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THE ROLE OF WOMEN CHARACTERS IN THE PLAYS OF SHAKESPEARE

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Abstract:
Life is a mixture of happiness and sorrows. One can enjoy the taste of life if they can experience all the tastes in equal proportions. A short story, drama or a novel will incorporate all sorts of spices in life. When we look deep into the literature of the past and compare it with the present, we can clearly observe that the literature of both the eras in the amalgamation of all flavors in life. Every literature lover starts his journey with Shakespeare's works. He travels through all the essential elements of life and comes out with the main philosophy of life. Shakespeare's plays depict a variety of emotions in human beings, which can be naturally seen in people around us. Shakespeare has depicted the life in various angles through his writings. In any play or a novel, the key elements are characters. Such characters constitute men and women. Though for years men play a vital role in the success of a play, women also have powerful roles to perform. The writers of the past or the present have high regard for women. Female characters had grown with strong deep roots from the past. It is fortunate that the feminist characters were carved as influential roles in the world literature. The present paper is going to focus on the feministic perspective of Shakespeare's plays.

Keywords: literature, Shakespeare's works, female, characters etc

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IMAGES OF WOMEN IN MODERN CREATIVE WRITINGS

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ABSTRACT

Can anyone imagine a day without night or a night without a day? It's highly impossible. As the human race got used to the light and the darkness, they cannot imagine a life without them. May be that could be the same reason behind the creation of the universe. As we have left and right, sun and moon the human race also started its existence with the creation of male and female species. But unfortunately one race has dominated the other suppressing their life and emotions. The age old traditions have given women a sub ordinate status and men a dominant status. Ultimately the sufferer is the weak sex. Whether it is a family or a society, the representation of women is one and the same. When one observes the literature of the past and the present times, it is crystal clear that the writers had chosen the theme of the existing day. From a male writer to a female writer the choice was limited to portray the characters of women. When the feminists had struggled to liberate the subordinated characters from the dominant characters, the male chauvinists portrayed the domination as a natural phenomenon. Suppression makes to raise more as anything cannot be pressed for a long time. So the feminists tried to focus on the burning issues of the modern days to show that their female protagonists are the new women, who were no longer confined to the four walls of their caged lives. The present article is going to focus the views of a modern writer Anita Nair through her pen out *Ladies Coupe* published in 2001.

Keywords: Emotional disturbances, domination, independent and so on

ABSORBING MULTI LINGUISTIC CULTURES THROUGH TRANSLATIONS

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Abstract

To enjoy the beauty of traditions and cultures of the entire globe, one should have a common language. Being a multicultural and a multilingual world, there are different languages in which people express their ideas and views. So, the literature of a country cannot also be confined to a single continent. It needs to travel across the globe for recognition and understanding. Today there are a good number of immigrants, who are crossing the oceans to prove themselves on the alien lands. So it has become must for them to have the knowledge of that particular country in which they want to set their foot. The first thing they have to do is to know the geographical, economical and social factors of that part. If the books containing this information are in vernacular languages, it becomes difficult for them to acquire sufficient input from them. So translation rightly addresses the problems. Most of the works need to be translated into a common language. A world wide language is essential to meet the needs of the people across the globe. So translation from one vernacular language to a global language has acquired importance. The present article is going to focus on the translation theory and the process of translating a Telugu story into English language.

Translation is not necessary that the native speaker of English should only translate. It is the translation from a given source language into English, the target language. The aim of translation is publication. The translator should be keep in mind the TL readers while translating because there is a danger if the work translated remains inaccessible to them. Among all the forms of translation such as commercial, financial, technical, scientific and so on, literary translation helps one to share their ideas creatively. There are many rewards for literary translation. The literature translators find pleasure in puzzle-solving and finding words equivalent to source language. There would be some problems when it comes to slang, nicknames, colloquialisms, proverbs, references to popular culture and so on.

It may seem apparent but some translators feel happy that when they translate they travel into a new world which would never penetrate their native lands. As Jorge Iglesias has said, 'To know we are reading a translation implies a loss of innocence.' This clearly entails a major burden on the source language translator to defeat and means to have a firm grip on the principles and techniques. It is essential for the translator to have command over the source language and the target language. Literary translators in general would be in love with the two languages. Most of the literary translators are academicians with good language background, tone, style, flexibility, inventiveness and knowledge of the culture.

It is assumed that the half-life of translation would be 30 to 40 years old. The challenges in translating children's literature are not less when compared to other books. Here also the translator should keep in mind the fluency, accuracy, flexibility and transparency. Above all they should also concentrate on the age-level. The other problem connected with literary translation is dialect. It is a challenge unique to the literary translators, whereas the commercial and technical translators depend on standard English. The chances are very less for the dialects to travel in translation. It's the duty of the translator to recognize the dialect at least at the level of one-to-one transference. Translation requires tools. Some of the essential tools which a translator requires are references, dictionaries for translation, electronics and printed dictionaries and dictionaries on the Internet.

The German linguists, Hans Vermeer and Katharina Reib established a theory on translation known as the Skopos theory. According to this theory translation is a purposeful activity and it provides a deep insight into the content of the text. Translation theory is another theory which studies the principles of translation. It is based on a solid foundation on understanding the different aspects of encoding, transforming and preserving meaning of the

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Chimeras In Time-Honored Societies

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Abstract

A river flows serenely accepting all the miseries and happiness that it comes across its journey. A tree releases oxygen for human beings despite its inner plights. The sun is never tired of its duty and gives sunlight without any interruption. Why are all these elements of nature so tuned to? Education is knowledge. Knowledge comes from learning. Learning happens through experience. Familiarity is the master of life that shapes the individual. Every individual learns from nature. Nature teaches how to sustain, withdraw and advocate the prevailing situations. Some dwell into the deep realities of nature and nurture as ideal human beings. Life is a puzzle. How to solve it is a million dollar question that can never be answered so easily. The perception of life changes from individual to individual making them either physically powerful or feeble. Society is not made of only individuals. Along with individuals it has nature, emotions, spiritual powers and superstitious beliefs which bind them. Among them the most crucial and alarming is the emotions which are interrelated to others. Alone the emotional intelligence is going to guide the life of an individual. For everyone there is an inner self which makes them conscious of their deeds. The guiding force should always force the individual to choose the right path. Writers are the powerful people who have rightly guided the society through their ingenious pen outs. The present article is going to focus on how the major elements bound together are dominating the individual's self through Rabindranath Tagore's Home and the World (1916)

Key Words: *Introspection, Political commotion, Religious beliefs and so on*

Introduction:

Home and the World (1916) was originally written in Bengali titled *Ghare Baire.* Though it was translated by his nephew, Surendranath Tagore as *Home and World* in 1919 it disappointed the readers as it lacked the novelty in many aspects. May be Surendranath had difficulty in translating the original parts of poetic prose and the poetry written in the form of Vaishnav Padavalis. As some opine his translation could not depict the real essence of the characters which makes the readers ambiguous in identifying the relations between the characters. Sreejata Guha, an MA in Comparative Literature from State University of New York at Stony Brook had translated this Bengali version taking much effort to safeguard the originality of the text. The introductory and notes were translated by Swagato Ganguly, a PhD in Comparative Literature and Literary Theory from the University of Pennsylvania, Philadelphia, who made the readers to have an authentic picture of the great writer's biographical sketch.

The novel is a true replica of Tagore's struggle between the ideas of Western culture and revolt against western culture. The novel is set mainly against the Swadeshi movement and Partition of Bengal. Though Tagore was also the part of the Swadeshi movement, he left as he was worried with the religious conflicts between the Muslims and the Hindus. It's not like the other novels and has its own mark incorporating the twenty six chapters as first

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SAGACIOUS CREATION OF MODERN WOMEN CHARACTERS

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Abstract
Are women born weak or made weakly? This question gives way for much introspection. Yes, a woman may not be physically stronger than man by birth, but they have strengthened themselves to be equal with man, sometimes even more than them. A woman in the past was made weak herself, among the others and in the society too. She was entangled with restrictions and burdens in the name of custom, tradition, and culture. She was penalized to follow the traditional norms in silence. With upcoming revolutionary thoughts of great personality, women issues were brought into the limelight through the writings of great Indian people. In the recent years, every woman has been given freedom to enjoy her life, freedom to search for her identity, freedom to express her thoughts before others but how far this group utilizes it in a superior manner is always a million dollar question for the writers as well as the readers of literature. We read, hear, listen, and dream ourselves in a superior manner but can we justify this in doing the right or wrong thing? To what extent we can avail our freedom, in what way can it is felt, will all our enjoyment, happiness, the satisfaction of self-be welcomed by the others, or will it be accepted in accordance to the societal norms? The present article tries to provoke into the select writings of the two modern writers Chetan Bhagat and Anita Nair, and bring out how the women characters have been projected, and in what way their freedom is sustainable and acceptable in the context of Indian society

Keywords: Submissive, Identity crisis, Freedom, Chauvinism

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A Move To Upkeep The Contemporary Humanoid Relations

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Abstract

Love a desire that makes the humankind to be pure, honest and loyal to others. It is an intrinsic thought which emphasis in a pure soul that assimilates moral virtues for the well-being of the society. It is the basis for the formation of living beings – the love of God. A bondage built by God with his creations is in turn reflected by the human beings. So, where there is love there is the presence of God. We personify God in human- his attitude, behavior, loyalty, friendliness, empathy, compassion and civility. All together the thought of pure mind and pure body that works for the well-being of the others is said to be a man of virtues. So, one who embodies good virtues always have the passion to lead a peaceful life. They thrive for the well-being of the others than self. Since antiquity many writers have focused on different a concept that reflects the society. Among the ideas concentrated by them, the most important is human bondage. What is the base for human bondage? Do we need to be consanguine and to show love? To answer these questions, I have made an attempt to analysis the novel Sister of My Heart (1999) written by Chitra Banerjee Divakaruni to find out the inert bondage of human beings.

Key words: *love, human bondage, empathy, friendship*

Introduction:

The writer's focus is to reflect the real situation prevailing in the society in order to educate the readers about where the society is heading towards. They project their ideology through different characters, cultures, religion and so on. As a reader we read, analyze, criticize and appreciated the writings of both the man and female writers though we find some disparities in their presentations. Sometimes we read for pleasure, whereas sometimes we read for knowledge. Whatever may be the perceptions we get from through reading, the writers only notion is to mirror the real things.

An Insight into the Persona:

Sister of My Heart (1999) moves around the lives of women folk's life style in Calcutta and an immigrant in America. The writer has made an attempt to bring out the amorous relationships in Indian traditional family system that could overcome the perils in the society. The story reflects the true Indian culture and human bondage that unites the people in the society. The orthodox belief of the people in Calcutta- the description of Bidhata Purush the deciding force of fortune of the newborn babies shows the customary belief of the people on the supreme power. The belief of god is the belief of truth; truth means virtues, virtues means happiness. The happiness in belief, the happiness in customs,

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Abstract:
Life is a mixture of happiness and sorrows. One can enjoy the taste of life if they can experience all the tastes in equal proportions. A short story, drama or a novel will incorporate all sorts of spices in life. When we look deep into the literature of the past and compare it with the present, we can clearly observe that the literature of both the eras in the amalgamation of all flavors in life. Every literature lover starts his journey with Shakespeare's works. He travels through all the essential elements of life and comes out with the main philosophy of life. Shakespeare's plays depict a variety of emotions in human beings, which can be naturally seen in people around us. Shakespeare has depicted the life in various angles through his writings. In any play or a novel, the key elements are characters. Such characters constitute men and women. Though for years men play a vital role in the success of a play, women also have powerful roles to perform. The writers of the past or the present have high regard for women. Female characters had grown with strong deep roots from the past. It is fortunate that the feminist characters were carved as influential roles in the world literature. The present paper is going to focus on the feministic perspective of Shakespeare's plays.

Keywords: literature, Shakespeare's works, female, characters etc

MAHASWETA DEVI PLAYS RENDER VOICE TO THE VOICELESS: A CRITICAL SERVEY

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Abstract

Mahasweta Devi being a writer par excellence wrote, worked and fought for the marginalised tirelessly for the past six decades. The thesis is mainly based on her efforts to be the voice of the subaltern. Her writing is disturbing because it shows the reader his or her own true face. Through her works she was deeply involved and explored the Women and Dalit issues across the nation in general and the lives of the tribal communities of West Bengal in particular. In her thought-provoking Bengali Plays, she often depicts the brutal oppression of tribal people and untouchables by potent authoritarian upper caste landlords, feudal lords, money-lenders and government officials. Referring to her source of inspiration, Mahasweta Devi says, that she has always believed that the real history is made by ordinary people and she has constantly come across its reappearance in various forms of folklore, ballads, myths and legends carried on by ordinary people across generations. She again holds the view that the reason and inspiration for her writings are those people who are exploited and used and yet do not accept defeat.

Key words: marginalized sections, oppression and exploitation of tribals, untouchables etc.

Mapping the poverty-ridden, wretched existence of women, her works provide a strong critique of the ways in which caste and class collude with gender roles in India to alienate women. She focuses on double colonization of women which results from being subjected to general discrimination as subalterns and specific discrimination as women. She contextualizes her gynocentric stories within the framework of socio-economic structures. The issues pertaining to women that she highlights are the rural poverty, bonded labour, horrid exploitation of tribal and lower-caste women, their dismal condition in brothels, their wasted youth, diseased bodies and the sorry state of their children. She depicts their deplorable plight, empathizes with them and at the same time turns the tables on society itself and the literate folks, for condoning such horrors in silence. This paper has attempted to analyse various marginalisations

Electrical Conductivity Studies on (1-x)[PVA/PVP]: x[$MgCl_2\{6H_2O\}$] Blend Polymer Electrolytes

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Abstract. Blend polymer electrolytes of polyvinyl alcohol and polyvinyl pyrrolidone were prepared with different molecular wt% ratios of $MgCl_2.6H_2O$ by solution cast technique. Electrical conductivity measurements for the prepared films were performed using Keithley electrometer model 6514 and the maximum ionic conductivity was found to be $1.01x10^{-3}$ S/cm at 373 K for the prepared composition of 35PVA/35PVP:30$MgCl_2.6H_2O$. The maximum ionic conductivity of polymer electrolyte has been used in fabrication of electrochemical cell with the configuration of Mg^+/(PVA/PVP+$MgCl_2.6H_2O$)/(I_2+C+electrolyte).

Keywords: PVA/PVP blend polymer electrolytes, Solution cast technique, DSC, DC conductivity.

INTRODUCTION

Blend polymer electrolytes with high ionic conductivity are widely used in many practical and industrial applications due to their potential behavior and mechanical integrity[1]. Polymers with the complexation of organic and inorganic salts can give electrolytes, which are mainly used in solid state batteries, fuel cells, energy storage devices, smart windows and electrochromic devices etc[2]. In order to improve the ionic conductivity of polymers, plasticizers are added to the electrolytes in the presence of nanofillers. For instance, blending of two polymers is a new avenue to improve ion conductivity. The complexation of polymer blends is physically similar but structurally different and has interlinking with hydrogen bonding, ionic, dipole interactions. Moreover the physical and mechanical properties of the films depend upon the miscibility of the polymer blend such as charge transfer complexes for homopolymer mixtures[3]. Rao et al. published their results on different materials in the earlier studies[4-20].

In the present work blend polymers like polyvinyl alcohol and polyvinyl pyrrolidone were chosen because of their excellent physical and chemical properties. They are thermally stable and cross linked with the composites having high mechanical strength. They can be used as electrode materials in secondary batteries, microelectronics and also electrochromic display material[21].

EXPERIMENTAL

Polyvinyl alcohol (PVA), Polyvinyl pyrrolidone (PVP) was purchased from Sigma Aldrich chemicals Ltd., India with average molecular weight of 36,000 are used in the present investigation. Magnesium chloride hexahydrate (99.5% purity) with melting point of 118 ^oC purchased from Loba chemicals Ltd., India, were used without further purification. PVP based solid polymer electrolyte films doped with magnesium chloride hexahydrate salt were prepared in different weight ratios (90:10, 80:20 and 70:30) by solution cast technique using double sterilized water

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Optical Absorption Studies on Biodegradable PVA/PVP Blend Polymer Electrolyte System

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Abstract. Biodegradable blend polymer electrolytes of PVA/PVP with different wt% ratios of $MgCl_2.6H_2O$ have been prepared using solution cast technique. Optical absorption studies were carried-out on to the prepared films at room temperature using JASCO V-670 Spectrophotometer in the wavelength region 200-600 nm. Due to the clusters between the vibrations of molecules a broad peak is obtained due to π-π^* transition in the wavelength region 310-340 nm.

Keywords: PVA/PVP blend polymer electrolytes, Optical absorption studies.

INTRODUCTION

In recent years, polymer inorganic salt complexes have been widely studied as solid electrolytes due to their excellent potential importance in the development of energy storage devices such as batteries, super capacitors, electrochromic display devices, etc. Liquid electrolytes are used in energy devices due to their high potential conductivity over a past few years. These electrolytes have still some problems such as heavy weight, leakage problem and rust formation at electrode surface and unstablized at ambient temperatures[1]. To overcome these problems, blend polymer electrolytes (SPEs) have been explored because of their unique properties like dopability, environmental stability and high electrical conductivity, thus they are widely used in various applications[2]. Solid polymer electrolytes with design flexibility used in the fabrication of safe batteries permits further step in the development of rechargeable lithium batteries and thin film microbatteries[3]. Rao et al. published their results on different materials in the earlier studies[4-19].

The present study provides an opportunity to investigate on blend polymer electrolytes such as polyvinyl alcohol (PVA) and polyvinyl pyrrolidone (PVP) because of their excellent optical and potential behavior[20].

EXPERIMENTAL

Polyvinyl alcohol, polyvinyl pyrrolidone were purchased from Sigma Aldrich chemicals Ltd., India with average molecular weight of 36,000 used in the present investigation. Magnesium chloride hexahydrate (99.5% purity) with melting point of 118 ^{0}C purchased from Loba chemicals Ltd., India, were used without further purification. PVP based solid polymer electrolyte films doped with magnesium chloride hexahydrate salt were prepared in different weight ratios (90:10, 80:20 and 70:30) by solution cast technique using double sterilized water as solvent. The mixture was stirred for 24 hours to obtain a homogeneous solution. Later the complexed polymer solution was placed in the polypropylene dishes and placed in hot air oven at 60 ^{0}C to remove the solvent traces in the polymer films. Later the films were taken off from the dishes and then placed in a desiccator until further test.

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Spectroscopic Studies on Samarium Oxide (Sm_2O_3) Doped Tungsten Tellurite Glasses

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Abstract. Samarium oxide (Sm_2O_3) doped tungsten tellurite glasses have been prepared by conventional rapid melt quenching method. The optical absorption spectrum of Samarium oxide doped tellurite glasses showed an absorption peak at 301 nm. FT-Raman studies suggested that Sm_2O_3 could modify the properties of glass and CIE chromaticity coordinates were calculated for the generation of white light from the luminescence spectra.

Keywords: Samarium Oxide, Melt quenching method, Optical absorption, FT-Raman and Chromatic properties.

INTRODUCTION

Now a day's in photonics, researcher has focused on the new materials which have high intensity, light weight, free space volume, electromagnetic interference, stability at ambient temperatures and having low bandwidths[1]. Over the past few years rare earth doped materials in photonics play an important role in various applications due to their excellent behavior of structural, thermal, Optical properties[2]. Moreover rare earth glassy materials are also used in the applications of laser systems and light emitting materials. Non silica based photonic materials possess high band width and large transitions, non-hygroscopic with higher glass stability and corrosion resistive, but they are not applied in very large scale due to their high cost. To overcome these problems tellurium based materials have been introduced because of its good properties such as wide band gap and optical properties. The rare earth ions like samarium (Sm) can be used as a dopant in the host materials and glasses for obtaining the low band gap in the optical absorption[3]. While doping of samarium in host glasses possesses high intensity and large quantum efficiency and in elastic properties which could be suitable for laser applications. Rare earth doped tellurium glasses became very promising materials because of their wide bandgap and thermal properties such that they are used in many applications such as lasers, sensor systems, optical storage materials, optical fibers etc. Rao *et al.* published their results on different materials in the earlier studies[4-20].

In the present investigation Samarium oxide (Sm_2O_3) doped tungsten tellurite glasses have been prepared by conventional rapid melt quenching method. Different characterization techniques were performed on to the prepared glasses such as Optical absorption; Raman spectroscopy and CIE color coordinate studies.

EXPERIMENTAL

The Samarium doped tungsten tellurite glasses have been prepared by melt quenching technique with the chemical compositions of $(60\text{-}x)(H_3BO_3) + 25WO_3+15PbF_2+ 0.5Sm_2O_3 +xTm_2O_3$, (where x= 0.5 mol %). All chemicals were purchased form Sigma Aldrich with high purity (99.9%) used in the present work. All chemicals were properly weighed and grinded well by using mortar for 15 min to get homogenous mixture. Finally the mixture of chemicals

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Dielectric Studies on PVA/PVP Blend Polymer Electrolyte Films

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Abstract. Biodegradable blend polymer electrolytes of PVA/PVP with different wt% ratios of $MgCl_2.6H_2O$ have been prepared using solution cast technique. Dielectric studies were performed on to the prepared films using HIOKI 3532-50 in the frequency range 5000 Hz - 50000 KHz. As increasing the frequency the dielectric constant gradually decreases and found to be high for the sample prepared at 30 wt%; this concludes that the drifting of ions is high giving raise to conductivity phenomenon.

Keywords: PVA/PVP blend polymer electrolyte, Solution cast technique, Dielectric studies.

INTRODUCTION

In present scenario, batteries are primary source for high energy density which plays an important role in device applications[1]. Blend polymer electrolytes with complexation of organic or inorganic salts have been focused to prepare energy devices, due to their potential and electrochemical properties and safety as compared to their liquid counterparts[2]. One of the main objectives is to develop the blend polymer systems with high ionic conductivity in polymer research for a variety of applications as electrolytes in solid state batteries such as fuel cells, electrochemical display devices/smart windows, photo-electrochemical cells etc. In view of negligible hazards and enhanced safety, studies on rechargeable magnesium batteries are expected to have a wide scope in the future. The complexation of polymer blends is physically similar but structurally different and has interlinking with hydrogen bonding, ionic and dipole interactions. One of the main advantages of polymer blends can attain the high ionic conductivity, which cannot be achieved by one polymer alone. Moreover the physical and mechanical properties of the film depend upon the miscibility of the polymer blend such as charge transfer complexes for homo-polymer mixtures[3]. Rao et al. published their results on different materials in the earlier studies[4-20].

In this present investigation blend polymer electrolytes were prepared with the polymers such as polyvinyl alcohol (PVA) and polyvinyl pyrrolidone (PVP) because they are good at physical chemical and mechanical properties[21].

EXPERIMENTAL

Polyvinyl alcohol, polyvinyl pyrrolidone were purchased from Sigma Aldrich chemicals Ltd., India with average molecular weight of 36,000 used in the present investigation. Magnesium chloride hexahydrate (99.5% purity) with melting point of 118 ^{0}C purchased from Loba chemicals Ltd., India, were used without further purification. PVP based solid polymer electrolyte films doped with magnesium chloride hexahydrate salt were prepared in different wt% ratios (90:10, 80:20 and 70:30) by solution cast technique using double sterilized water as solvent. The mixture was stirred for 24 hours to obtain a homogeneous solution. Later the complexed polymer solution was placed in the polypropylene dishes and placed in hot air oven at 60 ^{0}C to remove the solvent trace in the polymer films. Later the films were taken off from the dishes and then placed in a desiccator until further test.

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Impedance Analysis on PVA/PVP: GO Blend Nanocomposite Polymer Films

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Abstract. Nanocomposite polymer films have been prepared by doping Graphene oxide (GO) in PVA/PVP blend polymers by solution cast technique. AC conductivity studies were performed on to the prepared nanocomposite films and the maximum ionic conductivity is found to be 6.13×10^{-4} Scm^{-1} for (0.30:0.3) wt% of nanocomposite polymer film at room temperature. The maximum ionic conductivity of nanocomposite polymer films of PVA/PVP: GO holds great promise in potential applications.

Keywords: Graphene oxide, Solution cast technique, AC Conductivity.

INTRODUCTION

In present scenario a wide focus has been made towards Graphene and graphene oxide-based materials because of their excellent potential, thermal and mechanical properties in various fields[1] such as microsensors, microwave absorbing, hard disc memory devices and energy storage devices etc. Nanocomposite polymer films are prepared by dispersion of conductive nanoparticles in the host polymer such as graphite, carbon nanotubes, carbon fiber, carbon black and metal particles. When the content of conductive nanoparticle reaches to a critical value a continuous electrical conductive network is formed which enhances the ionic mobility[2].

Graphene, a monolayer of hexagonally packed carbon atoms has revolutionized both the academic and industrial world ever since it comes to experimental existence. Such a huge interest may be owned to its novel properties like its high modulus and tensile strength, large theoretical specific surface area, almost transparent and excellent conductivity. Out of many possible functionalized forms of graphene and its composites, polymer based graphene composites are quite promising candidates due to combine features with improved properties of polymers composites. Specifically, flexible super capacitor is one of the most important energy storage devices have been extensively explored in these years. GO based polymer nanocomposites have been extensively studied and reported because of their great improvement in the thermal stability mechanical and electrical properties of polymers[3]. Rao et al. published their results on different materials in the earlier studies[4-20].

In the present investigation, nanocomposite polymer films were prepared by dispersed GO nanoparticles with PVA/PVP blend polymers to improve the ionic conductivity which is suitable for battery application.

EXPERIMENTAL

Nanocomposite polymer films are prepared with the combination of GO, PVA and PVP. Take 200 ml round bottom flask and add 30 ml of distilled water with blend polymers of PVA/PVP: wt% (0.20/0.20, 0.25/0.25 and 0.30/0.30) (equal wt% ratios of PVA/PVP). Stir all the mixtures till the polymers get dissolved in water, later reduced nanoparticles of GO: x% (0.1, 0.2 and 0.3g) were added to the homogenous mixture and sonicate the solution to get

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Original research article

Role of Mn^{2+} ions on optical and luminescent properties of $LiF–Sb_2O_3–ZnO–B_2O_3–SiO_2$ glasses

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ABSTRACT

MnO doped $LiF–Sb_2O_3–ZnO–B_2O_3–SiO_2$ glasses were synthesized by melt quenching technique. Different physical parameters such as density, molar volume, electronegativity, optical basicity and refractive index were calculated. The non-crystalline nature of the samples was confirmed by XRD analysis. SEM images projected that the prepared glass materials were contain well defined and indiscriminately allocated grains. The chemical analysis of these materials was studied by energy dispersion spectrum. The glass transition and glass crystallization temperatures of the glasses were recorded by DTA. FT-IR, Raman and ESR studies were also carried out on the prepared glass samples. The optical absorption reports of these glass materials have suggested that the octahedral tendency of Mn^{2+} ions increases with increasing concentration of MnO. The optical bandgap, Urbach energy, transition probability and emission cross section of these glass materials were calculated. Photoluminescence studies were also performed on the glass samples. The outcomes on all the investigations of these glasses have suggested that the Mn^{2+} ions predominantly occupy octahedral sites at higher concentrations of MnO.

1. Introduction

The subject of MnO doped antimony borosilicate glass materials appeared to be most advantageous and speculative. Mn^{2+} metal ions involved glass materials exhibit different characteristics which are mainly used in developing electrooptical and semiconductive devices [1]. Almost all classes of MnO doped antimony borosilicate glass materials exhibit two and three fold oxidation states. Basically the material such as glass is an amorphous solid and it is often transparent and mainly used for different decorative applications like tableware and optoelectronic devices [2]. Glass can transmit, reflect and refract light. These qualities can be enhanced by cutting and polishing to make optical lenses, prisms, fine glassware and optical fibers for high speed data transmission [3]. Many applications of borosilicate glasses are derived from their optical transparency, giving rise to their primary use as window panels. Addition of Mn^{2+} ions to the present glass materials extensively enhances the optical characteristics, required to develop high efficient photosensitive waveguides. The supreme class of most advantageous glass materials are collectively made up through well regulated structural, mechanical and optical properties. The borosilicate glass materials have great benefits over classical silicate glass materials of rich characteristics such as abnormal transmission of UV rays and remarkable thermal expansion [4,5]. MnO doped antimony borosilicate glass materials have great importance in developing photoconductive and electrooptical devices. The polymeric anions of the present alkali borosilicate glass materials are influenced by Mn^{2+} metal ions which induce different properties such as hygroscopicity, volatile nature and chemical stability. The ESR records of MnO doped glasses were used to survey the glassy

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Role of Mn^{2+} ions on optical and luminescent properties of CaF_2–Y_2O_3–ZnO–B_2O_3–SiO_2 glasses

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Abstract

MnO doped CaF_2–Y_2O_3–ZnO–B_2O_3–SiO_2 glasses were synthesized. Different physical parameters of these glass materials such as density, molar volume, electronegativity, optical basicity and refractive index were calculated. The glass transition and glass crystallization temperatures of these glasses were measured by DTA analysis. The mechanical properties such as Young's modulus, Shear modulus, Bulk modulus, Poisson's ratio and microhardness of these materials were also calculated. Different characterization such as FT-IR, ESR, DC conductivity, optical absorption and photoluminescence were carried out on the prepared glass samples. ESR studies of these glass materials exhibited sextet at lower concentrations of MnO. The optical bandgap, Urbach energy, transition probability and emission cross section of these glass materials were calculated. Semiconducting nature of these glass materials was also observed due to the significant increase in BO_3 and MnO_6 units with increasing concentration of MnO. Optical absorption studies revealed that the increase in intensity of different octahedral peaks were due to the increase in concentration of MnO. Photoemission occurs around 545 to 567.3 nm suggested that the emission was red-shifted for higher MnO concentration and green-shifted for lower MnO concentration.

Keywords: CaF_2–Y_2O_3–ZnO–B_2O_3–SiO_2 glasses; DTA; ESR; Elastic properties; DC conductivity; Optical properties; Photoluminescence studies.

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Effect of Al_2O_3 on structural and luminescent properties of neodymium (Nd^{3+}) doped alumina lead fluoride glasses

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Abstract

The conventional rapid melt quenching method was used to prepare neodymium doped alumina lead fluoride glasses. Different physical parameters of these glass materials such as density, molar volume, electronegativity, optical basicity and refractive index were calculated. Structural, optical, electrical and dielectric properties of neodymium doped GeO_2-PbO-PbF_2 glasses with increasing concentration of Al_2O_3 were studied and reported. X-ray diffraction studies confirmed that the prepared samples were non-crystalline in nature. Surface morphology revealed that the glass materials prepared have similar surface topography. The optical absorption edge observed at 610.5 nm for neodymium glass materials shifted to higher wavelength region with increasing concentration of Al_2O_3 up to 1.0 mol%, beyond the concentration shift towards shorter wavelength region. The intensity of the luminescence peak was observed around 1090 nm corresponding to $^4F_{3/2}$ - $^4I_{11/2}$ transition. The observed functional values of analyzed CIE chromaticity from the luminescence spectra were suggested that the prepared samples were used as red photoemission sources.

Keywords: Nd^{3+} ions; Melt quenching; Microstructure; Photoluminescence; CIE chromaticity studies.

Effect of ZrO_2 Nanofiller on Ionic Conductivity Studies of PVP-$CH_3COONa.3H_2O$ Polymer Electrolyte Films

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Abstract. Zirconium oxide (ZrO_2) doped solid polymer electrolytes have been prepared with different compositions of PVP-$CH_3COONa.3H_2O$ by solution cast technique. AC ionic conductivity measurements were performed on the prepared films in the frequency ranging from 400 Hz to 50000 KHz. The ionic conductivity of the film was found to be maximum ($2.42x10^{-3}$ S/cm) for the prepared sample 60PVP:40$CH_3COONa.3H_2O$:ZrO_2 (1 wt%) at room temperature. The majority transfer of ions and electrons in the solid polymer electrolytes can be calculated by transport properties. Finally an electrochemical cell was fabricated and the discharge characteristics were studied.

Keywords: Nanocomposite polymer electrolyte, Solution cast technique, AC conductivity, Transport properties and Discharge characteristics.

INTRODUCTION

Now a day's solid polymer electrolytes (SPEs) have gained a considerable attention towards the energy store device applications such as cellular phones, thin credit cards and laptop computers due to their good thermal, physical and chemical properties. In order to attain high ionic conductivity over liquid electrolytes, solid polymer should satisfy several requirements, such as stabilized conditions at ambient temperatures, long durability, excellent in electrochemical properties[1]. One of the major advantages from the solid polymer electrolyte has desirable sizes and good contacts at electrode-electrolyte interfaces in energy storage devices. Recent studies have been dominated by lithium ion conducting systems for their potential use in solid state batteries with the high cell performances of lithium batteries. From the past few years researchers have focused on the development of new type nanocomposite solid polymer electrolytes which can be widely used in many applications such as solid state batteries, chemical sensors and electrochemical devices[2]. Since sodium metal is the replaceable material to the lithium anode material such that it is taken as the anode material in the present investigation.

Polyvinyl pyrrolidone (PVP) was chosen as the host polymer because of its excellent physical and mechanical properties. PVP is the most extensively studied among all the polymers, as it has excellent potential applications[3]. Inorganic salt like sodium acetate is used as dopant material in the preparation of polymer films. To increase the mechanical integrity and softness of the films inorganic fillers like SiO_2, TiO_2, ZrO_2 and Al_2O_3 and also some

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Structural and Luminescent Properties of Samarium Oxide (Sm_2O_3) Doped Lead Fluoro Tungsten Tellurite Glasses

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Abstract. A new type of samarium oxide (Sm_2O_3) doped lead fluoro tungsten tellurite glasses have been prepared by conventional rapid melt quenching method. Spectroscopic characterization was performed on the prepared glasses. XRD pattern showed the amorphous nature of the prepared glass system. The luminescence spectra of the prepared glasses consist of two peaks: one in blue and the other one in yellow regions corresponding to the transitions $^4F_{7/2} \rightarrow {}^6H_{13/2}$ (465 nm) and $^4F_{9/2} \rightarrow {}^6H_{15/2}$ (580 nm). Among all the glasses Samarium doped lead fluoro tungsten tellurite glasses with 4% concentration showed the highest CCT value.

Key words: Samarium Oxide, Melt quenching method, XRD, Luminescence studies, Decay life time.

INTRODUCTION

Now a day's rare earth compounds and transition metal ions doped glasses can be widely used in different applications such as ceramics, layers for optical and electronic devices etc. Rare earth doped ions have the good thermal and mechanical properties which can be mainly used in reflecting window applications. The preparation of rare earth doped glass materials is easier than the preparation of single crystals due to easy formation of glass with different size and shape[1]. Tungsten tellurite glasses have the excellent physical properties like good optical behavior and high emission line widths. Therefore, rare earth dopant glass brings a drastic change over the single crystal with outstanding optical properties[2]. Different types of glass materials have been introduced by the researchers. But some of the organic dopant glass materials are costly. They are used in various fields such as lasers, sensor systems, optical storage materials and optical fibers etc[3]. To overcome these problems, samarium oxide based materials have been introduced because of the good properties such as wide bandgap and optical properties. The rare earth ions like samarium can be used as a dopant in the host materials and glasses for obtaining the low bandgap in the optical absorption[3]. While doping of samarium in host glasses possess high intensity and large quantum efficiency which could be suitable for laser applications[4]. Rao et al. published their results on different materials in the earlier studies[5-18].

In the present investigation lead fluoro tungsten tellurite glass and samarium oxide (Sm_2O_3) doped tungsten tellurite glasses have been prepared by conventional rapid melt quenching method and compared their studies.

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Effect of TiO_2 Nanofiller on Structural Properties of PVP-CH_3COOK Based Solid Polymer Electrolytes

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Abstract. Nanocomposite solid polymer electrolytes have been prepared by doping TiO_2 nanofiller with different wt% compositions of PVP-CH_3COOK by solution cast technique. Chemical complex nature of the dopant ions was confirmed by Raman studies. DC ionic conductivity measurements of the prepared nanocomposite films were performed by lab made conductivity four probe method. From the measurement, the maximum ionic conductivity was found to be 2.01×10^{-3} S/cm at 373 K for the composition 60PVP:40 CH_3COOK: TiO_2 (1 wt %). Using the prepared nanocomposite polymer electrolytes, a solid state battery was fabricated and the discharge characteristics were studied.

Keywords: Nanocomposite polymer electrolyte, Solution cast technique, Raman, DC conductivity, Discharge characteristics.

INTRODUCTION

Form the past few decades nanocomposite based solid polymer electrolytes were used in many applications such as rechargeable batteries, super capacitors, fuel cells, energy storage devices and sensors, due to their excellent physical and chemical properties. The first report on polymer as an electrolyte material was given by Wright and Armand in 1970s which has taken a growth step towards new area of research called polymer electrolytes. In general nanofiller based polymer electrolytes give higher ionic conductivity over liquid counter parts. Because liquid electrolytes have a lot of disadvantages like leakage problem, rust formation at electrodes, production of gases on overcharging and even explode. To overcome such type of problems researchers have introduced solid polymer electrolytes which lead to a new path towards energy storage technology[1]. A few attempts have made on potassium based complex films. Apart from the scientific interest, the use of potassium has several advantages like lithium metal. Moreover potassium is cheaper than lithium and it is freely available from earth crust. This makes potassium metal used as anode material. However the softness of these materials makes it easier to achieve and maintain good contact with other components in the battery[2]. The mechanical integrity of the polymer electrolytes can be improved by the addition of inorganic fillers like SiO_2, TiO_2, ZrO_2, Al_2O_3 and also some plasticizers like ethylene carbonate

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Grid Power Energy System for IoT Applications

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Abstract. A new type of nickel metal hydride batteries have been developed for backup power supply system. The prepared grid power energy system has high capacity for backup use and also provides a backup power time to the systems up to 13 hours at 21 °C under 210-VA output power. The average power of the system increases up to 16 W. The grid power source stabilized at $3x10^9$ cycles with the increase of frequency. The external energy source of the grid power system increases up to 4 J. Thus it can be used as a promising outdoor power supply for electronic devices.

Keywords: Renewable energy, nickel metal hydride batteries.

INTRODUCTION

Now a days grid power sources play a key role for utilizing computer back up, electronic appliances and solar photovoltaic devices because of their excellent potential, thermal and mechanical properties. Initially implantation of grid power energy systems devised in 20th century as lead-acid storage devices for utilization in house hold purposes and direct current network. Grid power energy system is used for the conversion of electrical energy from a power grid network and stored in a large quantity and also by changing it back into electrical energy when demand is required[1]. In grid power energy systems some of the problems were raised due to the lead acid batteries because of repeatedly power shut down. To overcome these problems, nickel metal hydride batteries were introduced because they have unique properties like high modulus and tensile strength, large theoretical specific surface area, almost transparent and excellent conductivity. Specifically, flexible super capacitor is one of the most important energy storage devices which have been extensively explored in these years[2].

Nickel metal hydride (Ni-MH) batteries are used in hybrid electric storage devices as well as telecom power applications, because of their light weight configuration and also Ni-MH battery has three-time larger energy density and have long durability than lead-acid batteries. The battery's capacity is 95 Ah, and it features slow self-discharge and slow deterioration in the full-charge state. It is especially important to clarify the performance under a high temperature condition. However, the performance of this new technology applied to the power supply systems

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Effect of Zinc Stannate Nanofiller on PVA-CH_3COONa Polymer Electrolyte for Humidity Sensor Application

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Abstract. Zinc Stannate ($ZnSnO_3$) doped nanocomposite polymer electrolyte films have been prepared with the composition PVA-CH_3COONa by solution cast technique. The prepared samples were characterized by XRD. Further, humidity sensing parameters were studied on the prepared nanocomposite film. XRD revealed that the prepared nanocomposite film has a perovskite phase with orthorhombic structure. From the humidity sensing parameters, the prepared compositional ratio of nanocomposite film exhibited better performance and the maximum sensitivity of the sample was found to be 3 GΩ/% RH.

Keywords: Nanocomposite polymer electrolyte, Solution cast technique, XRD, Humidity.

INTRODUCTION

Now a day's nanocomposite solid polymer electrolytes (SPEs) have gained a considerable attention towards the sensor applications such as humidity, gas sensor due to their good thermal, physical and chemical properties. Due to their significant importance humidity sensor is widely used in medical and industrial applications such as diagnosis process, mapping at human oxygen level pumping system, as well as measuring the percentage of snow in an atmosphere, Industrial and pharmacy companies etc. In the present scenario researcher have gained a considerable attention towards the development of humidity sensors. Today in electrical goods market there are many types of humidity sensors are available. Out of these, some of them were used to measure the resistive, capacitive and sensing RH. There are many drawbacks with these sensors such as high cost, environmental hazardous and inability to produce large scales. To reduce these problems researchers have developed and introduced polymeric humidity sensors in the market. Polymeric based humidity sensors give the similar results to that of metal oxide ceramic sensors[1]. The polymer sensors are cheaply available with low cost and easy to fabricate even when compared to ceramic sensors. Polymer exhibits stability at ambient temperatures and good at physical and chemical properties. Thus it can be taken as a host material in the fabrication process. Organic and inorganic composites or hybrid materials are doped in the polymer materials in order to improve the sensing mode in humidity sensors[2,3].

Polyvinyl alcohol (PVA) has been introduced as a host matrix because it is good at optical, electrical physical and mechanical properties. One of the physical properties of PVA is it can form good transparent film and can possess high conducting nature. CH_3COONa has been introduced in a polymer matrix because inorganic salt acetate

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Thermal and Optical Properties of Zinc Stannate Doped PVA Capped CH_3COONa Polymer Electrolyte Films

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Abstract. Zinc Stannate ($ZnSnO_3$) doped nanocomposite polymer electrolyte films were prepared with the composition PVA-CH_3COONa by solution cast technique. The prepared samples were characterized by DSC and UV- visible spectroscopy. Humidity sensing parameters were also studied on the prepared nanocomposite film. DSC measurements showed the glass transition temperature (T_g) of the prepared samples was found to be 117 °C . Optical absorption of the prepared films was recorded in the wavelength ranging from 200 to 800 nm at room temperature. The prepared nanocomposite film exhibited the humidity sensing reproducibility up to ±75%.

Keywords: Nanocomposite polymer electrolyte, Solution cast technique, DSC, Optical absorption, Reproducibility.

INTRODUCTION

Now a days nanocomposite solid polymer electrolytes (SPEs) have gained a considerable attention towards the sensor applications such as humidity, gas sensor due to the good thermal, physical and chemical properties. Due to their significant importance, humidity sensor is widely used in medical and industrial applications such as diagnosis process, mapping at human oxygen level pumping system, as well as measuring the percentage of snow in an atmosphere, industrial and pharmacy companies etc. In the present scenario researchers have gained a considerable attention towards the development of humidity sensors. Today in electrical goods market there are many types of humidity sensors are available. Out of these, some of them were used to measure the resistive, capacitive and sensing RH. There are many drawbacks with these sensors such as high cost, environmental hazardous and inability to produce large scales. To reduce these problems researchers have developed and introduced polymeric humidity sensors in the market. Polymeric based humidity sensors give the similar results to that of metal oxide ceramic sensors[1]. The polymer sensors are cheaply available with low cost and easy to fabricate even when compared to ceramic sensors. Polymer exhibits stability at ambient temperatures and good at physical and chemical properties. Thus it can be taken as a host material in the fabrication process. Organic and inorganic composites or hybrid materials are doped in the polymer materials in order to improve the sensing mode in humidity sensors[2,3].

Polyvinyl alcohol (PVA) has been introduced as a host matrix because it is good at optical, electrical physical and mechanical properties. One of the physical properties of PVA is it can form good transparent film and can possess high conducting nature. CH_3COONa has been introduced in a polymer matrix because inorganic salt acetate has the ability to absorb the moisture content in the atmosphere. Rao et al. published their results on different

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Cr^{3+} doped $NaF–ZrO_2–B_2O_3–SiO_2$ glass ceramic materials for optoelectronic device application

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Abstract

The glass materials of composition (25-x)NaF–5.0ZrO_2–10B_2O_3–60SiO_2: x Cr_2O_3 ($0 \leq x \leq 0.5$) were synthesized. Structural (XRD, SEM, EDS and DTA), optical (optical absorption and photoluminescence), DC conductivity and dielectric investigations of all these glass ceramic materials were studied. Different physical parameters such as density (ρ), refractive index (μ), polaron radius (r_i), field strength (F_i), optical basicity (Λ_{th}) and molar volume (V_m) were calculated. The glass transition temperature (T_g) and glass crystallization temperatures (T_c) of these materials were recorded by using DTA studies. The decrease in the value of theoretical optical basicity with increasing Cr_2O_3 concentration of the present glass ceramic materials suggests the increase in covalence. Various optical parameters such as bandgap (E_o), nephelauxetic ratio (β), transition probability (A) and emissive cross-section (ϕ) were calculated. Different dielectric parameters such as density of states near Fermi level, activation energy for dipoles and temperature region of relaxation were also calculated. The observed studies suggest that these materials are suitable for both optical and electronic device applications.

Keywords: Cr^{3+} ions; Nephelauxetic ratio; Transition probability; Emissive cross-section; dielectric relaxation.

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1. Introduction

The B_2O_3 and ZrO_2 added SiO_2 glass materials exhibit higher chemical durability and greater hardness than all other classical B_2O_3 or P_2O_5 glass materials. These were the glass materials which had

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Structural and ionic conductivity studies of PVA/PVP: KNO_3 composite polymer electrolyte films

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Abstract

Composite polymer electrolytes films were prepared with potassium nitrate (KNO_3) in PVA/PVP blend polymers with different wt% compositional ratios by solution cast technique. XRD revealed that the structural phase of the film decreases with increasing wt% of the salt composition. The chemical complexation and the bond formations between the functional groups were confirmed by FTIR. The ionic conductivity of the prepared solid polymer electrolytes has been measured by AC and DC conductivity plots and the higher ionic conductivity was found to be 1.29×10^{-3} S/cm at 373 K for the composition 60PVP/PVA: 40 KNO_3. The transference number revealed that the charge transport occurs in these polymer films was mainly due to ions. Using these prepared composite polymer electrolytes, electrochemical cell was fabricated and the discharge parameters were studied.

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Keywords: Composite polymer electrolytes; Solution cast technique; XRD; FTIR; Ionic conductivity; Transport properties; electrochemical cell;

1. Introduction

Nowadays blend polymer electrolytes have a great demand, which can be used in wide variety of applications. Blend polymer films can be prepared with different methods. Among those cost effective solution cast technique is the best method which can be used for the preparation of the film easily. The ionic conductivity of the films can be improved by doping inorganic salts in the blend polymer. Thus it can be used in many applications such as solid state batteries, fuel cells, energy storage devices, smart windows and electrochromic devices [1-5]. The physical

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Dielectric studies on PVP-CH_3COONa based solid polymer electrolytes

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Abstract

Solid polymer electrolytes have been prepared with different wt% compositional ratios of PVP-CH_3COONa by solution cast technique. The ionic conductivity of the prepared solid polymer electrolytes has been measured by the Nyquist plots and the higher ionic conductivity was found to be $2.32x10^{-5}$ S/cm at higher temperature for the composition 80PVP:20CH_3COONa. Dielectric studies were performed on the prepared polymer films at room temperature in the frequency ranging between 5000 Hz and 50000 Hz to find the best optimum conductivity and electric relaxation process of the samples.

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Keywords: Solid polymer electrolyte; Solution cast technique; AC-ionic conductivity; Dielectric studies.

1. Introduction

For the past few decades' an attractive attention has been made towards composite based materials due to the low production cost and excellent structural, electrical, thermal and magnetic properties. Solid polymer films are expected to exhibit a major change in wide range of technological applications and industrial fields such as electrochemical cells, humidity sensors, microwave absorbing and fuel cells etc. Solid polymer films are prepared by doping inorganic salt in the host polymer. The mechanism of solid polymer electrolytes and the advantages were reported by Wright and Armand in 1970s [1-3]. Due to many advantages solid polymer electrolytes have taken a

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Absorption and emission features of Ho^{3+} ion in Nb_2O_5 mixed Lithium zirconium silicate glasses

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Abstract

Li_2O–ZrO_2–SiO_2: Ho^{3+} glasses mixed with Nb_2O_5 were prepared. Optical absorption and photoluminescence spectra of these glasses have been recorded at room temperature. The optical absorption spectra of all glasses recorded at room temperature in the wavelength region 300-2000 nm exhibited several absorption bands all from the ground state $^5I_8$ to $^5G_5$, $^5G_6$, $^5F_1$, $^5F_3$, ($^5F_4$+$^5S_2$), $^5F_5$, $^5I_5$, $^5I_6$, $^5I_7$. The luminescence spectra of all the glasses recorded at room temperature in the visible and NIR regions exhibited the following prominent emission bands $^5F_3 \rightarrow {}^5I_8$, $^5S_2 \rightarrow {}^5I_8$, $^5G_4 \rightarrow {}^5I_6$, $^5K_8 \rightarrow {}^5I_7$, $^5F_5 \rightarrow {}^5I_8$, $^5G_5 \rightarrow {}^5I_6$, $^5F_4 \rightarrow {}^5I_7$, $^5G_5 \rightarrow {}^5I_5$, $^5F_2 \rightarrow {}^5I_6$, $^5F_3 \rightarrow {}^5I_6$, $^5I_5 \rightarrow {}^5I_8$ (Visible region) and $^5I_7 \rightarrow {}^5I_8$ (NIR region). The luminescence spectra of Nb_2O_5 mixed Li_2O–ZrO_2–SiO_2 glasses (free of Ho^{3+} ions) have also exhibited broad emission band in the blue region. This band is attributed to radiative recombination of self-trapped excitons (STEs) localized on substitutionally positioned octahedral Nb^{5+} ions in the glass network. The Judd–Ofelt theory was successfully applied to characterize Ho^{3+} spectra of all the glasses. From this theory, various radiative properties like transition probability A, branching ratio β_r, the radiative lifetime τ_r, for $^5S_2$ emission levels in the spectra of these glasses has been evaluated. The radiative life time for $^5S_2$ level of Ho^{3+} ions has also been measured and quantum efficiencies were estimated.

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*Keywords:*Holmium glasses;optical absorption; luminescence

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Influence of TiO_2 on structural, luminescent and dielectric investigations of $CaF_2–CaO–Y_2O_3–B_2O_3–P_2O_5$ glasses

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Abstract

Glasses with different molar ratios of (20-x)CaF_2–10CaO–5Y_2O_3–10B_2O_3–55P_2O_5: x TiO_2 ($0 \leq x \leq 1$ mol%) were synthesized. Structural, optical, luminescent and ionic conductivity studies of the prepared glasses were studied. The investigations on these glass materials had indicated that the titanium ions exhibit two different oxidation states visually Ti^{3+} and Ti^{4+}. Different physical parameters were calculated on the prepared glasses and reported. The phase transition points such as T_g and T_c of these glasses were analyzed by DTA analysis. The shift in the wavenumbers of different asymmetrical and symmetrical band positions of these glass materials were identified by FT-IR and Raman studies. By increasing the TiO_2 concentration in the glass matrix, the decrement in the theoretical and optical basicity values had been observed. This may be due to the covalent bond formation between the dopant and the glass matrix. The crystal field stabilization energy, ligand field parameters such as B and C were calculated. The luminescent properties and ionic conductivity of these glass materials were also studied.

Keywords: Structural; EPR; Optical; Photoluminescence; DC conductivity.

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Structural and electrochemical properties of ZrO_2 doped PVP-Na^+ based nanocomposite polymer films

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ABSTRACT

Polymer based nanocomposite polymer films are prepared with polyvinyl pyrrolidone (PVP) and sodium metaphosphate ($NaPO_3$) into which zirconium oxide (ZrO_2) is dispersed by different wt% compositional ratios using solution cast technique. The prepared polymer films are characterized by different analytical methods. XRD studies have revealed the semicrystalline phase of the prepared nanocomposite films. The interlinking band formation and their complex nature with dopant ions are analyzed by FTIR and Raman studies. DSC analysis have revealed the glass transition temperature, T_g = 42.5 °C at which the phase transformation changes from glassy to rubbery amorphous phase on heating. The AC conductivity is measured in the frequency ranging from 42 Hz to 5 MHz. The ionic conductivity is found to be maximum (1.02×10^{-3} S/cm) for the film prepared with wt% composition of PVP + $NaPO_3$: ZrO_2 (60:40:4%) at room temperature. Electrochemical studies are also carried out on the prepared polymer films for solid state battery application.

1. Introduction

In the past researchers have made remarkable efforts on nanocomposite polymers (NCP's) owing to their excellent performance in physical and electrochemical studies. They are widely used in many potential applications like rechargeable batteries, electrochemical cells and grid sources etc [1]. At present, the energy consumption is the main source for the main kind for household purposes. To overcome these problems a wide interest has taken place on electrolyte materials for the development of batteries and energy storage devices. Solid polymer based batteries exhibit several advantages like easy film formation and flexibility. They are good at physical and mechanical stability over liquid electrolyte based batteries. The next step of the liquid electrolytes is executed by solid polymer electrolytes due to their advantages like high ionic conductivity and better performance at their operating voltages [2]. Although the battery technology has improved for the past few years, the search for new materials having better performance with high energy density and extended cycles of rechargeability is promoted. However the uses of non-toxic and non-hazardous surrogate materials have not yet been systematically developed.

First PEO-based sodium polymer batteries have been developed in which sodium based salts are dissolved in the host polymer. Later the research has been carried out on the other polymers such as poly (vinyl alcohol) (PVA), poly (vinyl pyrolidone) (PVP), poly (methyl methacrylate) (PMMA), poly (ethylene glycol) (PEG) etc, to enhance the ionic conductivity. The reason behind the enhancement of ionic conductivity in the NCP's is the solubility of cation in the host polymer matrix. Although sodium-ion battery carries several advantages, safety and environmental issues associated with sodium-ion battery cannot be ignored [3]. In the present scenario sodium based rechargeable batteries can be considered an essential power sources due to their excellent properties such as good mechanical behavior, light weight, easy fabrication and long durability [4]. Steep growth takes place on sodium-ion conducting solid polymer electrolytes due to their fast growing demand and usage in several applications like mobile rechargeable batteries, portable optoelectronic devices etc [5,6]. By adding sodium salt to the host polymer the ionic conductivity can be improved and it shows significant properties which can be used for energy devices. Some inorganic nanofillers are added to the polymer matrix to enhance the ionic conductivity which will increase the durability of a battery [7]. The brittle nature can be minimized by doping nanofillers like Cr_3O_2, TiO_2, ZrO_2, Al_2O_3 and plasticizers such as ethylene carbonate (EC) and propylene carbonate (PC) to the NCP's. By the complete dispersion of salt, the effective transfer of ions takes place through the polymer matrix [8,9]. They also possess high ionic transfer of ions more than electrons and it is well supported and explained by Wagner's polarization technique [10,11].

The first rechargeable sodium battery was developed in 1970s.

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Original research article

Structural and photoluminescence investigations of Cr^{3+} mixed $Li_2O—Bi_2O_3—ZrO_2—SiO_2$ glass ceramics for optoelectronic device application

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ARTICLE INFO

Keywords:
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ABSTRACT

Chromium oxide mixed $Li_2O—Bi_2O_3—ZrO_2—SiO_2$ (Cr^{3+}:LBZS) glasses were crystallized by heat treatment. Structural (X-ray diffraction, surface morphology, energy dispersion, DTA, FT-IR and Raman) and spectroscopic (optical absorption and luminescence), of these Cr^{3+}:LBZS glass ceramics were studied. XRD pattern of Cr^{3+}: LBZS glass ceramic samples exhibited distinct crystalline peaks. SEM images of the Cr^{3+}: LBZS glass ceramic materials have revealed well identified and distributed crystals of reformed size. The glass transition (T_g) and various crystallization temperatures (T_{c1}), (T_{c2}) and (T_{c3}) of these ceramics were identified by DTA analysis. The shift in the wavenumbers of different symmetrical and asymmetrical band positions of these glass ceramics were analysed by FT-IR and Raman studies. The optical bandgap (E_o), CFSE (D_q) and nephelauxetic ratio (β) were calculated. Photoluminescence properties were also investigated.

1. Introduction

Chromium oxide mixed $Li_2O—Bi_2O_3—ZrO_2—SiO_2$ (Cr^{3+}: LBZS) glass ceramics are hard in mechanical strength, exhibit high thermal stability and are strongly corrosion resistive. In this regard these Cr^{3+}: LBZS glass ceramics are exceptionally favourable materials in many industrial and medical applications [1]. Among all transition metal oxides, the nucleation agent, chromium oxide have been chosen to enhance properties of Cr^{3+}: LBZS glass ceramics since the collaboration between the chromium ions and glass ceramic complex have intensive electron phonon the interaction is done to facilitate additional dissipation of heat [2]. The Cr^{3+} ions of Cr_2O_3 have durable influence on spectroscopic and dielectric behaviour of $Li_2O—Bi_2O_3—ZrO_2—SiO_2$ samples [3]. The chromium ions within these bismuth zirconia silicate glass ceramics strengthen the glass ceramic assembly, chemical endurance and influence the mechanical properties to the huge extent. Cr^{3+}:LBZS materials exhibit different valence states which are most useful as cathode resources [4,5]. The small magnitudes of Cr^{3+}:LBZS glass ceramics exhibit significant variations in chromaticity and optical properties [6]. The existence of Cr^{3+} and Cr^{6+} ions within these glass ceramic materials cause colour. Comparatively the values of high hardness and corrosion resistance of partially alloyed chromium is the most useful and durable as good surface coating material [7]. Wide research is being done on the Cr^{3+} ions in a choice of different oxide glass ceramic materials in view of their industrial consequences in the development of novel laser active resources [8].

The hardening impact of expanding stable metal oxides at the grain limits and the strong increment in erosion obstruction grades

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Effect of Some Modifier Ions in CuO Doped Sodium Borosilicate Antibacterial Bioglass

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A set of sodium borosilicate glasses mixed with different modifier oxides, *viz.*, Li_2O, MgO, CaO and ZnO, doped with antimicrobial oxide *viz.* CuO were synthesized. The structural (FT-IR spectroscopy, SEM and XRD) and bioactivity studies of the glasses were carried out before and after 30 days of immersion in simulated body fluid (SBF) under static conditions. Optical absorption spectra of all the glasses exhibited a broad absorption band identified due to $^2B_{1g} \rightarrow {}^2B_{2g}$ octahedral transition of Cu^{2+} ions. Glass microstructure is analyzed using SEM images and XRD patterns to authenticate glass bioactivity (*viz.* to confirm whether there is formation of hydroxyapatite (HAp) layer on the surface). For further confirmation of the formation of HAp on the surface of the post immerse samples, the FTIR spectra were recorded. The spectra revealed some vibrational peaks of calcium phosphate. Solubility (weight loss due to immersion in SBF) percentage is found to be different for different modifiers mixed glasses containing antibacterial CuO. SEM results confirm apparent nodular calcium phosphate microcrystalites. It is observed that the addition of antimicrobial oxide has a positive effect on the bioactivity of glass and make these glasses as fourth-generation biomaterials, which are being extensively used to heal the wounds in the human body by facilitating the growth of soft tissues.

Keywords: Sodium borosilicate glasses, Hydroxyapatite, Antibacterial glass, Modifier oxides, Simulated body fluid.

INTRODUCTION

Applications of bioglasses in medical fields become innumerable, particularly for wound healing, ulcer treatment and ophthalmology through angiogenesis. Borate glass matrices doped with biologically active bioinorganic ions like copper, cobalt, lithium, gallium, silver, zinc, *etc.*, that act as biochemical cues and accelerate soft tissue regeneration by prompting angiogenesis, osteogenesis and boost bone formation [1-3].

It is expected that Cu^+ and Cu^{2+} are effective in killing bacteria through the generation of reactive oxygen species (ROS), protein oxidation, lipid peroxidation and DNA degradation [4]. Addition of ions of copper (Cu^+ and Cu^{2+}) and cobalt (Co^{2+}) to the bioglasses enhances angiogenesis *in vitro* and *in vivo* [5,6]. Copper ions regulate several factors such as vascular endothelial growth factor (VEGF), fibronectin, angiogenin, collagenase, prostaglandin E-1, ceruloplasmin and FGF1/2 that initiate vasodilation and vascular permeabilization, endothelial cell proliferation, migration and morphogenesis and blood vessel formation through extracellular matrix in angiogenesis therapy [7].

From the molecular point of view, copper induces two signaling pathways in angiogenesis. The first one is owed to copper-activated HIF-1 (hypoxia inducible factor) that initiates angiogenesis [8] and the other is mitogen-activated protein kinase (MAPK) cascades that play a key role in transduction extracellular signals to cellular responses called cell proliferation [9]. It is evident from several earlier reports that copper ions as angiogenic dopants support both hard and soft tissues and hence these ions in combination with bioactive glass become an excellent multifunctional *viz.*, antibacterial, osteoinductive and angiogenic material [10,11].

Antibiotic resistance has become a serious risk to public health. Patients in more than 70% of hospital acquire bacterial

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Optical and spectroscopic study as a tool to probe the role of modifier oxides on bioactive behavior of zirconia added sodium boro silicate glass system

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ARTICLE INFO

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ABSTRACT

A novel bioactive glass of the composition B_2O_3–SiO_2–Na_2O–ZrO_2: MO is synthesized through conventional melt quenching technique. Role of some modifier oxides (Li_2O, MgO, ZnO, and CaO) on bioactive behaviour through optical and spectroscopic properties of these samples is investigated after immersing in simulated body fluid (SBF) for about a month. XRD pattern and SEM pictures of the post-immersed sample in SBF solution suggested the deposition of HAp layer on surface of the samples. pH of the test solution is enhanced in the course of immersion and showed a linear increase at the initial stage and attained saturation after a period of about 10 days. The comparison of pH of the remnant solution of the glasses mixed with different modifier oxides indicated the maximal value for Li_2O mixed glasses. The IR spectra of post immersed samples exhibited vibrational bands related to carbonated hydroxy-apatite groups. The optical band gap estimated from the optical absorption spectra indicated considerable increase due to immersion in SBF and it is attributed to the deposition of HAp layer on the glass surface. Overall analysis of the results indicated Li_2O mixed glasses are more efficient bioactive glasses when compared with the glasses mixed with other modifier oxides.

1. Introduction

An increasing incidence of skeletal diseases in the progressive aging of world population is the main constant driving force stimulating many leading research initiatives in developing novel implantable materials. Bio-glasses are the promising candidates as their surface is more susceptible for the deposition of thin layer of hydroxyapatite (HAp) (identical to the mineral apatite of bone tissue) when placed in the biological fluids. This layer frees ions that are bioactive leading to osteogenic variation of stem cells [1–3] through the formation of a strong bond between the bone and soft tissues thus regenerating and repairing living tissues damaged by disease. Bioactive behaviour depends on the composition and structure of bioactive glasses [4,5]. Mixture of modifier oxides such as MgO, ZnO or SrO in bioactive glasses further enhance the bioactivity [6–9].

Bioactive glasses commonly exhibit faster rates of HCA formation and bone-bonding formation was first reported in glass systems with silicates [10,11]. During the immersion, the glass network disrupts and releases silicon into the fluid in the form of silanol $Si(OH)_4$ groups. The local pH value of the biological fluid favors the formation of polymerized silica gel layer glass surface that stimulates the body's natural healing process.

This process is also a part of bioactivity of glasses [12–14]. Good number of borate glasses are either biodegradable or bioresorbable and a few alone are exhibiting bioactive properties and show inclination to dissolve in aqueous media in a desired fashion. Some glasses exhibit decomposable as well as bioactive properties, are potentially useful as degradable temporary implants and ultimately replaced by the desired natural tissues [15]. Lithium based bioactive glasses release therapeutic levels of lithium ions [16] and found to excite skullcap osteoblast spreading in animals and human beings [17].

Lithium is identified as a suitable element for addition into borate glasses (BG) in place of sodium ion, with an added advantage of providing therapeutic effect by means of regulation of Wnt

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Role of molybdenum ions in lead zinc phosphate glass system by means of dielectric studies

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PbO-ZnF_2-P_2O_5 glasses doped with different mol% (0.1 to 1.0) of MoO_3 have been prepared. Dielectric properties $\epsilon'(\omega)$, tanδ, σ_{AC}, of the synthesized samples were calculated from frequency measurements versus temperature. Space charge polarization was used to analyze the temperature and frequency dispersions of dielectric constant $\epsilon'(\omega)$ and dielectric loss tanδ. Quantum mechanical tunneling model was employed to explain the origin of AC conductivity. The AC conductivity exhibited an increasing trend with increasing concentration of MoO_3 (up to 0.2 mol%) but the activation energy for conduction decreased. The plots of AC conductivity revealed that the relaxation dynamics depends on MoO_3 dopant concentration.

Keywords: *electrical and dielectric properties; quantum mechanical tunneling; AC conductivity; relaxation dynamics*

1. Introduction

In recent years, the study of electrical properties, including dielectric characteristics in glasses plays a significant role in solid state electronic devices [1]. The main applications of glassy dielectrics involve capacitance elements in electronic circuits and electrical insulators. Transition metal ions (TMI) in glasses are beneficial in electrochromic devices, such as smart windows and flat panel displays [2–7]. A small percentage concentration of TMI in oxide glasses resulted in their semiconducting properties [8, 9] and for these glasses the dielectric relaxation effect was due to electron hoping pairs [10].

Phosphate glasses exhibit distinctive physical properties when compared to the other borate and silicate glasses. The phosphate glasses have lower coefficient of thermal expansion, high ultraviolet transmission and comparatively lower melting temperature [11–13]. The semiconductor oxide MoO_3 acts as a conditional glass former as well as a modifier. When phosphate glasses are mixed with this oxide, their physical properties and chemical durability are expected to be improved [14, 15]. The MoO_3 mixed glasses find potential applications in developing alphanumeric displays, microbatteries, gas sensors, and memory devices [16, 17]. The stable oxidation states, Mo^{5+} and Mo^{6+} of MoO_3, are anticipated to change the dielectric properties depending on the composition of glass.

PbO-P_2O_5 glasses are recognized for their stability and moisture resistance. PbO plays a dual

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Influence of strontium on structure, bioactivity and corrosion behaviour of B_2O_3–SiO_2–Na_2O–CaO glasses-investigation by spectroscopic methods

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ABSTRACT

Strontium mixed borate based bioactive glasses of the composition (55–x)B_2O_3–5SiO_2–20CaO–20Na_2O: xSrO (with x = 2,4,6,8 and 10 mol%) were synthesized using conventional melt quenching technique. Structural variations in the glasses due to addition of SrO were assessed from FTIR and optical absorption spectroscopy methods. Degradation and bioactivity studies of the glasses were performed by immersing the glasses in simulated body fluid (SBF). Degradation studies of these glasses measured as function of immersion time were analyzed in terms of structural modifications taken place due to strontium mixing. The formation of hydroxy apatite (HA) layer on the surface of glasses, treated in SBF solution was examined by XRD, FTIR, optical absorption and scanning electron microscopy studies. The observed bone like apatite formation on glass surface demonstrated the potentiality of the chosen glass for integration with bone. Quantitative analysis of results of the studies on the bioactive behavior of the titled glass indicated that the mixing of SrO to the optimum levels improved its bioactivity.

1. Introduction

Bioactive glasses (BGs) are mainly being used in bone filling, implant coating and in bone tissue engineering applications [1–4]. These glasses react with the body fluids to form hydroxyapatite (HA) layer which is responsible for an intimate bond with bone [5]. This layer is predicted to play a crucial role for attachment of proteins such as fibronectin (a high molecular weight glycoprotein) and vitronectin (which is also glycoprotein present in the platelets) with osteoblasts (the bone cells responsible for forming new bone) and proliferate and thereby pave the way to grow a strong bone [6]. Most of the bioactive studies are confined to 45S5 [7] glass composition. Though, these glasses exhibit excellent bioactivity, the conversion process of these glasses in to HA is very slow. Moreover, borate-based BGs exhibit interesting properties related to osteogenesis and angiogenesis and are predicted to be viable alternative for poly methyl methacrylate (PMMA) in the treatment of deep bone diseases [8]. Besides this, boron plays a vital role in bone formation and depends on its concentration in glass composition. The highest concentrations of boron are found in bone, nails and hair in the human body [9,10]. By adding some modifier oxides like SrO to B_2O_3 containing bioactive glasses the release of toxic BO_3^{3-} ions could be controlled [11]. It was also shown that boron affects the RNA synthesis in fibroblast cells [12] and hence such glasses are of special interest. However, the localized high concentration of boron due to its rapid degradation may result in cytotoxicity which is of high concern.

Further, bioactive glasses incorporated with strontium have gained considerable attention recently. Strontium (Sr) ions normally stimulate osteoblastic bone formation and facilitate for anabolic and anti-catabolic effects in bioactive glasses. These ions were also reported to play a important role in inhibiting osteoclastic bone resorption both *in vitro* and *in vivo* [13–15]. It was also observed that the chemical similarities between Ca and Sr, enabled strontium to accumulate in bone by exchanging with Ca in the crystalline hydroxy apatite [16]. It has also been predicted that Sr acts as a promising agent in treating osteoporosis [17]. Yet, Sr is known to be an essential element for metabolic processes associated with the formation and calcification of bone tissue [18,19]. Recently, O'Donnell et al. [20,21] have investigated the influence of strontium and importance of glass chemistry, structure while designing bioactive glasses for bone regeneration. Their studies have indicated that immersion of the Sr-glasses in SBF lead to the formation of biomimetic apatite and cell proliferation assays and the all the

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In vitro degradation studies on bioactive calcium fluoroborophosphate glasses mixed with some modifier oxides-influence of therapeutically active vanadium ions

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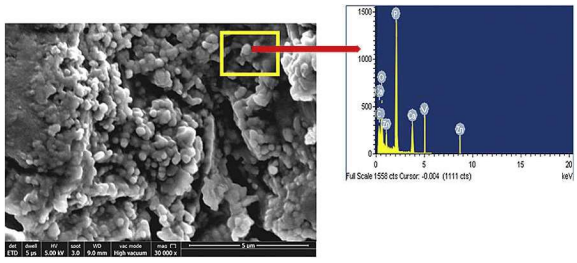
HIGHLIGHTS

- *In vitro* degradation of V_2O_5-calcium oxy fluoro borophosphate glasses is studied.
- Bioactivity dependence on ionic radii of BaO, SrO, ZnO and MgO is investigated.
- A part of V^{5+} ions was reduced to V^{4+} ions and formed vanadyl complexes $(VO)^{2+}$.
- HAp layer formation with calcium vandate crystal phases is established.
- The glass mixed with BaO exhibited the superior bioactivity due to larger degradability.

GRAPHICAL ABSTRACT



SEM and EDS pictures of V_2O_5 doped CaF_2–CaO–B_2O_3–P_2O_5–ZnO glass after immersion in SBF for 30 days. The pictures indicate the deposition of HAp layer with vanadium ions on its surface.

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Vanadium ions
Modifier oxides
SBF solution
HAp layer

ABSTRACT

The main objective of the study is to investigate the influence of therapeutically active vanadium ions on the *in vitro* bio-active properties of calcium oxy fluoro borophosphate glasses mixed with different modifier oxides *viz*., BaO, SrO, ZnO and MgO. The investigations mainly include the degradation studies of the chosen glasses in simulated body fluid (SBF) for a prolonged period (about 800 h). The rate of degradation was estimated by measuring the weight loss of the samples and by measuring the pH of the residual SBF solution at regular intervals of immersion time. During the immersion of the samples in SBF solution, a thin layer of crystalline hydroxy apatite layer (HAp) is observed to develop on the surface of the glass samples. The comparison of the results of XRD, SEM, EDS and IR spectral studies of pre and post immersed samples confirmed the formation of HAp layer embedded with calcium vanadate crystal phases. From the XRD studies it is understood that the magnitude of HAp layer developed on the surface of the samples is the highest for BaO modifier mixed glasses. The optical absorption as well as EPR spectral studies of pre and post immersed samples confirmed that vanadium ions existed in different oxidation states, mainly in V^{4+} and V^{5+} states, in the bulk glass samples. The ratio of the concentration of these two ions is predicted to be different for different modifier oxides mixed glasses and such variation is predicted to play a vital role in the variations of the magnitude of HAp layer formed on the surface of

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The role of Ni^{2+} ions on structural and spectroscopic properties of Li_2O–ZrO_2–Y_2O_3–SiO_2 glass system

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Yttrium silicate glasses
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ABSTRACT

The glasses of composition (35–x) Li_2O–$5ZrO_2$–$10Y_2O_3$–$50SiO_2$: x NiO (0 < x < 0.5) have been synthesized. The amorphous nature of the samples is verified by XRD studies and DTA studies. The information on of various structural vibrational units (viz., zirconate, silicate) and their compositional dependence of is evaluated by FT–IR and Raman studies. The results of these studies have indicated that there is a growth of asymmetrical bands at the expense of symmetrical bands of silicate units with increasing concentration of NiO. The optical absorption (OA) and photoluminescence (PL) spectral of Li_2O–ZrO_2–Y_2O_3–SiO_2: NiO glasses indicated gradual increase of octahedral occupancy of Ni^{2+} ions in the glass network with the increase in the concentration of NiO in the glass network.

1. Introduction

Lithium silicate glasses are well-known as photosensitive glasses [1]. Lithium silicate glasses possess high thermal, chemical and mechanical stability and offer suitable environment for hosting transition metal ions that exhibit intense luminescence in the visible region [2]. Addition of Y_2O_3 to lithium silicate glasses increases the region of spectral transparency, refractive index and decreases the phonon losses [3]. The lithium yttrium silicate glasses have been proven to be the best luminescent materials in both continuous wave and pulsed operations; better candidates for photonics, integrated optics and for biomedical applications [4]. The ionic radius of Y^{3+} ion (0.89 Å) is more than that of Si^{4+} ion (0.42 Å) and hence increases its tendency towards a higher oxygen coordination number. These factors may cause to increase the softening temperature of the glass [5]. The mechanical strength (hardness) of lithium yttrium silicate glasses may be further improved by adding ZrO_2. Some of the previous studies on these glasses indicated that for some specific concentrations of Y_2O_3/ZrO_2; the lithium silicates may possess negative thermal expansivity; such tendency may increase the scope for applications of these glasses [6]. The refractive index, the chemical and electrical resistivity are also expected to be enhanced with the addition of ZrO_2 in lithium yttrium silicate glasses. Due to improved physical properties, zirconate lithium yttrium silicate glasses can be considered as the highly suitable materials for hosting luminescent rare earth ions and also transition metal ions like Ni, Mn and Co etc. These glasses have potential applications such as laser mirrors, optical filters, thermal barrier coatings and dielectric material between gate and substrate of FETs in analog electronics [7].

Most of the transition metal ions possess multivalent states and their stability in glassy materials may be compositional dependent; as these ions will act as glass modifiers. The previous studies of transition metal ions doped glasses it was reported that nickel ions mainly exist in divalent state and is most stable and immune for further oxidation and reduction and occupies octahedral sites and act as modifiers in the glass network. The nickel doped zirconate lithium yttrium silicates has prominent importance in telecommunication as Ni^{2+} ions are luminescent activators to produce laser emission in the wavelength range of UV, visible and NIR regions [8–11]. Owing to such importance of Ni^{2+} ions, in the present study, we have investigated the mainly the luminescence features of Ni^{2+} ions in zirconate lithium yttrium silicate glasses and the concentration dependence. The obtained results were analyzed with other spectroscopic studies like optical absorption, FT-IR and Raman.

2. Experimental

The chemical composition of glasses (35–x) Li_2O–$5ZrO_2$–$10Y_2O_3$–$50SiO_2$: x NiO(0 < x < 0.5) has been chosen for present

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Investigation on silver doped $B_2O_3 - SiO_2 - P_2O_5 - Na_2O - CaO$ bioglass system for biomedical applications

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Silver ions
Hydroxyapatite layer
SBF solution

ABSTRACT

The borate based bioactive glasses doped with Ag_2O are synthesized using melt quenching technique. *In vitro* bioactivity studies of these glasses are carried out as a function of Ag_2O content. The glasses of the chemical composition $43B_2O_3–5SiO_2 –2P_2O_5–20Na_2O–$ (30–x) CaO: x Ag_2O with $0 \leq x \leq 2$, are obtained by conventional melt quenching technique and are characterized by FTIR, UV- vis-absorption and X-ray diffraction techniques. Physical properties such as density, molar volume, oxygen packing density and silver ion concentration are also evaluated. The data obtained indicated that these parameters are affected by the silver oxide content. Results from FTIR, UV–vis.-spectroscopy studies indicated that Ag_2O acted as a network modifier, by converting boron atoms from three coordinated to four coordinated with oxygens. Simulated body fluid (SBF) solution is used to test the *in vitro* bioactivity of the pure and silver doped glasses. Scanning electron microscopy (SEM) is used to investigate the surface morphology of the samples. Moreover, SBF treated samples are characterized by FTIR, XRD techniques in order to verify their bioactivity as a function of Ag content. The solubility test data indicated that a clear increase of degradability of glass with increase of Ag_2O content. The results obtained from XRD, FTIR pointed out that the increase of Ag_2O content enhanced the ability of formation of hydroxyapatite (HA) layer on the surface of the samples.

1. Introduction

Bioactive glasses are being extensively used for bone reconstitution and tissue engineering [1]. These glasses are considered to be osteoconductive and regulate genetic profiles of osteogenitor/stem cells down to the lineage of bone forming cells [2]. Several bioactive glass devices are available to treat bone loss due to periodental disease, conductive deafness and to fill cystic and surgically created defects [3–5]. After the investigations of Day et al. [6–9], the uses of borate glasses in biomedical applications are being studied extensively [10]. The potentiality of bioactivity of borate glasses comes from their lower chemical durability. The presence of borate in these glasses facilitate them to convert to hydroxyapatite (HA) partially or completely at faster rates. Several researchers working on bioactive glasses have already proved that borate had osteogenic effect and hence influence bone, especially trabecular and alveolar type bone growth and maintenance [11,12]. Boron (B) is one of the trace elements which plays a crucial role in many life processes including immune functions, wound healing, bone growth embryogenesis, psychomotor skills, and maintenance. Further it is well established that boron has an important role on the metabolism of calcium, magnesium, vitamin D and steroid hormones and many indirect effects on bone. Boron containing tissues and organs show heterogeneous distribution that indicates it has variable roles to play depending on the type of tissue. It is estimated that majority of total B content in human body accumulates in bone and keratinous tissue and thus it would be appropriate to assume that this element has an important role in hard tissues [13–17]. Further, in these substances it was reported that boron enhances the adhesion, growth and osteogenic differentiation of bone derived cells [18–20]. Hence such materials may emerge as a new generation of biomaterial for bone regeneration. Moreover, it is established that boron perform functions in angiogenesis and osteogenesis. The controlled and localized release of B ions from bioactive glasses (BGs) is expected to provide a promising

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Influence of Ga^{3+} ions on the structure and *in vitro* bioactivity of B_2O_3–SiO_2–Na_2O–CaO glass system

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Abstract

Bioactive borate glasses were doped with Ga_2O_3 in order to improve their biological properties. The samples were synthesized by melt quenching technique and characterized by X-ray diffraction, UV–vis spectroscopy and FTIR techniques. The physical parameters such as density, molar volume, O_2 molar volume, O_2 packing density and excess molar volume and Ga ion concentration were also evaluated. The data obtained indicated that high density sample shows negative excess volume which exhibits more compactness with low porosity than other glasses. Further, the sample with low content of Ga_2O_3 with high value of V_e along with high O_2 molar volume V_O shows high dissolution rate exhibits higher bioactivity. The bioactivity of these glasses was studied *in vitro* in SBF solution. The post-soaked samples were analyzed using XRD, SEM and MIR. From the quantitative analysis of the spectroscopic data of both pre–immersed and post–immersed samples together with the information on variation of pH value of residual solution as a function of immersion time, it is concluded that the participation of gallium ions in tetrahedral positions is obstruction for rate of formation of HA layer and for the bioactivity of the samples.

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Keywords: Gallium ions; Spectroscopic studies; Bioactivity; B_2O_3–SiO_2–Na_2O–CaO glass system

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An *in-vitro* bioactive, structural and degradation studies on B_2O_3–SiO_2–P_2O_5–Na_2O–CaO glass system incorporated with chromium ions

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Abstract

Calcium borosilicate glasses with composition $43B_2O_3$–$5SiO_2$–2 P_2O_5–20 Na_2O–(30–x) CaO–x Cr_2O_3 with $0 \leq x \leq 1$ mol%, have been prepared by the conventional melt-quenching technique. The samples were characterized by FTIR, UV-vis-absorption and X-ray diffraction techniques. The physico chemical properties such as density, molar volume, oxygen packing density and chromium ion concentration were also evaluated. The data obtained indicated that the Cr_2O_3 will break the bonds of the glass network by the creation of non bridging oxygens (NBO's); as a result an increase in the volume of the glass network due to loosely packed structure. Results from FTIR, UV-vis.-spectroscopy studies indicated that Cr_2O_3 acted as a network modifier, by converting four coordinated to three coordinated boron atoms. In this context, we have examined the bioactivity of various concentrations of Cr_2O_3 doped glasses with the help of simulated body fluid (SBF). After immersion of glasses in the SBF, formation of hydroxyapatite layer on the surface was confirmed by XRD, FT-IR and SEM-EDS analysis. The solubility test data indicated that a clear increase of degradability of glass and significant change in the pH of the body fluid was observed with the addition of chromium. The results showed that partial substitution of Cr_2O_3 with CaO positively influenced the bioactivity. Thus bioactivity is increased with increase in the content of Cr_2O_3.

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Keywords: Chromium ions; HA; Bioactivity

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Original research article

Influence of Mn^{2+} ions on optical and electrical properties of Sb_2O_3 mixed lithium fluoro borophosphate glasses

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ABSTRACT

Glasses with composition of (20–x)LiF–10Sb_2O_3–10B_2O_3–60P_2O_5:x MnO (0< x <0.5 mol%) were synthesized. The non-crystalline nature of the samples was confirmed by XRD analysis and the glass forming abilities were analyzed by DTA studies. The compositional dependence of various structural vibrational units was analyzed by FT–IR and Raman studies. DTA, FT–IR and Raman studies suggested a higher degree of disorder in the glass network with increasing concentration of MnO up to 0.3 mol %. The reversal trend has been observed beyond 0.3 mol% suggesting an increasing polymerization causing lower degree of disorder in the glass network. The optical properties of LiF–Sb_2O_3–B_2O_3–P_2O_5: MnO glasses were analyzed by optical absorption, photoluminescence and ESR spectra. The observations of ESR, OA and PL spectral studies suggested that the gradual increase of octahedral Mn^{2+} ions with the increase in the concentration of MnO up to 0.3 mol%. At higher concentration i.e. above 0.3 mol% of MnO, there was a reduction in the concentration of octahedral Mn^{2+} ions. The electrical properties of the glass samples were studied by both DC and AC conductivity studies. The dielectric dispersion analysis was also performed on the prepared glass samples. The results of these studies indicated that there is a mixed conduction (both ionic and polaronic) and the polaron hoping seems to prevail over ionic conduction in the glasses containing MnO less than 0.3 mol%. The increase in space charge polarization is responsible for enhanced values of dielectric parameters and AC conductivity for all frequency and temperature ranges.

1. Introduction

Phosphate and borate glasses exhibit useful physical properties due to their high refractive index, low M.P. and low T_g (glass transition temperature). However, in borophosphate glasses, due to the mixture of both glass network formers, the chemical stability and durability increases. P_2O_5 glasses are generally found to be hygroscopic in nature. It can be reduced by the amalgamation of boron atoms into the arrangement of phosphate glass network. The presence of alkali ions due to the incorporation of LiF in borophosphate glasses will enhance the ionic conductivity and these glasses exhibit large electro-optical Kerr–like effect and show third order non linearity. These glasses are of great interest for their use in ionic conductors, optical materials and biomaterials. Antimony trioxide is a heavy metal oxide mainly used as a flame retardant

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Influence of strontium on structure, bioactivity and corrosion behaviour of B_2O_3–SiO_2–Na_2O–CaO glasses-investigation by spectroscopic methods

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ABSTRACT

Strontium mixed borate based bioactive glasses of the composition (55–x)B_2O_3–5SiO_2–20CaO–20Na_2O: xSrO (with x = 2,4,6,8 and 10 mol%) were synthesized using conventional melt quenching technique. Structural variations in the glasses due to addition of SrO were assessed from FTIR and optical absorption spectroscopy methods. Degradation and bioactivity studies of the glasses were performed by immersing the glasses in simulated body fluid (SBF). Degradation studies of these glasses measured as function of immersion time were analyzed in terms of structural modifications taken place due to strontium mixing. The formation of hydroxy apatite (HA) layer on the surface of glasses, treated in SBF solution was examined by XRD, FTIR, optical absorption and scanning electron microscopy studies. The observed bone like apatite formation on glass surface demonstrated the potentiality of the chosen glass for integration with bone. Quantitative analysis of results of the studies on the bioactive behavior of the titled glass indicated that the mixing of SrO to the optimum levels improved its bioactivity.

1. Introduction

Bioactive glasses (BGs) are mainly being used in bone filling, implant coating and in bone tissue engineering applications [1–4]. These glasses react with the body fluids to form hydroxyapatite (HA) layer which is responsible for an intimate bond with bone [5]. This layer is predicted to play a crucial role for attachment of proteins such as fibronectin (a high molecular weight glycoprotein) and vitronectin (which is also glycoprotein present in the platelets) with osteoblasts (the bone cells responsible for forming new bone) and proliferate and thereby pave the way to grow a strong bone [6]. Most of the bioactive studies are confined to 45S5 [7] glass composition. Though, these glasses exhibit excellent bioactivity, the conversion process of these glasses in to HA is very slow. Moreover, borate-based BGs exhibit interesting properties related to osteogenesis and angiogenesis and are predicted to be viable alternative for poly methyl methacrylate (PMMA) in the treatment of deep bone diseases [8]. Besides this, boron plays a vital role in bone formation and depends on its concentration in glass composition. The highest concentrations of boron are found in bone, nails and hair in the human body [9,10]. By adding some modifier oxides like SrO to B_2O_3 containing bioactive glasses the release of toxic BO_3^{3-} ions could be controlled [11]. It was also shown that boron affects the RNA synthesis in fibroblast cells [12] and hence such glasses are of special interest. However, the localized high concentration of boron due to its rapid degradation may result in cytotoxicity which is of high concern.

Further, bioactive glasses incorporated with strontium have gained considerable attention recently. Strontium (Sr) ions normally stimulate osteoblastic bone formation and facilitate for anabolic and anti-catabolic effects in bioactive glasses. These ions were also reported to play a important role in inhibiting osteoclastic bone resorption both *in vitro* and *in vivo* [13–15]. It was also observed that the chemical similarities between Ca and Sr, enabled strontium to accumulate in bone by exchanging with Ca in the crystalline hydroxy apatite [16]. It has also been predicted that Sr acts as a promising agent in treating osteoporosis [17]. Yet, Sr is known to be an essential element for metabolic processes associated with the formation and calcification of bone tissue [18,19]. Recently, O'Donnell et al. [20,21] have investigated the influence of strontium and importance of glass chemistry, structure while designing bioactive glasses for bone regeneration. Their studies have indicated that immersion of the Sr-glasses in SBF lead to the formation of biomimetic apatite and cell proliferation assays and the all the

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The role of Ni^{2+} ions on structural and spectroscopic properties of Li_2O–ZrO_2–Y_2O_3–SiO_2 glass system

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Yttrium silicate glasses
IR spectra
Raman spectra
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ABSTRACT

The glasses of composition (35–x) Li_2O–$5ZrO_2$–$10Y_2O_3$–$50SiO_2$: x NiO (0 < x < 0.5) have been synthesized. The amorphous nature of the samples is verified by XRD studies and DTA studies. The information on of various structural vibrational units (viz., zirconate, silicate) and their compositional dependence of is evaluated by FT–IR and Raman studies. The results of these studies have indicated that there is a growth of asymmetrical bands at the expense of symmetrical bands of silicate units with increasing concentration of NiO. The optical absorption (OA) and photoluminescence (PL) spectral of Li_2O–ZrO_2–Y_2O_3–SiO_2: NiO glasses indicated gradual increase of octahedral occupancy of Ni^{2+} ions in the glass network with the increase in the concentration of NiO in the glass network.

1. Introduction

Lithium silicate glasses are well-known as photosensitive glasses [1]. Lithium silicate glasses possess high thermal, chemical and mechanical stability and offer suitable environment for hosting transition metal ions that exhibit intense luminescence in the visible region [2]. Addition of Y_2O_3 to lithium silicate glasses increases the region of spectral transparency, refractive index and decreases the phonon losses [3]. The lithium yttrium silicate glasses have been proven to be the best luminescent materials in both continuous wave and pulsed operations; better candidates for photonics, integrated optics and for biomedical applications [4]. The ionic radius of Y^{3+} ion (0.89 Å) is more than that of Si^{4+} ion (0.42 Å) and hence increases its tendency towards a higher oxygen coordination number. These factors may cause to increase the softening temperature of the glass [5]. The mechanical strength (hardness) of lithium yttrium silicate glasses may be further improved by adding ZrO_2. Some of the previous studies on these glasses indicated that for some specific concentrations of Y_2O_3/ZrO_2; the lithium silicates may possess negative thermal expansivity; such tendency may increase the scope for applications of these glasses [6]. The refractive index, the chemical and electrical resistivity are also expected to be enhanced with the addition of ZrO_2 in lithium yttrium silicate glasses. Due to improved physical properties, zirconate lithium yttrium silicate glasses can be considered as the highly suitable materials for hosting luminescent rare earth ions and also transition metal ions like Ni, Mn and Co etc. These glasses have potential applications such as laser mirrors, optical filters, thermal barrier coatings and dielectric material between gate and substrate of FETs in analog electronics [7].

Most of the transition metal ions possess multivalent states and their stability in glassy materials may be compositional dependent; as these ions will act as glass modifiers. The previous studies of transition metal ions doped glasses it was reported that nickel ions mainly exist in divalent state and is most stable and immune for further oxidation and reduction and occupies octahedral sites and act as modifiers in the glass network. The nickel doped zirconate lithium yttrium silicates has prominent importance in telecommunication as Ni^{2+} ions are luminescent activators to produce laser emission in the wavelength range of UV, visible and NIR regions [8–11]. Owing to such importance of Ni^{2+} ions, in the present study, we have investigated the mainly the luminescence features of Ni^{2+} ions in zirconate lithium yttrium silicate glasses and the concentration dependence. The obtained results were analyzed with other spectroscopic studies like optical absorption, FT-IR and Raman.

2. Experimental

The chemical composition of glasses (35–x) Li_2O–$5ZrO_2$–$10Y_2O_3$–$50SiO_2$: x NiO(0 < x < 0.5) has been chosen for present

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Spectroscopic, dielectric dispersion and dc conductivity studies of Sb_2O_3doped lithium fluoroborophosphateglasses mixed with small concentrations of NiO

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ABSTRACT

Glasses of the composition(20–x) LiF–10 Sb_2O_3–10 B_2O_3–60P_2O_5: x NiO(0<x<0.25) were synthesized by conventional rapid melt quenching method. The non–crystalline nature of the samples was confirmed by XRD analysis and the glass forming abilities were analyzed by DTA studies.The compositional dependence of structural aspects of the glasseswas analyzed by FT–IR and Raman studies.The DTA, FT–IR and Raman studies suggested an increasing degree of disorder in the glass network with increasing concentration of NiO up to 0.20 mol %. The reversal trend observed beyond 0.20 mol% is attributed to an increasing polymerization of glass network. The optical absorption (OA) and photoluminescence (PL) studies were alsocarried on these glasses. The results of OA and PL spectral studies suggested that the gradual increase of octahedral Ni^{2+} ions with the increase in the concentration of NiO up to 0.20 mol%. Electrical properties viz., dielectric dispersion, DC and AC conductivity of the titled glass samples were also performed on titled glass samples.The observed increase in the values of dielectric constant, dielectric loss and AC conductivity (at any frequency and temperature) with the increase in the concentration of NiO up to 0.20 mol%is ascribed to the increasing space charge polarization in the glass network. The results of conductivity studies indicated that there is a mixed conduction (both ionic and polaronic) and the polaron hopping seems to prevail over ionic conduction in the glasses containing less than 0.20 mol% of NiO

Keywords: Borophosphate glasses; IR spectra; Optical absorption; Photoluminescence; DC conductivity;Dielectric properties.

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PAPER

Influence of cobalt ions on spectroscopic and dielectric properties of Sb_2O_3 doped lithium fluoroborophosphate glasses

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Original research article

Role of Mn^{2+} ions on optical and luminescent properties of $LiF–Sb_2O_3–ZnO–B_2O_3–SiO_2$ glasses

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$LiF–Sb_2O_3–ZnO–B_2O_3–SiO_2$ glasses
Melt quenching
Structural
ESR
Optical
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ABSTRACT

MnO doped $LiF–Sb_2O_3–ZnO–B_2O_3–SiO_2$ glasses were synthesized by melt quenching technique. Different physical parameters such as density, molar volume, electronegativity, optical basicity and refractive index were calculated. The non-crystalline nature of the samples was confirmed by XRD analysis. SEM images projected that the prepared glass materials were contain well defined and indiscriminately allocated grains. The chemical analysis of these materials was studied by energy dispersion spectrum. The glass transition and glass crystallization temperatures of the glasses were recorded by DTA. FT-IR, Raman and ESR studies were also carried out on the prepared glass samples. The optical absorption reports of these glass materials have suggested that the octahedral tendency of Mn^{2+} ions increases with increasing concentration of MnO. The optical bandgap, Urbach energy, transition probability and emission cross section of these glass materials were calculated. Photoluminescence studies were also performed on the glass samples. The outcomes on all the investigations of these glasses have suggested that the Mn^{2+} ions predominantly occupy octahedral sites at higher concentrations of MnO.

1. Introduction

The subject of MnO doped antimony borosilicate glass materials appeared to be most advantageous and speculative. Mn^{2+} metal ions involved glass materials exhibit different characteristics which are mainly used in developing electrooptical and semiconductive devices [1]. Almost all classes of MnO doped antimony borosilicate glass materials exhibit two and three fold oxidation states. Basically the material such as glass is an amorphous solid and it is often transparent and mainly used for different decorative applications like tableware and optoelectronic devices [2]. Glass can transmit, reflect and refract light. These qualities can be enhanced by cutting and polishing to make optical lenses, prisms, fine glassware and optical fibers for high speed data transmission [3]. Many applications of borosilicate glasses are derived from their optical transparency, giving rise to their primary use as window panels. Addition of Mn^{2+} ions to the present glass materials extensively enhances the optical characteristics, required to develop high efficient photosensitive waveguides. The supreme class of most advantageous glass materials are collectively made up through well regulated structural, mechanical and optical properties. The borosilicate glass materials have great benefits over classical silicate glass materials of rich characteristics such as abnormal transmission of UV rays and remarkable thermal expansion [4,5]. MnO doped antimony borosilicate glass materials have great importance in developing photoconductive and electrooptical devices. The polymeric anions of the present alkali borosilicate glass materials are influenced by Mn^{2+} metal ions which induce different properties such as hygroscopicity, volatile nature and chemical stability. The ESR records of MnO doped glasses were used to survey the glassy

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Equilibrium and Kinetic studies of the Adsorption of Acid Blue 9 and Safranin O from Aqueous Solutions by MgO decked FLG coated Fuller's Earth

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Theoretical Model of a Nematogen: Estimation of Phase Stability, Absorption, Electrochemical, and Nonlinear Optical Properties

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Theoretical analysis has been presented on a nematogen 4-dimethylaminobenzaldehyde (4-cyanophenylethylidene) hydrazone (E,E) ($C_{18}H_{18}N_4$) to analyze its phase stability. The net atomic charges and dipole moment at each atomic centre has been calculated using complete neglect of differential overlap/spectroscopy method. The modified Rayleigh–Schrödinger perturbation theory along with multicentered-multipole expansion method has been used to evaluate the long-range intermolecular interactions. A "6-exp" potential function has been used for short-range interactions. The total interaction energy values have been used as input to calculate the probability of a particular configuration using the Maxwell–Boltzmann formula. Further, the Helmholtz free energy, and entropy at room temperature (300 K), nematic-isotropic transition temperature (436 K) and above transition temperature (500 K) have been computed. An attempt has been made to understand the phase stability and behaviour of the molecule. UV absorption spectra have been calculated using complete neglect of differential overlap/spectroscopy, and intermediate neglect of differential overlap/spectroscopy methods. The observed $\pi \rightarrow \pi^*$ transitions, electrochemical properties based on highest occupied molecular orbital, lowest unoccupied molecular orbital energies, and principal polarizability components, and anisotropy of polarizability have been reported to understand the kinetic stability, global reactivity, and non-linear optical activity of the molecule.

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PACS/topics: phase stability, UV absorption, reactivity, nematogen

1. Introduction

Number of mesophases will be observed during a transition from an ordered crystal to the disordered isotropic liquid, which are known as liquid crystalline (LC) phases [1]. These phases are with partial order of the crystalline state and certain degree of mobility. The quest of researchers to explicate the phase structure-ultra violet (UV) stability relationship at molecular level is the progressing theme of LC science [2, 3]. From the LC literature, one may conclude that there are different kinds of nematic phase [4] among which the local molecular organization is qualitatively different. The research of particular nematogens demands a thorough knowledge of their structure in relation to that of other nematic phases based on theoretical models [5, 6] prior to the synthesis as it offers valuable information on phase behaviour. The stability of a given phase is principally governed by the Helmholtz free energy A. Molecular motions (translational, rotational etc.) have a direct effect on the entropy of a substance, since, the greater the energy that is stored in these motions, greater the degrees of freedom, and greater the entropy. Hence, the free energy is altered. In general, the intramolecular electronic energy is much higher than the intermolecular potential energy, a phase transition results in a very small change in the electronic energy of a molecule. The molecular structure remains unchanged despite the phase transitions in such cases.

The phase structure arises from a delicate interplay between the internal molecular structure and the molecule–molecule interaction energy, which has a close relation with anisotropy of physical properties [7]. These mesophases are controlled by the interplay between probability and entropy. Further, the analysis of the electronic excited states of mesogenic molecules may also have some interest for the study of LC behaviour. In fact, the orientation-dependent part of the dispersive intermolecular forces, which also contribute to the stabilization of the LC phase, particularly of the long range orientational order of nematics, depends on the spatial anisotropy of molecular transition moments from fundamental to excited electronic states (molecular anisotropy factor) [8].

The role of molecular interactions in LC compounds has engrossed the attention of several workers [9, 10] based on the Rayleigh–Schrödinger perturbation method. These studies have been focused at establishing the anisotropic nature of the pair potential, and subsequently finding out the maximum probable configuration of a pair of LC molecules. Thus, the main emphasis was laid on

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Theoretical study on ultraviolet profile and chemical reactivity descriptors of fluorinated liquid crystals: Effect of end chain length and substituent

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ABSTRACT

The electronic transitions in the ultraviolet (UV) region of nematic 4′-(3,4,5-trifluorophenyl)-4-alkylbicyclohexyl (3FP*n*BCH) molecules with propyl (3FP3BCH), and pentyl (3FP5BCH) have been studied. The UV spectra of these molecules have been simulated using the TDDFT/B3LYP/6-31 + G (d) method. Molecular charge distribution has analyzed based on Mulliken and Loewdin atomic charges for each molecule. The absorption spectra, HOMO and LUMO energies corresponding to the electronic transitions in the UV region have been reported. Excited states have been calculated via CI-singles (CIS) with semiempirical Hamiltonian ZINDO. Further, intensity profile analysis has been carried out to detect the highest possible absorption wavelength. Global chemical reactivity descriptors and effect of end chain length on all these parameters has been studied. Similar studies have been carried out for these molecules with respect to boron substitution (3BP*n*BCH; $n = 3, 5$). These computations offer deeper understanding in UV stability, reactivity, and kinetic stability of these molecules.

KEYWORDS

Intensity profile; UV stability; reactivity; oscillator strength

Introduction

Fluorinated materials play a significant role in exhibiting variety of applications such as electronic, electro-optic, and physico-electro-chemical to enable them for the fields such as polymer, coating material, surfactant, pharmaceutical and liquid crystals (LCs) due to their unique properties. Fluorination of LC materials has been an abundant approach due to the influence of fluorine on mesophase behavior [1] and linked physico chemical properties.

In the process of LC structure-ultraviolet (UV) light interaction [2,3], UV light degrades the LCs so that the consequent electro-chemical-optic effects are altered. Hence, it has become a meticulous task to identify the mechanism of LC structure, and explore new structures that can resist up to longer UV wavelengths. Recent literature focuses on improving the UV stability of LC molecules [4] for display applications at

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RESEARCH ARTICLE - PHYSICS

Quantum and Thermodynamic Estimation of Mesostate Behaviour of Alkyl Benzoic Acids in Dielectric Medium: Comparative Study

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Abstract
Quantum and thermodynamic estimation of mesostate behaviour of *p*-*n*-alkyl benzoic acid with pentyl (PBA), hexyl (HBA) groups has been studied in dielectric medium (benzene). The complete neglect differential overlap (CNDO/2) method has been implemented for the charges, dipole moment and its components analysis. The long-range intermolecular interactions have been examined using the modified Rayleigh–Schrodinger perturbation method coupled with multicentred multipole expansion method. For understanding the short-range interactions, a '*6-exp*' potential function has been used. The interaction energy values have been used to estimate the probability of each configuration in a dielectric medium (benzene) using the Maxwell–Boltzmann formula at room temperature (300 K) and at nematic–isotropic transition temperatures. Thermodynamic view has been presented based on Helmholtz free energy and entropy. A correlation has been made between quantum statistical and thermodynamic data to estimate the mesostate behaviour of the title molecules.

Keywords Molecular rigidity · Nematogen · Quantum chemistry · Dielectric medium

1 Introduction

Prediction of phase behaviour and the responsibility of molecular interactions are the purpose of a molecular theory of liquid crystals (LCs). Generally, various orders exist in crystals because of not only their positions, but also orientations. These types of different orders are vanished in a melting process from an ordered crystal phase to LC phase and from LC phase to isotropic liquid. Hence, with change in temperature, change in molecular phase occurs, and from thermodynamic point of view, phase behaviour explains various features of a particular state at a particular temperature [1]. The strong interdependence between molecular structures and intermolecular interaction plays a decisive role in the formation of the condensed states or phase of matter [2]. The condensed state is bound to participate in a transition when the subtle balance between these factors is lost. Hence, phase transition from one state to another state is observed. Balance between these states mainly lost because of change in pressure, volume, temperature and free energy [3]. The length of alkyl chain is a significant parameter [4]; hence, this needs a special attention. Therefore, the factors responsible for mesostate behaviour or its stability needs a serious perception. Hence, the LC phase has been a constant challenge to theoretical scientists to explicate and for exact prediction of the phase behaviour/stability [5].

The theory of LCs is now getting towards a microscopic understanding towards phase behaviour and its stability in terms of simplified molecular models. Hence, several statistical models are to be developed to realize the end group length effect on LC properties. The stability of a given phase is in general directed by the free energy (A). Due to the change in intermolecular motion, the disorderness or entropy (S) is changed, and hence, the free energy (A) is also changes due to change in entropy. The phase transformation of a molecule will occur even due to a small change in its elec-

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(International Peer Reviewed Journal)

Prediction of Speeds of Sound in the Binary Mixtures of Ethyl Lactate with Cyclohexanone, Cyclohexylamine and Cyclohexanol at 303.15 K

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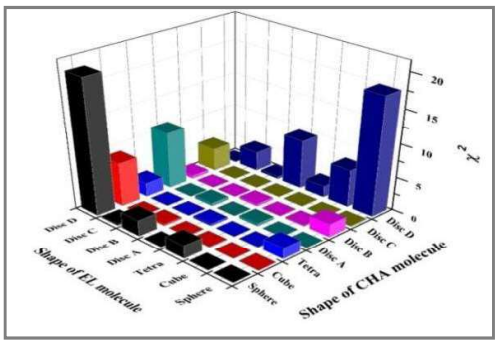
ABSTRACT

Densities and speeds of sound of binary mixtures of ethyl lactate with cyclohexanone, cyclohexylamine and cyclohexanol including those of pure liquids are measured over the entire composition range at temperature 303.15 K. A comparative study of experimentally measured and theoretically predicted speeds of sound at 303.15 K is made using different theories viz., Nomoto, impedance, Van Gael and Vangeel, Junjie, Rao and collision factor theories. Scaled particle and free length theories are applied to these mixtures by considering different shapes viz., sphere, cube, tetrahedron, disc A, disc B, disc C and disc D for both the participating components i.e., ethyl lactate with cyclohexanone, cyclohexylamine and cyclohexanol. From the experimental data, various thermodynamic parameters viz., molar volume, intermolecular free length and isentropic compressibility useful in the computation of theoretical speeds of sound in the mixtures are calculated. Chi-square test is applied for the goodness of the fit to investigate the relative applicability of these theories to the binary liquid mixtures under investigation by considering 196 combinations of different molecular shapes and thermodynamic states at 303.15 K and a close agreement is found between theoretically predicted speeds of sound and the experimental values.

Graphical Abstract



χ^2 values corresponding to different shape combinations
of ethyl lactate and cyclohexylamine molecules using scaled particle theory

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Journal of Applicable Chemistry

2019, 8 (2): 821-832

(International Peer Reviewed Journal)

Vapor-Liquid Equilibrium Studies of the Binary Liquid Mixtures of Ethyl lactate with Amino-, Chloro- and Phenyl-ethanols

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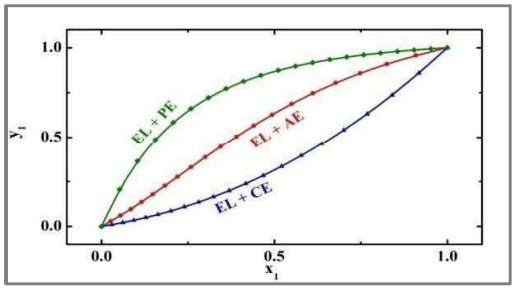
ABSTRACT

For the binary mixtures of ethyl lactate + aminoethanol, + chloroethanol and + phenylethanol, isobaric vapor-liquid equilibrium (VLE) data is experimentally determined at 95.3 kPa over the entire composition range using a Swietoslawski type ebulliometer. Densities at 303.15 K are reported for the pure liquids. The activity coefficients are correlated with the mole fraction using Wilson, nonrandom two-liquid (NRTL), van Laar and Margules liquid-phase equations and the corresponding binary interaction parameters are reported. The liquid phase activity coefficients are estimated considering the non-ideal behavior of the mixtures. The computed vapor phase mole fractions, activity coefficients, and Gibbs energy values along with optimum Wilson parameters are presented and the results are correlated to the molecular interactions between the dissimilar molecules of the binary mixtures. The studies indicate that all three binary systems are non-ideal liquid mixtures deviating from Raoult's law exhibiting negative values of excess Gibbs energies due to intermolecular hydrogen bonding between unlike molecules and also the non-formation of azeotropic mixtures is observed. The observed trend in the Gibbs energies indicates that the interactions between ethyl lactate and substituted ethanol molecules follow the order: ethyl lactate + aminoethanol > ethyl lactate + chloroethanol > ethyl lactate + phenylethanol.

Graphical Abstract



x_1-y_1 phase diagram for the binary mixtures of ethyl lactate + aminoethanol, ethyl lactate + chloroethanol and ethyl lactate + phenylethanol systems

Keywords: Vapor liquid equilibrium, Hydrogen bonding, Liquid phase equation, Gibbs energy.

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One-pot three-component tandem reaction: Synthesis of aryl/alkyl cyanamides libraries and their further conversion into tetrazole derivatives

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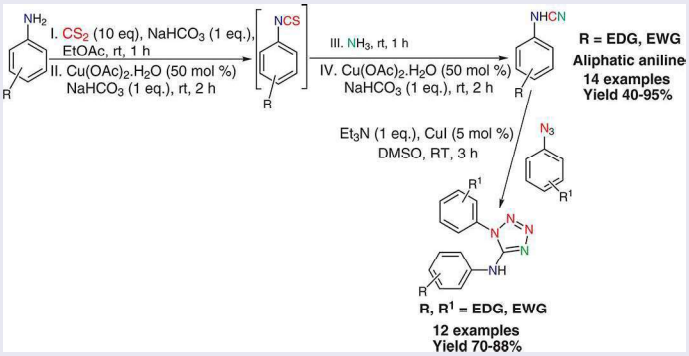
ABSTRACT

We have developed methodology for the synthesis of aryl/alkyl cyanamides from amines in one-pot four steps reaction using cheap, readily available and air stable copper source as catalyst under mild reaction conditions. We have also studied the application of cyanamides. In this connection, we could construct aryl tetrazolamine from cyanamides using click reaction

GRAPHICAL ABSTRACT



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KEYWORDS
Copper catalyst; desulphurization; mild reaction conditions; room temperature; substituted cyanamides; tandem reaction

Introduction

In recent years, *N*-alkyl or *N*-aryl imides[1] and herbicides[2] were synthesized from cyanamides (RR^1N–CN), which are good intermediates and these are also useful for the synthesis of heterocyclic compounds that have biologically, medicinally and pharmaceutical importance.[3] It acts as a not only synthetic intermediate but also show apparent tumor growth inhibition activity.[4] Since the cyano group is easy removal from cyanamide, they regularly perform as a protecting groups in the construction of heterocycles, which are having secondary and tertiary amines.[5] Apart from that, synthesis of many reagents has been developed from cyanamides.[6]

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/lsyc.
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SYNTHESIS OF CYANAMIDES LIBRARIES AND FURTHER CONVERSION INTO TETRAZOLE COMPOUNDS *VIA* CLICK-CHEMISTRY

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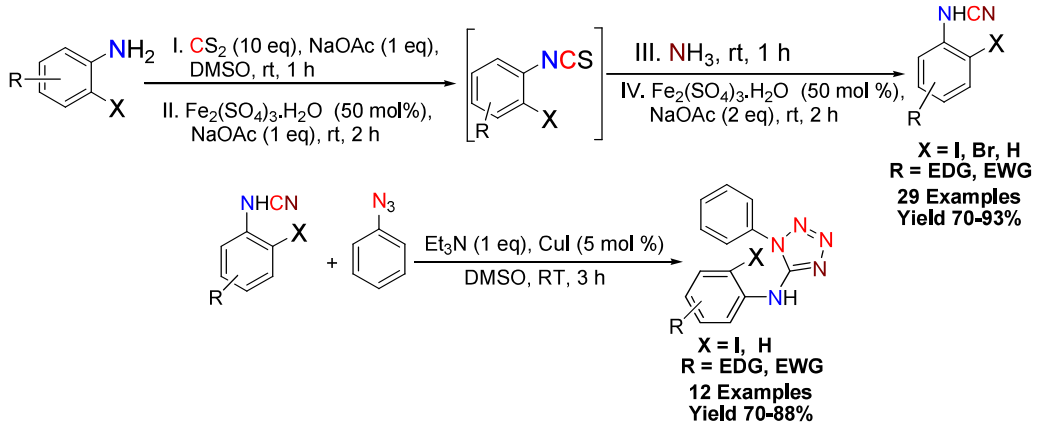
Abstract
The synthesis of 2-halo aromatic/aryl/alkyl cyanamides has been demonstrated in the presence of transition metal under mild reaction conditions. Further, tetrazole compounds have also been constructed from cyanamides through click-reaction. All electron donating and withdrawing substituent's readily underwent the reaction to give target products in good to excellent yield.



Keywords
Cyanamides; Tetrazole compounds; Iron catalyst; Desulphurization; Multistep reaction

Introduction
Due to its unique reactivity, cyano group is recognized as important building block and is found in various bioactive molecules and functionalized materials.[1] Cyanamides are useful precursors and important synthetic intermediates for the synthesis of biological, medicinal and pharmaceutically important heterocycles.[2] Since the cyano group is easy removal from

An Improved Rayleigh model for Software Defect Prediction

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Abstract: Software reliability is one of significant software quality feature which works without threats in software over the limited period of time in a particular platform. Software defect prediction is significant task in predicting the defects in software projects that improves the performance of software project quality. Several researches conducted experiments on both cross-project and within-project defect prediction. However, various existing methods don't predict the number of defects in an beta version software product. Prediction of software defects at the method level is most important. No existing methods are not focused on this method-level defect prediction. More efforts are required to implement the method-level defect prediction which is applied on new software version. In this paper, an improved Rayleigh model is developed to find the accurate results of software defect prediction. To improve the performance of Rayleigh model, for the better analysis of data and an improved technique for software defect prediction is Analysis of Means (ANOM). The proposed methodology is applied on synthetic software defect prediction dataset. Experimental results show the performance of the proposed methodology.

Keywords: software reliability, prediction Rayleigh model, ANOM.

Introduction

Software Reliability is most important attribute of software quality, gather with functionality, reusability, performance, etc. Software Reliability is very difficult task to achieve because of its complexity that consider software and it is very hard to reach to certain level of reliability, the software developers that tend to push complexity into the software layer, the fast development in size of software is used to upgrade the software. For Example, Large Aircraft with next-generation level will have more than 1 million source code if software. There is an inter-related between the other aircraft management software code and every module within this software will have 1 to 2 million lines of source code. The complexity of the software is related to this huge code and it is inversely related to software reliability, the other factors that influence the software development is software quality, specifically functionality, capability, etc. To add these features to the software development becomes more complex.

In every software development and programs errors may cause the failure to the software projects. Errors are otherwise called as exceptions. Errors may occur at the time of code development and exceptions may occur at the runtime. Software quality and dependability are the two parameters that influence the software reliability. This is explained that the probability of overall error free software is initialized for a particular period of time [1]. The software errors, failures and defects occur when the specifications and requirements are not satisfied by the developers or designers which results faults in the software. This paper mainly focused on prediction of software defects in software application.

Literature Survey

One of the purposes of reliability models is to make the prediction of reliability in the early stages of product development. Having a defect prediction model for testing is useful in determining the number of defects that are likely to occur during execution, and thus contributing to no known defects of a software product when it is released. Predicting the total number of defects before testing begins impacts the quality of the product being delivered.

Enhanced Top Text Mining using NLP and AI Techniques

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Abstract **-** In this paper, the proposed system focuses on providing the sequential patterns based on the uploaded datasets. Top Text mining (TTMs) mining is got many problems such as accuracy of the results. The proposed system advanced top text mining using NLP and AI Techniques (ATTM). Results shows the proposed system plays the major role in providing the better results.

Keywords **-** NLP and AI, Data Mining, Information Retrieval.

I. INTRODUCTION

Learning revelation is a strategy for nontrivial extraction of data from immense databases, data that is dim and gainful for client. Information mining is the first and principal advance in the midst of the time spent learning presentation. Particular information mining frameworks are accessible, for example, affiliation lead mining, dynamic case mining, close case mining and visit thing set mining to perform extraordinary information disclosure assignments. Successful utilization of found cases is an examination issue. Proposed framework is acknowledged utilizing different information burrowing strategies for learning introduction.

Content burrowing is a philosophy for recovering vital data from a lot of modernized substance information. It is in this manner basic that a decent substance mining model ought to recover the data as per the client basic. Conventional Information Retrieval (IR) has same focal point of typically recovering as different basic records as could sensibly be ordinary, while separating out unessential reports in the interim. In any case, IR-based structures don't give clients what they really require. Different substance mining approachs have been made for recovering huge data for clients.

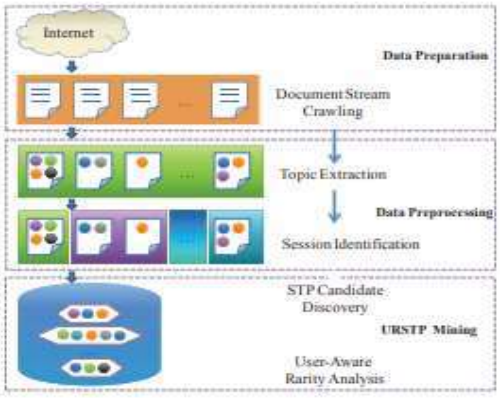

Figure 1: Architecture Diagram

Most substance mining procedures utilize watchword based techniques, while others lif+t the verbalization framework to develop a substance portrayal for a strategy of reports. The enunciation based methods perform superior to anything the catchphrase based as it is viewed as that a greater number of data is passed on by an explanation than by a lone term. New examinations have been concentrating on discovering better substance delegates from a printed information accumulation. One blueprint is to utilize information mining frameworks, for example, constant delineation tunneling for Text mining. Such information mining-based procedures utilize musings of close dynamic outlines and non-close cases to diminish the once-over of capacities evaluate by expelling uproarious cases. New procedure, Pattern Discovery Demonstrate with the genuine goal of adequately utilizing found designs is proposed. Proposed structure is assessed the measures of cases utilizing setup sending process and what's more discovers traces from the negative preparing portrayals utilizing design Evolving process.

II. LITERATURE REVIEW RELATED WORK

The issue of mining consecutive examples [1] over information is unraveled by this paper. Components of a consecutive example require not be basic things. The calculation split the issue of mining successive examples into number of stages, Sort stage, Litemset stage, Transformation stage, Sequence stage, Maximal stage.

Another calculation for mining consecutive examples calculation is particularly productive when the successive examples in the database are long. Here presenting a novel profundity first inquiry technique that coordinates a profundity first traversal of the hunt space with compelling pruning mechanisms.Finding consecutive examples in extensive exchange databases is an essential information mining issue. The issue of mining successive examples and the help certainty system were initially proposed by Agrawal and Srikant.

Digging information streams for learning disclosure is imperative to numerous applications, including Web click stream mining. There is a work, created by Chuan XU, Y Chen and R. Bie utilized weighted sliding window. The calculation SWSS [9](Sequential design mining with the weighted sliding window show in SPAM) to mine successive consecutive examples in view of the weighted sliding windows demonstrate. This calculation gives more space to clients to indicate which successions they are more intrigued by as of late; information mining groups have concentrated on another information display, where information lands as persistent streams. Numerous applications can produce awesome measure of information

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Review on Political using Social Media

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Abstract: Media outlets and savants have rushed to grasp on the web informal communities to disperse their own particular feelings. Be that as it may, intellectuals' sentiments and news scope are regularly set apart by a reasonable political predisposition, as broadly confirm amid the savagely challenged 2012 U.S. presidential decisions. Given the wide accessibility of such information from locales like Twitter, a characteristic inquiry is whether we can evaluate the political leanings of media outlets utilizing OSN information. In this work, by drawing a correspondence amongst tweeting and retweeting conduct, we figure political inclining estimation as a not well postured direct reverse issue. The outcome is a basic and versatile approach that does not require express information of the system topology. We assess our strategy with a dataset of 119 million race related tweets gathered from April to November, what's more, utilize it to examine the political inclining of noticeable tweeters also, media sources.

INTRODUCTION

Legislators worldwide and in the U.S. specifically have figured it out the power that online networking conveys with regards to battling. Here, Twitter is on the forefront as it draws in numerous clients in political wrangles about and, eventually, activates them for grass root developments Web based crusading on Facebook and Twitter is generately thought to have played a critical control amid the 2008 U.S. presidential races [16, 15].

In Twitter, hashtags are utilized to stamp watchwords or points in a Tweet to "tag" the tweet. They give clients a way to "connection to" a continuous, virtual level headed discussion on the relating subject and they are utilized deliberately by key influencers to outline a political level headed discussion and to characterize the vocabulary utilized as a part of this level headed discussion. Indeed, there are cases where clients from restricting political camps are occupied with political "hashtag wars". 1 The objective of such wars is to acquire control over the terms being used to talk about specific issues.

One imperative angle which has, be that as it may, not been contemplated is the political polarization of hashtags and its flow. To think about this marvels, we show a technique to distinguish political hashtags, allot an inclining to them and to figure drifting scores. We begin from an arrangement of seed Twitter clients whose political introduction is known. We at that point take a gander at retweeting conduct to remove a vast set of political clients on Twitter with a derived political introduction.

We break down the nature of the derived introduction by utilizing open Twitter client indexes. Once an arrangement of client of a specific inclining has been recognized, we dole out an inclining to hashtags in extent to the quantity of times it was utilized by thecomparing political camp, standardized in a fitting way. We demonstrate that the inclining acquired along these lines bodes well and we track changes in hanging after some time. Here, we are centering our examination on "change focuses" with a solid, sudden change in inclining. We demonstrate that such change indicates frequently compare the movement of "hashtag thieves" and we give a portrayal of these clients. At last, we take a gander at coarse-grained points by grouping hashtags agreeing to their co-use examples and we track the development of theclusters got after some time. We trust that both our strategy and our finding is important to individuals contemplating the elements in online networking.

Related Work

In this section, we summarize the related work thatspreads across various research fields.

Social Science and Political Science A number of studies analyze social phenomena regarding political activities, political thoughts, and public opinions on social media. These studies model the political spectrum from liberal to conservative (Adamic and Glance, 2005; Zhou et al., 2011; Cohen and Ruths, 2013; Bakshy et al., 2015; Wong et al., 2016), political

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RESEARCH ARTICLE

IMPACT OF E-RECRUITMENT ON HUMAN RESOURCES PRACTICES.

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Keywords:-
E-recruitment,internet recruitment,internet.

Abstract

In the contemporary scenario the traditional and conventional recruitment practices has been revolutionized by the origin of internet. E-Recruitment is the recent trend and it has been adopted by various organizatons. Importance of internet can be seen as searching for best suitable job is just a click away. Even so many organizations are already adopted and conducting their recruitment through E-recruitment channel to post their jobs and accept resumes on the internet, and correspond with the applicants via e-mail. E-recruitment or online recruitment or internet recruitment is the process of recruiting personnel by consuming the technology and e-resources. The E-Recruitment practice has made the process more efficient and effective.

Introduction:-

E-recruitment is the use of technology and electronic resources for the process of attracting, selecting and managing the recruitment practices in a company.

E-recruitment includes practices carried out by the organization using technology, particularly web-based technology for the purpose of identifying and attracting potential employees. Through e-recruitment employers can save resources by reaching larger number of potential employees and facilitation of the recruitment process like using assessment tools incorporated into recruitment software.

E-recruitment is also known as online recruitment as internet communication is vital to this process. However, e-recruitment has certain disadvantages such as being too impersonal, high volume of responses and faces certain technology issues.

The main elements of e-recruitment are as follows:

1. **Applicant Tracking**: Status of candidate with respect to the jobs applied by him/her
2. **Employer's Website**: Communicate details of job opportunities and collect data for the same
3. **Job Boards**: Just like recruitment advertising section of a newspaper or magazine, will carry job advertisements from employers and agencies
4. **Online Testing**: Some kind of evaluation of candidates over internet
5. Others like multiple posting tools, Intelligent CV parsing etc.

Online recruitment utilises the power of the internet to match people to jobs. Fundamentally, it is about advertising the organizations vacancies on either job sites or thier corporate websites. At this very basic level it is particularly

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RESEARCH ARTICLE

AN EMPIRICAL STUDY ON YOUTH PERCEPTION TOWARDS ENTREPRENEURSHIP WITH REFERENCE TO VIJAYAWADA CITY.

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Keywords:
entrepreneurship,personality trait,perception.

Abstract

The research was conducted to exploring the perception of youth towards entrepreneurship. It was the objective of the study on youth perception towards entrepreneurship.It was also aimed at determining the attitude level of youth towards contemporary scenario of the entrepreneurship.The data was collected from one hundred respondents who are from the different academic disciplines and various professionals . The respondents were selected using the stratified random sampling method. Data was collected through pre-tested questionnaire. Descriptive statements analysis was used to explain and highlight the variables, while statistical tools were applied in the analysis of the relationships existing between variables .

The study concluded that entrepreneurial influencing factors such as personality traits, learning,annual income,family business experiences,economic status of family,government policies, social factors and culture; and entrepreneurial development factors, such as information technology development and education system showing impact on the favourable perception of the youth towards entrepreneurship .

Introduction:-

Entrepreneurship has become an important facet in promoting economic development and wealth. The significance of entrepreneurship has committed extremely in reducing the extent of unemployment and thereby promoting employment opportunities among the youth.The growth and economic sustainability of every nation has been shaped and carved by men and citizens of nation who have taken their destinies in their own hands by perceiving opportunities and risking their resources (money, machines, materials, men) in establishing and operating their own business Entrepreneurship has become a fundamental facet in promoting economic success, steadiness and wealth creation .

The Government of India has undertaken several initiatives and instituted policy measures to foster a culture of innovation and entrepreneurship in the country. Job creation is a foremost challenge facing India. With a significant and unique demographic advantage, India, however, has immense potential to innovate, raise entrepreneurs and create jobs for the benefit of the nation and the world.

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Influence of Consumer Profile on Adoption of Fintech Products with Reference to Vijayawada City, Ap

J.Katyayani , Ch.Varalakshmi

ABSTRACT--- In this modern era there is rapid growth of electronic transactions in the finance field .There are various electronic means like NEFT,RTGS,EFT,IMPS, plastic money, internet banking, mobile banking, instant payment applications, block chain, crypto currency, Electronic wallets, online transactions in stock markets etc.. Software industry is playing key role in the finance sector. Financial corporations are also adopting digital tools while delivering the services to their customers.In this study various demographical factors such as gender, age, educational qualification, marital status,occupation,annual income were considered and found impact of various demographical factors on users interest to adopt the fintechnology.

Index Terms: BlockChain, Crypto Currency, Digital tool,Electronic Wallets,Monetary transaction

I. INTRODUCTION

Fintechnology which utilises the technology to enhance the efficiency of financial services. It also refers to the involvement of information technology in the field of finance, the usage of mobile devices for mobile banking, internet banking, instant payment applications, plastic money, crypto currency etc.. are various examples of technologies aiming to make financial services more accessible to the general public .

II. REVIEW OF THE LITERATURE

The study conducted by Arvidsson,N(2014) in Sweden found that age is effecting the customer attitude towards adoption of fintech.The study conducted by Goi and NG(2011) in Malaysia argued that mostly young people are using fintech.The study conducted by Waranpong (2017) in Bangkok argued that most of the users of fintech are y-generation(between the age of 18-35 years) according to this study.According to M.Kolodinsky in USA (2004) most users of fintech are young people who have higher income and high educational qualification.The study conducted by Bruce Carlin,ArnaOlafsson,Michaela Pagel(2017),Iceland in Europe argued that baby boomers(who born between 1946-1964) are not enjoying the fruits of fintech.According to his study mostly men are using the mobile applications,digital tools, for their financial transactions,compared to women.So the age,gender are influencing the users adoption of fintech.The studies conducted by Ataran,A,Nami(2011) in Iran,Ming-Chin Chen,Hung –Ming Yeh ,Weil(2016) in Taiwan argued that higher educational qualification level mostly influence the users adoption of fintechnology.The studies conducted by Venkatesh V,Thong,Xu,X(2012) in Sweden ,Kolodinsky(2004) in USA argued that the people who have higher income level are mostly using the fintech. So the income level positively influencing the users adoption of fintechnology.The study conducted by Venkatesh V (2012) in Sudan argued that gender, marital status, occupation of the user not significantly influencing the fintech adoption.

III. OBJECTIVE OF THE STUDY

To study the influence of various demographical factors such as gender, age group, educational qualification, marital status, occupation, income level on users adoption of fintechnology.

IV. HYPOTHESIS OF THE STUDY

H_1: There is no impact of demographical factors on users intention to adopt the fintechnology

H_{1a}: There is no impact of gender on users intention to adopt the fintech

H_{1b}: There is no impact of age on users intention to adopt the fintech

H_{1c}: There is no impact of educational qualification on users intention to adopt the fintech

H_{1d}: There is no impact of marital status on users intention to adopt the fintech

H_{1e}: There is no impact of occupation on users intention to adopt the fintech

H_{1f}: There is no impact of annual income on users intention to adopt the fintech

V. RESEARCH DESIGN

The present study consists the respondents who are using the fintech products and services in Vijayawada city. The sample size is 100.The data collected from various respondents by using the structured questionnaire.Convinience sampling technique used for the study.Anova technique used to analyse the data.

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Cognitive Computational Model for Evaluation of Fintech Products and Services with Respect to Vijayawada City, Ap

J.Katyayani., Ch.Varalakshmi

Abstract: ***Now in the era of artificial intelligence and digitalisation financial sector is adopting various digital tools in their products and services offerings. That's why user acceptance of technology in the financial sector has became the important field of the study. Internet banking, mobile banking,ATM,cash deposit machines, instant payment services, online trading in stock markets, online funds transfers,E-wallets,wealth management, peer to peer lending,blockchain technology are various fintech products and services. This study is an attempt to analyse the users acceptance of technology in their financial management decisions by using cognitive computational model. Cognitive computing provides a great opportunity for users to understand the true nature of risk for the industry especially new upcoming risk such as cyber security. This study mainly focuses on how different cognitive factors such as perceived expenditure, ease of time, level of risk, service quality, frequent use of automated tools, socio cultural factors, perceived trust, perceived usability and perceived convenience to use influence the users motive to adopt and utilise the Financial Technology.***

Index terms: Artificial Intelligence, Block Chain Technology, Cognitive Computing, Digitalisation

I.INTRODUCTION

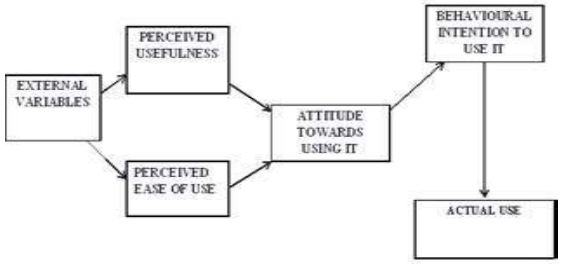

FIGURE-1-TECHNOLOGICAL ACCEPTANCE MODEL-1

Financial Technology is the technical advancement that targets to combat with the conventional financial practices in the finance sector. Financial Technology is an improvised sector in the field of finance. It is applying technology in the field of finance. Mobile banking, internet banking, crypto currency, ATM,block chain are few examples of Financial Technology.Finacial Technology organizations include both startups and existed fintechnology entities.

II. REVIEW OF THE LITERATURE

A.TECHNOLOGICAL ACCEPTANCE MODEL 1

This study is based on the Technological Acceptance Model version -1 proposed by Davis,Bagozzi,Warshaw in 1989.This model specifically deals with the foresight of the acceptance and adoption of an information device. This model widely used in the field of research related to the users perception to adopt technology in their life.

The factors considered are as follows

A.PERCEIVED EXPENDITURE

Perceived expenditure is stated as the level to which a user assumed a cost for utilising information technology tool. The study conducted by Cham,Cheng, Lim Chee, Khin,Bin in Malaysia (2018), argued that up to what extent the perceived expenditure influences the users motive to adopt the Financial Technology products and services and the study conducted by Ying-Feng Kuo,Sheih-Neng Yen (2009) examined that perceived expenditure negatively influencing the attitude of the users to adopt fintechnology.

B.EASE OF TIME

Ease of time means that the level at which user feels that less time will be taken to perform any activity by utilising the system. The study conducted by Chen(2016) in Taiwan found that banking companies are delivering services through the internet platform. Using of digital platform banking services are available to the customers 24*7.So the time saving, less time taking and 24*7avalibality of the fintech services positively influencing the customer perceived opinion towards the adoption of fintechnology.

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AN EMPIRICAL STUDY ON USERS PERCEPTION TOWARDS ADOPTION OF DIGITAL PAYMENT METHODS WITH REFERENCE TO VIJAYAWADA CITY, ANDHRA PRADESH

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ABSTRACT

With the entry of Indian government policies like demonetisation, digital India there is a rapid growth of cash less transactions, digital payment methods in India. Citizens are adopting digital transactions in their daily life style. They are searching for new means of digital transactions. Indian government is also encouraging new innovations in digital payments. We have different digital payment methods like internet banking, mobile banking, electronic wallets, unified payment interface, Micro atm,credit and debit cards, aadhaar enabled payment services, Unstructured Supplementary Service Data etc…This study is an attempt to analyse users perception towards adoption of digital payment methods in their daily life by using users perception model .This study mainly considers various variables like perceived usability, perceived desirability, perceived accessibility, perceived feasibility, performance expectancy, effort expectancy, social influence, facilitating conditions, perceived cost, perceived protection and perceived comfort will influence the users adoption of digital payment methods.

Key words: Demonetisation, Digital India, Unified Payment Interface, Electronic Wallet, Perception, Digital payment

I.INTRODUCTION

Digital payment methods (or) Electronic payment methods are technically defined as any monetary transactions are made using different electronic means by using our electronic devices like personal computer, mobile phone, laptop, tablet etc…,. Digital payment methods will encourage cashless transactions (or) digital monetary transactions. In India we have different methods of digital payments like online banking, mobile banking , instant payment applications, unified payment interface, AEPS(Aadhaar Enabled Payment Service), micro atm, USSD(Unstructured Supplementary Service Data),NEFT, RTGS etc..,. Digital India policy encourages new digital innovations in India. Various financial institutions are also offering different financial services to their customers by using digital modes only. Users are also slowly shifting from traditional monetary transactions to digital monetary transactions. We have different payment banks in India. Users are accepting these new means of digital payments for their daily life style. We have top electronic wallets in India like Google pay, Mobikwik, Free charge, Paytm, Phone pe etc..,.

II.REVIEW OF THE LITERATURE

Unified theory of acceptance and use of technology (UTAUT) is one type of users technological adoption theory which was proposed by Venkatesh and others in the year of 2003.It is an advanced version for different technological adoption models like technological acceptance model (TAM), Innovation Diffusion Theory (IDT), Theory of planned behaviour (TPB) and Theory of Reasoned Action (TRA).Effort expectancy, performance expectancy, social influence, facilitating conditions ,user behaviour, behaviour intention are various determinants of this model. In this study effort expectancy, performance expectancy, social influence, facilitating conditions are taken from this model. Other variables like Perceived usability, perceived feasibility, accessibility, desirability, comfort, cost, protection are also taken for the study.

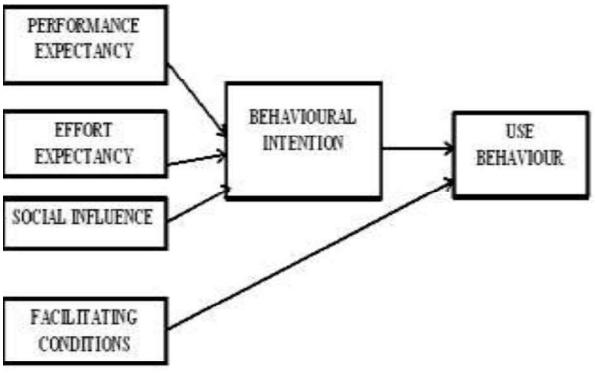

FIGURE-1 UNIFIED THEORY OF ACCEPTANCE AND USE OF TECHNOLOGY (UTAUT) BY VENKATESH-2003

"A STUDY ON MANAGING WORKPLACE RELATIONS"

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***Abstract*—**Globalized environment the most important resource is Human Resource, why because people have relations and those relations to society and people and someone else but now a days with the advent of Globalization people have no time to listen and talk to even his family members also most of the time he spends his time in office or work place. so this place is most important to work for his personal objectives and fulfilling the company's objectives and professional growth, so in this segment we need to discuss the three major areas of why workplace relations are important is The first is that we hunger for community in the workplace—that is, for a workplace where people can use their talents and find personal growth along with mutual security and satisfaction. The second is that the world is changing too fast for experts, and it is hard to solve one problem without creating many others. The third theme is that the main tension in working with others derives from the conflict within each of us between authority and dependency, individuality and the need to belong, so in this context, Interpersonal relations are very important for the sustenance of a person. More so, at the workplace these days, where changing office dynamics has made office almost a second home

INTRODUCTION

Workplace relationships are unique interpersonal relationships with important implications for the individuals in those relationships, and the organizations in which the relationships exist and develop. Studies show that workplace relationships directly affect a worker's ability to succeed. Because workers are spending on average 50 hours a week in the workplace, these long work hours are resulting in the formation of workplace friendships. These connections can be both positive, and have the potential to become harmful. Since these relationships are becoming more common this page will briefly overview relationships in the workplace.

The Hawthorne effect grew out of a series of studies. The theory states that participants will act and react in different manners because they are aware they are being watched. Specifically in McGregor's X and Y theory states that the manager's approach affects the outcome of the worker. "If you give your employees even a little attention, they will equate that attention to "special" treatment that is different from the treatment that others receive. The Workplace Relations Act 1996 is an Australian law passed by the Howard Government after coming into power in 1996.

Previous Labor Government's Industrial Relations Act 1988. It started operation on 1 January 1997 and provided for the continuation of the federal award system which provides a minimum set of terms and conditions for employment. It also is important to recognize The Australian Industrial Relations Commission (AIRC) continues to determine federal awards but has been restricted by the Act to just 20 "allowable award matters", namely:

Here are 6-tips to help you better manage relationships at work.

- No dirty politics please,
- Never be partial towards a co-worker/boss
- Be appreciative of others work
- Be genuinely nice
- Be punctual
- Never indulge in blame-game

You Need To Actively Work At Building And Maintaining Relationships In The Workplace And Be Aware And Open To Others' Situations. Do Your Part By Cultivating:

THE BIGGEST TAX REFORM IN INDIA

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ABSTRACT

In today's globalized world all economic transactions are neutralized, liberalized and privatized. With the advent of LPG, entire world become global village, everybody have a right to sell and buy anything from anybody, this is the starting point of development and as well giving scope to cheat and manipulate the consumers with their own mechanisms, so in my paper I would like share some of my knowledge regarding this tax structure and reforms formed by both central and state governments known as Income Tax. Its compulsory for everyone who buys and who produce and who manufacture and who are called dealers and retailers have to pay some of money to the government, but the problem is no one wants pay the exact figure they have to pay that's why the common man have not pursuing the what he wants for living, everybody wants profits but nobody wants share that profit in the name of income tax this is the reason why this one nation and one tax came into the picture. GST also known as the Goods and Services Tax is defined as the giant indirect tax structure designed to support and enhances the economic growth of a country. More than 150 countries have implemented GST so far. However, the idea of GST in India was mooted by Vajpayee government in 2000 and the constitutional amendment for the same was passed by the Loksabha on 6th May 2015 but is yet to be ratified by the Rajyasabha. However, there is a huge hue and cry against its implementation. It would be interesting to understand why this proposed GST regime may hamper the growth and development of the country.

INTRODUCTION

The Goods and Services Tax (GST) is a vast concept that simplifies the giant tax structure by supporting and enhancing the economic growth of a country. GST is a comprehensive tax levy on manufacturing, sale and consumption of goods and services at a national level. The Goods and Services Tax Bill or GST Bill, also referred to as The Constitution (One Hundred and Twenty-Second Amendment) Bill, 2014, initiates a Value added Tax to be implemented on a national level in India. GST will be an indirect tax at all the stages of production to bring about uniformity in the system.

On bringing GST into practice, there would be amalgamation of Central and State taxes into a single tax payment. It would also enhance the position of India in both, domestic as well as international market. At the consumer level, GST would reduce the overall tax burden, which is currently estimated at 25-30%.

Under this system, the consumer pays the final tax but an efficient input tax credit system ensures that there is no cascading of taxes- tax on tax paid on inputs that go into manufacture of goods.

In order to avoid the payment of multiple taxes such as excise duty and service tax at Central level and VAT at the State level, GST would unify these taxes and create a uniform market throughout the country.

The impact of behavioral finance on government securities (gilt-edged market) in India

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ABSTRACT

The capital market is a vital of the financial system. Capital market provides the support of capitalism to the country. The wave of economic reforms initiated by the government has influenced the functioning and governance of the capital market. The Indian capital market is also undergoing structural transformation since liberalization. The chief aim of the reforms exercise is to improve market efficiency, make stock market transactions more transparent, curb unfair trade practices and to bring our financial markets up to international standards. Further, the consistent reforms in Indian capital market, especially in the secondary market resulting in modern technology and online trading have revolutionized the stock exchange.

A Government Security (G-Sec) is a tradable instrument issued by the Central Government or the State Governments. It acknowledges the Government's debt obligation. Such securities are short term (usually called treasury bills, with original maturities of less than one year) or long term (usually called Government bonds or dated securities with original maturity of one year or more). In India, the Central Government issues both, treasury bills and bonds or dated securities while the State Governments issue only bonds or dated securities, which are called the State Development Loans (SDLs). G-Secs carry practically no risk of default and, hence, are called risk-free gilt-edged instruments

Key words: G-Sec, debt obligation, original maturities, risk- free, gilt-edged.

BEHAVIORAL FINANCE MEANING:

Behavioral finance is a discipline that attempts to explain and increase understanding regarding how the cognitive errors (mental mistakes) and emotions of investors influence the decision making process. It integrates the field of psychology, sociology, and other behavioral sciences to explain individual behavior, to examine group behavior, and to predict financial markets.38According to behavioral finance people are not always rational: many investors fail to diversify trade too much, and seem to selling winners and holding losers. Not only that, but they deviate from rationality in predictable ways.

- Behavioral finance is the integration of classical economics and finance with psychology and the decision making sciences.
- Behavioral finance is an attempt to explain what causes some of the anomalies that have been observed and reported in the finance literature.
- Behavioral finance is the study of how investors systematically make errors in judgment or 'mental mistakes'.

GOVERNMENT SECURITIES (GILT-EDGED MARKET) MEANING:

Strengthen the Indian economy through Cashless transactions and Dream to cashless society

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ABSTRACT

The Prime Minister of India Sri.NarendraModi announced Demonetization policy on 8th November, 2016, ceasing Rs.500 and Rs. 1000 currency notes as a part of legal tender in India. Up to now 2 years completed form 2016-2018. In the middle of the years physical changing of Rs.200 notes, Rs.50 notes and 10 notes also implemented. All for this RBI prepared Commercial banks for such an eventuality. The **researcher expresses the positive sign in the present and future benefits regarding Demonetization in India.** This move viable for a nation like India where a quarter of its population, after the JAM [JanDhan, Aadhar and Mobile Technology] passed successfully. Most of the Business persons realize the positive impact on their business they will continue to sell against cards and not for cash.

Presently, the Government of India is attributing Demonetization to encourage Digital Transactions, which is very difficult to create cashless society as nearly 70% of Indian population is not inculcating into their daily life. Some of the problems like illiteracy fear of cybercrimes and so on.

Key words: Physical changing, future benefits, Illiteracy,

- Introduction
- Objective of the study
- Research Methodology
- Objective of Demonetization
- Black Money
  - Single black
  - Double black
  - Sources of black money
  - India position in the world in black money[statistical analysis]
- Terror Financing
- Corruption
- Cash Alternatives
  - Cards
  - POSM [Point of Sales Machine]
  - Electronic Wallets
  - UPI [Unified Payments interface]
  - USSD [Unstructured supplementary Service Data]
  - AEPS [Aadhar Enabled payment system]
- Challenges to Achieve
- Conclusion
- References

Introduction

In India's case, the move has been taking to curb the menance of black money and fake notes by reducing the amount of cash available in the system. It is also interesting to note that this was not the first time the government India has gone for the demonetization of high –value currency. It was first implemented in 1946 when the RBI demonetized circulated Rs 1000 and Rs 10000 notes. Then government introduced higher denomination bank notes in Rs 1000, Rs 5000 and Rs 10000 in afresh avatar 8 years later in 1954 before the morarjidesai gov't demonetized there note in 1978. The Government again certainly has taken a historic step to address several issues.

Several Issues

a. Reduce terror financing
b. Arms Smuggling
c. Corruption
d. Drug financing
e. Black Money

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TECHNOLOGICAL INFLUENCE ON ENGLISH LANGUAGE IMPACT ON LITERATURE AND CULTURE IN THE INDIAN CONTEXT

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ABSTRACT

This Article express that how "**Technology in uence on English Language Impact on Literature and Culture in the Indian context"**Ar cle supports, the Text book reading is the good habit for this new educated people to gain more knowledge, communica on skill in the Globalized world. Technology advancement is a good sign in India but usage is addi onal equipment for wri ng books and ar cles. India is a great country having di erent geographical areas. Countries surrounded like China, Pakistan, Bangladesh, Nepal, Maldives, and Srilanka. All these countries are di erent Languages but India in uence English Language roots from Bri shers by the e ort of A.O.Hume. In previous days the famous personali es like Rabindranadh Tagore, R.k.Narayan, Mulk Raj Anand, and Mahatma Gandhi etc; these writers and the Readers connected their views to each other. The Vocabulary, Sentences, Quality of expression is leads to cultural in uence. In these days 21st century Writers are using simple words basing on the readers knowledge. Most of the readers using Electronic Gadgets(Cell Phones, Tablets, Lap tops, Personal Computers) for communica on purpose. They use Informal Language not following pure construc ve English Language. Reading News papers, Ar cles, mo on pictures, movies and so on but they not gaining the Language in a be er way.

Keywords: *Cultural di erences-Technological involvement-Forecas ng the future English Language- Remedial Measures*

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Research Article

Soft rot of Jackfruit (*Artocarpus heterophyllus*) by *Rhizopus artocarpi* (Berk. & Broome) Boedijn, in Andhra Pradesh, India.

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Abstract: Jack fruit (*Artocarpus heterophyllus*) is most widely cultivated in Andhra Pradesh, india. It has high nutritional values, medicinal values, rich phytochemical compositions, minerals etc. Such crop plants are infected by soft rot causing fungi by *Rhizopus artocarpi* (Berk. & Broome) Boedijn, in Andhra pradesh, India. The flowers and fruits are severally damaged by soft rot fungi. So this soft rot fungus was isolated from fruits and identified as *R. artocarpi* (Berk. & Broome) Boedijn. The soft rot fungus is grown on PDA medium and cultural characters are studied. The antifungal test is done by using fungal extracts from *Phelinus noxius* and *Ganoderma lucidum* and leaf extract *Prosopis juliflora* (Sw.) DC. In early stage of infection, *Rhizopus* spores deposit on moist fruit surface, get germinates and mycelia grow into the tissues of fruit. The infection produces a layer of black spores on the fruit surface. The fruit becomes soft, watery and brown spots develop on the fruit. In culture on PDA medium it is heavily growing and spreading. It produces sporangia with spores, and then it becomes brownish black with maturity of fungal colony. For biocontrol of soft rot fungi, 20% methanolic extract is more effective than 5, 10, and 15% concentrations. The methanolic extract showed 100% inhibition of both soft rot fungi when compared to water extract. For the first time fungal extracts were used to control the soft rot fungus causing disease in Jackfruits.

Keywords: Soft rot, *Rhizopus artocarpi* rot, Jack Fruit, Biocontrol, India

Introduction

The genus Artocarpus belongs to the family Moraceae and is distributed across India. There are 18 artocarpus species found in India (Ahmedullah and Nayar, 1986). The name Artocarpus is derived from the Greek words artos (bread) and carpos (fruit) (Bailey, 1942). The common name of "jackfruit" used by the physician and naturalist Garcia de Orta in his 1563 book "Colóquios dos simples e drogas da India" (IPGRI, 2000). It is native to South and Southeast Asia and Originated in the south-western rain forests of India. Artocarpus is one of the major keystone species in Western Ghats (Isaac and Nair, 2006). The genus is receiving importance for agroforestry, plantation in forestry and afforestration programmes due to wide range of utilities like fruits and timbers, ayurvedic, culinary uses, etc. However, very limited studies are available in jackfruit production, marketing and value addition (Chowdhury *et al.,* 2012; Sharma *et al.,* 2013). The Artocarpus species have been used by traditional folk medicine in India. It is considered as rich source of carbohydrates, minerals, carboxylic acids, dietary fibers and vitamins such as ascorbic acid and thiamine (Lin *et al.,* 2000), Manganese and magnesium (Barua and Boruah, 2004), potassium, calcium and iron (Goldenberg, 2014) elements are found in seed. Seeds contain two lectins namely jacalin and artocarpin (Theivasanthi and Alagar, 2011). Jacalin has used for the evaluation of the immune status of patients infected with human immunodeficiency virus (Haq, 2006). It also has antioxidant activity (Biworo, 2015). It act against inflammation, malarial fever and skin disease (Khan *et al.,* 2003), anti-bacterial and anti-helmintics (Soeksmanto *et al.,* 2007). Jack leaves are commonly used to heal ulcers. Its leaves have the potential of curing diabetics due to the presence of hypoglycemic and hypolipidemic substances (Prakash *et al.,* 2009). The leaves and stem also have sapogenins, cycloartenone, cycloartenol, β-sitosterol and tannins (Sathyavathi *et al.,* 1987). Root extract is remedy for skin disorder and asthma (Ferrao, 1999). Fruits and roots used for tapeworm infection (Khan *et al.,* 2003). The fruit contains free sugar (sucrose), fatty acids, ellagic acid and amino acids like arginine, cystine, histidine, leucine, lysine, metheonine, threonine, tryptophan etc. (Swami *et al.,* 2012). Flakes of ripe fruits are rich with nutritive value; every 100 g of ripe flakes contains 287-323 mg potassium, 30.0-73.2mg calcium and 11-19g carbohydrates (Elevitch and Manner, 2006). Lycopene also found in jackfruit pulp (Setiawan *et al.,* 2001). There are 18 carotenoids were successfully separated, identified and quantified and 14 were detected in jackfruit (De Faria *et al.,* 2009). In the present paper, most widely used fruit was destroyed by soft rot causing fungus like *R. artocarpi* in Andhra Pradesh, India. So this soft rot disease is

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Bio-Ethanol Fuel production by White Rot Fungi for future Energy Needs and Economy

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Abstract: The energy policy of India is largely defined by the country's expanding energy deficit and increased focus on developing alternative sources of energy. The primary energy consumption in India is the third biggest after China and USA with 5.3% global share in 2015. In 2013, India's net imports are nearly 255.3 Mtone of primary energy which is equal to 42.9% of total primary energy consumption. India is largely dependent on fossil fuel imports to meet its energy demands by 2030. India's dependence on energy imports is expected to exceed 53% of the country's total energy consumption. India's growing energy demands and limited domestic fossil fuel reserves, concerns about climate change from greenhouse gas emissions and the desire to promote domestic rural economies, the country has ambitious plans to expand towards renewable energy resources. The current availability of biomass in India is estimated at about 500 million metric tones. The biomass sources contribute 14% of global energy and 38% of energy in developing countries. Ministry of New and Renewable Energy Sources (MNERS) has proposed to reach total 4324.22 MW of power generation in villages based on biomass power and gasification as well as co-generation. the cost of bio-ethanol was considerably higher than the cost of fossil gasoline supply. lignocellulosic materials are an attractive option for the production of bio-fuels. Lignocellulosic materials serve as a cheap and abundant feedstock, which is required to produce fuel ethanol from Biomass resources at reasonable costs. White-rot fungi are the most effective basidiomycetes for biological pretreatment of lignocellulosic materials. so lignicolous fungi like *Pleurotus ostreatus, Phanerochaete sordid, Sporotrichum pulverulentum, Ceriporiopsis subvermispora, Cyathus stercoreus, Phanerochaete chrysosporium*, *Lenzites betulinus*, etc. were used for bioethanol production. The white rot fungi present in Andhra Pradesh also useful for bio ethanol fuel production.

Key words: Bioethanol, Bio fuel, Economy, Energy needs, white rot fungi

I. INTRODUCTION

The world's present economy is highly dependent on various fossil energy sources such as oil, coal, natural gas, etc. These are being used for the production of fuel, electricity and other goods (Uihlein and Schbek 2009). Developing countries demand more energy in the midst of enormous economic development. The increased demand for energy has led to escalating fossil fuel prices. Excessive consumption of fossil fuels, particularly in large urban areas, has resulted in generation of high levels of pollution during the last few decades. The level of greenhouse gasses in the earth's atmosphere has drastically increased (Ballesteros et al., 2006). Gross domestic product (GDP) is an indicator for a nation's socio-economic development and is correlated with energy consumption (Dincer and Dost, 1997). These countries increased their share for the world's total energy consumption to 18% in 2005 (EIA-2008). It has been projected that by 2030 the non-OECD (Organization for Economic Cooperation and Development) countries including China and India will increase their energy consumption rate to 25% of the world's energy consumption. Using energy efficiency strategies could not alone resolve the energy demands of all countries in the world. Renewable biofuel generation, application and its research & development have received greater global attention and implication. Utilization of renewable energy resources (biomass, solar, wind, hydro, geothermal) could resolve a greater portion of the energy demand problem and may replace up to 40% of the fuel demand by the middle of the 21st century (Johansson et al. 1992).

The world's total proven oil, natural gas and coal reserves are respectively, 168.6 billion tons, 177.4 trillion cubic meters, and 847.5 billion tons by the end of 2007, according to the recently released 2008 BP Statistical Review of World Energy (BPC 2008). With current consumption trends, the reserves-to-production (R/P) ratio of world proven reserves of oil is lower than that of world proven reserves of natural gas and coal — 41.6 years versus 60.3 and 133 years (BPC 2008), respectively. In 2007, world oil production was 3.90 billion tons, a decrease of 0.2% from the previous year (BPC 2008). According to International Energy Agency statistics (IEA 2008), the transportation sector accounts for about 60% of the world's total oil consumption.

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RESEARCH PAPER OPEN ACCESS

Aero-mycoflora of Amaravati Capital of Andhra Pradesh, India

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Key words: Amaravati Capital, Aero-mycoflora, India, Asthma, Respiratory problems

Abstract

Fungal spores were abundant in natural air, soil, water etc. The size of spores was less than 10 microns in diameter. So it will easily deposits in lower airways of peoples. Aero-mycoflora of Amaravati capital was estimated from rainy season 2012 to winter season 2016 using PDA plates exposing to air. The fungal species to be identified was collected from indoors and out door environment of ALC, Vijayawada city of Amaravati capital. In last five years, Amaravati capital peoples may be suffering from allergic ailments, asthma, atopic dermatitis etc. because abundant fungal spores. Total number of isolates from Amaravati was 706 in which 529 fungal species was isolated for four years and 177 in last year and from ALC was 501 in which 369 fungal species was isolated for four years and 132 in last year. 99% of fungal colonies were identified up to species level. The frequently isolated spores of fungai from amaravathi were *Aspergillus flavus, Chaetomium globossum, Cladosporium cladosporioides, Mucor racemosus, Rhizopus stolanifer* and from ALC was *A. fumigates, Drechslera* sp, *Fusarium solani, M. racemosus.* When compared to the outdoor aero-mycoflora of Amaravathi capital i e Vijayawada city and ALC campus, the ALC was less polluted because thick cover of plants which filter air. Aero-mycoflora of Vijayawada city studies revealed that fungal pathogens were causing respiratory problems like Asthma, Bronchitis, Cough, Cold, difficulty in breathing due to rapid urbanization.

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Floristical and Palaeoecological implications of the Early Cretaceous sequences of Krishna-Godavari Basin, East coast of India

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ABSTRACT
The Early Cretaceous plant diversity and palaeoecology of the Krishna-Godavari Basin flora is studied. The study is based on the plant fossils collected by the authors during the recent years and published reports of past work. Nature and mode of preservation of the leafy fossils were considered to understand the vegetation relationship. Similarly, Nearest Living Equivalent method and palaeoecological information of diverse plant groups from the published sources, along with sedimentological inputs are adopted to draw the palaeoenvironnement. The results show that the flora was dominated by bennettitaleans. The vegetation includes plant fossils from the parauto- to allo-chthonous sources. The association of the plant fossils with marine fauna indicates the vegetation was growing near to the sea. The phytogeographical correlation of the flora shows its similarity with that of Antarctica and Australia in the generic composition but greatly differ in specific composition. The composite flora indicates the prevalence of warm and humid conditions.

KEY WORDS
Flora,
taphonomy,
palaeoecology,
phytogeography,
Early Cretaceous,
Krishna-Godavari Basin.

RÉSUMÉ
Analyse floristique et implications paléoécologiques des séquences du Crétacé inférieur du bassin de Krishna-Godavari, Côte Est de l'Inde.
La diversité et la paléoécologie de la flore du Crétacé inférieur du bassin de Krishna-Godavari sont étudiées. Ce travail exploite des récoltes récentes et des rapports préliminaires faits par les auteurs. La nature et le mode de préservation des feuilles fossiles sont étudiés afin de comprendre la relation entre les végétaux. Pour reconstituer les paléoenvironnements, des données sédimentologiques et des informations paléoécologiques sur des groupes variés ont été utilisées. Cette étude a aussi été complétée par une approche fondée sur la méthode actualiste. Les résultats montrent que la flore est dominée par les bennittitales. La végétation comprend des plantes d'origines parautochtone à allochtone. L'association de plantes à des éléments de faune marine indique un développement proche de la mer. L'analyse de corrélation phytogéographique montre des similitudes avec l'Antarctique et l'Australie dans sa composition générique, mais cette flore diffère dans sa composition spécifique. Cette flore composite indique une prévalence de conditions climatiques chaudes et humides.

MOTS CLÉS
Flore,
taphonomie,
paléoécologie,
phytogéographie,
Crétacé inférieur,
Bassin de Krishna-Godavari.

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Palaeofloras from the Kota Formation, India: palaeodiversity and ecological implications

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Key words: *Agathoxylon*, floral diversity, palaeoecology, Kota Formation, India.

Abstract. The Kota Formation of the Pranhita-Godavari Basin is well known for its fossil fauna and flora especially for its silicified woods. However, the palaeoflora and its palaeoclimatic significance within the formation are poorly known. In spite of the fact that the formation yields a rich fauna and flora chronostratigraphic problems still exist. The present study aims to analyze the palaeofloras from the Kota Formation to understand their diversity and palaeoecological significance. We also describe a new species *Agathoxylon kotaense* belonging to the conifer family Araucariaceae. Our study shows that the flora was dominated by conifers and that it is comparable to that of the ?Late Jurassic – Lower Cretaceous Gangapur Formation, Pranhita-Godavari Basin and that of the Rajmahal Formation of the Rajmahal hills. The growth ring pattern and leaf fossil assemblage suggest that the growth conditions were seasonal, but mostly stressed.

INTRODUCTION

Plant fossil assemblages are widespread, abundant and often diverse in the Mesozoic sequences of India, where they remain a valuable tool for understanding the diversity, and evolution of the Mesozoic ecosystems (Bose *et al*., 1990; Chinnappa *et al*., 2014, 2015; Chinnappa, Rajanikanth, 2016, 2017, 2018). A number of Mesozoic floras from Triassic and Cretaceous sequences have been described in India (Rajanikanth, Chinnappa, 2016 and reference therein). However, only limited palaeobotanical studies have been conducted on the Jurassic sequences in India (Mahabale, 1967; Biradar, Mahabale, 1978; Prabhakar, 1989; Sukh-Dev, Rajanikanth, 1988; Rajanikanth, Sukh Dev, 1989; Muralidhara Rao, 1991; Vijaya, Prasad, 2001; Bonde, 2010; Chinnappa, Rajanikanth, 2016; Rai *et al*., 2016). These studies were restricted to the description and listing of plant fossil assemblages. Consequently, little is known regarding the diversity and palaeoecology of the Jurassic floras of India. One of the main reasons for the lack of knowledge regarding the Jurassic floras of India is the lack of proper age control.

In India, the Jurassic sediments are distributed in the Kota Formation of Pranhita-Krishna-Godavari Basin, the Hartala Formation of South Rewa Basin, the Lathi Formation of Jaisalmer Basin, the Jhuran Formation of Kutch Basin and the Dubrajpur Formation of Rajmahal Basin (Fig. 1A, B). Among these formations, the Kota Formation has received great attention from various authors because of its rich palaeoflora (Mahabale, 1967; Biradar, Mahabale, 1978; Sukh-Dev, Rajanikanth, 1988; Prabhakar, 1989; Rajanikanth, Sukh Dev, 1989; Muralidhara Rao, 1991; Vijaya, Prasad, 2001; Chinnappa, Rajanikanth, 2016) and palaeofauna (Owen, 1952; Rao, Shah, 1959; Jain, 1973, 1974a, b, 1983; Tasch *et al*., 1973; Govindan, 1975; Jain *et al*., 1975; Yadagiri, Prasad, 1977; Misra, Satsangi, 1979; Yadagiri *et al*., 1979; Datta, 1981; Yadagiri, 1984, 1985, 1986; Yadagiri, Rao, 1987; Prasad, Manhas, 1997, 2001; 2002, 2007; Evans

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Protaxodioxylon from the Late Jurassic to Early Cretaceous Kota Formation, Pranhita-Godavari Basin, India

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Abstract—The xylotomy of the silicified wood from the Late Jurassic to Early Cretaceous Kota Formation of the Pranhita-Godavari Basin is studied and its systematic affinity is identified here. The wood is characterised by distinct growth rings with mixed pitting on radial tracheid walls, and taxodioid cross-field pits. The combination of the features observed in the present wood indicates that, it belongs to *Protaxodioxylon* of the taxodiaceous Cupressaceae s. l., as a new species *Protaxodioxylon sahnii* sp. nov. The comparison of wood with the modern representatives of the family suggests its relation with *Taxodium*. The present fossil wood with distinct growth rings characterised by their low percentage of latewood suggests that the growth conditions were favorable. The riparian habitat was inferred for the *Protaxodioxylon sahnii* sp. nov., based on sedimentological and other associated plant fossils. The vegetation in the study area is possibly favored by the influence of a subtropical climate with seasons, and by high levels of precipitation along the river banks.

Keywords: Protaxodioxylon, Late Jurassic- Early Cretaceous, Kota Formation, India, sub-tropical arid zone

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INTRODUCTION

Mesozoic fossil woods with mixed pitting on radial tracheid walls and closely related to new world taxodiaceous Cupressaceae s.l., were originally assigned to the fossil genera *Prototaxodioxylon* Vogellehner, (1968). Nonetheless, *Prototaxodioxylon* was an erroneous interpretation of cross-field pits by Vogellehner (1968) in the wood *Protocupressinoxylon chouberti* Attims, from Morocco (Vozenin-Serra et al., 2011). On the re-examination of the original types of *Prototaxodioxylon*, Nadjafi (1982) found that there was a contradiction between the original diagnosis and the holotype. Vogellehner's *Prototaxodioxylon* is indeed characterised by the presence of true spiral thickenings like in the family Taxaceae and have cupressoid cross-field pits. So, Nadjafi (1982) attributed it to *Prototaxoxylon* Krausel et Dolianiti (1958). However, according to Bamford and Philippe (2001) *Prototaxodioxylon* was a taxonomical synonym of either *Protocupressinoxylon* Eckhold or *Brachyoxylon* Hollick et Jeffrey. Nadjafi (1982) also proposed a new name *Metataxodioxylon* Nadjafi for such woods with taxodioid cross-field pits but also with only araucarian radial pitting. However, the name has never been validly published. Consequently, Bamford and Philippe (2001) proposed a new genus name *Protaxodioxylon* Bamford et Philippe to accommodate the Mesozoic wood with mixed radial tracheid pitting and taxodioid cross-field pits.

Here, we describe a new species of *Protaxodioxylon* from the Late Jurassic-Early Cretaceous sediments of the Kota Formation, Pranhita-Godavari Basin, east coast of India (Fig. 1). The formation is named after the village Kota, situated on the east bank of the river Pranhita-Godavari in the Chandrapur District, Maharashtra. The formation is well known for its fauna (Prasad, and Manhas, 2002) and flora (Mahabale, 1967; Biradar and Mahabale, 1978; Prabhakar, 1989; Sukh-Dev and Rajanikanth, 1988; Rajanikanth and Sukh-Dev, 1989; Muralidhara Rao, 1991; Vijaya and Prasad, 2001; Chinnappa and Rajanikanth, 2016, 2018).

The age of the Kota Formation is not known precisely, because the sediments from the Kota Formation have not yielded any biostratigraphically significant index fossils. As no datable magmatic rocks occur above and below or intercalated with the Kota Formation, radiometric dates are also not available. Early Jurassic to Early Cretaceous ages were suggested to the Kota Formation based on the individual faunal and floral evidences. Nevertheless, the recent faunal (Prasad and Manhas, 2002) and palynological (Vijaya and Prasad, 2001) studies suggested Late Jurassic-

Mesozoic woods from India: nomenclature review and palaeoclimatic implications

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Abstract

Nomenclature reappraisal, diversity pattern and palaeoclimatic implications of Jurassic, Triassic and Early Cretaceous pycnoxylic woods in India are undertaken in the present study. Among the fourteen generic names published previously, only eight are validly published and the rest are nomenclaturally illegitimate. About 51 species were reported under these genera to date. There is a gradual increase of species diversity of fossil wood from the Triassic to Early Cretaceous. The nature of the growth rings was applied to understand the palaeoclimate. The lack of distinct growth rings in the Triassic woods suggests absence of seasonality. The Jurassic woods with an inconsistency in growth rings and presence of growth interruptions suggest climate was seasonal and turbulent. During the Early Cretaceous, conifer dominated vegetation and with wider growth rings and gradual transition suggests warm environments with pronounced seasonality. The general increase in mean ring width from the Triassic to Early Cretaceous indicates ameliorating climatic conditions, particularly benign summer conditions.

Keywords: Mesozoic fossil woods; Nomenclature reappraisal; Diversity; Palaeoclimate; India

1. Introduction

Fossil woods are an important component of the Mesozoic fossil flora and they are one of the major sources to understand the flora of the geological past (Sahni, 1931; Rajanikanth and Sukh-Dev, 1989; Falcon-Lang and Cantrill, 2001; Poole and

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Research Article

Optimization of Cultural Parameters for Enhanced Biomass and Production of Bioactive Metabolite by *Alcaligenes faecalis* VuBc M20 isolated from Machilipatnam Sea Coast of Andhra Pradesh, India

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ABSTRACT
The present work was aimed to investigate the influence of appropriate culture medium by optimizing the cultural conditions for enhanced biomass and production of bioactive metabolite by *Alcaligenes faecalis* VuBc M20 which was selected based on its antibacterial potential observed during primary screening study. An attempt was made to examine the impact of optimized environmental parameters like incubation period, pH, temperature and salt concentration and effect of various carbon and nitrogen sources and minerals on bioactive metabolite production and biomass. From the obtained results, it was observed that the optimum pH and temperature for increased bioactive metabolite production were 7.0 and 37°C, respectively. The growth and metabolite production were found optimized with 3.0 % (w/v) glucose, 1.5 % (w/v) tryptone and 0.002 % L-aspartic acid as carbon, nitrogen and amino acid sources, respectively. At all these optimized conditions, *Alcaligenes faecalis* VuBc M20 showed relatively highest antibacterial activity against *Serratia marcescens* (MTCC 4822) when compared to the other tested bacteria namely *Bacillus cereus* (MTCC 430), *Bacillus subtilis* (MTCC 441) and *Escherichia coli* (MTCC 443).

KEYWORDS: Antibacterial activity; bioactive metabolites; biomass; cultural parameters; optimization

INTRODUCTION

The emergence of multi-drug resistance phenomenon in many pathogenic bacteria and the subsequent health consequences has caused a revival of interest in finding new reserves of bioactive compounds from natural sources [1]. Among the natural products, special interest is centered on the microbes that have been proved to be the natural repositories for an array of bioactive metabolites with diverse and promising applications in the field of pharmacology, biomedical and drug development research. Though, nearly 22,000 bioactive compounds have been reported from the marine biota, microbe-derived compounds of the marine ecosystem still remains as a relatively unexplored area of interest. Therefore, screening of microorganisms for the production of new and novel bioactive constituent continues to be an emerging and interesting approach in modern drug discovery programs [2, 3, 4]. In recent years, microbes especially bacteria dwelling in extreme marine habitats are the prime source for many important bioactive compounds with

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Estimation of high and low UV intensity profiles of mesogenic oxovanadium (IV) salen complexes: Doubling effect of homologue number

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ABSTRACT

This article estimates the high and low UV intensity profiles of mesomorphic oxovanadium (IV) salen [VO (4-$C_nH_{2n+1}O)_2$ salen; *n*VLC] complexes. Structure of these complexes have been optimized using the Density functional B3LYP with 6–31 + G (d) basis set using crystallographic geometry as input. The UV absorption spectral characteristics have been estimated in the UV region by employing the DFT method. The oscillator strength (*f*) and vertical transition energy (E_V) have been reported corresponding to absorption wavelength (λ_{max}). Further, some electrochemical properties have been reported for the molecule. The doubling effect of homologue number on the reported parameters has been discussed.

KEYWORDS

Intensity profile; oxovanadium; UV absorption

Introduction

Research on metal-containing liquid crystals (LCs) is a swiftly intensifying, multidisciplinary field with new materials design, synthesis, and novel applications being analyzed. Metallomesogens are metal complexes (with covalent (neutral) or ionic character), which exhibit LC properties, forming the same type of mesophases as found in purely organic materials [1]. They offer wider possibilities for structural variations than simple organic materials that may lead to new mesophases or new types of molecular organizations, and eventually form the basis for new effects and devices. Recent interest in designing novel soft and functional materials with more and more challenging requirements such as improved charge transport, luminescence, chirality, and biological functions for technological applications has been directed toward the use of new mesomorphic systems [2]. Design principles based only on the shape and the symmetry [3, 4] of the mesogenic molecules are giving way to alternative concepts for achieving new molecular motifs able to give rise to dynamic functional properties and unusual topologies and families of mesophases [5].

In order to understand the practical device applications of LCs, one must have knowledge on certain parameters like UV–VIS–IR absorption [6], dielectric permittivity, dielectric loss [7], conductivity [8], refractive index, birefringence and viscosity [9], etc., with varying some

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Color versions of one or more of the figures in the article can be found online at www.tandfonline.com/gmcl.

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PEST MANAGEMENT USING MACHINE LEARNING ALGORITHMS: A REVIEW

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ABSTRACT

Agriculture is a unique business crop production, which is dependent on many climate and economy factors, the major occupation of Indians is farming where in about 70% of the population depends on agriculture. Farmers have wide range of diversity to select suitable Fruit and Vegetable crops. However, the cultivation of these crops for optimum yield and quality produce is highly technical. The crop production has reduced due to various factors like pest attack, diseases and climatic conditions. Crop protection is the science and practice of managing pests, plant diseases and other pest organisms that damage agricultural crops. Machine learning is a looming field of computer science which can be applied to the farming sector quite effectively. It can facilitate the up-gradation of conventional farming techniques in the most cost-friendly approach. This paper reviews on how different machine learning algorithms are useful in pest management of various crops.

KEYWORDS: Pest Management, Machine Learning Algorithms & Agriculture

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Original Article

INTRODUCTION

Agriculture is the main source of the Indian Economy and about 70 per cent of India's rural population are dependent on agriculture for their livelihood. Agriculture is one of the main contributors to the Gross Domestic Product in India. Sustainable agriculture, in terms of food security, rural employment, and environmentally sustainable technologies such as soil conservation, sustainable natural resource management and biodiversity protection, are essential for holistic rural development. India's agriculture is composed of many crops, with the foremost food staples being rice and wheat. Indian farmers also grow pulses, potatoes, sugarcane, oilseeds, and such non-food items as cotton, tea, coffee, rubber, and jute [31]. However, the major loss in agriculture profit is observed mainly due to improper Pest management and lack of awareness in Information Technology**.**

Managing pests (weeds, insects and plant diseases) in agriculture involves the safe and environmentally sound use of pesticides to control crop pests when and where needed, as well as **Integrated Pest Management (IPM)** strategies that avoid total reliance on chemical pesticides. IPM is the most comprehensive way to manage pests. It is a set of strategies based on monitoring, economic thresholds and preventive tactics to determine if and when pest treatment is needed. IPM strategies are presently better developed for insect control than weed control. IPM is especially advanced for fruit and vegetable production [32].

To detect a plant pest in very initial stage, use of Machine Learning technique is beneficial. Machine learning is an emerging technology that can aid in the discovery of rules and patterns in sets of data. It has frequently been observed that the volume of recorded data is growing at an astonishing rate that far outstrips our ability to make sense of it. The “database mining” is now being used to describe efforts to analyze data sets automatically for significant structural regularities. Potential applications of these techniques are applied in the

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BIG DATA FOR ANALYSIS OF COMMONLY CULTIVATED CROPS YIELD PRODUCTION IN ANDHRA PRADESH

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Abstract

Now-a-days as data is growing rapidly analysis of data is playing a key role for efficient decision making. Big data refers to the ability to collect and analyze the huge amounts of data that is being generated by different departments working directly or indirectly involved in agriculture . Due to lack of resources the analysis of crop yield production is very slow which leads to take poor decisions that occurs loss to farmers. The goal is to provide better solution for finding problems and to enhance the crop yield productivity of the agriculture sector. This kind of analysis can be done using big data tools to make better decisions on various crop yield productivity in Andhra Pradesh.

***Keywords*:**Apache Pig, Crop yield, Big Data ,Agriculture