Heterocyclic Letters
Vol. 8| No.2|419-433|Feb-April |2018
ISSN : (print) 2231–3087 / (online) 2230-9632
CODEN: HLEEAI
http://heteroletters.org

TRANSITION METAL POLYCHELATES WITH SALEN-TYPE SCHIFF BASE: SYNTHETIC, SPECTROSCOPIC, THERMAL, ELECTRICAL CONDUCTIVITY, BIOLOGICAL, AND COORDINATION ASPECTS

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ABSTRACT

Cr(III), Mn(III), Fe(III), Ti(III), Zr(IV), VO(IV), MoO_2(VI) and UO_2(VI) polychelates with salen type Schiff base 4,4*'-bis*[(*N*-butanessalicylaldimine-5)azo]biphenyl (BNBSAP) prepared from dye 4,4*'-bis*[(salicylaldimine-5)azo]biphenyl and 1,4-diaminobutanehave been characterized by elemental analyses, IR and electronic spectra, magnetic susceptibility measurements and thermogravimetric analysis.All the polychelatesare dark colouredsolid and sparinglysoluble in common organic solvents. ^{1}H-NMR spectrum ligand clearly indicates the presence of OH and azomethine groups. Thermogravimetric analysis confirms the coordination of H_2O in polychelates.The thermal data have also been analyzed for the kinetic parameters by using Horowitz-Metzger method. Solid state dc conductivity of ligand and its polychelates was measured in their compressed pellet form over 373-413K range of temperatures and all compounds show semiconducting behaviour. The Synthesise polychelateswere also screened for antimicrobial activity against various bacteria.

KEYWORDS: Polychelates, Thermal analysis, Electrical Conductivity, Biological Activity.

INTRODUCTION

Polymers have increasing interest over the last few decades in the fundamental research as well as in their potential applications in fields such as catalysis, ion exchange, photochemistry, selective separation, biological study, physical and materials chemistry [I-IV]. Chelate polymers are defined as materials in which metal ions are linked together with polyfunctional ligands and chelate polymers are also well known for their thermal stability [V]. The incorporation of transition metals into polymeric Schiff bases not only affects their physical characteristics, but also their chemical activity. Complexation of a metal ion to functional polymeric ligand changes its activity due to polymeric effect.Polymer–metal complexes are in general coordinating polymers containing one or more electron donor atoms such as N, S and O that can form coordination with most of the transition and toxic heavy metals.Among polymers those containing nitrogen as donor atoms have been synthesized and

Progress of Financial Inclusion in India – The Crisil Inclusix Analysis

Sanjay P. Dhanwate & Anumita Agarwal

INTRODUCTION

Financial Inclusion is gaining global priority as it is capable of bolstering sustainable, balanced inclusive economic growth at the macro level and promoting economic and social inclusion at the household and enterprise level especially among financially excluded and under-privileged populations. There are three elements of integral financial strategy i.e. financial education, financial inclusion and financial stability. Financial Inclusion works from the supply side by providing access to various financial services; financial education feeds the demand side by promoting awareness among the people regarding the needs and benefits of financial services offered by banks and other institutions. Further these two strategies promote the third element of financial stability.

DEFINITION OF FINANCIAL INCLUSION

Financial Inclusion may be broadly defined as universal access to a wide range of financial services at a reasonable cost. These not only include banking products but also other financial services such as insurance and equity products (The Committee on Financial Sector Reforms, Chairman: Dr. Raghuram G. Rajan). If the term 'Financial Inclusion' is elaborated it means that all working age adults (persons at the age 15+) have effective and quality access to and usage of - at a cost affordable to the customers and sustainable for the providers - financial services provided by formal institutions. "Effective access" involves convenient and responsible delivery of services that re responsive to the needs of financially excluded and underserved customers, at a cost affordable to the customers and sustainable for the providers. The demonstration of effective access is usage. The fact that a customer can access services offered by a formal financial service provider does not mean she or he is "financially included". For this, the condition of "effective access" must be met (GPFI White Paper, 2016).

Dilip Mookherjee emphasizes two other important aspects of financial inclusion in the context of India. The first is the necessity of wider financial inclusion to improve the efficiency and targeting of government welfare programs. For example, transfers that can be made directly to citizen bank accounts can help to eliminate corrupt and inefficient intermediaries.

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Macromolecular Symposia
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Transition Metal Complexes Incorporating with Unsymmetrical N_2O_2-Donor Schiff Base Ligand: Microwave-Assisted Synthesis, Spectroscopic, Thermal, and Biological Aspects

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Complexes of Ti(III), Cr(III), Mn(III), Fe(III), VO(IV), MoO_2(VI), WO_2(VI), and UO_2(VI) with 3-(1-(2-(1-(2,4-dihydroxyphenyl)ethylideneamino)-cyclohexylimino)-ethyl)-4-hydroxy-6-methyl-2*H*-pyran-2-one (H_2L) are reported and have been characterized by various spectroscopic techniques like IR, UV–visible, ^1H & ^{13}C NMR, Mass, XRD, and ESR as well as elemental analyses, magnetic, and thermal measurements and also by the aid of molar conductivity measurements. It is found that the ligand behaves as a dianionic tetradentate coordinating to the metal ion with 1:1 metal to ligand stoichiometry. An octahedral geometry is proposed for all the complexes except Mn(III) and VO(IV) complexes, which possess square pyramidal geometry. The thermal studies show the type of water molecules involved in metal complexes as well as the thermal decomposition of the metal complexes. The compounds are subjected to antimicrobial activity screening and minimum inhibitory concentration is determined. Microbial assay of the above compounds against *Escherichia coli* MTCC 443, *Pseudomonas aeruginosa* MTCC 424, and *Staphylococcus aureus* MTCC 96 and fungal strains *Candida albicans* MTCC 227 and *Aspergillus niger* MTCC 282 shows that complexes exhibit higher activity than the ligand.

1. Introduction

The chemistry of metal complexes with dicompartmental ligands has become a rapidly growing area of research[1] because of their importance in biomimetic studies of binuclear metalloproteins,[2] their interesting catalytic processes,[3] and their ability to stabilize unusual oxidation states and mixed-valence compounds. They are also useful as starting materials for the synthesis of important drugs like antibiotics, antiallergic, antiphologistic, and antitumor agents.[4] The antibacterial and antifungal activities of complexes appear to be due to the chelating behavior of the ligand, with most of the metal ions coordinated through *N* and *S* donor atoms. The influence of the donor atoms and their relative position, the number and size of the chelate ring formed, and shape of the coordination moiety play important role in the biological and catalytic activity of the complexes formed.[5] The poisoning role of central metal ions in living organisms is ascertained using these complexes by determining the action of drugs. It is well documented that coordination of a ligand to the transition metal ions increase the biological activity of the ligand and reduce the cytotoxic effects of metal ion and ligand.[6] Schiff bases derived from substituted aldehydes or ketones and diammines constitute one of the most relevant synthetic ligand systems with importance in asymmetric catalysis and microbial activity. In this paper, our efforts have focused on the synthesis and characterization of Ti(III), Cr(III), Mn(III), Fe(III), VO(IV), MoO_2(VI), WO_2(VI), and UO_2(VI) metal complexes with ligand 3-(1-(2-(1-(2,4-dihydroxyphenyl)ethylideneamino)cyclohexylimino)-ethyl)-4-hydroxy-6-methyl-2*H*-pyran-2-one (H_2L) by microwave technique, as microwave-assisted synthesis of organic compounds is an efficient and eco-friendly synthetic strategy and has now become a powerful tool in green chemistry.

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DOI: 10.1002/masy.202000071

2. Experimental Section

2.1. Materials and Physical Measurements

All chemicals used were of either AR or chemically pure grade. The solvents obtained from commercial sources were dried

ISSN NO:2231-3990

Carcinogenic Cr(VI) Abetment Applicability of 8-HQPHF-II Terpolymer

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Abstract

Recently surface water and groundwater gets commonly contaminated with toxic heavy metals. Amongst these heavy metals hexavalent chromium Cr(VI) is more toxic because it is carcinogenic and mutagenic. For this reason, the removal of Cr(IV) from polluted water has received an extensive concern and has become a hot topic in environmental research. The aim of the present investigation is to synthesize an efficient adsorptive material (8-HQPHF-II terpolymer) and to evaluate its practical efficacy towards removal of hexavalent chromium. Its synthesis was done by polycondensation of 8-HydroxyQuinoline, Phenylhadrazine and Formaldehyde in 2:1:3 molar ratio followed by its applicability studies in environmental pollution control with respect to Cr(VI) removal. The characterization and the structural elucidation of the newly prepared terpolymer was carried out using the modern techniques such as elemental analysis, TGA, FTIR, XRD and ^{1}H-NMR spectral studies. The Cr(VI) removal property of the terpolymer was determined by batch equilibrium method. The effects of various parameters like pH, contact time and adoption doses have also been studied and their optimum values are found to be pH 4, 110 min and 5 gm respectively. The adsorption data were found to fit well with the Langmuir and Freundlich isotherm models. At optimum condition nearly 90% abatement of Cr(VI) has been noted using 8-HQPHF-II.Thus the 8-HQPHF-II under study has been proved be as an efficient/successful adsorbent material for removal of Cr(VI) from contaminated water.

Keywords: *Hexavalent chromium, Carcinogenic, Batch method, environmental applications.*

Introduction

The compounds containing chromium(Cr) are among the most common toxic pollutants in water [1]. Chromium concentration increase in surface water/ground water is a

Dogo Rangsang Research Journal
ISSN : 2347-7180

UGC Care Group I Journal
Vol-10 Issue-07 No. 3 July 2020

Sustainable development and COVID-19 Pandemic

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ABSTRACT

Development means making lifebetter, to have a better standard of living and an improved quality of life.In this system of development man ,trees,environment,society,wealth are important factors i.e.,economic,social environmental development is essential. There are various goals of sustainable development which was in progress but due to COVID-19pandemic effect it totally change the situation. The major crises found in global economy. so How to control this situation is a major problems. All the countries given priorities of pandemic infection control. The infection and mortality rate increases at higher level in some countries.The most important thing to return and achieve our suistainable development we must focus on how we save our life during COVID-19 Pandemic.

KEY WORDS:-Sustainable development,Goals, COVID-19.

INTRODUCTION

The term 'sustainable development'first come to prominence in the world conservation strategy (WCS) in 1980.Development is a describing of human potentials for meaningful participation in economic,social,political and cultural process and institutions,so that people can improve their conditions.The aims of this to maximizing the probability of achieving sustainable development and minimizing the chances of environmental degradation. "Sustainable development is development that encounters the needs of the present without compromising the ability of future generations to meet their own needs."(Unite Nations General Assembly, 1987).The goals and targets are universals, meaning they apply to all countries around the world, not just poor countries. Reaching the goals requires action on all fronts-governments, businesses, civil society and people everywhere all have a role to play .Sustainable development is in the news every day as the world handles with climate change, biodiversity loss, conflict and resource scarcity.In the present situation we struggle with Corona virus COVID-19 Pandemic problem which is highly infectious,spreading all over the world.Government declared lockdown for the safety purpose.This infection is out of control in some countries ,death rate increases.WHO declared it as a Pandemic in all over the world.

Results in Chemistry 2 (2020) 100074

Contents lists available at ScienceDirect

Results in Chemistry

journal homepage: www.elsevier.com/locate/rechem

Harvesting amino acid doped KDP crystal by temperature and time control using AVR microcontroller

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ARTICLE INFO

Keywords:
AVR microcontroller
Crystal growth
Vickers hardness
SHG
Dielectric constant
X-Ray diffraction

ABSTRACT

The significant advances in the fascinating field of solid state physics which is largely concerned with crystal world. The growth of crystal was reported along growth zone plane ⟨011⟩ and ⟨101⟩ by seed rotating crystal method under specially made constant temperature bath which was observed by Temperature and time control using AVR microcontroller software simulation. The AVR Microcontroller Based Temperature Control System with Real Time Data Logger is designed and developed in our laboratory. The doping concentrations in mother solution were 1.0 mol% and 2.0 mol% and corresponding seed rotation rate 30 rpm and 60 rpm for 15 days to 20 days. A transparent clear crystals has been harvested of size 10 × 12 × 24 mm, 10^2 × 35 mm. the crystal structure and perfection were determine using powder XRD. The Vickers micro hardness (H_v) for LV doped KDP crystals at constant load at 50 g, was found 120.4 H_v and 122.0 H_v. This shows that the concentration of dopant increases the hardness property of crystals. The Vickers hardness value increases as dopant concentration increases due to stiffness of grown crystal which has low porosity. The dielectric constant decreases for increasing frequencies and remains constant at higher frequencies. The valine doped KDP crystal shows the property of SHG.

1. Introduction

The nonlinearity property is very important in material for its opto-electronics, laser action, storage devices and telecommunication application. KDP is that it's best known, transparent dielectric material for NLO and has best electro optical properties [1]. KDP family crystal such as its isomorphs ADP, DKDP which has been used for nonlinear optical and electro-optic application for X-ray fluorescence analysis, single crystal of ADP are used for frequency doubling, frequency tripling of laser systems, optical switching in inertial confinements fusion and acousto-optical devices [2,3]. Kumaresan et al. [22] have improved the mechanical and electrical properties of KDP crystal by doping amino acids such as L-glutamic acid, L-histidine and L-valine. Non-Linear optical (NLO) crystals are a key material for the development of laser science and technology because there is almost only this kind of materials that have functions to change frequency of laser beam and modulate it in amplitude and phase. The study reveals that the efficiency of SHG enhance by doping organic molecule, e.g. amino acid in the host crystal of KDP due its high nonlinear coefficients [4]. The presence of amino acid impurity in KDP solution was found to increase the hardness value of the material, optical transmission, electrical conductivity with temperature [5,6]. Researchers grown large number of crystals in order to modify electrical, SHG, mechanical properties of KDP crystal [7–9].

A good transparent crystal were grown by Seed Rotating Crystal Method (SRCM). The excellent defect free seed were chosen for crystal preparation. The doping concentration in mother solution was 1.0 mol % and 2.0 mol % with corresponding seed rotation rate was 30 rpm and 60 rpm for 15 to 20 days. The growth of crystal have been observed was about 0.5 mm to 1 mm per day. A transparent clear crystals has been harvested of size 10 × 12 × 24 mm, 10^2 × 35 mm. The growth of crystal was reported along growth zone plane ⟨011⟩ and ⟨101⟩, C-axis at constant temperature bath which was observed by Temperature and time control using AVR microcontroller software simulation. The AVR Microcontroller Based Temperature Control System with Real Time Data Logger is designed and developed in our laboratory. All records of temperature and controlling system are maintained with the help of data logger. Data is logging & the data is transmitted to computer by serial port. Output is displayed on LCD display including heating status.

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https://doi.org/10.1016/j.rechem.2020.100074
Received 14 June 2020; Accepted 14 October 2020

ISSN - 2348-2397
APPROVED UGC CARE
GGS

SHODH SARITA

SHODH SARITA
Vol. 7, Issue 28, October-December, 2020
Page Nos. 100-105

AN INTERNATIONAL BILINGUAL PEER REVIEWED REFEREED RESEARCH JOURNAL

"AN APPLICATION OF CAPITAL ASSET PRICING MODE (CAPM) ON VALUATION OF EQUITY LINKED SAVING SCHEMES"

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ABSTRACT

Money lying at leisure in our bank account is a chance lost. We must always invest that capital smartly to induce excellent returns out of it. For a greenhorn Investors, it's being advised to adopt a meticulous investment strategy and diversify their portfolio, as through diversification overall investment risk can be reduced. Many AMC's Floated plenty of schemes for the investors to invest their surplus savings. Within this context, close evaluation of mutual funds has become essential. Hence, picking out profitable mutual funds for investment could be an important issue. The foremost intention of this research work is to investigate financial performance of selected Equity Linked Saving Schemes through the employment of Financial & statistical parameters like (Average annualised return, beta, Capital Asset Pricing Model). The findings of this research study are help full to investors for their future investment decisions.

Keywords: Mutual funds, Equity Linked Saving Schemes, investors.

1. Introduction :

Ample Mutual Funds are available where the investors can Park their wealth. But, before investing they want to be aware with the fact that which fund gives more return, which fund is more risky etc. All these can be found out using certain key ratios & statistics. With the assistance of those key ratios & statistics an investor can analyze different mutual funds and put his/her money during a fund which suits his/ her risk perception. Mutual fund returns can be evaluated using Arithmetic mean, Compounded Annual Growth Rate; etc, Whereas risk will be analyzed by checking out standard deviation, Beta.

Taking this under consideration an approach to evaluate the performance of mutual fund schemes is Capital Asset Pricing Model (CAPM).

2. Equity Linked Saving Schemes :

With the objective to grant the double advantage of Capital Appreciation and Tax write-offs to Investors, Equity Linked Saving Scheme has been designed with their maximum exposure in equity and equity-oriented securities, a part of the quantity is additionally parked in debt

3. Literature Review :

Ashraf & Sharma (2014) analyzed mutual fund performance of 10 growth oriented- open ended- equity mutual fund schemes. on the premise of Coefficient of Variation, Treynor's ratio, Sharpe's ratio, Jensen's measure, Fama's measure and Regression analysis. They use monthly NAVs and benchmark market index for the period of April 2007 to March 2012.

Shukla (2015) studied the 5 categories of mutual fund i.e. mid & small cap, large-cap, multi cap, infrastructure and hybrid. This study analysed the financial performance in terms of risk return relationship of selected mutual fund schemes through the statistical parameters such as alpha, beta, standard deviation, r-squared, Sharpe ratio. Infrastructure and Mid & Small Cap funds have performed better than the benchmark, Equity Linked Saving Schemes and hybrid funds on return parameters.

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OUR HERITAGE
ISSN: 0474-9030,Vol-68, Special Issue-9
International Conference On E-Business, E-Management,
E-Education and E-Governance (ICE4-2020)
Organised by
Kamla Nehru Mahavidyalaya, Nagpur
7th & 8th February-2020

E– Tourism–A Key Element for the Growth of Maharashtra Tourism Development Corporation.

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Abstract

The Internet is rapidly using for the distribution of tourism information and sales. This paper deals with e-tourism in Maharashtra. The Web sites can now have equal Internet access to international tourism markets. Research examines problems and solutions concerned to electronic tourism in the tourism industry and guides for successful e-tourism in tourism to be applied by the sector and the government of Maharashtra. The corporate world has taken over the majority of skilled man power providing them with the maximum salaries, hence leaving another challenge in the travel industry of rather small number of skilled manpowers interested to seek employment in the field. The research paper tries to examine the following factors.

- Role of e – tourism in promoting tourist destination in Maharashtra.
- The benefits of e – tourism on the number of incoming tourists and on the life of local service providers.

Keywords: e - Tourism, e – Business.

Introduction

As per WTO, the Internet is rapidly using for the distribution of tourism information. An increasing proportion of Internet by the people for buying online and tourism would gain a larger share of the online

RESEARCH ARTICLE

Macromolecular Symposia

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Study of Acoustical Properties of Lead Oxide Nanoparticle in Different Solvent Mixtures at 305 K by Using Nanofluid Interferometer

Avinash A. Ramteke, Pradnya K. Chougule, Neeraj Prasad, Yogesh K. Vyawahare, Shivaji R. Kulal, and Amit R. Yaul*

In the present paper, study the acoustical properties of lead oxide nanoparticles through the measurement of ultrasonic velocity and density of lead oxide nanoparticles as a ligand in 70% dioxane + water, 70% methanol + water, and 70% ethanol + water mixtures-based solutions has been carried out, this measurement is important for understanding the particle–particle, particle–solvent, and molecular interaction. The reported nanoparticles of lead oxide by using biological method such as using plant extract, but their acoustical properties of lead oxide nanoparticles are attracted the attentions of many researchers. Hence, the present investigation is focused on the study of acoustical parameters of lead oxide nanoparticles like adiabatic compressibility (β), acoustic impedance (Z), free length, and relative association by using the nanofluid interferometer. These measurements are carried out at frequency 2 MHz and temperature 305 K (at room temperature). The obtained results are helped to observe the behavior of ultrasonic velocity and acoustic properties at different concentrations range of ligand (i.e., lead oxide nanoparticle) such as 0.01, 0.05, 0.10, and 0.15 mol dm^{-3} reveal the presence of interaction between particle–particle, particle and solvent.

1. Introduction

Nanomaterials are in performance and important role in the developing science and technology. Hence, their unique structural features, morphology, and size make them interesting ligands. They have wide application in the fields of medical science, physical science, chemical science, and biological science.[1–4] The lead oxide nanoparticle is having extensive uses in the field of medical, chemical, and physical science due to these interesting uses, which has been attracted the attention of researchers toward the simple and more efficient synthetic methodology. Out of all the synthetic methods, biological method is so simple and efficient. Hence, the prepared the metal oxide nanoparticle by biological method but still acoustic properties is lacking behind; therefore, many researchers are interested to know the physical and acoustical properties of metal nanoparticles. In recent years, ultrasonic waves have acquired the status of an important probe for the study of structure and properties of matter in basic science. Acoustic means sound wave propagation arising from the high frequency acoustic irradiation of a fluid can generate considerable stresses at the free surface of the fluid leading toward its destabilization and subsequent breakup. Acoustic technique is best suited for physicochemical studies of various systems.[5–7] Molecular interaction studies on *n*-alkanols in cyclohexane with DMF at 303 K by Thirumaran and Jayalakshmi.[8] The study of acoustical properties of silver nanoparticles[9] and cupric oxide nanoparticles[10] in aqueous solutions of various glycols.

An exhaustive literature review tells that the study of acoustical properties of nanomaterials still lacking behind. Hence, we have undertaken this study and focused on acoustical properties of

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DOI: 10.1002/masy.202100171

https://doi.org/10.33451/florafauna.v27i2 pp301-307
FLORA AND FAUNA
ISSN 2456 - 9364 (Online)
2021 Vol. 27 No. 2 PP 301-307
ISSN 0971 - 6920 (Print)

A preliminary checklist of moths (insect : lepidoptera) of Karanja (Ghadge), District Wardha (Maharashtra) India

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Received : 01.08.2021; ***Accepted*** : 01.09.2021

ABSTRACT

Diversity of moth species (Lepidoptera: Heterocera) was studied in the Karanja (Ghadge), District Wardha of Vidarbha region of Maharashtra. A total 64 species of moths belonging to 14 families and 31 subfamilies were recorded from different sites. Family Erebidae (22 species) was found to be dominating taxon, followed by Geometridae (11 species), Cambridae (10 species) Noctuidae (07 species), Sphingidae (4 Species), Cossidae (3 Species) and 1 species each from family Eupterotidae,Pterophoridae, Saturnidae, Uranidae, Bombycidae,Lasiocampidae and Scythrididae.

Figures : 03 References : 12 Table : 01
KEY WORDS : Diversity, Karanja (Ghadge), Maharashtra, Moths, Vidarbha.

Introduction

Moths belong to order Lepidoptera of class Insecta. Many studies and survey have been carried out time to time by many researchers on moth fauna of Maharashtra state. Total 611 species of moths from Maharashtra have been reported[8]. From Nashik district of Maharashtra 70 species of moths from family Noctuidae (including Ereidae) have been recorded[4]. A preliminary checklist of moths has been reported from northern Maharashtra, wherein they have reported 245 species of moths[5]. In their further studies they reported total 405 species of moths from northern Maharashtra[6]. From Northern Western Ghats of Maharashtra 418 moth taxa from 28 families and 15 superfamilies was studied and also reported 11 species of moths from 5 families as a new record from India[12]. A total 112 species of Moths from Marathwada region belonging to 88 genera and 15 families were reported[11].

Recently a preliminary checklist of 34 moth species were recorded from Ahmednagar College campus, Maharashtra and200 moth's species belonging to 23 families and 13 superfamilies from Goa University campus[1&7].

Review of literature reveals that moth diversity from Maharashtra have been studied and their published data are available at some extent but no any attempt has been done to record diversity of moths from Wardha district of Maharashtra. Therefore, a small and very first preliminary attempt was made in the present survey to record diversity of moths from Karanja (Ghadge) of Wardha district of Maharashtra.

Material and Methods

The study was carried out from the month of February 2020 to January 2021. The moths observed during day in their natural environmental condition and during night near light in Karanja (Ghadge) of District Wardha were considered for the study. The moths observed during day in their natural environmental condition and during night near light were photographed with the help of mega plexus camera. The moths observed

ACKNOWLEDGEMENTS : The authors are grateful to Dr. Sachin Arjun Gurule, Assistant Professor, Department of Zoology and Research Center, K.T.H.M College, Gangapur Road, Nashik for his valuable taxonomical help during identification of moth species.

We are also thankful to Mr. Tushar Makh& Mr. Bhaskar Gadre, B.Sc. students for their valuable help during field survey and also like to express thanks to Dr. Gaurav B Pethe, Assistant Professor, Department of Chemistry for his valuable help during setting of the moths' photos.

J. Adv. Zool. 2021: 42(2) : 186-193 **ISSN-0253-7214**

STUDY ON BUTTERFLY FAUNA OF KARANJA (GHADGE) TAHSIL OF DISTRICT WARDHA (MAHARASHTRA)

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ABSTRACT: The fauna of butterfly species was studied from in and around area of Karanja (Ghadge) tahsil of Wardha District from period of July 2019 - June 2020. A total 41 species of butterflies belonging to 5 families were recorded. Maximum 18 species of butterflies were recorded from family Nymphalidae, followed by 10 species from family Lycaenidae, 7 species from family Pieridae and 3 species were recorded each from family Papilionidae and family Hesperiidae. In the above study 2 species of butterfly recorded comes under Wild Life Protection Act 1972 of India. The butterfly species *Euchrysops cnejus* comes under Schedule II and *Euploea core* comes under Schedule IV of the Indian Wild Life Protection Act 1972.

KEYWORDS: Butterfly, Species, Karanja (Ghadge).

INTRODUTION

Butterflies belongs to Class Insecta, Order Lepidoptera of Phylum Arthropoda, are known as important pollinating agent for various wild and crop plants. They help to pollinate more than 50 economically important plant crops[1]. Butterflies are also known for good indicators of environmental changes as they are very sensitive to climate changes[5]. About 1,504 species of butterflies are found in India[4,6,7]. In Madhya Pradesh and Vidarbha region of Maharashtra about 177 species of butterfly have been reported[2]. Ganvir and Khaparde[3] recorded 69 species of butterflies belonging to 47 genera and 5 families from Sakoli talula of Bhandara District of Maharashtra. Tiple[9] have reported 167 species of butterflies belonging to 90 genera and 5 families form Vidarbha region of Maharashtra. Tiple[10] recorded 114 species of butterflies belonging to 6 families from Bor Wild Life Sanctuary, Wardha, Maharashtra, Central India. However not a single study has been carried out on butterfly fauna of Karanja (Ghadge), District Wardha.

The present study will give idea about list of butterfly species in Karanja (Ghadge), Tahsil, since there was no any published data on the fauna of butterflies in the area of Karanja (Ghadge) tahsil of Wardha District (Maharashtra).

MATERIALS AND METHODS

The present study has been carried out in Karanja (Ghadge) and nearby areas from period of July 2019- June 2020. The time selected for observation of butterflies is from 8:30 am to 12:00 pm and 4:00 pm to 6:00 pm. The butterflies observed in their natural habitat were recorded using photographic method by capturing the observed butterfly in a camera. The

ISSN NO 0447-948

Volume 65, Issue 2, 2021

Journal of Scientific Research

Institute of Science,

Banaras Hindu University, Varanasi, India.

Changes in the Total Lipid Content of the Foot and Hepatopancreas of the Slug, *Semperula maculata* with Reference to Thermal

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Abstract: **Semperula maculata is most commonly found land slug in Vidarbha region and it is abundantly available in the field andgardens.It is an important species on earth. They play significant role in their ecosystem and serve humans in many ways. Acclimation refers usually to the compensatory change in an organism under maintained deviation of a single environmental factor (usually in the laboratory). Terrestrial animals are subjected too much greater fluctuation in the temperature and their body temperature is closely related to their water balance. Higher utilization of total lipid content in hepatopancreas and foot of the slug, Semperula maculata on warm acclimation (32°C and 36°C). Similarly catabolism and bioconversion of incorporated total lipid content in the hepatopancreas and foot was lowered down at cold acclimated (10°C and 15°C) than at warm acclimated temperature. The findings of total lipid content in the slug, Semperula maculata at cold and warm acclimated temperature suggests that the slug is capable of adapting changes in the environmental temperature by modifying content.**

Index Terms: **Acclimation, Foot, Slug, Thermal, Total lipid**

I. INTRODUCTION

Slugs are members of the phylum mollusk. Mollusks are the animal, which have come on land but are still dependent on the moist environment. Study of living organism would not be completed without proving their relationship with environmental entities. Environment is the sum of many abiotic and biotic factors interacting constantly. The organism not only exists in this dynamic fluctuating complex but also it is a part and parcel of it (Crawford Sidebothen, 1972). A living organism is both structurally and functionally adjusted to the environment in which it is living. It must respond to external stresses in such a way that its internal environment is maintained in the optimum condition for the continuation of its metabolism reactions (Peters & Lovejoy, 1992). The organism has to face a variety of environmental factors like water, organic food, oxygen carbon dioxide, light, pressure, radiation and temperature (Buckland, 1994). Temperature is considered as a critical environmental factor in the ecology of most of the organism (Ahmed & Raut, 1991). The organism has to face a variety of environmental factors like water, organic food, oxygen, carbon dioxide, light, pressure, radiation and temperature (Diaz et al., 1998). The terrestrial mollusks mainly face water scarcity problems in the environment of variable humidity and temperature. The slugs are the most successful Stylommatophora pulmonates as far as their adaptability is concerned (Kulkarni, 1970). The physiological and biochemical changes in the unfavorable conditions have been studied by Florkin & Scheer (1972). The perusal of literature indicates that the study of changes in the lipid content in the hepatopancreas and foot of the slug, Semperula maculata with respect to temperature have great importance because now a day temperature of atmosphere goes on changing. It effects on land slug which play significant role in ecosystem. The rate of chemical reaction increases as the temperature rises (Getz, 1959). The nature of physiological adaptation of poikilotherms to constant temperature has been investigated to some extent by Bullode, 1955, Prosser, 1955, 1958. Biochemical correlation occurs with acclimated temperature (Rao, 1967). Animal expose to temperature disturb the physiological and biochemical process within the organisms. Exposure to different temperature affects biological constituents of slug (Kulkarni et al; 1992) and other terrestrial animals. And this is the current topic of interest because of changing ecological parameter day to day. Normally various sources of energy metabolism are required by the organism to encounter the stress (Horiguchi, 1956). Lipid is also a major source of energy after carbohydrate in animal, as it yields highest amount of energy (9.3Cal/gm), and which is more than double the energy obtained from carbohydrates and

DOI: 10.37398/JSR.2021.650212

Journal of Solid State Chemistry 300 (2021) 122279

Contents lists available at ScienceDirect

Journal of Solid State Chemistry

journal homepage: www.elsevier.com/locate/jssc

Evidence of magnetic dilution due to unusual occupancy of zinc on B-site in $NiFe_2O_4$ spinel nano-ferrite

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ARTICLE INFO

Keywords:
Ni–Zn ferrite
Superparamagnetic
Nanoparticles
Sol-gel combustion
Low coercivity

ABSTRACT

The present article investigates the influence of Zn substitution on magnetic properties of $Ni_{1-x}Zn_xFe_2O_4$ spinel nano ferrite compounds. The materials were prepared via sol-gel auto combustion method followed by suitable sintering. X-ray powder diffraction pattern shows formation of cubic nanostructure for all values of 'x'. The magnetic measurement at room temperature shows the narrow M – H curve indicating the superparamagnetic behavior. Unlike normal tetrahedral occupancy of Zn ions in bulk ferrite, the Zn ions peculiarly preferred octahedral sites and led to dilute magnetization in prepared nano ferrite. The nano ferrite shows small value of saturation magnetization and coercivity. Mössbauer spectra were studied at room temperature which also confirms the existence of superparamagnetic phase in nano ferrites and well supports the fact that Zn replaces the Fe ions at the octahedral site. The substitution of Zn ions gives paramagnetic doublet and lead to weakening the magnetic interaction and decrease hyperfine field at A and B sites. The study also explains the effect of Zn substitution on Bohr's magneton, Yafet–Kittel angle, coercivity (H_c), remnant magnetization, magnetic susceptibility and Curie temperature.

1. Introduction

Ferrites, the composite Fe_2O_3 materials catch the recognition of many research scholars because of its distinctive microwave, electro-magnetic properties etc and are extensively utilized for high-frequency applications [1]. Amongst different ferrites the M-type Ba and Sr-hexaferrites possesses hexagonal crystalline structure allows the electronic equipment operating at frequency of 10^{12} Hz and above for high-frequency applications without electro-magnetic intervention because of their instantaneous magnetic-dielectric losses and high resistivity [2]. The present research module is more curious and tempted about nano-structured spinel ferrites due to its exceptional physio-chemical properties, crystal structure, electric and magnetic significances which makes it a potential material for numerous applications [3].

Even though the spinel ferrites are magnetic materials but they exhibit excellent electrical properties. Spinel ferrites owed unique electromagnetic properties and have applications in fields of biomedical viz. drug carrier, hyperthermia, MRI, heating the cancer cells in human body etc. [4]. In general, the spinel ferrites have close-packed cubic structure that belongs to space group symmetry Fd3m [5]. The crystal structure formula of spinel ferrite is expressed as $M^{2+}Fe_2^{3+}O_4$ and has two interstitial sites viz. tetrahedral sites (A) and octahedral sites (B) filled by metal ions [6,7]. The properties of spinel ferrites can be significantly altered on the substitution of various cations into these sites and motivate the magnetic materials to enhance its wide range of applications [8,9].

In the spinel family, nickel ferrites are eye-catching and extensively studied due to its distinctive and fascinating properties [10]. If the particle size is about or less than 28 nm then nickel ferrites can be superparamagnetic [11]. In defining the properties of ferrites, zinc plays a vital role, and hence by varying the concentration of zinc in given ferrites compositional changes can be carried out [12]. With the substitution of nonmagnetic ions like zinc or copper in nickel ferrite, its magnetic properties are drastically modified due to the redistribution of ions in A and B sites [13]. In Ni–Zn ferrites, even zinc and nickel have their strong

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https://doi.org/10.1016/j.jssc.2021.122279
Received 29 March 2021; Received in revised form 9 May 2021; Accepted 11 May 2021
Available online 16 May 2021

Impact of Soil Type on Fenugreek Plant Germination and Growth from Chiplun (Tondali) Region and Study of their Antioxidant Activity

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Abstract: Natural soil is required for sufficient growth and development of Fenugreek Plant. Therefore, green house grown trials of Fenugreek seedlings in five different soils types were investigated. The seeds of Fenugreek able to germinate were sown in Natural Soil, equal mixture of soil and sand, Burning Crop residue (BCR) paddy, Cow Dunk Paddy and Soil Mix with fertilizer (Urea) and the germination and growth of plant were monitored for a period twenty-one day in uniform block design. Several growth parameters like germination rate, plant height, quality and strength of plant were taken during the experimental period. One Way ANNOVA showed that treatments have significant effect on growth, germination rate and quality of Fenugreek Plant. The Free Radical Scavenging Activity (Antioxidant Activity) was investigated by DPPH (2,2-diphenyl-1-picrylhydrazyl). The data of DDPH assay of Fenugreek plant indicates slight variations in Antioxidant activity in different soil type. The result suggests Natural soil for sufficient growth and development of Fenugreek Plant in Chiplun (Tondali) region of Maharashtra, India.

Keywords: Antioxidant Activity, Fenugreek, soil texture, DPPH, One Way ANNOVA.

I. INTRODUCTION

The interest in natural medicinal products, including legume seeds, for the pharmaceutical industry, is increasing worldwide[1] [2] . Medicinal plant cultivation can increase the diversity of farming systems, improve their profitability, and make an important contribution to human health[3].

Fenugreek (Trigonella foenum-graecum L.), plant is widely distributed throughout the world and which belongs to the family Fabaceae. In this context, fenugreek (Trigonella foenum graecum L.), an annual legume, is extensively cultivated in most regions of the world for its medicinal value (Petropoulos, 2002). Recently, through both human and animal experiments, scientific evidence has shed light on the wide range of health benefits of fenugreek, including its positive anticarcinogenic, antidiabetic, antiatherogenic, antioxidant, antianorexic, galactagogue, antihyperlipidemic, anti-inflammatory, Agronomy 2019, 9, 367; doi:10.3390/agronomy9070367 www.mdpi.com/journal/agronomyAgronomy 2019, 9, 367 2 of 16 antifungal, antibacterial, and neuroprotective effects[4]. Fenugreek has also been reported to exhibit strong antioxidant properties, which has led to an interest in using the inherent plant-based antioxidant for patients with heart disorders or cancer[5] [6].

Fenugreek is the third largest seed spice in India after coriander and cumin, specially known as "Common Methi" belonging to the family Fabaceae and sub family Papilionaceae, is widely used as spice and condiment to add flavour in various foods (Dwivedi et al., 2006). Fenugreek leaves and seeds have been used extensively for medicinal purposes. Fenugreek seed is known to exhibit anti-diabetic and anti-nociceptive properties and effects such as hypocholesterolaemic, anti-cancer and thyroxine-induced hyperglycaemia.

The three main classes of fenugreek secondary metabolites include saponins, flavonoids and alkaloids. This plant seeds were reported to contain 35% alkaloids, 10% flavonoids (100 mg per g of fenugreek seeds), 4.8% saponins and 0.2-0.9% diosgenin (Jani, 2009; Meghwal, 2012; Vaidya, 2013). Alkaloids, along with some other volatile compounds, are mainly responsible for the bitter taste and typical aroma of fenugreek (Kumar, 2012, Faeste, 2009). The plant also represents a significant source of antioxidants (Naidu, 2011).

Partial molar volumes and compressibilities of CNS stimulant 1, 3, 7-trimethylxanthine in aqueous-KCl solutions at 30°C

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Abstract – The partial molar volumes and compressibilities of CNS stimulant 1, 3, 7-trimethylxanthine (Caffeine) in aqueous-KCl solutions have been determined form the measured densities and ultrasonic velocities at 30°C. The results shows strong drug-solvent interactions in the solution and water molecules in the bulk solution are more compressible than water molecules surrounding the hydrophilic groups of drug.

Keywords: Thermodynamic properties, Molecular interactions, Drug

Introduction

Caffeine [1, 3, 7-trimethylxanthine] is white odorless powder soluble in water. It is methylxanthine class of central nervous system (CNS) stimulant. It can treat the premature chronic lung disease of infancy disease and most widely consumed as psychoactive agent [1], effective drug against some disease [2] including Parkinson's disease [3]. Caffeine belong to alkaloid which is found in leaves, nut, fruits and seeds of a number of plants and helps to protect them against predator insect and source of caffeine coffee bean of Coffea plant.

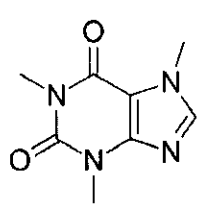

Figure 1. Structure of caffeine

Electrolytes significantly influence the stability and hydration behavior of the biomolecules. Potassium chloride is salt of metal halide composed of chloride and potassium. It is odourless and white crystalline appearance. KCl plays important role in many biological process, food and fertilizers [4, 5]. Further, it has wide application in industrial and medicine [6].

FERROELECTRICS
2022, VOL. 587, 18–32
https://doi.org/10.1080/00150193.2022.2034409

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Study of XRD, dielectric properties and DC electrical conductivity of Li-Zn-Al ferrite synthesized by sol–gel combustion method

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ABSTRACT

A series of nanocrystalline aluminum (Al^{3+}) doped Lithium-Zinc ferrites (LZA) having general chemical formula $Li_{0.5(1-x)}Zn_xFe_{2.5-y}Al_{y-0.5x}O_4$ with $x = 0.1$ and $y = 0.2$ (S1C1), 0.4 (S1C2), 0.6 (S1C3) and 0.8 (S1C4) were synthesized by citrate sol-gel combustion method. The structural characterizations of the samples were carried out by X-Ray Diffraction (XRD) studies. Morphological investigations were performed using Scanning Electron and Transmission Electron Microscopies. XRD analysis confirmed the formation of single phase of the reported samples. All the samples crystallized in spinel cubic crystal structure with *Fd-3m* (227) space group. Crystallite size was estimated in the range of 19 nm to 21 nm using Scherrer formula. The variation of D.C. electrical conductivity as a function of temperature of as-prepared samples revealed the semiconducting nature. The dielectric constant (ε'), dielectric loss factor (ε'') and the dielectric loss tangent (tan δ) were studied in the frequency range of 1 KHz to 1 MHz at room temperature by using LCR Meter. The values of dielectric constant, dielectric loss factor and dielectric loss tangent were found to decrease with addition of Al^{3+} content as well as with the increase in the frequency. The observed dielectric dispersion at lower frequency is attributed to Maxwell-Wagner type of interfacial polarization due to hopping of charge between Fe^{+2} and Fe^{+3}. High value of resistivity ($\approx 10^6$ Ω-cm) and low value of dielectric constant and dielectric loss are the prime achievements of the present research work which make these investigated nanoferrites useful for the microwave devices.

ARTICLE HISTORY
Received 10 January 2021
Accepted 28 December 2021

KEYWORDS
Ferrite; sol–gel combustion; X-ray diffraction; conductivity; dielectric constant; dielectric loss factor

1. Introduction

The spinel ferrites are of significant importance among the researchers all across the world due to their unique and versatile properties. Ferrites are extensively used in electronics and telecommunication industries because of their novel electrical and dielectric properties. Among the various ferrites, lithium ferrites have become the most important

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Schizophrenic Syndrome and Fallacious Identity in Kiran Desai's Novel the *Hullabaloo in the Guava Orchard*

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Abstract :

Indian-English fiction has full-fledged recognized identity since its inception and it deals mostly after the trend of post-modernism with thematic development, isolation of characters and sense of tormented, maladjusted and alienated individuals. India English fiction embraces social, political or ethical woes along with characters' sensibilities, the inner upheavals, dilemma, cultural identity and crisis. The leading character of the novel *Hullabaloo in the Guava Orchard* is an isolated and estranged. They don't have an iota of sense of self-pride with purposeful meaning in life, so, they has been is shambles of disconnected and uprooted. The novels are centered on manipulative, exploitative and opportunistic ways and manners of life.

Keywords : Postmodernism, schizophrenic characters, colonialism, man-nature and man-man conflict, fractured individuality.

Introduction :

Indian-English fiction has full-fledged recognized identity since its inception and it deals mostly after the trend of post-modernism with thematic development, isolation of characters and sense of tormented, maladjusted and alienated individuals. India English fiction embraces social, political or ethical woes along with characters' sensibilities, the inner upheavals, dilemma, cultural identity and crisis. The leading character of the novel *Hullabaloo in the Guava Orchard* is an isolated and estranged. They don't have an iota of sense of self-pride with purposeful meaning in life, so, they has been is shambles of disconnected and uprooted. He is ostracized by his own family, society and neighborhood. The novels are centered on manipulative, exploitative and opportunistic ways and manners of life.

The novel highlights the grim living condition of people, living in a small town of Shahkot, owing to the protracted beginning of monsoon. The residents of the town are forced to suffer by the fire of summer: Shahkot has been under severe no-water zone as it was declared drought-prone. It was summer that sent the dizzy pulse of fever into the sky in which even rules and laws that usually stood straight and purposeful grew limp, like plants exposed to the afternoon sun, and weak. The heat softened and spread the roads into sticky pools of pitch and melted the grease in the Brigadier's moustache so that it dropped and uncurled casting shadows of his fine, crisp presence.

Delineation of characters with their myriad traits and foibles gives the sense that the novel deals with loneliness, alienation, desolation. All characters are bogged down in the mire of estrangement, negation, isolation and alienation. The portrayal of these characters sheds light on uprooted and complex personalities. Commenting on her novel, Desai Says, "I think my first book was filled with all that I loved most about India and knew I was in the inevitable process of losing. It was also very much a book that came from the happiness of

ISSN No. 2394-5990

Feministic Rebellious Streaksin Meena Kandasamy's Novels *When I Hit You: Or, A Portrait of The Writer as a Young Wife* and *The Gypsy Goddess*

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ABSTRACT :

The present study is ahumble attempt to critically explore the feminist characteristics of MeenaKandasamy's works. Though the impact of patriarchy has been a pervasive theme of writers in order to shed a lighton the misery of women, the research paperbrings to fore thematicissuesof women which have been emerged in recent times. These issues are being instrumented, corroborated by technology and new avatar of patriarchy being acclimatized with vicious developments of digital world.

These new challenges unabatedly, surreptitiously heaps on new constraints on the rights of women, conditioning them as being subservient and subordinate. Presence of patriarchy are found invisibly every walk life under the garb of so-called progressive mind, holding the outdated, prejudiced beliefs that go against the letter and spirit of equitable society and fundament rights enshrined in the Constitution meant to be preserve the dignity of individual irrespective of gender. Meena Kandasamy's *When I Hit You: Or, The Portrait of the Writer As A Young Wife*and *The Gypsy Goddess* render us glimpses with convincing portrayal of her characters.

Keywords: Ever-changing patriarchal norms, technology-fuelled injustices, reemergence of hidebound practices

Introduction:

Indian women writers in English have made a powerful literary depiction of the second sex, highlighting the abjectness of women of all classes, their lack of identity and independence, and the systemic exploitation and oppression of women in a patriarchal socioeconomic structure. Some of the major figures who launched a new wave in Indian literature are Kamala Markandya, Ruth PrawarJhabwala, NayantaraSahgal, and Anita Desai. Then there are novelists like ShashiDeshpande, whose concentration has been on educated women in a male-dominated society. Shobha De, a typical twentieth-century novelist, explores the role and importance of sex in modern society. Thus, in contemporary women's literature, a serious and conscious effort is being made to depict women in a realistic portrayal; female characters have been created who think, talk, and act in accordance with the demands of artistic imagination without being restricted by literary norms.

Entrenched Biological Discrimination:

When I Hit You: Or, The Portrait of the Writer As A Young Wife (2017), is an autobiographical piece that exposes the struggle of women in violent marriages. Despite the fact that it is based on her own experiences in an abusive marriage, it has a universal appeal. The story is an honest attempt by the author to break the silence of

ISSN No. 2394-5990

The Paradox of Modernity and Cultural Disparity in Manju Kapur's Novel *Immigrant*

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Abstract:

The research paper deals with the dire urge of liberation and autonomous individualism, women are raising voice being rebellion force as they have been silent sufferer of discriminative and exploitative structure of society since the ages. Taking into consideration the innermost and impassioned urge of having rights of women an individual and free-willed being, 'Immigrant' brings out protagonist's yearning for existence with freedom from the patriarchal frame of structure of the society.

Keywords: Feminism, patriarchy, postmodernism, and cultural prejudices.

Introduction :

It is true that the novelists today have presented a plethora of characters that deviate from the cultural biases, and restructure for them a new world of their own choices. It is a world of their own free will, wherein they exercise freedom of expression and choice in their bid to be modern, often forgetting the fact that they are actually moving away from the roots. Since ages women have been symbols of chastity and loyalty. Similarly, they have also been victims of socially created artificial dichotomization, which defines separate roles for men and women. In the name of tradition, hegemonic masculinity has made the condition of women deplorable and degenerative. The cardinal feature of the socio-cultural set up in India has been the stark inequalities in gender relations. Thus, thus it is noteworthy that the protagonists have succeeded to gain self-recognition and assertion only when they walk out of their tradition bound roles to modern individualistic ones. Tradition reins in women, but modernity frees them.

Cultural Disparity :

Manju Kapur's fourth novel *The Immigrant* deals with the theme of cultural disparity which the immigrant are subjected to. They have been born and brought up in their native boundaries with specific cultural habits but the immigration compels them to adopt the contrasting culture of foreign country. This cultural dilemma often causes many emotional setbacks to them. The cultural crisis makes them to pass through fits of nostalgia resulting into dejection and stress. Same is true with Nina. As per the India tradition girls are married early and so the single status of Nina even at the age of thirty is looked down upon by everybody. And so she is full of grief and tension.

She gets disappointed with the worsening way of life she is living. Nina is economically self-sufficient yet like all other Indian daughters she feels herself as a burden on her mother, she is a liability, a responsibility. Thus, Nina's mother, like all other Indian mother, has only one agenda that is how to marry off her daughter. Traditionally in India, marriage has been regarded sacrosanct duty of parents to get rid of daughter by getting their daughter married because it is supposed to be sacred institution. Nina's mother in *The Immigrant* is very anxiously desperate and is looking forward to her daughter's marriage though she knows that

FERROELECTRICS
2022, VOL. 587, 18–32
https://doi.org/10.1080/00150193.2022.2034409

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Study of XRD, dielectric properties and DC electrical conductivity of Li-Zn-Al ferrite synthesized by sol–gel combustion method

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ABSTRACT

A series of nanocrystalline aluminum (Al^{3+}) doped Lithium-Zinc ferrites (LZA) having general chemical formula $Li_{0.5(1-x)}Zn_xFe_{2.5-y}Al_{y-0.5x}O_4$ with $x = 0.1$ and $y = 0.2$ (S1C1), 0.4 (S1C2), 0.6 (S1C3) and 0.8 (S1C4) were synthesized by citrate sol-gel combustion method. The structural characterizations of the samples were carried out by X-Ray Diffraction (XRD) studies. Morphological investigations were performed using Scanning Electron and Transmission Electron Microscopies. XRD analysis confirmed the formation of single phase of the reported samples. All the samples crystallized in spinel cubic crystal structure with *Fd-3m* (227) space group. Crystallite size was estimated in the range of 19 nm to 21 nm using Scherrer formula. The variation of D.C. electrical conductivity as a function of temperature of as-prepared samples revealed the semiconducting nature. The dielectric constant (ε'), dielectric loss factor (ε'') and the dielectric loss tangent (tan δ) were studied in the frequency range of 1 KHz to 1 MHz at room temperature by using LCR Meter. The values of dielectric constant, dielectric loss factor and dielectric loss tangent were found to decrease with addition of Al^{3+} content as well as with the increase in the frequency. The observed dielectric dispersion at lower frequency is attributed to Maxwell-Wagner type of interfacial polarization due to hopping of charge between Fe^{+2} and Fe^{+3}. High value of resistivity ($\approx 10^6$ Ω-cm) and low value of dielectric constant and dielectric loss are the prime achievements of the present research work which make these investigated nanoferrites useful for the microwave devices.

ARTICLE HISTORY
Received 10 January 2021
Accepted 28 December 2021

KEYWORDS
Ferrite; sol–gel combustion; X-ray diffraction; conductivity; dielectric constant; dielectric loss factor

1. Introduction

The spinel ferrites are of significant importance among the researchers all across the world due to their unique and versatile properties. Ferrites are extensively used in electronics and telecommunication industries because of their novel electrical and dielectric properties. Among the various ferrites, lithium ferrites have become the most important

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Volume 15, Number 1, 2022. pp. 37-42

Jordan Journal of Physics

ARTICLE

Optical, P-XRD & U-V Properties by Varying the Concentration of L-valine Amino Acid in Pure KDP

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Doi: **https://doi.org/10.47011/15.1.5**

Received on: 01/08/2020; *Accepted on: 27/1/2021*

Abstract: H_2PO_4 potassium dihydrogen phosphate crystals (KDP) were prepared for dopant L- valine amino acid. The bulk growth was reported along <011> and <101> plane by seed rotating crystal method and solution growth method. The doping concentrations in the mother solution were 0.4 mole%, 0.6 mole% and 0.8 mole% and the corresponding seed rotation rates were 30 rpm, 60 rpm and 100 rpm for 15 to 20 days. KDP crystal of dimensions 102 x 23 mm, 72 x 23 mm and 102 x 35 mm size has been grown. FTIR spectra showed the presence of functional groups in the crystal. Powder X-ray diffraction analysis of transparent bulk nonlinear optical crystal doped with LV confirms the formation of the tetragonal system. Energy Dispersive X-ray analysis (EDAX) confirms the elemental analysis of potassium and phosphate radicals in the reported crystal. Optical transmission increases with the increase of concentration of L-valine in KDP crystals.

Keywords: Crystal growth, Symmetry, FTIR, UV, EDAX.

1. Introduction

The non-linear property of a single crystal is very useful for optoelectronics, acousto-optics, laser, telecommunication technologies, medical instrumentation, … etc. KDP single crystal possesses important piezoelectric, ferroelectric, electro-optic and mainly NLO properties [1, 2]. NLO property of matter is essential for frequency conversion in laser devices. KDP is suitable for higher harmonic generation of a huge laser system of fusion experiments, because it can be grown to larger sizes and KDP has a high laser damage threshold. Some of the crystal-like KTP used in Nd: YAG laser by frequency doubling to get green light; lithium borate, potassium beryllium boro-fluoride, strontium beryllium borate, … etc. are promising for UV generation because of their wide bandgap and adequate optical nonlinearity. Many researchers have attempted to enhance the properties and growth rate of KDP crystal by varying the concentration of dopant or by changing the growth conditions [3-6]. The doping of organic impurities like amino acid improved the NLO properties of the KDP crystal [7].

In the present investigation, the kinetic mechanism of growth of prismatic faces of pure and doped KDP solutions was studied. The crystal morphology depends on the expansion rates of the various crystallographic faces. The study shows that the prismatic face (1 0 0) type is much more sensitive to some impurities than the (1 0 1) pyramidal faces [8].

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ISSN No 2394-5087

जिल्हा उद्योग केन्द्राचे कार्य व भूमिका एक विश्लेषणात्मक अध्ययन

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बीज शब्द : जिल्हा, उद्योग, सुविधा, लघुउद्योग, विकास, औद्योगिक, विकेंद्रीकरण, मदत

गोषवारा (सारांश) :

विकेंद्रिकरणाची भूमिका वास्तविकतेमध्ये आणण्याकरीता, २३ डिसेंबर १९७७ ला, नवीन औद्योगिक निती घोशीत करून ग्रामीण, कुटीर, लघु व अतिलघु उद्योगांचा विकास करण्यासाठी जिल्हा उद्योग केन्द्र ही संस्था स्थापन करण्याचे ठरले व तसा निर्णय घेण्यात आला. १ मे १९७८ पासून जिल्हा उद्योग केन्द्राने आपले कार्य सुरू केले.

जिल्हा उद्योग केन्द्र नवीन उद्योग उभारण्यासाठी विविध सुविधा एकाच ठिकाणी उपलब्ध करून देणारी महत्वपूर्ण अशी संस्था आहे. लघु उद्योजक व कारागीर यांना सर्व सुविधा एकाच ठिकाणी मिळाव्या म्हणून उद्योग निदेशालय, वित्त निगम, औद्योगिक गुंतवणूक निगम, लघुउद्योग निगम, खादी व ग्रामोद्योग मंडळ, राज्य विद्युत मंडळ इत्यादी सोबत संबंध प्रस्थापित करते. जागा, पाणी, वीज, मिळवून देण्याकरिता मदत करणे, लघुउद्योगांच्या नोंदणी करणे, दुर्मिळ कच्चामाल, भाडेतत्वावर यंत्र सामुग्री मिळविण्याकरिता मदत करणे, सरकारी खरेदी व पुरवठा योजनेतून त्यांच्या उत्पादनाच्या विक्रीमध्ये, स्थानिक तसेच नैसर्गिक साधनसामुग्रीच्या उपलब्धतेनुसार छोटे उद्योग उभारण्यास उद्योजकांना सर्वतोपरी मदत करणे, उद्योजकता प्रशिक्षण शिबीर आयोजित करणे, वित्तीय सहाय्य उपलब्ध करून देणे इत्यादी कार्य करते.

प्रस्तावना :

समतोल आर्थिक विकास करणे, औद्योगिक प्रगतीचा वाढता विकास दर निर्माण करणे, आजारी उद्योगाचा प्रश्न सोडविणे, नवीन प्रकल्पांना चालना देणे असे किती तरी कार्य पारपाडणे आवश्यक आहे. ही सर्व कार्य करत असतांना जर कोणती प्रमुख अडचण असेल, तर ती भांडवलाची आहे. नक्रसच्या मते, विकसित देशाचा काळजी पूर्वक अभ्यास केल्यास असे लक्षात येते की, विकासाच्या प्रक्रियेमध्ये सुप्त परंतु प्रमुख घटक हा नेहमीच भांडवल निर्मिती असून, आर्थिक विकासाचे सर्व टप्पे वाढत्या भांडवल निर्मितीच्या सहाययाने पूर्ण करणे शक्य झाले आहे.[१]

आर्थिक विकासात भांडवल अर्धविकसित व विकशील प्रदेशामध्ये औद्योगिक प्रक्रिया गतिमान करण्याकरिता आवश्यक असले तरी, ते शासकीय सहभागाशिवाय शक्य नाही. शासन हे कार्य वित्त संस्थांच्या सहकार्याने पुर्ण करीत असते.

स्वातंत्रोत्तर भारतामध्ये, देशाच्या संतुलीत नियोजनबध्द विकासाच्या दृष्टीने, नैसर्गिक संसाधनच्या समायोजनाकरिता भारत सरकारने वर्ष१९४८ व १९५६ च्या औद्योगिक नितीवर आधारीत, औद्योगिक विकासाचा मार्ग स्वीकारला. परंतु असंतुलन वाढतच गेले व औद्योगिकरणात केंद्रिकरण निर्माण झाले. वर्ष१९७७ मध्ये विकेंद्रिकरण व ग्रामीण विकासाला महत्व दिल्या गेले, त्यामुळे ही विकेंद्रिकरणाची भूमिका वास्तविकतेमध्ये नियोजनात आणण्याकरीता, २३ डिसेंबर १९७७ ला, नवीन औद्योगिक निती घोषीत केल्या गेली.[२] या निती नुसार ग्रामीण, कुटीर, लघु, व अतिलघु उद्योगांचा विकास करण्यासाठी आवश्यक सहाय व सुविधा उपलब्ध करण्याकरिता जिल्हा उद्योग केन्द्र ही संस्था स्थापन करण्याचे ठरले व तसा निर्णय घेण्यात आला.[३]

वर्ष१९७८ मध्ये भारतात जिल्हा उद्योग केन्द्राच्या स्थापने नंतर, नवीन औद्योगिक वातावरण निर्माण होवून क्षेत्रीय असंतुलन दूर करण्यात सहाय झाले. कमीत कमी भांडवलात उद्योगाची स्थापना, क्षेत्रीय संसाधनाचा वापर शक्य झाला. तसेच रोजगार वृध्दी शहरी, आकर्षणाचा लोप, स्थानिक कौशल्याचा वापर झाला. जिल्हा उद्योग केन्द्र, उद्योगाच्या विकासाकरिता आर्थिक सर्वेक्षण, ऋण, विपणन, कच्चामाल, यंत्रसामुग्री, उपकरणे, संशोधन, विस्तार व प्रशिक्षण इत्यादी सोई-सुविधा उद्योजकांना उपलब्ध करून देते. त्यामुळे औद्योगिकरणाला गति मिळते व क्षेत्रीय असंतुलन दूर करून, संतुलीत औद्योगिक विकासाला चालना मिळते.

Contents lists available at ScienceDirect

Physica B: Condensed Matter

journal homepage: www.elsevier.com/locate/physb

Effect of Sr doping on structural, magnetic and transport properties of $La_{1-y}Sr_yMn_{0.5}Co_{0.5}O_{3\pm\delta}$

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ARTICLE INFO

Keywords:
Perovskite
Aqueous solution combustion method
X-ray diffraction
Rietveld refinement
Magneto-resistance
Double exchange mechanism

ABSTRACT

Structural, magnetic and magneto transport properties of $La_{1-y}Sr_yMn_{0.5}Co_{0.5}O_{3\pm\delta}$ perovskites prepared by aqueous solution combustion synthesis were studied in detail. The effect of Sr doping on the properties of these perovskites was investigated. As-prepared perovskites were characterized using X-ray diffraction for single phase formation. Magnetic study was carried out for in depth analysis of the magnetic properties. AC susceptibility study shows a change in the behavior of undoped and doped compounds in low temperature region. Ferromagnetic interactions was found to increase in the low temperature region in the doped compounds compared to that in the undoped compound. The measurements on resistivity showed reduction with Sr doping up to $y = 0.5$. This is attributed to the high spin stabilized Co^{3+} ions which enhance the ferromagnetic interactions and the hopping probability of e_g charge carriers.

1. Introduction

Perovskite manganese oxides $La_{1-x}A_xMnO_3$ have attracted a great deal of attention due to their interesting properties such as insulator-metal transition, colossal magnetoresistance (CMR) charge/orbital ordering. They are also found as attractive due their optical, photochemical and ferroelectric properties. Sr doped $LaMnO_3$ and $LaCoO_3$ have been widely studied for their electrical and magnetic properties [1–5]. Recently the transition metal based perovskites have also been extensively studied and used in different fields such as visible light-active photocatalysts for water splitting and CO_2 reduction and as thermoelectric, dielectric, and magnetic materials [6–8].

It has been reported that these perovskite compounds become ferromagnetic and metallic as an effect of replacement of La^{3+} ions by Sr^{2+} ions. Ferromagnetism and reduction in the resistivity in the $LaMnO_3$ can be well understood in terms of double exchange (DE) mechanism between Mn^{3+} ($t_{2g}^3 e_g^1$, S = 2) and Mn^{4+} ($t_{2g}^3 e_g^0$, S = 3/2) ions. This mixed state of Mn ions is formed as a result of reduction in the positive ionic charge due to the Sr doping. The core spin (S = 3/2) of Mn^{4+} arises from the half-filled t_{2g}^3 states. High spin state is stable in the Mn-based systems and doesn't exhibit thermal variation of spin state due to higher exchange energy than that of crystal field energy [9]. A strong intra-atomic Hund coupling of the core spin with the mobile charge carrier in the e_g orbitals determines most of the observed behaviour of the manganites [3–5]. In addition to DE mechanism, the lattice distortion, due to Jahn-Teller (JT) effect, also plays an important role through strong electron lattice coupling [9,10]. On the other hand, in $LaCoO_3$ the Co ions are found to be in low spin ($t_{2g}^6 e_g^0$, S = 0) state at low temperature because of strong crystal field energy which stabilizes the low spin state. As the energy difference between the low spin and high spin states is very small (≈0.03 eV), the Co ions show progressive conversion from low spin to high spin ($t_{2g}^4 e_g^2$, S = 2) state with the increase in temperature [11,12]. On Sr doping, Co^{4+} ions are expected to be created if oxygen non stoichiometry (δ) of the compounds is controlled.

According to the literature survey, it has been observed that many researchers have focused their attention on $LaSrMnO_3$ system i.e. A site doping for magnetic and transport properties. Large amount of work has also been carried out in order to understand the magnetoresistance (MR) of Sr-doped $La_{1-x-y}A_xSr_yMnO_3$ LASMO ceramics. A very less attention, however, has been given to co-doped $LaSrMnO_3$ i. e. $La_{1-y}Sr_yMn_{1-x}Co_xO_{3\pm\delta}$ system. In nutshell, it can be said that resistivity and MR values can be improved by adjusting the Sr concentration in $La_{1-y}Sr_yMn_{1-x}Co_xO_{3\pm\delta}$.

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https://doi.org/10.1016/j.physb.2023.414823
Received 19 July 2022; Received in revised form 11 March 2023; Accepted 18 March 2023
Available online 21 March 2023

Synthesis, Characterization and Removal of Malachite Green Dye from Aqueous Solutions using Terpoylmeric Resin by Adsorption

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ABSTRACT- In this work, 4-HAMF-III terpolymeric resin has been prepared by condensation of 4-HydroxyAcetophenone(4-HA), Melamine(M) and Formaldehyde(F) in 3:1:4 molar ratio using 2M HCl as a catalyst and was proved to be a good adsorbent for removal of Malachite Green(MG). The newly prepared terpolymer was characterization and its structural elucidation was confirmed by TGA, XRD, FTIR and ^{1}H-NMR spectral studies. The metal removal properties of the terpolymer were studied by batch equilibrium method. The effects of various parameters like contact time, initial adsorbate concentration, pH and 4-HAMF-III doses have also been studied and reported. The adsorption data were found to fit well with the Langmuir and Freundlich model. The percent removal of MG was found to be increase with adsorbent doses from 1 to 3gm. and maximum efficacy was found at 3gm. At optimum condition nearly 84% abatement of MG has been noted using 4-HAMF-III. The results revealed that the terpolymeric resin as adsorbent reported in this article is effective for removal of MG from aqueous water and thus can be successfully used for control of MG dye pollution.

Keywords: *pollution, terpolymeric resin, Malachite Green.*

1. Introduction

In the current era, water scarcity is one of the environmental issues prevailing in the world. Water is one of the most essential requirements for living being to survive because all physiochemical processes of body require aqueous medium this is due to Moreover, 70–80% of the mass of most living bodies consists of water and various mineral and organic salts.(1) Dyes are used in large quantities in many industries including textile, leather, cosmetics, paper, printing, plastic, pharmaceuticals, food etc. to color their products, which generates wastewater, characteristically high in color and organic content. The textile industry alone accounts for two third of the total dye stuff production(2). Availability of clean water is required for both industrial purposes and household activities. Release of industrial effluents and prolonged excessive use of fertilizers and pesticides in agricultural fields causes deterioration in the water quality resulting in water contamination or pollution [3, 4]. The occurrence of lesser concentrations of toxic dyes in water has a consequential impact on the environment. Dyes are mostly discharged from textile, food, pharmaceutical, paper, printing, leather, and cosmetic industries [5–7]. MG is used in aquaculture industries due to its great fungicide and bactericidal efficacy. Thus, it is extremely toxic to humans, plants, and aquatic fauna and it can cause carcinogenesis damage to the kidney and liver [8-10]. Due to the toxicity and carcinogenic effect of MG dye ions, their removal from the aqueous environment is highly demanded. Therefore, the removal of dyes such as MG from wastewaters or surface waters is mandatory for the protection of human health. The removal of methylene blue from wastewater were reported by using numerous methods such as liquid-liquid extraction, reverse osmosis, advanced oxidation process, electro coagulation, electrochemical oxidation, ozonation and membrane filtration. However, adsorption method gives some advantages due to its simple design, high efficiency and low costs with unhazardous by products [11,12].Therefore it is necessary to remove MG from environment, in order to prevent the deleterious impact of MG on ecosystem and public health. The necessity to reduce the amount of heavy metal ions pollution in wastewater streams has led to an increasing interest in terpolymers [13-16]. The aim of this research work is therefore to terpolymeric resin and to carry out the adsorption studies of MG abetment.

2. Materials and Methods

All the chemicals used were of analytical or chemically pure grade. Distilled water was used throughout the investigation.

2.1Synthesis of terpolymer- A mixture 4-HydroxyAcetophenone, Melamine and Formaldehyde(F) in 3:1:4 molar ratio in the presence of 200ml 2M HCl as a catalyst was taken in 500 ml round bottom flask fitted with water

International Journal of Modern Physics D
Vol. 32, No. 12 (2023) 2350077 (18 pages)

DOI: 10.1142/S0218271823500773

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Isotropization of symmetric teleparallel gravity with observational constraints

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Received 10 April 2023
Revised 29 July 2023
Accepted 31 July 2023
Published 2 September 2023

In this paper, we examine the homogeneous and isotropic flat Universe in the frame of symmetric teleparallel gravity say $f(Q)$ gravity (where Q is the nonmetricity scalar). In this work, we parametrized the field equations with the help of Hubble's parameter defined as $H(z) = \eta[1 + (z+1)^{-\gamma}]$, where η and γ are model/free parameters which are constrained with updated 57 data points of the Hubble data set within the redshift range $0.07 < z < 2.36$. For this, we have used a Markov Chain Monte Carlo Technique (MCMCT). Some physical parameters of the model are discussed. In addition, we analyze the jerk parameter and the statefinder parameters and we also study the energy conditions to assess the compatibility of our model with dark energy models; we determine that the Strong Energy Condition (SEC) is violated due to the fact that the Universe is currently accelerating.

Keywords: $f(Q)$ Gravity; isotropic Universe; observational constraints.

1. Introduction

The cosmic microwave background (CMB) anisotropy, type Ia supernovae (SNIa),[1,2] baryon acoustic oscillations (BAOs) and other cosmological data suggest that the

Sustainable Agriculture: A Tool for Environmental Balance

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Abstract:

As a measure to control the continuous change in the environment, there is a need to change the agricultural sector. 'Sustainable agriculture is the method used to meet today's needs without harming the environment'. Sustainable farming is also known as organic farming, natural farming, ecological farming. The aim of sustainable agriculture is to try to improve the quality of life of farmers. Creating better human health. Using nature to achieve maximum production at minimum cost. Making efforts to increase the productive capacity of the land by utilizing the experience of the farmers. Solving problems that may arise in the future. The National Agricultural Policy of India shows a special emphasis on conservation and management of natural resources. India's sustainable agriculture policy can be said to be technically viable, economically viable, environmentally protective and socially acceptable. Sustainable farming means using biological technology and modern breeding techniques to overcome drought, pest control and increase productivity. At the same time, environmental damage can also be prevented. That is, on the one hand, the needs of the growing population of food grains can be met and on the other hand, environmental balance can also be achieved. Because the average rainfall has decreased by 20%, the temperature has risen by one degree. Almost 70% people depend on agriculture. The direct and indirect effects of environmental change are seen on agriculture. There is a need for sustainable agriculture as there is a high possibility of decline in productivity and production. It is necessary to reduce carbon dioxide and green house gas emissions while doing sustainable agriculture, only then will the sustainable development of agriculture be done economically, socially and ecologically.

Key words: sustainable, agriculture, environment, production, development, organic

Introduction:

As a measure to control the continuous change in the environment, there is a need to change the agricultural sector. 'Sustainable agriculture is the method used to meet today's needs without harming the environment'. 'Sustainable agriculture is the technique of growing crops without any adverse effects on the quality of the land'. Sustainable agriculture is called the evergreen revolution. In order to control the changing environment, the use of natural resources has to be done consciously. The agricultural system which is incorporated in order to produce economically profitable and sustainable output is called sustainable agriculture. Sustainable agriculture involves proper use of natural resources for environmental balance. This means that without harming the

जिल्हा उद्योग केन्द्राच्या योजनांची उपयुक्तता एक विश्लेषणात्मक अध्ययन

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गोषवारा (सारांश):

भारत सरकारने सन 1948 व 1956 च्या औद्योगिक नितीवर आधारीत, औद्योगिक विकासाचा मार्ग स्वीकारला. परंतु असंतुलन निर्माण झाले व औद्योगिकरणात केंद्रिकरण निर्माण झाले. वर्ष 1977 मध्ये विकेंद्रिकरण व ग्रामीण विकासाला महत्व दिल्यागेले. त्यामुळे ही विकेंद्रिकरणाची भूमिका वास्तविकतेमध्ये नियोजनात आणण्याकरीता, 23 डिसेंबर 1977 ला, नवीन औद्योगिक निती घोषीत केल्या गेली. या निती नुसार ग्रामीण, कुटीर, लघु व अतिलघु उद्योगांचा विकास करण्यासाठी आवश्यक सहाय्य व सुविधा उपलब्ध करण्याकरिता जिल्हा उद्योग केन्द्र ही संस्था स्थापन करण्याचे ठरले व तसा निर्णय घेण्यात आला. या योजने मागील मुख्य उद्देश ग्रामीण व शहरी भागामध्ये लघु, अतिलघु व कुटीर उद्योगांचा विकास करून क्षेत्रीय असंतुलन कमी करणे होता, तसेच लघु उद्योजकांना एकाच ठिकाणी सर्व सुविधा उपलब्ध होवून लघु, कुटीर व अतिलघु उद्योगांच्या विकासाकरिता प्रोत्साहन देणे आणि ग्रामीण क्षेत्राचा आवश्यकता व उपलब्धते नुसार संतुलित विकास करणे आहे. याकरिता जिल्हा उद्योग केन्द्र उद्योजकांना तांत्रिक, विपणन विषयक, वित्तीय, कच्चामाल व यंत्र विषयक सर्व सोयी उपलब्ध करून देते.

औद्योगिक विकासाच्या काळात निर्माण होणाऱ्या अनेक औद्योगिक समस्या बाबत दक्षता घेणे. जसे पर्यावरण प्रदुषण, नैसर्गिक संपत्तीची हानी, शहरी करणाच्या समस्या इत्यादी. तसेच औद्योगिक विकासासाठी आवश्यक असणाऱ्या सर्व सुविधा निर्माण करण्यासाठी जसे. शिक्षण, मनोरंजन, वाहतुक, प्रशिक्षण इत्यादीकरिता जिल्हा उद्योग केंद्राच्या व्यवस्थापकांना संहकार्य करावे लागते. विविध योजनांद्वारे जिल्हा उद्योग केन्द्र जिल्ह्यातील औद्योगिक विकासाला मदत करते. जिल्हा उद्योग केंद्र राबवित असलेल्या विविध योजना ह्या उद्योजकांना केवळ तांत्रिक मदत किंवा वित्तीय मदत निर्माण करून देत नाही, तर विशिष्ट उद्योगाला किंवा उद्योजकाला त्याच्या आवश्यकते अनुरूप एकत्र सेवा उपलब्ध करून देते. त्याचप्रमाणे लघु, अतिलघु व ग्रामीण उद्योगांनां आपले उद्योग त्वरीत कार्यान्वित करता यावे म्हणून विविध शासकीय अडचणी अधिक सुलभ व जलदगतीने सोडविण्याकरिता एकाच ठिकाणी, विविध संस्थांच्या सहकार्यातून व्यवस्था निर्माण करण्याच्या उद्देशाने, जिल्हा उद्योग केंद्र समन्यवक म्हणून कार्य करते. जिल्हा उद्योग केंद्राच्या विविध योजनांद्वारे वित्त महामंडळे, विकास अधिकोष आणि उद्योजक या तीन घटकांमधील तुटलेले दुवे साधण्याचा प्रभावशाली व उपयुक्त प्रयत्न होत आहे, त्याचप्रमाणे ग्रामीण अथवा तालुका स्तरावर जे अतिलघु, लघु उद्योग आहे, त्यांच्या विशिष्ट गरजा लक्षात घेवून त्यांच्या अनुरूप योग्य ते सहाय्य मिळवून देण्याकरिता सहायक ठरत आहे. जिल्हा उद्योग केंद्र हे शासन व उद्योजक यांना औद्योगिक विकासाकरिता संयुक्त स्वरूपात प्रयत्न करण्यास सहाय्य करणारा घटक आहे.

बीज शब्द: जिल्हा, उद्योग, सुविधा, लघुउद्योग, विकास, औद्योगिक, विकेंद्रीकरण, संतुलन

संशोधक

नवीन शैक्षणिक धोरण : एक विश्लेषणात्मक अध्ययन

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सुमारे ३४ वर्षांनंतर शैक्षणिक धोरणामध्ये बदल करण्यात आले असून, भाषा शिक्षण कौशल्य व व्यवसाय शिक्षण इत्यादी विषयांमध्ये विशेष बदल करण्यात आले. शालेय शिक्षणात परिवर्तन, नवा अभ्यासक्रम, शैक्षणिक आराखड्यातील बदल, बाल वयातच काळजी घेऊन शिक्षण सुविधा, पायाभूत क्षमतेवर भर देऊन संख्याशिक्षण साध्य करण्याकडे कल दिसून येतो. शालेय अभ्यासक्रम आणि शिकविण्याच्या पद्धतीमध्ये विशेष सुधारणा, बहुभाषिक व भाषेची महत्व ओळखणारे शिक्षण, मूल्यांकन सुधारणा, न्याय आणि सर्व समावेशक शिक्षण, मजबूत शिक्षक भरती, शालेय प्रशासन, शालेय शिक्षणाकरता मानक निश्चिती व मान्यता सुविधा, उच्च शिक्षणाचा विस्तार करणे, समग्र बहुशाकीय शिक्षण व्यवस्था निर्माण करणे, सुचारू नियमन व्यवस्था निर्माण करणे, तर्कशुद्ध संस्थात्मक संरचनाची निर्मिती, प्रेरित करणारे उत्साही व सक्षम अध्यापक, शिक्षकाचे शिक्षण असणार, मार्गदर्शक मोहीम राबविणार, विद्यार्थ्यांना आर्थिक मदत मिळेल. मुक्त व दुरस्त शिक्षण सुविधा, ऑनलाईन व डिजिटल शिक्षणाची व्यवस्था, शिक्षणामध्ये तंत्रज्ञानाचा वापर केला जाईल, भारतीय भाषांचा प्रसार, व्यावसायिक व प्रौढ शिक्षणाची सुविधा, शैक्षणिक गुंतवणूक वाढविण्याची व्यवस्था आहे.

देशातील सुमारे दोन कोटी शाळाबाह्य मुलांना मुख्य शैक्षणिक प्रवाहात आणले जाईल. शिक्षणातील ४.४३% जीडीपीवरून ६% वाढीचे लक्ष आहे. मुलाच्या जन्माच्या वेळीची परिस्थिती किंवा इतर पार्श्वभूमीमुळे कोणताही मुलगा-मुलगी शिक्षणाची व आपल्यातील उत्कृष्टतेची संधी गमावणार नाही. देशातील सर्व अशिक्षित तरूण व प्रौढ यांना १००% साक्षर केले जाईल, त्याचबरोबर कौशल्य, आवश्यक शिक्षण आणि चिकित्सात्मक विचार विद्यार्थ्यांमध्ये वाढविण्याकरता व सर्वांगीण विकासाकरिता अभ्यासक्रम कमी करून अनुभवातून शिक्षण देणे हा शिकविण्याच्या पद्धतीचा व शालेय अभ्यासक्रमाचा उद्देश आहे. असे जरी असल तरी नवीन शैक्षणिक धोरणाची उद्दिष्टे प्रत्यक्षात आणण्याकरीता कठोर परिश्रम, अधिक वित्ताची आवश्यकता आहे. तसेच सक्षम नेतृत्व व तंत्रज्ञानाची आवश्यकता आहे हे विसरून चालणार नाही.

बीज शब्द : नविन, शैक्षणिक, शालेय, शिक्षण, सुधारणा, इयत्ता

प्रस्तावना :

नवीन शैक्षणिक धोरणाच्या साह्याने आत्मनिर्भर भारताची निर्मिती करण्याकरिता व सातत्यपूर्ण प्रगतीसाठी, तसेच भारताने स्वीकारलेल्या शाश्वत विकासाच्या कृती कार्यक्रमाच्या यशस्वीतेकरिता शिक्षण क्षेत्रात अमुलग्र परिवर्तन आवश्यक होते. भारत विकसित देशाकडे वाटचाल करत असून जगातील सर्वात मोठ्या तीन अर्थव्यवस्थांपैकी एक होत आहे. त्यामुळे मानवशास्त्रीय आणि कलेची मागणी वाढत जाण्याची अपेक्षा आहे.

अभ्यासक्रमात विज्ञान आणि गणितासह मूलभूत कला, हस्तकला, मानव्यशास्त्रे, खेळ, क्रीडा, स्वास्थ्य , भाषा, साहित्य, संस्कृती आणि मूल्य याचा समावेश असणे आवश्यक आहे. शिक्षणामुळे चरित्र निर्माण होवून नीतीवान, तर्कशुद्ध, सहानुभूतीशील व्यक्तीची निर्मिती होईल व त्यातुन लाभदायी आणि समाधानकारक रोजगार मिळवण्याची संधी निर्माण होईल.

राष्ट्रीय शिक्षण धोरण विशेषता प्रत्येक व्यक्तीच्या सुजन क्षमतेच्या विकासावर जास्त भर देते. शिक्षणाने केवळ आकलन क्षमता विकसित केल्या पाहिजे असे नाही, तर साक्षरता, संख्या ज्ञान या मूलभूत क्षमता व उच्च दर्जाच्या तार्किक समस्या निराकरण क्षमता, सामाजिक, नैतिक आणि भावनिक क्षमतांचा विकास केला पाहिजे, या दृष्टीने नवीन शैक्षणिक धोरणात बदल करण्याचे ठरले.

धोरण तयार करतांना प्राचीन आणि सनातन भारतीय ज्ञान आणि विचारांची समृद्ध परंपरा लक्ष घेण्यात आली. भारतीय विचार आणि तत्वज्ञान, प्रज्ञा आणि सत्याचा शोध नेहमीच मानवाची सर्वोच्च उद्दिष्ट मानली जातात. प्राचीन भारतात

संशोधक

ISSN No. 2394-5990

राष्ट्रीय शैक्षणिक धोरण - २०२० व भारतीय भाषा, कला व संस्कृती

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गोषवारा (सारांश) :

भारताने शाश्वत विकासाच्या कृतीत कार्यक्रमात जागतिक शिक्षण विकास कृती कार्यक्रम समाविष्ट केलेला आहे. सर्वांसाठी समावेशक आणि समान गुणवत्तेचे शिक्षण सुनिश्चित आणि सर्वांसाठी निरंतर अध्ययनाच्या शिक्षणाच्या संधींना प्रोत्साहन देणे यासाठी प्रयत्न करणे यासंबंधी त्यात स्पष्ट केले आहे. या उत्तुंग उद्दिष्टांना पूर्णत्वास नेण्यासाठी शिक्षण प्रणालीची नव्याने रचना करणे आवश्यक आहे. तरच शाश्वत विकास कृती कार्यक्रम २०३० ची महत्वाची ध्येय व उद्दिष्टे साध्य करता येईल.

ज्ञान क्षेत्रात दिवसेंदिवस आमूलाग्र बदल होत आहे. मशीन लर्निंग, बिग डेटा, कृत्रिम बुद्धिमत्ता, विज्ञानाच्या व तंत्रज्ञानाच्या क्षेत्रात वेगाने विकास होत आहे. अकुशल कार्य माणसाने माणसाऐवजी यंत्र करू शकतील. त्याचवेळी गणित, संगणक, विज्ञान, डेटा विज्ञान, या क्षेत्रातील कुशल कर्मचाऱ्यांची मागणी देखील वाढणार आहे. तेव्हा वाढते प्रदूषण, कमी होणारे नैसर्गिक साधने यामुळे जगाची ऊर्जेची गरज भागवण्यासाठी वेगळा दृष्टिकोन अंगीकारावा लागेल. वाढत्या साथी आणि महामारी यावर उपाय म्हणून संशोधन व लसींचा विकास करण्याची गरज निर्माण होईल. अनेक समस्या दूर करण्यासाठी बहुशाखीय शिक्षण फार महत्त्वाचे ठरते. भारत हा विकसित देश होण्याकडे वाटचाल करीत आहे. देशाला प्रगत राष्ट्राच्या अर्थव्यवस्थेची स्पर्धा करताना मानव्यशास्त्रे व कलेची मागणी ही होणार आहे.प्रत्येक मनुष्यामध्ये क्षमता ही दडलेली असते. तेव्हा या क्षमतेचा पुरेपूर वापर करण्यासाठी न्याय व समान पद्धतीने समाजाचा विकास करण्यासाठी शिक्षण हा पाया आह. भारताचा सातत्यपूर्ण विकास, आर्थिक विकास, सामाजिक न्याय आणि समानता, शास्त्रीय प्रगती, राष्ट्रीय एकात्मता आणि संस्कृतीचे जतन याकरिता दर्जेदार शिक्षण उपलब्ध करून देणे आवश्यक ठरते. आपल्या देशातील समृद्ध प्रतिभा आणि संसाधनाचा वापर हा व्यक्ती, समाज, देश व जगाच्या हितासाठी उच्च दर्जाचे सार्वभौमिक शिक्षण हा चांगला मार्ग आहे. भारताची लोकसंख्या दिवसेंदिवस वाढत आहे तेव्हा सर्वांना चांगल्या गुणवत्तेच्या शिक्षणाच्या संधी उपलब्ध झाल्यास समता पूर्ण नागरिक तयार होऊन यातूनच देशाचे भवितव्य ठरू शकते.

प्रस्तावना :

भारत हा हजारो वर्षाच्या कालावधीत विकसित झालेल्या आणि कला, साहित्य, रूढी परंपरा, भाषिक अभिव्यक्ती, प्राचीन वस्तू, वास्तू स्थळे आणि इतर अनेक स्वरूपात व्यक्त झालेल्या संस्कृतीचा खजिना आहे.

जगभरातील कित्येक लोक पर्यटनासाठी भारताला भेट देतात. येथे येऊन ते अन्न संस्कृतीचा आस्वाद घेतात. हस्तकलेच्या वस्तू व हस्तनिर्मित वस्त्रे खरेदी करतात. भारतीय साहित्य वाचतात. भारतीय संस्कृतीतील योग व ध्यान साधना अनुभवणे, अमूल्य अशा भारतीय तत्त्वज्ञानाने ते प्रेरित होतात. इतकेच नाही तर भारतीय सणांमध्ये ते सहभागी होतात. भारतातील विविध संगीत कलांचा आस्वाद घेतात आणि मानसिक लाभ करून घेतात. तेव्हा या भारताच्या सांस्कृतिक संपत्तीचे जतन आणि प्रचार करणे ही देशाची उच्च प्राथमिकता असणे आवश्यक आहे. अर्थव्यवस्था व देशाची ओळख याकरिता जगभरातील पर्यटकांचे आकर्षण वाढविणे आवश्यक ठरते.

भारतीय कला व संस्कृतीचा प्रचार केवळ देशासाठीच नाही तर प्रत्येक व्यक्तीसाठीही महत्त्वाचा आहे. त्यामुळे मुलांमध्ये आपलेपणा, ओळखी, इतर संस्कृतीचे कौतुक करण्याची भावना निर्माण होते. सांस्कृतिक जागरूकता व अभिव्यक्ती यासारख्या क्षमता मुलांमध्ये विकसित होतात. स्वतःचा सांस्कृतिक इतिहास, कला, भाषा व परंपरा विषयी दृढभावना, ज्ञान अवगत होते. त्यामुळे मुलांमध्ये सकारात्मक सांस्कृतिक ओळख, आत्मसन्मान वाढते. वैयक्तिक व सामाजिक कल्याण या दोन्हीच्या

https://doi.org/10.33451/florafauna.v29i2pp359-365
FLORA AND FAUNA ISSN 2456 - 9364 (Online)
2023 Vol. 29 No.2 PP 359-365 ISSN 0971 - 6920 (Print)

Butterfly species diversity from tirora, District Gondia of Vidarbha region of Maharashtra

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Received : 25.08.2023; ***Accepted*** : 08.09.2023

ABSTRACT

A study on butterfly diversity from Tirora, district Gondia of Vidarbha region of Maharashtra was undertaken. Total 36 species of butterflies belonging to 5 families were recorded from the given area. Maximum 16 species of butterflies were recorded from family Nymphalidae, followed by 6 species each from family Lycaenidae and Papilionidae, 5 species from family Pieridae and 3 species were recorded from family Hesperiidae. In the above field survey 5 species of butterfly recorded come under Wild Life Protection Act 1972 of India. The butterfly species *Lethe europa*, and *Castalius rosimon* come under Schedule I While *Appias albina* and *Hylpolimnas misippus* are under Schedule II and *Euploea core* under Schedule IV of the Wild Life Protection Act 1972.

Figures : 36 References : 14 Table : 01
KEY WORDS : Butterfly, Gondia, Species, Tirora

Introduction

Butterflies belong to order Lepidoptera which is the one of the largest order of class Insecta of Phylum Arthropoda. They are also known as important pollinating agent and help to pollinate more than 50 economically important plant crops[1]. Vidarbha region is situated on the eastern part of Maharashtra. Many researchers have studied the butterfly species diversity from different areas of Vidarbha region of Maharashtra.

From Madhya Pradesh and Vidarbha region (Maharashtra) about 177 species of butterfly have been reported [2]. 65 species of butterflies belonging to 52 genera and 7 families were recorded from Pench Tiger Reserve, Nagpur and 68 species belonging to 50 genera from Tadoba Andhari, Tiger Reserve, District Chandrapur respectively [7,8]. 103 species were recorded from Melghat Tiger reserve, Amravati [14]. From Nagpur city 62 species were recorded [9]. From Tadoba National Park, Chandrapur 111 species were recorded[10] and 167 species of butterflies belonging to 90 genera and 5 families form Vidarbha region of Maharashtra[11]. About 69 species of butterflies belonging to 47 genera and 5 families were recorded from Sakoli talula District Bhandara[4] and 114 species of butterflies belonging to 6 families from Bor Wild Life Sanctuary, District Wardha, Central India[12].

Tirora Taluka is situated in Gondia district of Nagpur division of Vidarbha region of Maharashtra. Many workers have studied the butterfly's fauna from different tahsils of Gondia. Butterfly diversity in agroeco system of Arjuni Morgaon taluka, district Gondia was studied and recorded 44 species of butterflies belonging to 32 genera and 5 families[5]. About 28 species of butterfly belonging to 19 genera and 4 families were recorded from Amgaon Tehsil of Gondia District[3]. However not a single study has been carried out on the diversity of butterfly from Tirora tahsil of District Gondia. The present field survey was undertaken to study the diversity of

BIOINFOLET 20 (2 A) 235 - 237, 2023

RESPONSES OF NEURO-SECRETORY CELLS OF *SEMPERULA MACULATA* TO TEMPERATURE ACCLIMATION

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ABSTRACT

Present study focuses on the effect of two acclimation temperatures neuro-secretory cells. High temperature (40°c) helped in releasing the neuro-secretory material whereas the low temperature (20°c) caused its accumulation in the snail,

Key words : Semperula maculate, Slug, Neuro secretary cells, Temperature

Introduction

Living organism face a variety of environmental conditions, out of which temperature is considered as a critical factor (Ahmed and Raut, 1991). Terrestrial mollusks are under constant confrontation against several such factors for their survival. The slugs are most successful air-breathing creatures. This taxon includes most land snails and slugs. The Physiological and biochemical changes under unfavorable conditions have been studied by Florkin and scheer (1972), while neuro-secretory phenomenon was studied by Van Mol (1962); Antheunisse (1963); Wigdenes et al., (1980).However, very little work has been undertaken on neuro-secretory cells in relation to temperature.

Semperula maculata is most common slug found in vidarbha region. It is abundant in the field and gardens. Present study focuses on the effect of two acclimation temperatures neuro-secretory cells A and B. The perusal of literature indicate that the study of changes in the cell types of cerebral ganglion with respect to temperature have great importance, because now a day's temperature often fluctuates from time to time, affecting land slugs, and disturbs ecosystem.

Material and Method

Adult fully matured slugs, *Semperula maculata* were collected from the city garden Paratwada and from different places around Paratwada city, Maharashtra, during July to September, 2019 The slugs were brought to the laboratory and maintained in glass tough containing sufficient amount of moist soil. Those were fed once in a day with plant vegetation.

Slugs were acclimated at room temperature (26 to 28°c) for 3 to 4 days. In order to give acclimation treatment the slugs were kept in BOD incubator at 15± 0.5°C for 10 days. The slugs were thereafter gradually cooled until the desired acclimatized temperature was reached. Similarly, for warm acclimation, slugs were kept inside BOD incubator at 32± 0.5°C for 10 days. After every 2days the soil was replaced re-moistened. Simultaneously control slugs were maintained at 26 to 28 °C.

Groups of five slugs under each treatment were sacrificed, cerebral ganglion was carefully dissected out from the slugs as early as possible, fixed in Bouins fluid, then dehydrated in alcohol, cleared in xylene and embedded in wax at 57.5°C. Serial sections were cut with the thickness of 8 µ and those were stained with Gomoris chrome

A Quantum Leap of the NEP 2020: Vision and Its Future Implications in HEIs

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Abstract:

The National Education Policy (NEP) 2020 is a paramount importance to make the country *Jagatguru* (World Teacher) as we have been since time immemorial. To preserve the sanctity of Bhartiya Knowledge System in its purest forms, we have felt extreme need to overhaul the Indian educational system from the scratch. With the advent of technological disruption and online education through various platforms, we need to have robust education system wherein teaching-learning process must fulfill the criterion of dissemination of knowledge, skills and information to keep all stakeholders of education abreast with demand of time. Keeping in mind much needed reforms, the central government in 2020 approved the NEP-2020 to fructify its dream in the coming days.

This research paper strives to analyze all the nuances of NEP 2020 with substantial data, exploring its key provisions, implications, and potential future directions. The paper explores forthcoming challenges while implementing the NEP-2020 in letter and spirit to cherish expected outputs. As the policy-makers are strongly convinced that with the common consensus of all state governments and central Government's strong resolution, the new education policy is likely to usher in new era where ambitions and aspirations of country's youngsters are going to be fulfilled. The time has come to discard the colonial hangovers of European education system since 1947 to actualize the dreams of freedom fighters visibly reflected in the Indian constitution.

Keywords: National Education Policy 2020, Multidisciplinary Learning, Technology Integration in Education, Curriculum Reform, Equity and Access in Education, Quality Enhancement in Education, Monitoring and Evaluation Mechanisms, Public-Private Partnership in Education, Stakeholder Engagement, Policy Coherence, Implementation Challenges

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Introduction:

"Education is a key to success and this success can be attained by the appropriate implementation of the policy"

The National Education Policy (NEP) 2020 is a transformative framework that aims to revamp the education system in India. It presents a vision for the future

Journal of Sol-Gel Science and Technology
https://doi.org/10.1007/s10971-023-06121-x

ORIGINAL PAPER: NANO STRUCTURED MATERIALS (PARTICLES, FIBERS, COLLOIDS, COMPOSITES, ETC.)

Exploration of Ce^{+3} substitution on electron density distribution, optical, and magnetic properties of Ni-Co-Zn spinel nano-ferrites

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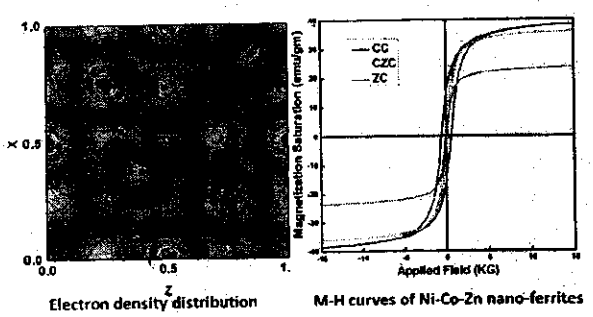
Received: 8 February 2023 / Accepted: 25 April 2023

Abstract

The present research module is about microwave-assisted sol-gel combustion synthesis of rare earth doped Ni-Co-Zn spinel ferrite nanoparticles. The phase formation, morphologies, and crystal structure were investigated by X-ray diffraction (XRD), scanning and transmission electron microscopy (SEM and TEM), Raman spectroscopy and Fourier transform infrared spectroscopy (FT-IR). The structural parameters, cation distribution, and lattice strain were calculated by Rietveld analysis and Williamson-Hall (W-H) plots. The electron density mapping of rare earth substituted Ni-Co spinel nano-ferrites was calculated by the G-fourier tool. The vibrating sample magnetometer (VSM) was used to carry out the room-temperature hysteresis curve of Ni-Co spinel nano-ferrites. The magnetic curves show a thin loop with low coercivity and retentivity, thereby indicating the soft behavior of spinel nano-ferrites. The effect of the substitution of non-magnetic ions on coercivity, magnetic interaction constant, permeability, and Curie temperature on Ni-Co-Zn mixed ferrite was discussed in detail. The saturation magnetization of the samples decreases with the addition of cerium, which is due to a reduction in particle size and hence a lower surface-to-volume ratio as well as spin canting phenomena. Rare earth-substituted nanocrystalline ferrites can be used in a variety of advanced technological applications such as switching devices and high-frequency devices.

Graphical Abstract



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Published online: 09 May 2023

Iranian Journal of Materials Science and Engineering, Vol. 21, Number 1, March 2024
RESEARCH PAPER

Cation Distribution of Co-Ni-Mn Ferrites from Magnetization and Magnetostriction

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Received: December 2023 **Revised: March 2024** **Accepted: March 2024**
DOI: 10.22068/ijmse.3541

Abstract: *Nickel-doped CoMn ferrites with high magnetization were synthesized by double sintering solid state route with compositions of $Co_{0.7-x}Ni_xMn_{0.3}Fe_2O_4$ with x= 0, 0.05, 0.1 and 0.15. Theoretical Cation distribution for cubic spinel ferrites was suggested based on electrical configuration expectations and cation site preferences. The cation distribution suggested was in good agreement with experimental results obtained from VSM and XRD. Values of theoretically calculated magnetic moment, coercivity and magnetization are in good agreement with experimental data obtained from VSM. Maximum saturation magnetization of 37.7emu/gm is obtained for sample $Co_{0.7}Mn_{0.3}Fe_2O_4$ at a magnetic field of 5 K Oe. Magnetostriction was found to increase with increasing magnetic field (from 1 KOe to 5 KOe.) Maximum magnetostriction of 84 ppm was observed for sample $Co_{0.7}Mn_{0.3}Fe_2O_4$ at 5 KOe. Maximum magnetization of magnetoelectric composites with 30% $Co_{0.7-x}Ni_xMn_{0.3}Fe_2O_4$ – 70% $PbZr_{0.48}Ti_{0.52}$ was found to be 7.4 emu/g for composition with x= 0.*

Keywords: *Co-Ni-Mn Ferrites, Cation Distribution, Magnetostriction, Nickel doped, M-H Hysteresis loop.*

1. INTRODUCTION

Ferrites have been of great interest due to their potential applications in sensors, hyperthermia, catalysts and targeted drug delivery [1]. Ferrites are ferromagnetic materials with the general formula MFe_2O_4 where M is a divalent metallic ion like Co^{2+}, Ni^{2+}, Mn^{2+} etc [2]. The unit cell of the cubic spinel structure of ferrites consists of eight formula units with 32 oxygen atoms occupying the FCC lattice. Metallic ions can occupy vacancies formed by oxygen ions [3]. Two types of occupancy sites are formed as 64 - tetrahedral site (A site), surrounded by four oxygen ions and 32 - octahedral site (B - site) surrounded by six oxygen ions. Among 64 available A sites only 8 are occupied by metallic cations while other cations reside at 16 octahedral sites. Cation distribution for normal, inverse and mixed spinel structure is given by,

Normal spinel structure - $[8M^{2+}]_{tet}\,[16Fe^{3+}]_{oct}$
Inverse spinel structure - $[8Fe^{3+}]_{tet}\,[8M^{2+}\,8Fe^{3+}]_{oct}$
Mixed spinel structure - $[(1\text{-}x)\,M^{2+}\,8Fe^{3+}]_{tet}\,[xM^{2+}\,8Fe^{3+}]_{oct}$

[4]. According to two sublattice models, the magnetic behavior of ferrites strongly depends on the A-B exchange interaction [5]. The distribution of cations among A site and B site will decide the properties of ferrites [6]. Thus, cation distribution obtained from theoretically and experimentally calculated data was compared for all compositions of $Co_{0.7-x}Ni_xMn_{0.3}Fe_2O_4$. Cobalt ferrite is well known for high magnetization, high coercivity, lower resistivity, high magnetic stability and good mechanical hardness [7]. The incorporation of Mn enhances magnetization and magnetostriction of cobalt ferrite [8]. Nickel ferrite has the highest resistivity among all spinel ferrite [9]. Doping of nickel may enhance the resistivity of Co-Mn ferrites [10], making $Co_{0.7-x}Ni_xMn_{0.3}Fe_2O_4$ with x= 0, 0.05, 0.1 and 0.15 suitable candidate as a magnetic phase of Magnetoelectric composites. A magnetoelectric composite with higher resistivity of the magnetostrictive ferrite phase is expected to give a high magnetoelectric coefficient [11]. Thus 30% $Co_{0.7-x}Ni_xMn_{0.3}Fe_2O_4$ –70% $PbZr_{0.48}Ti_{0.52}$ is expected suitable candidate to obtain higher magnetoelectric potential for sensor applications [12].

2. EXPERIMENTAL PROCEDURES

All the compositions of $Co_{0.7-x}Ni_xMn_{0.3}Fe_2O_4$

[DOI: 10.22068/ijmse.3541]