj [b], R. Vanajothi [c]

[a] PG& Research Department of Chemistry, Nehru Memorial College, Puthanampatti, Tiruchirappalli, Tamil Nadu, 621 007, India
[b] PG& Research Department of Chemistry, V.H.N.S.N.College, Virudhunagar, Tamil Nadu, 626 001, India
[c] Department of Zoology, Fatima College Madurai, Tamil Nadu, 625001, India

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Structural, Electrical, and Electrochemical Characterization of $Li_{1.2}Ni_{0.6-x}Mg_xCo_{0.3}O_2$ Cathode Materials for Application in Lithium-Ion Batteries

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Volume 49, pages 6622–6630, (2020) Cite this article

S. Abarna, R. Sudha Periathai, R. Pon Vengatesh & N. Prithivikumaran

Abstract

Lithium-rich nickel cobalt magnesium oxide cathode materials with varying concentrations of nickel and magnesium have been synthesized using a solid-state reaction (SSR) method. The structural properties of the as-synthesized cathode materials were analyzed by x-ray diffraction (XRD), confirming their α-$NaFeO_2$ layered structure in space group *R3m*. Scanning electron microscopy (SEM) study revealed the cube-like hexagonal structure of the prepared materials. Electrochemical impedance spectroscopy (EIS) was carried out in the frequency range from 1 Hz to 7 MHz with a voltage amplitude of 10 mV. At ambient temperature, the direct-current (DC) conductivity was found to be the highest for the $Li_{1.2}Ni_{0.6}Co_{0.3}O_2$ cathode material with a value of 3.64×10^{-4} S/cm. Various conducting mechanisms are proposed for the prepared cathode materials based on Jonscher's power law. The activation energy is seen to increase with increasing Mg concentration, which helps to produce a defect-less or ordered homogeneous structure. Furthermore, the value of the power-law exponent *n* is found to decrease with increasing Mg concentration. For the $Li_{1.2}Ni_{0.3}Mg_{0.3}Co_{0.3}O_2$ sample, the *n* value decreases with increasing temperature and is found to be less than 1 at higher temperatures, indicating the orderliness of the system. Cyclic voltammetry (CV) measurements confirmed that Mg substitution delayed the oxidation and reduction processes, thus enhancing the operating voltage of the electrochemical cell.

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Synthesis and characterization of novel nitrogen doped biocarbons from distillers dried grains with solubles (DDGS) for supercapacitor applications

Christoff Reimer[a], Michael R. Snowdon[a,b], Singaravelu Vivekanandhan[a,c], Xiangyou You[a,d], Manjusri Misra[a,b,*], Stefano Gregori[b], Deborah F. Mielewski[e], Amar K. Mohanty[a,b]

[a] Bioproducts Discovery and Development Centre (BDDC), Department of Plant Agriculture, University of Guelph, Crop Science Building, 117 Reynolds Walk, Guelph, Ontario N1G 1Y4, Canada
[b] School of Engineering, University of Guelph, Thornbrough Building, 80 South Ring Road E, Guelph, Ontario N1G 1Y4, Canada
[c] Sustainable Materials and Nanotechnology Lab, Department of Physics, V. H. N. S. N. College (Autonomous), Virudhunagar 626 001, Tamil Nadu, India
[d] Department of Bio-Resources Chemical & Material Engineering, Shaanxi University of Science & Technology, Longshuo Road, 8 Weiyang District, Xi'an 710021, Shaanxi, China
[e] Materials Science Department, Ford Research and Advanced Engineering Laboratory, Ford Motor Company, Dearborn, MI 48121, United States of America

ARTICLE INFO

Keywords:
Distiller's dried grains with solubles (DDGS)
Biocarbon
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ABSTRACT

Nitrogen doped biocarbon materials were effectively synthesised from distiller's dried grains with solubles (DDGS) using urea as the nitrogen source. The use of urea in the pre-treatment of DDGS on the fixation of elemental nitrogen in the biocarbon materials was investigated. Urea addition increases the nitrogen content in the obtained biocarbon, which is found to have 9.28 ± 0.67% for the DDGS:Urea weight ratio of 1:3. Physicochemical properties of the intrinsic and nitrogen doped biocarbon material were investigated by employing Raman and BET surface area analysis. Nitrogen rich biocarbon obtained using the DDGS:Urea weight ratio of 1:3 was taken for the fabrication of an electrochemical double layer capacitor. The fabricated symmetric supercapacitor with 2-electrode configuration showed the specific capacitance of 49.7 $F{\cdot}g^{-1}$ and 100.7 $F{\cdot}g^{-1}$ respectively for the intrinsic and nitrogen doped carbon materials at a current density of 0.5 $A{\cdot}g^{-1}$.

1. Introduction

Supercapacitors receive progressively more attention due to their large energy-storage densities, rapid charge/discharge rates and long cyclability (Li et al., 2015). Hence, they have been widely used for many applications, which include flexible and wearable electronics (Dubal et al., 2018), automotive (Kouchachvili et al., 2018), and electrical grid systems (Argyrou et al., 2018). A niche in which supercapacitors show promise is in the automotive sector, where supercapacitors display properties necessary for regenerative braking systems such as quick charge-discharge and good energy capacities (Frenzel et al., 2011). The electrochemical performances of the supercapacitors are mainly dependent on the physicochemical and morphological features of the electrode materials, which can be classified into three major categories such as carbon-based materials, transition metal compounds and conducting polymers (Deng et al., 2018). In particular carbonaceous materials that include activated carbons, carbon aerogels/xerogels, carbon nanofibers, carbon nanotubes and graphene have been extensively explored for the fabrication of supercapacitor electrodes (Q. Wang et al., 2016). Carbon materials exhibit many advantages for energy storage applications including, their eco friendliness, structural/morphological diversity, chemical stability against strong acids and bases, and relatively low cost (Frackowiak and Béguin, 2001). In addition to that, the amphoteric feature of the carbon materials leads to having inherent rich electrochemical properties at donor and acceptor levels (Frackowiak and Béguin, 2001). An effective capacitive and cycling performance of the supercapacitor can be attained through the high surface area and pores of the carbon materials and hence activated carbons are found to be the most promising (Frackowiak, 2007). Conventionally, the activated carbons are prepared from fossil resources. With the increasing concern over unsustainable production methods for high demand materials such as activated carbon, the production of environmentally-friendly alternatives to existing carbon-based technologies is a modern imperative (Snowdon et al., 2014).

As a result, the biocarbons (BioCs), which are the solid carbon

* Corresponding author at: Bioproducts Discovery and Development Centre (BDDC), Department of Plant Agriculture, University of Guelph, Crop Science Building, 117 Reynolds Walk, Guelph, Ontario N1G 1Y4, Canada.
E-mail address: mmisra@uoguelph.ca (M. Misra).

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Synthesis, Characterization and Antimicrobial Examination of Transition Metal Complexes from Curcumin Schiff Base and Chrysin as Co Ligands

J. Porkodi[1], M. Samuel[2] and N. Raman[2*]

[1]Department of Chemistry, SFR College for Women (Autonomous), Sivakasi.

[2]Department of Chemistry, V.H.N.Senthikumara Nadar College (Autonomous), Virudhunagar.

Abstract - A new series of transition mixed ligand complexes of Co(II), Ni(II), Cu(II) and Zn(II) were synthesized by incorporating curcumin Schiff base and flavonoid like chrysin as precursors. The structural features of the synthesized complexes had been explored by elemental analysis, UV-Vis, IR, mass and TGA spectral analyses and conductivity measurements. These spectral data support an octahedral geometry of the synthesized complexes. The low molar conductance value indicates the non-electrolytic nature of the synthesized complexes. All the synthesized complexes are examined for anti microbial activities using broth dilution method. MIC values of these synthesized complexes reveal that the complexes have better antimicrobial efficacy than the free ligand.

Keywords - Chrysin; Mixed ligand complexes; Schiff base; Antimicrobial efficacy.

1. INTRODUCTION

Molecules which are deployed from the biological active ingredients not only enhance their activity but also reduce their adverse effects. Innovation of peculiar and potential analogues from these ingredients plays a vital role in recent medicinal research fields. Among them, Curcumin, a diferuloylmethane yellow pigment extracted from turmeric (*Curcuma longa* L) exhibits potential against various dreadful diseases such as cancer, antitumoral, antimicrobial, anti-inflammatory, antioxidant, antihepatotoxic, antihyperlipidemic, antiviral, and anti-Alzheimer's diseases. Chrysin is present naturally in plants like passion flower, silver linden and also in honey (bee propolis (glue)) [1]. It is used for body building and for treating anxiety, inflammation, gout, HIV/AIDS, erectile dysfunction and baldness. It also exhibits antitumor effects [2,3]. Its solid metal complex needs much attention today because of its importance as a lead like molecule [4,5]. Over the past few decades on curcumin Schiff bases and its metal complexes are extensively studied because of their enhanced biological activity [6]. Metal complexes with two different binding ligands are known as ternary complexes or mixed ligand complexes. These complexes with biologically significant ligands are extensively considered because they act as models for metalloenzyme-substrate complexes [7].

Based on the literature survey and the above facts, a few mixed ligand complexes using the above biologically active flavonoids (curcumin and chyrsin) are synthesized. They have been characterized by UV-Vis, IR, mass and TGA analytical techniques. All the metal complexes are examined for antimicrobial activity using broth dilution method.

2. EXPERIMENTAL

2.1 Synthesis of mixed ligand metal complexes of flavonoids

Curcumin derived Schiff base was prepared as per our procedure reported previously in the literature [8]. About 1:1 ratio (5 mM) of the above synthesized curcumin derived Schiff base L_1 was stirred with metal(II) acetate [Cu(II)/Ni(II)/Co(II)/Zn(II)] in methanolic solution for *ca* 30 min. To this mixture, 5 mM of methanolic solution of chrysin (L_2) was added. The whole mixture was stirred for about 4 h. The obtained solid metal complexes was filtered, dried and recrystallized from hot ethanolic solution.

The obtained metal complexes were of type $[ML_1L_2H_2O]$, in 1:1:1 ratio (Ligand: metal: chrysin). The synthetic detail is presented in Scheme 1

Synthesis, characterization, ADMET, *in vitro* and *in vivo* studies of mixed ligand metal complexes from a curcumin Schiff base and lawsone

Porkodi Jeyaraman, Michael Samuel, Antonysamy Johnson & Natarajan Raman

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Abstract

Complexes are currently synthesized from plant origin because of their therapeutic effect against certain diseases with toxicity. Hence, in this work, four new transition metal(II) mixed ligand complexes have been synthesized using a curcumin Schiff base (primary ligand) and lawsone (as co-ligand). The geometry of these complexes was explored by elemental analyses, molar conductance, thermal analysis, magnetic moment values, IR, NMR, Mass, electronic and EPR spectral studies. Electronic absorption titrations, viscosity measurements and molecular docking studies reveal that all the metal complexes interact with the CT DNA by groove binding. Among all the complexes, the copper(II) complex (complex 1) exhibits a higher K_b value (3.5×10^{-4} M) which reveals that it has a strong binding efficiency toward the CT DNA. The complexes also possess strong DNA cleavage efficiency. Cytotoxicity investigations on *Artemia salina* show that all the complexes possess higher cytotoxic effect than the ligand. Moreover, all the metal complexes have better antimicrobial efficacy than the ligand. Swiss ADME, PASS and pkCSM online softwares are helpful to predict the pharmacokinetic and biological actions of the curcumin Schiff base. Theoretical results obtained from the *in silico* study are experimentally corroborated by *in vivo* anti-inflammatory screening study. All the above studies demonstrate that the copper complex possesses biological activity similar to that of the drug like molecules.

Research Article

Synthesis, spectral characterization, DNA-binding and antimicrobial profile of biological active mixed ligand Schiff base metal(II) complexes incorporating 1,8-diaminonaphthalene

Thiravidamani Chandrasekar, Alagarraj Arunadevi & Natarajan Raman

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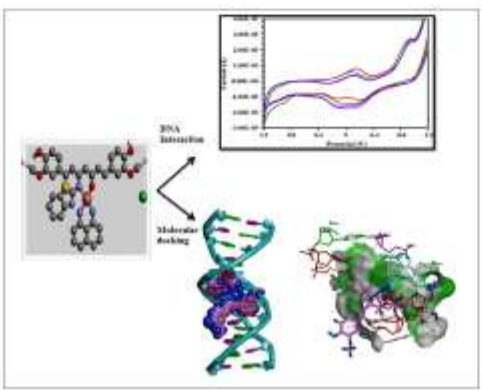
Abstract

Mixed-ligand complexes of bivalent metal ions, *viz*. Co(II), Ni(II), Cu(II), and Zn(II) of the composition [ML(dan)]Cl (where L = Schiff base ligand, dan = 1,8-diaminonaphthalene and M = Co(II), Ni(II), Cu(II), Zn(II)) have been synthesized and characterized. The stoichiometric ratio of the prepared complexes has been estimated using complementary techniques such as elemental analyses, FT-IR, UV-vis and EPR spectra, magnetic and molar conductivity measurements. The study shows that all the complexes have square planar geometry. The synthesized compounds have been tested *in vitro* against various types of pathogenic bacteria to weigh up their antimicrobial properties. They have lofty activity against the tested bacteria. The complexes have higher activity than the free ligands. The interaction of synthesized complexes with calf thymus DNA (CT-DNA) has been studied by absorption spectroscopic technique and viscosity measurements. The complexes show a successful interaction with CT-DNA *via* intercalation mode. In addition, molecular docking approach has been performed for predicting the binding free energy of the synthesized compounds with 1BNA receptor.



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LETTER

Tree diversity and carbon storage cobenefits in tropical human-dominated landscapes

Anand M. Osuri[1,2] | **Siddarth Machado**[3,4] | **Jayashree Ratnam**[4] | **Mahesh Sankaran**[4,5] | **N. Ayyappan**[6] | **S. Muthuramkumar**[7] | **N. Parthasarathy**[8] | **Raphaël Pélissier**[6,9] | **B. R. Ramesh**[6] | **Ruth DeFries**[10] | **Shahid Naeem**[10]

[1]The Earth Institute, Columbia University, New York, New York

[2]The Nature Conservancy, Arlington, Virginia

[3]School of Forest Resources and Conservation, University of Florida, Gainesville, Florida

[4]National Centre for Biological Sciences, Tata Institute of Fundamental Research, Bangalore, Karnataka, India

[5]School of Biology, University of Leeds, Leeds, UK

[6]Department of Ecology, French Institute of Pondicherry, Puducherry, India

[7]Department of Botany, V. H. N. S. N. College (Autonomous), Virudhunagar, Tamil Nadu, India

[8]Department of Ecology and Environmental Sciences, Pondicherry University, Puducherry, India

[9]AMAP Lab, IRD, CIRAD, CNRS, INRA, University of Montpellier, Montpellier, France

[10]Department of Ecology, Evolution, and Environmental Biology, Columbia University, New York, New York

Correspondence
Anand M. Osuri, Nature Conservation Foundation, 1311, "Amritha," 12th Main, Vijayanagar 1st Stage, Mysore 570 017, India.
Email: moanand@gmail.com

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Abstract

A lack of spatial congruence between carbon storage and biodiversity in intact forests suggests limited cobenefits of carbon-focused policies for conserving tropical biodiversity. However, whether the same applies in tropical human-dominated landscapes (HDLs) is unclear. In India's Western Ghats Biodiversity Hotspot, we found that while HDL forests harbor lower tree diversity and aboveground carbon stocks than relatively intact forests, positive diversity–carbon correlations are more prevalent in HDLs. This is because anthropogenic drivers of species loss in HDLs consistently reduce carbon storing biomass volume (lower basal area), and biomass per unit volume (fewer hardwood trees). We further show, using a meta-analysis spanning multiple regions, that these patterns apply to tropical HDLs more generally. Thus, while complementary strategies are needed for securing the irreplaceable biodiversity and carbon values of intact forests, ubiquitous tropical HDLs might hold greater potential for synergizing biodiversity conservation and climate change mitigation.

KEYWORDS

basal area, biodiversity conservation, carbon storage, climate change, forest degradation, meta-analysis, tree density, tropical forests, Western Ghats, wood density

Ultrasonics Sonochemistry
Volume 64, June 2020, 104913

Ultrasonic assisted fabrication of silver tungstate encrusted polypyrrole nanocomposite for effective photocatalytic and electrocatalytic applications

Abinaya Manickavasagan [a], Rajakumaran Ramachandran [b], Shen-Ming Chen [b], Muthuraj Velluchamy [a]

[a] Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar, India
[b] Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, Taiwan

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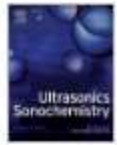

Ultrasonication and hydrothermal assisted synthesis of cloud-like zinc molybdate nanospheres for enhanced detection of flutamide

Ramachandran Rajakumaran [a], Manickavasagan Abinaya [b], Shen-Ming Chen [a], Karuppaiah Balamurugan [a], Velluchamy Muthuraj [b]

[a] Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No. 1, Section 3, Chung-Hsiao East Road, Taipei 106, Taiwan, ROC

[b] Department of Chemistry, VHNSN College (Autonomous), Virudhunagar, TN, India

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Under-Sample Binary Data Using CURE for Classification

T. Kathirvalavakumar, S. Karthikeyan & Rajendra Prasath

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Part of the Lecture Notes in Computer Science book series (LNAI,volume 11987)

Abstract

Classification is a major break-through in the field of research. The performance of a classifier is highly dependent on the preprocessing. Drawback with most of the classifiers is its performance. It always focuses on the class having a high number of samples and ignores the class having fewer numbers of samples. This problem is identified through state-of-the-art evaluation metrics. To overcome this problem, the data in imbalanced form are converted into balanced form before the classification process. In the proposed work, instead of balancing, samples are re-sampled with the help of cluster based technique CURE. It performs under-sampling by reducing the majority samples but not balancing with minority samples. The experimental results show that the data re-sampled through CURE performs better.

Keywords

K-means Cure Clustering Under-sampling Class imbalance

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CSR Practices of Financial Institutions for Sustainable Development in India – A Study

User's Satisfaction About Project Components Used In E-Governance Centres at Tuticorin District

R.Thanga Ganesh
Department of Business Administration,
V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar,
Tamil Nadu, India.
thangaa.ganesh@gmail.com

K.Pushpa Veni
pushpaveni@vhnsnc.edu.in

Abstract

Digital India leads the country towards fast, convenient and with cost effective service delivery of electronic services for the people. E-Governance centre is the junction, where the blank e-applications are filled for accessing government services. E-Governance is a universal digital platform for applying government certificate and schemes for the need of people. It is a sustainable government scheme for service delivery, where the people access their services at anywhere, anytime in the country. The researchers have attempts to study the people's perception about the project components used in e-Governance centre at the study area. The success of e-Governance service is purely depends on its well organizing committee and the selection of project components for the service delivery.

Key words: E-Governance, Digital governance, Project components, Service delivery, Entrepreneur, New public administration.

Introduction

Today, various applications are networked with information technology for rendering government services is incorporated with e-Governance system. In the past 12 years e-Governance have build a robust delivery model by expanding its service network across the rural and urban centre in India. 4 million rural people and 3 million urban people utilized various services including certificates, landholding records, taxations utility bills and for education. E-Governance system creates an opportunity to enhance a quality of life by distributing the government services and schemes electronically to its end users. E-Governance is an IT enabled front-end delivery system. The Director of software solutions private limited is the authorized chair person to design electronic service delivery software, select the service agents, employee, and the way of service delivery for the people. This system is acting as a change agent to promote entrepreneurship and enable community in digital participation.

WORKPLACE ENHANCES HAPPINESS AT WORK A STUDY WITH LOCKDOWN DUE TO COVID-19

*Mrs.K.Jotheswari, **Dr.D.Vijayalakshmi
Part Time Research Scholar in the Research Department of Management studies, Imayam College of Arts and Science, Thuraiyur, Trichy Affiliated to Bharathidasan University
Research Supervisor, Principal, Imayam College of Arts and Science, Thuraiyur, Trichy Affiliated to Bharathidasan University

"When work is a pleasure, life is joy;
When work is a duty, life is a slavery."
- Maxim Gorky

Abstract
This paper is an attempt to study the workplace happiness in the new normal working environment among IT employees. 'Work environment' refers to the circumstances of the employees within which the work has to be done. It may be the physical environment, people working together, relationship with these people, technology and facilities provided for working, roles and responsibilities of the employees etc., Work environment is the place where the employees are supposed to get things done allotted to him. This paper studies about the challenges ad changes faced by the IT employee due the changes in the work environment during this lockdown due to COVID-19. When there is a conducive working environment, the employee enjoy the amenities and the circumstances. It also acts as one of the determinant of happiness of employees at work. Work environment is one of the important source of happiness. The sample size taken was 158. Questionnaires has been mailed to the IT employees from various firms, responses recorded and analysis has been done to understand the changes and challenges of working environment and its impact on happiness at work.

Keywords Work environment, IT Industry, Lockdown, Workplace happiness, Happiness at work

Introduction

Being happy is a fundamental human need and is crucial to business performance. Happiness at work is an "Attitudinal outcome" and "Quality of life at work". Notions of happiness are central to organizational research (Fischer, 2010). Happiness at Work is a challenging and unusual concept in the business and academic world.. Happiness at Work is an attitudinal concept that measures employees' quality of life at work that is why we focus on HAW, not on engagement, involvement, job satisfaction or other concepts related to HAW. "Happiness is the state in which the employees have achieved satisfaction and sense of fulfillment with the almost all important aspects of work. Salas Vallina(2017) identifies happiness at work as strong and vigorous feeling of an employee at work. Fisher (2010) asserted the definition of workplace happiness as a construct that reflects pleasant judgments (positive attitudes), pleasant experiences (positive feelings, moods, emotions, flow states) or positive affective experience in the workplace. In Pryce-Jones' (2011) book, "Happiness at work: Maximizing your psychological capital for success", workplace happiness was described as "a mindset which allows you to maximize performance and achieve your potential." Thus according to Pryce Jones, workplace happiness is a emotional and psychological feeling of fulfillment and state of joy that they have received whatever they wanted and needed at work. When all the factors are fulfilled, the employees are happy at mind, so that they can achieve the desire targets and performance. Happier workers do help their company boost performance. Myers and Diener (1995) define "happiness" in general as the experience of high - frequent positive affect, low - frequent negative affect, and an overall life satisfaction. Workplace happiness is also quoted as work-happiness or happiness at work. Čaplánová, A.,et al 2009 formulates an equation for happiness that is.,

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வள்ளுவன் கண்ட (ஒரே) தொழில்
The Only Occupation Seen by Thiruvalluvar

முனைவர் கா.ஸ்ரீதர், உதவிப்பேராசிரியர், வி.இ.நா.செ.நா.கல்லூரி, விருதுநகர்.
Dr.K.Sridhar, Assistant Professor of Tamil, VHNSN Colllege, Virudhunagar,
ORCiD: https://orcid.org/0000-0003-3243-8149
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Abstract

The first occupation of humanity is Ploughing. The one and only occupation described by 'POIYAMOZHI PULAVAN' valluvan is Ploughing. The farmers explained by Valluvan lived like – 'Irappar' 'Irapparkku onru Evaar','Uzhuthundhu valvarre Valvar' ('farmers are the ones who gives food to the people otherwise they die', 'the one who thinks farming is divine could do the famimg in life'). But in this 21 st century, the government ignores the peasants. The traders fix the price for the cultivated products of the farmers. The loss of income due to the natural disaster, lack of income for labour, lack of value in the society make the educated young generation of farmers look for some other fields other than cultivation. This article aims at explaning the solution for the above.

Keywords: Occupation, Farming, Thiruvalluvar

அறிமுகம்

உலகிற்குத் தமிழைப் பறை சாற்றி வரும் பல அடையாளங்களுள் குறிப்பிடத்தக்க ஒன்றாய் திருக்குறள் திகழ்கிறது. இது தனிமனிதன் முதல் மாபெரும் வேந்தன் வரை அனைவரும் பின்பற்ற வேண்டிய இன்றியமையாத கருத்துகளைக் கொண்டுள்ளது. திருக்குறளின் உள்ளடக்கத்தையும் பயன்பாட்டையும் அறிந்தே வெள்ளிவீதியார் இதை, '**பொய்யா மொழி**', என்று சுட்டியுள்ளார். அந்த அடைமொழிக்கேற்ப காலம் கடந்தும் பொய்த்துப் போகாமல் நிலைபெற்று இருக்கும் திருக்குறள் உழவுத்தொழில் தவிர்த்து வேறு எந்தத் தொழிலையும் குறிப்பிடவில்லை. அதிகாரத்தை நிரல்படுத்திய அறிஞர்களும் '**குடிசெயல்வகை**'யை அடுத்து '**உழவு**' அதிகாரத்தை வைத்துள்ளனர். மேலும் '**உழவு**' இல்லையேல் சமூகத்தில் '**நல்குரவு**' ஏற்படும் என்பதை இலைமறைக் காயாய், நுண்ணிதின் உணர்த்தவே உழவு அதிகாரத்தைத் தொடர்ந்து நல்குரவு இடம்பெற்று இருக்கிறதோ என்று எண்ணுவதற்கு வாய்ப்பாக உள்ளது. குறள் விவரித்துள்ள (ஒரே) தொழிலின் மேன்மையையும் முக்கியத்துவத்தையும் நிகழ்காலத் தேவைக்கேற்ப காணவேண்டிய மாற்றங்களையும் விவரிப்பதாக இவ்வாய்வு அமைகிறது.

முதல் தொழில் / முதன்மைத் தொழில்

உழவு, தொலைநோக்குப் பார்வையில் சேவையாகவும் பொருளாதாரப் பின்புலத்தில் தொழிலாகவும் திகழ்கிறது. பழங்கால மனிதன் நிலையான இருப்பிடத்தை ஏற்படுத்திக் கொள்ளாமல்

Document details - An Analysis of the B³Π ₂– X³Δ ₂ (0, 0) Band System of the TiO Molecule in Laboratory and Sunspot Spectra

Solar Physics

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An Analysis of the $B^3\Pi_2$– $X^3\Delta_2$ (0, 0) Band System of the TiO Molecule in Laboratory and Sunspot Spectra(Article)

Sriramachandran, P., Priyadharshini, D., Ashraf Shiddeeqaa, N., Shanmugavel, R.

Physics Research Centre, VHNSN College, Virudhunagar, Tamilnadu 626001, India

Abstract

The $B^3\Pi_2$– $X^3\Delta_2$ (0, 0) band system of the titanium monoxide (TiO) molecule was excited in a DC copper arc with a constant deviation spectrometer. The resulting spectrum has been analyzed using image J software. Relative intensity measurements of the P- and R-branch molecular lines of the (0, 0) band with rotational quantum (J) numbering have been obtained. The measured intensity of rotational molecular lines and the J numbering were used to estimate the excitation rotational temperature of the source emitting the spectrum of TiO molecules. Also the presence of TiO spectral lines of the $B^3\Pi_2$– $X^3\Delta_2$ (0, 0) band in the wavenumber region of 14 500 to 16 000 cm^{-1} has been confirmed in the umbral spectrum, from the atlases recorded at the National Solar Observatory using the Fourier transform spectrometer (FTS) of the McMath-Pierce Solar Telescope on Kitt Peak. The combined laboratory and sunspot spectral line measurements have been used to obtain the improved molecular structure parameters for the electronic states $B^3\Pi_2$ and $X^3\Delta_2$ of the TiO molecule. Using equivalent width measurements of well resolved and identified lines in the sunspot spectrum with known rotational quantum number, the effective rotational temperature was found to be 2555 ± 780 K. This proves the presence of TiO molecules in sunspot and other higher temperature astrophysical sources. © 2020, Springer Nature B.V.

Author keywords

Emission spectrum | Molecular parameters | Rotational lines | Rotational temperature | Sunspots

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Sriramachandran, P.; Physics Research Centre, VHNSN College, Virudhunagar, Tamilnadu, India;

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Document details - Synthesis, structural, pharmacological and molecular docking simulations studies of some transition metal complexes

Inorganic Chemistry Communications

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Synthesis, structural, pharmacological and molecular docking simulations studies of some transition metal complexes(Article)

Soundaranayaki, V., Kulandaisamy, A., A.Arunadevi

[a]Department of Chemistry, Raja Doraisingam Government Arts College, Sivagangai, 630 561, India
[b]Department of Chemistry, Government Arts and Science College, Sivakasi, 626124, India
[c]Department of Chemistry, VHNSN College, Virudunagar, 626 001, India

Abstract

Neutral [CuL_2], [NiL_2], [CoL_2], [MnL_2] and [ZnL_2] complexes were synthesized using Schiff base derived from Benzalidene-4-imino-2,3-dimethyl-1-phenyl-3-pyrazolin-5-one and tyrosine. All the compounds were characterized by elemental analysis, magnetic susceptibility, ESI-Mass spectra, Powder XRD, SEM, FTIR, UV–Vis., ^{1}H & ^{13}C NMR, EPR and Cyclic voltammogram techniques. The general formula of the complexes [ML_2] was confirmed by analytical data and ESI-mass spectra. The polycrystalline nature of the complexes was proved by powder XRD and surface morphology studies ensure that the complexes exist in nano size grain. The octahedral geometry of synthesized complexes was examined by magnetic susceptibility measurements and electronic absorption spectra. ESR parameters of copper complex clearly indicate that the complex is axially elongated octahedral geometry. Pharmacological activities like analgesic, antipyretic, anti-inflammatory and CNS activities of Schiff base and its metal complexes were studied using albino mice which show that chelates have higher activities than free ligand. The good antioxidant activity of chelates was observed through DPPH free radical scavenging assay method. The antimicrobial activities of Schiff base and its complexes reveal that the complexes have superior antimicrobial activity than Schiff base. The DNA binding interaction study of [CuL_2] by UV–Vis. spectroscopy shows the strong binding of [CuL_2] complex on DNA with high binding constant value ($K_b = 7.4 \times 10^5$) and the respective binding occurs through intercalation mode. The prediction of activity spectra of substance (PASS) expounds the drug-like nature of the compound. The in silico ADMET studies expose that Schiff base acquires enhanced biological potential. This was further confirmed by molecular docking studies of complex with DNA and (PDB ID: 6COX) protein. © 2020 Elsevier B.V.

Author keywords

Anti-inflammatory | Antimicrobial activity | Antioxidant assay | Antipyretic activity | ESR spectra | Molecular docking simulations studies | Schiff base | Transition metal chelates

Funding details

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Kulandaisamy, A.; Department of Chemistry, Government Arts and Science College, Sivakasi, India;

Document details - Fabrication of Novel ZnSeO₃ Anchored on g-C₃N₄ Nanosheets: An Outstanding Photocatalyst for the Mitigation of Pesticides and Pharmaceuticals

Journal of Inorganic and Organometallic Polymers and Materials

Volume 30, Issue 11, 1 November 2020, Pages 4664-4676

Fabrication of Novel $ZnSeO_3$ Anchored on g-C_3N_4 Nanosheets: An Outstanding Photocatalyst for the Mitigation of Pesticides and Pharmaceuticals(Article)

Moorthy, S., Moorthy, G., Swaminathan, K.

[a]Department of Chemistry, VHNSN College (Autonomous), Virudhunagar, 626001, India
[b]Department of Chemistry, Seethalakshmi Achi College for Women, Pallathur, 630107, India

Abstract

In the scope, the developed novel $ZnSeO_3$/g-C_3N_4 nanocomposites and characterized in detail. Interestingly, the as prepared nanocomposites examined for the detoxification of organic pollutants like methyl parathion (MP) and cefuroxime drug (CF) under Visible light irradiation. The synthesized $ZnSeO_3$/g-C_3N_4 nanocomposites were characterized by various techniques such as X-ray diffraction (XRD), fourier transform infra-red (FTIR), UV–Vis diffuse reflectance spectra (DRS/UV–Vis), scanning electron microscopy (SEM), transmission electron microscopy (TEM), and energy dispersive X-ray spectra (EDX). The photocatalytic studies carried out by UV–Visible Spectroscopy it was exhibited that $ZnSeO_3$/g-C_3N_4 nanocomposites photocatalyst was a superior photocatalytic performance with the degradation efficiency of an analytic solution of MP and CF observed about 120 mins and 80 mins. The reactive oxidative species are ·OH radical and superoxide radical $O_2^{\bullet-}$ involved in the photocatalytic reaction under the source of visible light irradiation by trapping experiments. After the completion of degradation process, the photocatalyst was reused by centrifugation method. The reusability of photocatalyst was highly stable up to eighth cycle. Graphical Abstract: [Figure not available: see fulltext.]

Author keywords

Antibiotics | g-C_3N_4 | Pesticides | Photodegradation | $ZnSeO_3$

Indexed keywords

Engineering controlled terms: Degradation | Detoxification | Fourier transform infrared spectroscopy | Free radicals | High resolution transmission electron microscopy | Irradiation | Light | Nanocomposites | Organic pollutants | Photocatalytic activity | Reusability | Scanning electron microscopy | Zinc compounds

Engineering uncontrolled terms: Degradation efficiency | Diffuse reflectance spectrum | Energy dispersive x-ray | Fourier transform infra reds | Photocatalytic performance | Photocatalytic reactions | Reactive oxidative species | Visible-light irradiation

Engineering main heading: Selenium compounds

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Swaminathan, K.; Department of Chemistry, VHNSN College (Autonomous), Virudhunagar, India;

Document details - Enhanced photoactivity of cerium tungstate-modified graphitic carbon nitride heterojunction photocatalyst for the photodegradation of moxifloxacin

Journal of Materials Science: Materials in Electronics

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Enhanced photoactivity of cerium tungstate-modified graphitic carbon nitride heterojunction photocatalyst for the photodegradation of moxifloxacin(Article)

Prabavathi, S.L., Saravanakumar, K., Nkambule, T.T.I., Muthuraj, V., Mamba, G.

[a]Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar, Tamil Nadu 626 001, India
[b]Nanotechnology and Water Sustainability Research Unit, College of Science, Engineering and Technology, University of South Africa, Florida, Johannesburg, 1709, South Africa

Abstract

Design and optimization of visible-light-driven photocatalysts for degradation of organic pollutants is an important step towards environmental decontamination. In this study, wolframite cerium tungstate ($Ce_2(WO_4)_3$, (CW)) hybridized with g-C_3N_4 (CN) nanosheets was synthesized via a simple hydrothermal route followed by an ultrasound-assisted synthesis method. The prepared $Ce_2(WO_4)_3$@ g-C_3N_4 (CW@CN) heterojunction was investigated for photocatalytic degradation of the antibiotic moxifloxacin (MXF) under visible light irradiation. Structural, morphological, and optical properties as well as chemical composition of the as-synthesized heterojunction were investigated by transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS), X-ray diffraction (XRD), UV–Vis diffuse reflectance spectroscopy (UV–Vis DRS) and photoluminescence (PL). MXF photocatalytic degradation by the binary nanostructure ($Ce_2(WO_4)_3$@ g-C_3N_4) (94.1%) was the highest compared to g-C_3N_4 (53.6%) and $Ce_2(WO_4)_3$ (46.4%). Such enhanced activity could be ascribed to efficient suppression of the charge carriers' recombination, leading to adequate formation of the reactive species responsible for MXF degradation. Furthermore, the $Ce_2(WO_4)_3$@ g-C_3N_4 heterojunction showed remarkable stability over five consecutive cycles, with only 11.5% reduction after the 5th cycle. This work established the potential applicability of $Ce_2(WO_4)_3$@ g-C_3N_4 nanostructures towards photocatalytic removal of MXF. © 2020, Springer Science+Business Media, LLC, part of Springer Nature.

Indexed keywords

Engineering controlled terms: Carbon nitride; Cerium compounds; Heterojunctions; High resolution transmission electron microscopy; Hydrothermal synthesis; Light; Nanostructures; Optical properties; Organic pollutants; Photocatalytic activity; Tungsten compounds; X ray photoelectron spectroscopy

Engineering uncontrolled terms: Chemical compositions; Design and optimization; Diffuse reflectance spectroscopy; Hydrothermal routes; Photo catalytic degradation; Photo-catalytic removal; Visible light driven photocatalysts; Visible-light irradiation

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Muthuraj, V.; Department of Chemistry, V. H. N. Senthikumara Nadar College (Autonomous), Virudhunagar, Tamil Nadu, India;

Document details - An attempt of identification of barium hydride molecular lines in sunspot umbral spectra

New Astronomy

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An attempt of identification of barium hydride molecular lines in sunspot umbral spectra(Article)

Karthikeyan, B., Shanmugapriya, G., Rajamanickam, N., Bagare, S.P.

[a]Department of Physics, Mepco Schlenk Engineering College, Sivakasi, 626 005, India
[b]Department of Physics, V.V.V College for Women, Virudhunagar, 626 001, India
[c]Research and Development Centre, Bharathiar University, Coimbatore, 641 046, India

View additional affiliations

Abstract

A high-resolution sunspot umbra spectrum recorded in National Solar Observatory, Kitt Peak in the visible and infrared wave number range 13, 600 – 25, 000cm^{-1} was taken in the present study for identifying the rotational lines of barium hydride (BaH) molecule. Number of chance coincidences was evaluated for the A $^2\Pi_{1/2}$ – X $^2\Sigma$ ((0,0), (1,1), (2,2), (1,0), (2,1)), A $^2\Pi_{3/2}$ – X $^2\Sigma$ ((0,0), (1,1), (2,2)), B $^2\Pi_{1/2}$ – X $^2\Sigma$ (0,0), B $^2\Pi_{3/2}$ – X $^2\Sigma$ (0,0), C $^2\Sigma$ – X $^2\Sigma$ ((1,1), (1,0), (2,2), (2,1), (3,2)) and D $^2\Sigma$ – X $^2\Sigma$ ((1,0), (2,0), (3,0), (4,0), (5,0), (8,0), (9,0)) band systems of BaH using line identification procedure. The obtained number of chance of coincidences was compared with I- parameter values. The highly resolved rotational lines were chosen to evaluate equivalent widths using triangle approximation method. The effective rotational temperatures were calculated for the bands (0,0), (1,1), (2,2) and (2,1) of A $^2\Pi_{1/2}$ – X $^2\Sigma$, (0,0) (1,1) and (2,2) of A $^2\Pi_{3/2}$ – X $^2\Sigma$, B $^2\Pi_{1/2}$ – X $^2\Sigma$ (0,0) and B $^2\Pi_{3/2}$ – X $^2\Sigma$ (0,0) of BaH molecule. The rotational temperature values calculated for these bands were found to be in the range 1185 – 3514 K. They were also compared with the already reported sunspot temperatures. © 2020

Author keywords

BaH molecule | Line width | Rotational temperature | Sunspot spectrum

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Karthikeyan, B.; Department of Physics, Mepco Schlenk Engineering College, Sivakasi, India;

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Document details - Corrigendum to “Periconium sp. (endophytic fungi) extract mediated sol-gel synthesis of ZnO nanoparticles for antimicrobial and antioxidant applications” (Materials Science in Semiconductor Processing (2020) 105, (S1369800119312259), (10.1016/j.mssp.2019.104739))

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Corrigendum to “Periconium sp. (endophytic fungi) extract mediated sol-gel synthesis of ZnO nanoparticles for antimicrobial and antioxidant applications” (Materials Science in Semiconductor Processing (2020) 105, (S1369800119312259), (10.1016/j.mssp.2019.104739))(Erratum)

Ganesan, V., Hariram, M., Vivekanandhan, S., Muthuramkumar, S.

[a]Department of Botany, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu 626001, India
[b]Sustainable Materials and Nanotechnology Lab, Department of Physics, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu 626001, India
[c]Department of Physics, Bharathidasan University, Palkalaiperur, Tiruchirappalli, Tamil Nadu 620024, India

Original document

Periconium sp. (endophytic fungi) extract mediated sol-gel synthesis of ZnO nanoparticles for antimicrobial and antioxidant applications
(2020) Materials Science in Semiconductor Processing, 105, Article number 104739

Abstract

The authors regret that they made a mistake in mentioning the name of the fungus as “Periconium sp”, which needs to be correctly read as “Periconia sp.” throughout the article, including the title. The authors would like to apologise for any inconvenience caused. © 2020 Elsevier Ltd

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Muthuramkumar, S.; Department of Botany, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu, India;

Document details - Innovation of Novel Stone-Like Perovskite Structured Calcium Stannate (CaSnO₃): Synthesis, Characterization, and Application Headed for Sensing Photographic Developing Agent Metol

ACS Sustainable Chemistry and Engineering

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Innovation of Novel Stone-Like Perovskite Structured Calcium Stannate ($CaSnO_3$): Synthesis, Characterization, and Application Headed for Sensing Photographic Developing Agent Metol(Article)

Muthukutty, B., Krishnapandi, A., Chen, S.-M., Abinaya, M., Elangovan, A.

[a]Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No. 1, Section 3, Chung-Hsiao East Road, Taipei, 106, Taiwan
[b]Department of Chemistry, VHNSN College (Autonomous), 3/151-1, College Road, Virudhunagar Tamil Nadu, 626001, India
[c]Department of Chemistry, Thiagarajar College, 139, Teppakulam West St, Kamarajar Salai, Madurai Tamil Nadu, 625009, India

Abstract

Inorganic perovskite-based alkaline earth oxide materials for electrochemical sensing devices are an unwrapped research field yet to be studied. Herein, we designed a novel perovskite-type calcium stannate ($CaSnO_3$) material with stone-shaped structural morphology synthesized by a simple coprecipitation method with the aid of urea and utilized as an electrocatalyst for the electrochemical detection of photographic developing agent metol (MT). The synthesized $CaSnO_3$ was systematically characterized with the help of X-ray diffraction (XRD), Raman, Fourier-transform infrared spectroscopy (FT-IR), field emission scanning electron microscopy (FESEM), energy-dispersive X-ray spectroscopy, elemental mapping analysis, high resolution transmission electron microscope (HR-TEM), and electron spectroscopy for chemical analysis (ESCA). Furthermore, the electrochemical property of $CaSnO_3$ was examined by cyclic voltammetry and differential pulse voltammetry techniques. As a result, $CaSnO_3$ modified with a glassy carbon electrode ($CaSnO_3$/GCE) implies better electrocatalytic activity with an enhanced redox peak response, wider linear range (0.01-123 μM), lower detection limit (0.003 μM), and appreciable sensitivity toward the detection of MT. In addition to that, the $CaSnO_3$ modified electrode has excellent selectivity with the existence of potentially interfering compounds such as cationic/anionic species and biological substances. Moreover, the $CaSnO_3$ modified electrode has better reproducibility, repeatability, and storage stability. Further, the practical viability of the synthesized $CaSnO_3$ was investigated by using lake water as a real sample, revealing reasonable recovery results. © 2020 American Chemical Society.

Author keywords

Differential pulse voltammetry technique | Metol | Perovskite $CaSnO_3$ | Photographic developing agent | Redox behavior

Indexed keywords

Engineering controlled terms: Alkalinity | Calcium | Chemical detection | Cyclic voltammetry | Electrocatalysts | Electron spectroscopy | Energy dispersive spectroscopy | Field emission microscopes | Fourier transform infrared spectroscopy | Glass membrane electrodes | High resolution transmission electron microscopy | Perovskite | Scanning electron microscopy | Spectrum analysis | Urea

Engineering uncontrolled terms

Differential pulse voltammetry techniques | Electron spectroscopy for chemical analysis | Energy dispersive X ray spectroscopy | Field emission scanning electron microscopy | Fourier transform infra red (FTIR) spectroscopy | Metol | Photographic developing agents | Redox behavior

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Chen, S.-M.; Electroanalysis and Bioelectrochemistry Lab, Department of Chemical Engineering and Biotechnology, National Taipei University of Technology, No. 1, Section 3, Chung-Hsiao East Road, Taipei, Taiwan;

Document details - ISOMORPHIC DEGREE SPLITTING GRAPHS

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Volume 7, 2020, Article number 13

ISOMORPHIC DEGREE SPLITTING GRAPHS(Article)(Open Access)

Avadayappan, S., Bhuvaneshwari, M.

Research Department of Mathematics, VHNSN College, Virudhunagar, 626001, India

Abstract

Let G(V, E) be a graph and let V_i denote the set of all vertices of degree i. The degree splitting graph DS(G) of G is obtained from G, by adding a new vertex w_i for each partition V_i such that $|V_i| \geq 2$ and joining w_i to each vertex of V_i. In this paper, we characterise graphs for which degree splitting graphs are trees or unicyclic. We develop an algorithm to check whether the given graph is a degree splitting graph of a graph. Also we establish some necessary conditions for the existence of non isomorphic graphs to have isomorphic degree splitting graph. 2010 Mathematics Subject Classification. 05C78. © 2020 Asia Pacific Journal of Mathematics

Author keywords

co - splitting graph | degree splitting graph | k - regular adjacency graph | k - regular adjacency vertex | Splitting graph

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Document details - Electrospun nanofibers of biopolymers and biocomposites

Advanced Green Materials: Fabrication, Characterization and Applications of Biopolymers and Biocomposites

1 January 2020, Pages 297-350

Electrospun nanofibers of biopolymers and biocomposites (Book Chapter)

Hariram, M., Sankaranarayanan, S., Muthuraj, R., Vivekanandhan, S.

[a]Sustainable Materials and Nanotechnology Lab, V.H.N.S.N. College (Autonomous), Tamil Nadu, Virudhunagar, India
[b]Worn Again Technologies Ltd., Nottinghamshire, Nottingham, United Kingdom

Abstract

In the field of one-dimensional (1D) materials, electrospinning has been extensively explored as a simple, viable, and versatile processing technique with effective control over the fibrous morphology. A wide range of polymers or organic molecules has been effectively spun into micro- and nanodimensions and has exhibited unique/superior properties due to the aspect ratio and specific surface area. Because of the renewability, ecofriendliness, and biocompatibility, biopolymers have received great interest over the last two decades and have been explored for various potential applications. From this perspective, natural polymers such as starch, cellulose, chitosan/chitin, gum, protein, and lignin have also been electrospun into nanofibers. They have also been explored for biomedical uses, energy storage/conversion, and environmental remediation. Thus, this chapter provides an overview of the research in electrospun nanofibers of natural polymers and their composites with carbon nanomaterials, cellulose nanofibers, clay/talc nanoparticles, and metal/metal oxide nanostructures. © 2021 Elsevier Ltd All rights reserved.

Author keywords

Electrospinning | Nanocomposites | Nanofibers | Natural polymers | Reinforcements

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Dehnad, D. , Ghorani, B. , Emadzadeh, B.

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applications with a focus on soy proteins

(2024) Food Hydrocolloids

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Lavrenov, A.V. , P'yanova, L.G. , Leont'eva, N.N.

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Interrogation for Modernistic Conceptualization of Complementary Perfect Hop Domination Number with Various Grid Models(Conference Paper)

Mahadevan, G., Vijayalakshmi, V., Aavadayappan, S.

[a]Department of Mathematics, Gandhigram Rural Institute—Deemed to be University, Tamil Nadu, Gandhigram, India
[b]Department of Mathematics, VHNSN College, Tamil Nadu, Virudunagar, India

Abstract

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Aruna Devi, K., Kathirvalavakumar, T.

[a]Mother Teresa Women's University, Kodaikanal, India
[b]Kristu Jayanti College, Bengaluru, India
[c]Research Center in Computer Science, V. H. N. Senthikumara Nadar College, Virudhunagar, India

Abstract

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Mahadevan, G., Vimala Suganthi, M., Avadayappan, S.

[a]Department of Mathematics, Gandhigram Rural Institute-Deemed to be University, Tamil Nadu, Gandhigram, India
[b]Department of Mathematics, V.H.N.S.N. College, Tamil Nadu, Virudhunagar, India

Abstract

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Document details - Influence of substrate temperature on tin sulphide thin films using chemical spray pyrolysis technique

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Influence of substrate temperature on tin sulphide thin films using chemical spray pyrolysis technique(Article)

Gopalakrishnan, P., Amalraj, L., Vijayakumar, K.

[a]Department of physics, H.H.Rajah's College, Pudukottai, Tamilnadu 622 001, India
[b]Department of physics, V.H.N.S.N College, Virudhunagar, Tamilnadu 626001, India
[c]Department of physics, P.S.R Engineering College, Sivakasi, Tamilnadu 626 140, India

Abstract

Thin films of tin sulphide (SnS) were prepared on glass substrates,using chemical spray pyrolysis technique, using precursor solutions of doubly hydrated stannous chloride and thiourea at, different substrate temperatures varied in the range 548-648 K in steps of 25 K. X ray diffraction analysis revealed the crystalline nature of SnS compound having orthorhombic structure along (111) plane. The size of the tin sulphide crystallites with nano dimension was determined using the Full Width Half Maximum values of the Bragg peak at the optimized substrate temperature. The surface morphology have been observed on the surface of these films, using scanning electron microscope and atomic force microscopy. Single-phase, p-type, SnS film with direct allowed band gap of 1.3 eV was determined at the substrate temperature 573 K. © 2020 NSP Natural Sciences Publishing Cor.

Author keywords

Band gap | Bragg peak | Crystallite | Diffraction | Thin film

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Vijayakumar, K.; Department of physics, P.S.R Engineering College, Sivakasi, Tamilnadu, India;

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Document details - Biochar as Sustainable Reinforcement for Polymer Composites

Encyclopedia of Renewable and Sustainable Materials: Volume 1-5

Volume 1-5, 1 January 2020, Pages 10-22

Biochar as Sustainable Reinforcement for Polymer Composites (Book Chapter)

Vivekanandhan, S.

Virudhunagar Hindu Nadars' Senthikumara Nadar College (Autonomous), Virudhunagar, India

Abstract

Carbon materials that belong to micron, sub micron and nano domains have been extensively explored as the filler/reinforcement for the fabrication of various composite materials using thermoset, thermoplastic and elastomeric matrixes. Traditionally these carbon materials were synthesized by using petroleum based feedstocks as the source of carbon. As the demand for sustainable materials for various technological applications increased in recent years, there is a drive for finding new alternate carbon materials that are fabricated using renewable precursors. Hence, an increasing interest has been found in the field of renewable resource based carbon materials for various potential applications including composite fabrication. Among them, the biochar, a carbonaceous material obtained through pyrolysis of various renewable precursors has received increasing interest for composite fabrication as reinforcement. This article is focusing the recent advances and emerging opportunities of biochar based composite materials towards the enhancement of sustainable manufacturing. © 2020 Elsevier Inc. All rights reserved

Author keywords

Biochar Biomass Composites Pyrolysis Reinforcement Renewability Sustainability

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Document details - Estimation of effective rotational temperature from spectral lines of yttrium monoxide molecule in sunspot spectrum

Romanian Astronomical Journal

Volume 30, Issue 1, 2020, Pages 55-60

Estimation of effective rotational temperature from spectral lines of yttrium monoxide molecule in sunspot spectrum(Article)

Sriramachandran, P., Nirmaladevi, S., Vijayalakshmi, R., Neeraja, H., Shanmugavel, R.

Physics Research Centre, VHNSN College, Virudhunagar, 626 001, India

Abstract

By measuring the equivalent widths of rotational lines of $B^2\Sigma^+$- $X^2\Sigma^+$(0, 0) band system of Yttrium Monoxide (YO) molecule observed in umbrae of the sunspots on 24 March 1981 was obtained by Wallace et al. (2000) with the Fourier Transform Spectrometer of the McMath-Pierce telescope of the National Solar Observatory at Kitt Peak, the rotational temperature is calculated. The equivalent widths of well resolved identified lines of the P_1, $P_2$and R_1, R_2branches yield the rotational temperature as 2747 K. © 2020 The Authors. Journal of Virus Eradication published by Mediscript

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Effective rotational temperature | Molecular data | Physics | Sunspot | YO molecule

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Document details - Carbon dots from renewable resources: A review on precursor choices and potential applications

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Carbon dots from renewable resources: A review on precursor choices and potential applications(Book Chapter)

Vishnukumar, P., Sankaranarayanan, S., Hariram, M., Vivekanandhan, S., Navia, R.

[a]Sustainable Materials and Nanotechnology Lab (SMNL), Department of Physics, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu 626001, India
[b]Scientific and Technological Bioresource Nucleus (BIOREN), Universidad de La Frontera, Av. Francisco Salazar 01145, Temuco, 4780000, Chile
[c]Department of Physics, Bharathidasan University, Tiruchirappalli, Tamil Nadu 620024, India

View additional affiliations

Abstract

In recent years, carbon dots have received immense attention not only due to their exciting structural, morphological as well as physicochemical properties but also because of the versatility in their fabrication and manipulation toward various applications. Traditionally, they have been synthesized using different carbon-rich precursors that are originated from petroleum resources. Emerging concerns in utilizing petroleum resources that include limited availability, poor cost stability, greenhouse gas effect and climate change that significantly impacted the synthesis of carbon dots from renewable feedstocks. The key advantages of utilizing renewable precursors as a carbon source in synthesizing carbon dots are their abundance and wider options for source selection. Recently, several renewable resource-based materials have been effectively utilized for the synthesis of carbon dots. Thus, the present chapter is ultimately aimed to summarize their recent developments, current potential applications, and emerging opportunities. © Springer Nature Singapore Pte Ltd 2020.

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Carbon dots | Nanomaterials | Renewable resources | Sustainability

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Vivekanandhan, S.; Sustainable Materials and Nanotechnology Lab (SMNL), Department of Physics, V.H.N.S.N. College (Autonomous), Virudhunagar, Tamil Nadu, India;

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Characterization of spray pyrolysised nano tin disulphide thin film(Article)

Vijayarajasekaran, J., Gopalakrishnan, P., Amalraj, L., Vijayakumar, K.

[a]Department of Physics, Nazia college of Arts and science, Kariapatti, 626 115, India
[b]Department of Physics, P.S.R. Engineering college, Sivakasi, 626 140, India
[c]Department of Physics, V.H.N.S.N. College, Virudhunagar, 626 001, India

View additional affiliations

Abstract

Tin disulphide (SnS2) thin film has been prepared on glass substrate by chemical spray pyrolysis technique using the precursor solutions of tin (IV) chloride and thiourea, which were atomized with compressed air as carrier gas. Thin layer of SnS2 film has been grown at lower thermal energy of 473 K. The Structural properties have been analyzed by X-ray diffraction (XRD) and surface morphology by SEM micrograph. The optical properties of the thin film deposited were obtained using experimentally recorded transmission spectral data as functions of the wavelength, in the range of 400–800 nm. Analysis of the spectral absorption of the deposited film revealed optical direct forbidden band gap (2.2 eV) and indirect band gap energy (2.35 eV) respectively for SnS2 layer. The DC room temperature electrical resistivity of this film is calculated using four probe technique as 4.2 x 10^4 Ω cm in dark and 1.65 x 10^3 Ω cm in light respectively. Activation energy of this thin film was plotted by Arrhenius plot. © 2020 NSP Natural Sciences Publishing Cor.

Author keywords

Band Gap | Diffraction | Optical | Thin Film | Transmittance

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Vijayakumar, K.; Department of Physics, H.H. The Rajah's college, Pudukkottai, India;

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Iridium doped ZnO nanocomposites: Synergistic effect induced photocatalytic degradation of methylene blue and crystal violet(Article)

Dhanalakshmi, M., Saravanakumar, K., Prabavathi, S.L., Muthuraj, V.

[a]Department of Chemistry, V.V. Vanniaperumal College for Women (Autonomous), Virudhunagar-626 001, Tamil Nadu, India
[b]Department of Chemistry, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar-626 001, Tamil Nadu, India

Abstract

A series of novel iridium (Ir) nanoparticles doped ZnO nanocomposites were constructed via one-pot simple hydrothermal strategy and used as a visible light driven photocatalyst for the degradation of Methylene Blue (MB) and Crystal Violet (CV). The synthesized pure ZnO and Ir loaded ZnO nanocomposites were systematically characterized by crystal structure, structural morphology, elemental and optical properties. The photocatalytic performance of Ir doped ZnO (2%) nanocomposite is much higher than that of pure ZnO and other Ir doped ZnO nanocomposites and more encouragingly, 10 mg/L of MB can be completely removed within 50 min of irradiation. The Ir doped in the lattice of ZnO can act as the electron trapping sites, which effectively improve the charge carrier separation. The enhanced photocatalytic activity of Ir doped ZnO (2%) composite is mainly attributed to the synergistic interaction between ZnO and Ir NPs, which could not only enhance the light absorption range, but also accelerate photo-induced interfacial charge transfer during the photocatalytic processes. Influence factors such as initial dye concentrations and catalyst doses were investigated. The generation of reactive oxidative species (ROS) such as $^{[rad]}OH$, h^+ and $O_2^{[rad]-}$ was also been demonstrated. Moreover, this study also paves a new vista for promising applications in environmental water purity and energy harvesting. © 2019 Elsevier B.V.

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Dye solutions | Iridium | Photocatalyst | Synergistic effect | Visible light irradiation

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Muthuraj, V.; Department of Chemistry, V.H.N. Senthikumara Nadar College (Autonomous), Virudhunagar-626 001, Tamil Nadu, India;

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