International Journal of Recent Technology and Engineering (IJRTE)
ISSN: 2277-3878 (Online), Volume-9 Issue-5, January 2021

Hybridization of Machine Learning Techniques to Optimize Portfolio of Stock Market: Review of Literature from the Period 2005 to 2018

K.S. Mahajan, Ulka Toro, R.V.Kulkarni

ABSTRACT: ***In finance there has always been the problem of how to combine investments to form a portfolio. Progress on this problem we focus on some of the important applications such as Forecasting, Trading, Portfolio Selection and Management of Stock Market is considered as one of the fundamental building block of developed country. If number of investor's increases then the economy of the country also increases and every investor invests to get good returns. But as stock market is uncertain and complicated the selection of good scripts are considered as one of the challenge in stock market field. So much work has been donein this field, The purpose of the present study is to review research articles from the period 2005 to 2018 and to find research gap for future work.***

KEYWORDS: ***Stock Market, Machine Learning Techniques, Fuzzy, Neural Network, Portfolio, BSE Stock Exchange, NSE Stock Exchange.***

I. INTRODUCTION:

Optimization is a process by which the most constructivetransaction between competing interests is determined subject to the constraints faced in any decision making process. Within the context of portfolio management, the competing interests are risk reduction and return enhancement among the other interests. Stock Market Portfolio Optimization is the main foundation for the investment in capital market with huge uncertainty and confusion. So much work has been done related toportfolio selection, prediction and management called as Portfolio Optimization, which helpsin decision making for investors to get better return against their investments and to improveefficiency of portfolio. Towards this study the first research is been conducted by Markowitzin 1952 introduced about the diversification of total amount of the investor using Mean-Variance Model. This work has created new horizons, assumptions and more scope for further research and the Linear programming model has been introduced by Konno-Yamazaki and then Werner has combined both the ideas and developed Fuzzy LinearProgramming Model.

Manuscript received on August 24, 2020.
Revised Manuscript received on January 28, 2021.
Manuscript published on January 30, 2021.
Mrs. Keerti. Mahajan, Ph.D at Bharati Vidyapeeth Institute of Management ,Kolhapur.
Dr. Ulka Toro, Associate Professor in Bharati Vidyapeeth Institute of Management, Kolhapur .
Dr. R.V Kulkarni, Professor and Head of Computer studies in Chh. Shahu Institute of business education and research Kolhapur

Fuzzy set theory is used in this model which was first introduced by Zadeh is able to handle uncertainty which is more in the behaviour of stock market andto handle inadequate information about returns on investment.
Stock market is considered as one of the most important economic pillar of each countrywhere public companies raise funds by issuing shares to public and Institutions.
Furthermore,a future trading is not only popular in developed markets of the world, but is equally popularin emerging markets like India. More than 8000 public companies are listed in Indian stockmarket which is evident from the fact that Indian equity future is ranked in top 5 in the list ofworld stock market from last two decades. Indian Stock Market (both BSE and NSE) offersan average of more than 25,00,00, 000 stocks, This makes an approximate business of morethan 2000 cr. By purchasing these scripts, an investor becomes partial owner of the tradedcompany which creates a portfolio of individual investors. Stocks are exchanged amongbuyer and sellers which generate a huge transaction data and prices keeps on changing as perdemand and supply of stocks. All trading data is captured by stock exchange where stockcompanies are listed. Stock trading data is non-linear, fluctuating and uncertain hence highly time variant. Hugeinformation is hiding therefore extracting and analysing such huge market data will be beneficial toindividual investors to make their portfolio strong. When we speak about portfolio then theinvestor thinks about strong, correct and high return scripts against investment.Accordinglyeach investors has to be practical rather than emotional or sentimental hence study of manyparameters and historical data using some powerful tool is vital to design strong portfolio,Considering above points, rotation of money is also vital in portfolio and to achieve thisbuying and selling both are important. As per the current scenario, the process of buying andselling of equity is called portfolio development and management which helps to minimizerisk, to earn profit and also helps to book profit and loss.Hence to select , predict and to optimize the patterns generated in this Stock Trade over theperiod of time from Indian Stock market is essential, Also rotation of moneyin the portfolio is a key requirement. An application based on Machine Learning Techniquesis the right choice in the current scenario.The research work intends to construct and design correct investors portfolio by developinghybrid model using machine learning techniques such as Data Mining, Statistical computations and soft computingtechniques.

International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 5 Issue 5, July-August 2021 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Review on Smart Dairy ERP System Based on Android Application

Miss. Shailja S. Panhalkar, Miss. Vanashri S. Shinde, Miss. Rucha D. Patil

Computer Science & Engineering, Dr. D.Y. Patil College of Engineering, Kolhapur, Maharashtra, India

ABSTRACT

Dairy is one of the biggest agribusinesses in India and a significant contributor to Indian economy. It operates round the year to deliver milk and other dairy products to every human being. It is one the industries that still relies heavily on regional supplies, mostly from the rural areas. In regards to the dairy industry, Indian markets with the greatest growth potential are also among the least developed in infrastructure and consumer awareness. Though large scale dairies like Gokul have automated and latest technology at their disposal, the small scale and mid-scale dairies are still intimidated by the use of technology mostly because of the cost and complexity of the IT systems. Hence, making the process much more labouring, inefficient and error prone. Dairy production faces multiple challenges, most of these challenges are related to the supply chain, at the level of dairy farms and milk collection. One of the most common and alarming challenges is deception of farmers by the upper management in the dairies. The dairy farmers suffer from financial loss as they are often deceived by collection center owners into paying higher commissions and the dairy administrators are unaware of it. So in order to earn a profit, dairy farmers turn to options like adulteration of milk which declines the milk quality. This can be avoided by having an integrated system. An ERP system will ensure that the farmers will get paid fair prices, the collection center owners get their commission accordingly and the dairy administrator can manage all this with ease. This will make the dairy industry more reliable and profitable.

KEYWORDS: *farmer; financial statement; milk Collector*

How to cite this paper: Miss. Shailja S. Panhalkar | Miss. Vanashri S. Shinde | Miss. Rucha D. Patil "Review on Smart Dairy ERP System Based on Android Application" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-5, August 2021, pp.743-746, URL: www.ijtsrd.com/papers/ijtsrd43920.pdf

IJTSRD43920

I. INTRODUCTION

In the existing system, most of the work is done manually and using traditional methods like book-keeping. Small scale and mid-scale dairy industries either use outdated systems or they do not use one at all .Lack of communication and knowledge among the management is also a problem and as the industry grows, this problem only becomes more intense. Another problem is that most of the systems are not centralized and do not provide financial transparency among the entities. Using an integrated system will eliminate almost all the manual work making the process easy and effortless. It will optimize the process and make the system centralized, secure and efficient. The Smart Dairy ERP system will not only be used by the Dairy administrators and employees but also by the farmers and milk collectors that supply milk to the dairies. Having an integrated system in any industry is a must and Smart Dairy ERP system will automate most of the process, reducing the labour, give more control to the administrators and most importantly provide financial transparency among farmers, milk collectors and administrators.

Smart Dairy ERP System is designed for farmers, collection centers, and milk processing units (dairies). This ERP software ensures efficient collaboration between farmers, collection center owners, and administrators, thus giving a sustainable competitive advantage. The main purpose of the Smart Dairy ERP Project is to facilitate communication between farmers / local milk sellers and the milk factory. This software will help the administrators to register all the suppliers, buyer details, sales details, etc. It will also allow the farmers and milk collection center owners to track their day-to-day transactions. It is an integrated system that provides relevant information across the Dairy thus resulting in better management and transparency. The Smart Dairy ERP system supports the optimization of processes like procurement including milk entry and milk payment statement, transparent traceability across all value-adding stages – from farmer to administrator, automation and centralized control.

STUDYING THE THERMO PHYSICAL PROPERTIES AND PREPARATION OF NANOFLUIDS

Shashank Vasant Divgi

Research Scholar Sunrise University Alwar

Dr. Suresh D. Mane

Professor Sunrise University Alwar

BSTRACT

anofluids are a new class of fluids developed by dispersing nano-sized materials anoparticles, nanofibers, nanotubes, nanowires, nanorods, nanosheet, or droplets) in base uids. In other words, nanofluids are nanosized colloidal suspensions contain condensed anomaterials. They are two-phase systems with one phase (liquid phase) in another (Solid hase). Nanofluids have been found to enhance thermal properties such as thermal onductivity, thermal diffusivity, viscosity, and convective heat transfer coefficients compared the base fluids like oil or water. However, preparation and stabilization of such fluids are deed a matter of concern for better understanding. For the last decade numerous research nd development works have been done in the synthesis and stability of such materials. In is contribution, a brief review has been presented to provide an update about the preparation nd stabilization methods of nanofluids.

eywords: Nanofluids; thermo physical properties; stability;

INTRODUCTION

election of working fluid is directly linked to the properties of the fluid. The properties affect ie ability to transfer heat and the compatibility with the case and wick material. While selecting ie working fluids the important factors such as good thermal stability, wettability of the naterials (wick and wall), vapour pressures (high or low) over the operating temperature ange, high latent heat, high thermal conductivity, low liquid and vapour viscosities, high urface tension compatibility with wick and wall materials should be considered.

• Conventional Fluids

ost commonly used working fluids in heat pipes are water, methanol, ethylene glycol (EG), ngine oil (EO), etc. The melting point, boiling point and useful range of various conventional ids used in heat pipes.

• Nanofluids

ano means something very small or a dimension about few tens of thousand times thinner an human hair. These nano materials can be metals, polymers, ceramics or composites. ie term nanotechnology was first formed by Norio Taniguchi. For the past 10 years, the study nano structured materials has grown to a very wide range. The term nanoparticle fluid spension (nanofluid). Nanofluids are the dispersion of nano-sized particles (carbon, metals,

ScienceDirect

Journal of Electroanalytical Chemistry
Volume 889, 15 May 2021, 115225

Short Communication

Efficient synthesis of acetylene-bridged carbazole-based dimer for electrochemical energy storage: Experimental and DFT studies

Chinna Bathula [a], Iqra Rabani [b], Henry Opoku [c], Hae-Kyung Youi [a], Vijaya Gopal Sree [d], Suresh D. Mane [e], Young-Soo Seo [b], Hyun-Seok Kim [a]

Show more

https://doi.org/10.1016/j.jelechem.2021.115225
Get rights and content

Abstract

The energy storage prospects of organic molecule has recently rendered them as promising candidates for supercapacitors (SCs) applications. Herein, we report an investigation into the electrochemical and energy storage capability of two carbazole based monomer and dimer moieties, connected through mono (CBZ-1) and diacetylene (CBZ-2)-based linkages. Synthesized intermediates and final compounds were experimentally and theoretically characterized via spectral, scanning electron microscopy (SEM) analysis and density functional theory (DFT) calculations respectively. Excellent electrochemical properties were observed in an organic pseudo-capacitive-supercapacitor (SC) based on the carbazole derivatives, with the dimer (CBZ-2) functionalized with diacetylene showing a comparatively better capacitive and improved electrochemical characteristics (398F.g^{-1} at a current density of 1 A.g^{-1}) than the mono (CBZ-1) derivative.

Introduction

Researchers continue to investigate suitable and viable alternative energy storage technologies that can complement existing strategies [1], [2], [3]. In addition to certain secondary technologies with high-energy capacities such as batteries and fuel cells, supercapacitors (SCs; or electrochemical capacitors) have been also identified as a viable energy storage option [4], [5], [6], [7], [8]. The performance of its electrode system, which is one of its main components and performance determinant depends on the constituent components and its structural make-up [9], [10], [11]. Therefore, the effects of several materials ranging from nanotubes [12], [13], [14], nanofibers [15], [16] carbonaceous nanomaterials [17], [18], [19], metal/metal oxides, and their combinations [20], [21], [22] on the performance have been investigated. The electrochemical implementation of SCs depends on the structures and morphologies of the electrode tools. Thus, SCs with arrays of various constituents (involving carbon nanomaterials and transition materials with small molecules) have been constructed [23], [24], [25].

Supercapacitors (SCs) organized as organic fragments have attracted much attention owing to their accessibility and multiplicity with developing blocks, mechanical changeability, less significant ecological influence, and advantageous electrochemical characteristics (e.g., superior capacitance, cycle steadiness, and greater power and energy densities) [26], [27], [28]. Carbazole and its derivatives are excellent electrode materials owing to their remarkable chemical strength and mechanical tolerability; the resulting efficient ionic kinetics are crucial for morphologically and electronically stable electrode materials [28], [29], [30]. The simple structure of repeated En-Dyne chromophores is

ScienceDirect

Ceramics International

Volume 47, Issue 10, Part A, 15 May 2021, Pages 14665-14672

Short communication

Micro structurally engineered hysteresis-free high efficiency perovskite solar cell using Zr-doped TiO_2 electron transport layer

Sanjay Sandhu [a], Chirag Saharan [b], Susan Kumari Buruga [c], S. Arun Kumar [d], Pawan S. Rana [b], P.C. Nagajyothi [e], Suresh D. Mane [f]

Show more

https://doi.org/10.1016/j.ceramint.2021.01.187

Get rights and content

Abstract

The high trap-state density and low conductivity in compact TiO_2 (c-TiO_2) layer limits the power conversion efficiency (PCE) of organic-inorganic hybrid perovskite solar cells (HPSCs). Metal doping in c-TiO_2 has been proven to be a successful strategy for enhancing the PCE of HPSCs. Herein, Zr is incorporated in the c-TiO_2 layer with different doping concentrations, and its impact on the photovoltaic performance of methylammonium lead iodide ($MAPbI_3$) HPSCs is investigated. Inclusion of Zr enhances the charge carrier collection at TiO_2/perovskite junction as well as conductivity of TiO_2 layer. It is demonstrated that Zr-doping reduces the dark current significantly by suppressing non-geminated recombinations, leakage path, and electron trap-states. As a result, the HPSCs with optimum Zr-doping (10vol%) exhibits open-circuit voltage (V_{OC}) of 1.076V, short-circuit current density (J_{SC}) of 23.57mAcm^{-2}, and PCE of 18.16% under one-sun illumination conditions. UV absorption confirms the increase in bandgap upon Zr-doping that leads to favorable band alignment with the perovskite layer. Further, the engineered solar cells are probed for current density-voltage (*J-V*) hysteresis, operational stability, leakage current, intensity-dependence behavior, and electrochemical impedance spectroscopy (EIS).

Introduction

Organic-inorganic hybrid perovskite solar cells (HPSCs) have gained significant interest among the worldwide researchers due to their extraordinary optical and electrical properties such as suitable and tunable bandgap, broad spectral absorption range from visible to near-infrared, high molar extinction coefficient, long diffusion length, high charge carrier mobility, low exciton binding energy (<50meV), and simple solution processing fabrication process [[1], [2], [3], [4], [5], [6], [7], [8], [9]]. Pb-based HPSCs turns out to be first solution-processed photovoltaic (PV) devices to reach very high efficiencies up to ca. 25.5%, which is comparable to the PVs with thin-film technologies such as CdTe, CIGS, and a-Si [[10], [11], [12]]. This tremendous enhancement is attributed to extensive research efforts devoted in several directions such as composition and interface engineering, additives doping, device architecture, controlling nucleation, and crystallization process [13,14]. However, HPSCs still suffer from the critical challenge of charge carrier recombination at perovskite/charge transport layer interface, leakage path, poor charge transport, and extraction. These limiting factors are ascribed to low conductivity, deep trap states, and unfavourable band alignment of the electron transport layer (ETL) [15]. Therefore, improving the properties of ETLs is the key requirement for high-efficiency HPSCs.

International Journal of Future Generation Communication and Networking

Review of Recent Deep Learning based Web Services Recommendations

Bhopale Shrikant , Dr. Sudhansu Srivastava

Abstract

With the outstanding expansion in the measure of advanced data over the web, online shops, online music, video & image libraries, web indexes & recommendation framework have become the most advantageous approaches to discover applicable data inside a brief timeframe. In the new occasions, deep learning's advances have acquired critical consideration in the field of discourse acknowledgment, image processing & characteristic language processing. In the mean time, a few late investigations have shown the utility of deep learning nearby recommendation frameworks & data recovery also. In this short audit, author covers the new advances made in the field of recommendation utilizing different variations of deep learning innovation. Author put together the audit in three sections: Collaborative framework, Content based framework & Hybrid framework. The audit additionally talks about the commitment of deep learning coordinated recommendation frameworks into a few application areas. The survey finishes up by conversation of the effect of deep learning in recommendation framework in different space & whether deep learning has shown any huge improvement over the traditional frameworks for recommendation.

PDF

Published

International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 07 | July - 2021 ISSN: 2582-3930

Experimental analysis of Black cotton soil using lime stabilization technique

Mr. Gaurav Desai[1]

Department of Civil Engineering, Dr. D. Y. Patil Pratishthan's College of Engineering, Salokhenagar, Kolhapur, Maharashtra, India

---

Abstract - Improving the different type of engineering properties of black cotton soil and it is making for stable soil. It can be done by the use of controlled compaction, proportioning and the addition of suitable different types of admixtures and stabilizers. There are used in various infrastructure projects are also used in different highways, railways, water reservoirs reclamation etc. which are requires earth material in very large quantity. In many which are not suitable for due to black cotton soil, so we should stabilize soil by use of locally available materials like lime. Soil stabilization is very necessary for various construction works like road pavement and foundation because it improves the engineering properties of the black cotton soil. The experimental analysis evaluates the effect of the lime and on the some basic engineering properties of soil such as liquid limit, plastic limit and compaction of black cotton soil and California bearing ratio (CBR) of black cotton soil.

Key Words: lime stabilisation, bearing capacity, soil test, black cotton soil, CBR test

1. INTRODUCTION

Black cotton soils of India are well known for their expansive nature. These expansive soils are called black cotton soils become of their predominant black color and the cotton crop that is grown abundantly on such soils. These soils cover about 520000 km^2 area which is more than one-fifth of the country and extend over the states of Maharashtra, Gujarat, southern part of Utter Pradesh, Eastern part of Rajasthan, Southern and western part of Madhya Pradesh, and few parts of Andhra Pradesh and Chennai.

The black cotton soils possess low strength and undergo excessive volume changes, making their use in the constructions very difficult. Because of its high swelling and shrinkage characteristics, the black cotton soil (BC soils) has been a challenge to the highway engineers. The black cotton soil is very hard when dry, but loses its strength completely when in wet condition. It is observed that on drying, the black cotton soil develops cracks of varying depth. As a result of wetting and drying process, vertical movement takes place in the soil mass. All these movements lead to failure of pavement, in the form of settlement, heavy depression, cracking and unevenness. The properties of the black cotton soils may be altered in many ways viz. mechanical, thermal, chemical and other means. Modification of black cotton soils by chemical admixture is a common stabilization method for such soils. Among various admixtures available lime, fly ash and cement are most widely and commonly used for the stabilization of the black cotton soils.

2. Body of the Paper

Lime in the form of quicklime (calcium oxide- Cao), hydrated lime (calcium hydroxide- $Ca(OH)_2$), or lime slurry can be used to treat soils. Quicklime is manufactured by chemically transforming calcium carbonate (limestone – $CaCO_3$) into calcium oxide. Hydrated lime is created when quicklime chemically reacts with water. It is hydrated lime the reacts with clay particles and permanently transforms then into a strong cementitious matrix. Most lime used for soil treatment is "high calcium" lime, which contains no more than 5% magnesium oxide or hydroxide. On some occasions, however, "dolomitic" lime is used. Dolomite lime contains 35 to 46% magnesium oxide or hydroxide. Dolomite lime can perform well in soil stabilization, although the magnesium fraction reacts more slowly than the calcium fraction. In present experimental analysis the performance of black cotton soil with lime for the improvement in strength is done. The experimental analysis is planned to study the following objectives.

1. To study physical properties of black cotton soil with varying percentage of lime from 0 to 10%.

International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 05 | May - 2021 ISSN: 2582-3930

Removal of Nitrate from Simulated Waste Water using Selective Filter Media

Monica Prakash Shinde[1]

[1]*Department of Civil Engineering, Dr. D. Y. PatilPratishthan's College of Engineering Salokhenagar Kolhapur.*

Abstract –The Studies adopted for improving the water quality by removing nitrate. The study carries by using selective filter media which are locally available and inexpensive. Media combinations of charcoal with brick bats (i.e, Setup I), rice husk ash with pebbles (i.e, Setup II) were used. To assess their effectiveness the laboratory scale model constructed filled with above combinations. The effect of various parameters on removal of nitrate were also studied.Set up I gives the nitrate removal efficiency 45.29%The setup II is seen to produce an optimum degree of nitrate attenuation, the average removal efficiency of bed obtained is 67.26%.

Key Words:nitrate, charcoal, brickbats, rice husk ash, pebbles

1.INTRODUCTION

There are so many uses of water in day today life which are increasing in applications. It includes agricultural, industrial, household, recreational and environmental activities and these activities generates the wastewater. Any addition to undesirable substances to ground water caused by human activities is considered to be added contamination. Contamination may occur to a lesser magnitude when compared to pollution, but it also may render the contaminated medium unusable or make it slightly hazardous to life. Movement of water and dispersion within the aquifer spreads the pollutant over a wider area. The contaminants in ground water comes from leaking sewers, landfills, industrial areas storage, oil storage, fertilizers and pesticides spreading on land, etc. They are listed in annexure table1. The contaminants are of organic or inorganic type. There are many problems with ground water contamination that are increasing because of the large and growing number of toxic compounds using in industrial and agricultural. Also the treatment options for ground water pollution are costly, non-effective, so the ground water contamination is the serious problem, as the ground water is difficult to treat.

Nitrate is a problem as a contaminant in drinking water (primarily from groundwater and wells) due to its harmful biological effects. High concentrations can cause methemoglobinemia, and have been cited as a risk factor in developing gastric an intestinal cancer. Due to these health risks, a great deal of emphasis has been placed on finding effective treatment processes to reduce nitrate concentrations to safe levels. An even more important facet to reduce the problem are prevention measures to stop the leaching of nitrate from the soil. Some suggest that reducing the amount of fertilizers used in agriculture will help alleviate the problem, and may not hurt crop yields. Other new developments in leach pits and slurry stores help to control the nitrate that comes from stored manure. By installing these prevention methods and reducing the amount of fertilizer used, the concentration of nitrate in the groundwater can be reduced over time. Treatment processes, such as ion exchange can have an immediate effect on reducing levels in drinking water. These processes do not remove all the nitrate, but can help to bring the concentration down to the suggested level of 10mg/L.

Sources of Nitrate in water and wastewater:

Although there are many sources of nitrogen (both natural and anthropogenic) that could potentially lead to the pollution of the groundwater with nitrates, the anthropogenic sources are really the ones that most often cause the amount of nitrate to rise to a dangerous level. Waste materials are one of the anthropogenic sources of nitrate contamination of groundwater. Many local sources of potential nitrate contamination of groundwater exist such as, sites used for disposal of human and animal sewage; industrial wastes related to food processing, munitions, and some polyresin facilities and sites where handling and accidental spills of nitrogenous materials may accumulate. Septic tanks are another example of anthropogenic source nitrogen contamination of the groundwater. Many areas of the United States and other countries have reported significant contamination of groundwater from septic tanks. Ground water contamination is usually related to the density of septic. In densely populated areas, septic systems can represent a major local source of nitrate to the groundwater. However in less populated areas septic systems don't really pose much of a threat to groundwater contamination.

When natural sources contribute a high concentration of nitrate to the groundwater it is usually as a result of anthropogenic disturbance. One example of this is the effect of forested areas on the leaching of nitrate to the groundwater. Natural, mature forests conserve nitrogen but human disturbances can lead to nitrate pollution of the groundwater. However, while this is a potential problem for groundwater, forests represent a very small source of nitrogen compared to agriculture.

Health Effects of Nitrate:

Heavy metals are major pollutants in marine; ground and industrials, and even in treated waste water. The presence of these metals in the environment has been a great concern because of their toxic nature and other adverse effects on receiving waters. Among these heavy metals are chromium, beyond the permissible quantities can cause various chronic disorders in human beings. It is well known that heavy metals can damage nerves, liver and bones, and they also block functional groups of essential enzymes [1]. Tannery waste characteristically contains a complex mixture of both organic and inorganic pollutants. For example, in related studies, chlorinated phenols and chromium were found to be closely associated with the tannery waste [2].

Nitrate is a problem as a contaminant in drinking water (primarily from groundwater and wells) due to its harmful biological effects. High concentrations can cause methemoglobinemia, and have been cited as a risk factor in developing gastric an intestinal cancer. Due to these health risks, a great deal of emphasis has been placed on finding effective treatment processes to reduce nitrate concentrations to safe levels. An even more important facet to reduce the problem

Materials Science and Engineering B 271 (2021) 115298

Contents lists available at ScienceDirect

Materials Science & Engineering B

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

Probing the electrochemical properties of $NiMn_2O_4$ nanoparticles as prominent electrode materials for supercapacitor applications

Suprimkumar D. Dhas [a], Parvejha S. Maldar [a,e], Meenal D. Patil [a], Maqsood R. Waikar [b,f], Rajendra G. Sonkawade [b], Shiv K. Chakarvarti [c], Surendra K. Shinde [d], Dae Y. Kim [d], Annasaheb V. Moholkar [a,*]

[a] Thin Film Nanomaterials Laboratory, Department of Physics, Shivaji University, Kolhapur 416 004, India
[b] Radiation and Materials Research Laboratory, Department of Physics, Shivaji University, Kolhapur 416 004, India
[c] Manav Rachna International Institute of Research and Studies (MRIIRS), Faridabad and Ex-National Institute of Technology, Kurukshetra 136 119, India
[d] Department of Biological and Environmental Science, College of Life Science and Biotechnology, Dongguk University, 32 Dongguk-ro, Biomedical Campus, Ilsandong-gu, Siksa-dong, 10326 Goyang-si, Gyeonggi-do, South Korea
[e] D.Y.Patil College of Engineering, Salokhenagar, Kolhapur Maharashtra, 4163007, India
[f] Padmabhooshan Vasantraodada Patil Institute of Technology (PVPIT), Sangli (Budhgaon), Maharashtra 416304, India

ARTICLE INFO

Keywords:
Cubic spinel structure
Mixed transition metal oxides
$NiMn_2O_4$ (Nickel Manganese Oxide)
Sol–gel method
Specific capacitance
Supercapacitors

ABSTRACT

$NiMn_2O_4$ (NMO) powders have been prepared by facile sol–gel route, and the effect of annealing temperature and the concentration of KOH electrolyte on its electrochemical performance has been investigated. The electrochemical performance of the NMO electrodes is tested via a three electrode arrangement in KOH electrolyte. The NMO electrode (NMO1) prepared from the powder synthesized at a temperature of 500 °C with an approximate crystallite size of 10 nm exhibits maximum specific capacitance of 571 Fg^{-1} at a scan rate of 5 mVs^{-1} in 1 M KOH electrolyte. The specific capacitance of the NMO1 electrode is found to be improved from 571 Fg^{-1} in 1 M KOH to 762 Fg^{-1} in 6 M KOH electrolyte. The improvement in the specific capacitance of the NMO1 working electrode in 6 M KOH electrolyte can be attributed to good electrochemical utilization and an effective charge storage mechanism.

1. Introduction

Supercapacitors (SCs) have attracted much attention because of the fast rechargeability, higher power density over the batteries, and more energy storage ability as compared to conventional capacitors. The SCs have enormous energy storage capacity besides possessing the combined property of both conventional capacitor and battery [1]. Based on the charge-storage mechanism, electrochemical SCs can be classified into three categories: viz, pseudocapacitors, electrical double-layer capacitors (EDLCs), and hybrid capacitors. The conducting polymers and various metal oxides are utilized as the active electrode materials in pseudocapacitors, whereas in EDLCs carbon-based materials such as activated carbon, graphene, and carbon nanotubes are used as active electrodes. One more type of SCs is a mixture of both pseudocapacitors and EDLCs, known as a hybrid capacitor. To construct these types of SCs, the active electrode materials are made by combining either two or three distinct elements which give very large specific capacitance and enhanced energy density than pseudocapacitors or EDLCs [2]. However, all the above-mentioned SCs still suffer from some significant disadvantages such as poor cyclic life span of conductive polymers, the low capacitance of carbon-based materials and high cost of typical transition metal oxides like RuO_2 [3]. RuO_2 has been extensively investigated as a promising material due to its high specific capacitance and excellent cycling stability, but rareness and the high cost of ruthenium element are putting significant barriers to its commercialization [4]. To overcome these significant disadvantages, it is necessary to explore other alternative materials for the fabrication of supercapacitors.

Mixed transition metal oxides (MTMOs) are preferred to fabricate electrode materials for supercapacitor application over the single transition metal oxide component due to its enhanced chemical stability and electrochemical properties [5]. Out of the different MTMOs, considerable attention has been centered towards the synthesis of cubic spinel $NiMn_2O_4$ (NMO) as it offers high conductivity, outstanding electrochemical capacitance, high redox-active sites, and exceptional chemical

* Corresponding author.
E-mail address: avmoholkar@gmail.com (A.V. Moholkar).

https://doi.org/10.1016/j.mseb.2021.115298
Received 20 October 2020; Received in revised form 14 May 2021; Accepted 30 May 2021
Available online 17 June 2021

Journal of Electroanalytical Chemistry 897 (2021) 115548

Contents lists available at ScienceDirect

Journal of Electroanalytical Chemistry

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

Fabrication of efficient electrochemical capacitors rooted in sol-gel derived $NiMn_2O_4$ nanoparticles

S.D. Dhas [a], P.S. Maldar [a,c], M.D. Patil [a], S.A. Mane [a], M.R. Waikar [b], R.G. Sonkawade [b], A.V. Moholkar [a,*]

[a] Thin Film Nanomaterials Laboratory, Department of Physics, Shivaji University, Kolhapur, Maharashtra 416 004, India
[b] Radiation & Materials Research Laboratory, Department of Physics, Shivaji University, Kolhapur, Maharashtra 416 004, India
[c] D. Y. Patil College of Engineering, Salokhenagar, Kolhapur, Maharashtra 416 007, India

ARTICLE INFO

Keywords:
Sol-gel preparation
Crystal structure
Nanoparticles
$NiMn_2O_4$
Specific power
Supercapacitors

ABSTRACT

$NiMn_2O_4$ (NMO) nanoparticles (NPs) with a cubic spinel structure have been synthesized via the sol–gel method. The surface morphology study explored the porous nature of the NMO NPs. The compositional analysis displayed the constituent elements Ni, Mn, and O in NMO NPs. Electrochemical properties of the electrodes prepared from NMO NPs are investigated in 1 M KOH, 1 M NaOH, and 1 M Na_2SO_4 electrolytes. At a scan rate of 5 mVs^{-1}, a specific capacitance of 658 $Fg^{-1}$is obtained for the NMO-Ni foam electrodes in 1 M NaOH electrolyte. At a current density of 0.5 $mAcm^{-2}$, the determined values of specific energy and specific power for the NMO-Ni foam electrodes are 13.4 $Whkg^{-1}$ and 523.8 Wkg^{-1}, respectively, in 1 M NaOH electrolyte. The NMO-Ni foam electrodes showed 96.4 % capacitance retention in 1 M NaOH for 1000 cycles.

1. Introduction

Rapid fossil fuel consumption has necessitated the use of CO_2-free technologies for clean energy production. In this respect, electric energy storage systems such as batteries and supercapacitors are suitable alternatives to limit the loss of naturally available resources and to meet growing energy requirements [1–4]. Compared to batteries, supercapacitors have a longer life span and an enormous current handling capacity. Moreover, the long cycle life of supercapacitors makes them suitable to store and transform the energy from renewable sources [5,6]. Supercapacitors have been used in a variety of fields such as portable electronics, electric vehicles, power grids, and power stabilizers [7–9].

The performance of supercapacitors is determined by the structure and nature of electrode materials. Carbon-based materials like carbon nanotubes and graphene are competent candidates for fabricating supercapacitors. However, the synthesis methods needed for manufacturing carbon nanotubes and graphene are very complex and involve toxic chemicals [7,10–11].The use of binary transition metal oxides, rooted in copious and environmentally benign materials such as NiO, ZnO, Co_3O_4, MnO_2, and CuO as electrode materials over RuO_2, is a cost-effective approach for the development of electrochemical supercapacitors [12,13]. Moreover, mixed transition metal oxides (MTMOs) offer certain advantages as compared to the single metal component of binary oxides, such as more active redox sites, enhanced stability, and a wide operating potential window [13]. Therefore, implementing MTMOs as electrode materials will be expedient to enhance the performance of the electrochemical capacitors. In this notion, crucial properties of $NiMn_2O_4$ (NMO) like low cost, high conductivity and exceptional structure stability make it a distinct candidate for creating efficient supercapacitors [14–16].

Different strategies have been used by the researchers to prepare NMO, such as spray pyrolysis [17], hydrothermal [18], co-precipitation [19], and sol–gel [15,20]. Out of the different techniques accessible for the synthesis of porous metal oxide materials, the sol–gel method exhibits several advantages like low synthesis temperature, high throughput, and low manufacturing cost [21].

In the present research work, the sol–gel synthesis of NMO nanoparticles (NPs) has been reported. The working electrodes are prepared from the sol–gel derived NMO NPs. The supercapacitor properties of the NMO-Ni foam electrodes are investigated in different electrolytes, such as 1 M NaOH, 1 M KOH, and 1 M Na_2SO_4.

2. Experimental details

2.1. Synthesis of NMO NPs by sol–gel method and fabrication of the working electrodes

All the chemicals in the present research work were of AR grade and used without further purification. The NMO NPs were prepared through the sol–gel method. Nickel acetate tetrahydrate and man-

* Corresponding author.
E-mail address: avmoholkar@gmail.com (A.V. Moholkar).

https://doi.org/10.1016/j.jelechem.2021.115548
Received 2 December 2020; Received in revised form 21 June 2021; Accepted 17 July 2021
Available online 23 July 2021

materials

MDPI

Article

Influence of Tin Doped TiO_2 Nanorods on Dye Sensitized Solar Cells

Sandeep B. Wategaonkar [1,2,3], Vinayak G. Parale [4], Sawanta S. Mali [5], Chang-Kook Hong [5], Rani P. Pawar [6], Parvejha S. Maldar [7,8], Annasaheb V. Moholkar [8], Hyung-Ho Park [4,*], Balasaheb M. Sargar [2] and Raghunath K. Mane [3,*]

1 Department of Chemistry, Sanjay Ghodawat Polytechnic, Atigre 416118, Maharashtra, India; sandip.wate@gmail.com
2 DST-FIST Sponsored Material Research Laboratory, Department of Chemistry, Jaysingpur College, Shivaji University, Kolhapur 416001, Maharashtra, India; sargarbalasaheb@gmail.com
3 Department of Chemistry, K. R. P. Kanya Mahavidyalaya, Shivaji University, Kolhapur 415409, Maharashtra, India
4 Department of Materials Science and Engineering, Yonsei University, Seoul 03722, Korea; vinayakparale3@gmail.com
5 Polymer Energy Materials Laboratory, School of Chemical Engineering, Chonnam National University, Gwangju 61186, Korea; sawanta@jnu.ac.kr (S.S.M.); hongck@jnu.ac.kr (C.-K.H.)
6 Department of Physics, Sanjay Ghodawat University, Kolhapur 416118, Maharashtra, India; rani.ddrrpp.pawar@gmail.com
7 Department of Physics, D.Y. Patil College of Engineering, Salokhenagar, Kolhapur 416007, Maharashtra, India; parvezmaldar8@gmail.com
8 Thin Films Nanomaterials Laboratory, Department of Physics, Shivaji University, Kolhapur 416004, Maharashtra, India; avmoholkar@gmail.com
* Correspondence: hhpark@yonsei.ac.kr (H.-H.P.); rkmanekrp1970@gmail.com (R.K.M.); Tel.: +82-2-2123-2853 (H.-H.P.); +91-992-148-2155 (R.K.M.)

check for updates

Citation: Wategaonkar, S.B.; Parale, V.G.; Mali, S.S.; Hong, C.-K.; Pawar, R.P.; Maldar, P.S.; Moholkar, A.V.; Park, H.-H.; Sargar, B.M.; Mane, R.K. Influence of Tin Doped TiO_2 Nanorods on Dye Sensitized Solar Cells. *Materials* **2021**, *14*, 6282. https://doi.org/10.3390/ma14216282

Academic Editor: Vincenzo Baglio

Received: 26 September 2021
Accepted: 17 October 2021
Published: 21 October 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Abstract: The one-step hydrothermal method was used to synthesize Sn-doped TiO_2 (Sn-TiO_2) thin films, in which the variation in Sn content ranged from 0 to 7-wt % and, further, its influence on the performance of a dye-sensitized solar cell (DSSC) photoanode was studied. The deposited samples were analyzed by X-ray diffraction (XRD) and Raman spectroscopy, which confirmed the existence of the rutile phase of the synthesized samples with crystallite size ranges in between 20.1 to 22.3 nm. In addition, the bare and Sn-TiO_2 thin films showed nanorod morphology. A reduction in the optical band gap from 2.78 to 2.62 eV was observed with increasing Sn content. The X-ray photoelectron spectroscopy (XPS) analysis confirmed Sn^{4+} was successfully replaced at the Ti^{4+} site. The 3-wt % Sn-TiO_2 based DSSC showed the optimum efficiency of 4.01%, which was superior to 0.87% of bare and other doping concentrations of Sn-TiO_2 based DSSCs. The present work reflects Sn-TiO_2 as an advancing material with excellent capabilities, which can be used in photovoltaic energy conversion devices.

Keywords: Sn-doped TiO_2; Hydrothermal method; X-ray diffraction; photoelectrode; dye-sensitized solar cells

1. Introduction

Nanostructured, nanoporous semiconducting metal oxides with large surface areas and high diffusion rates are exclusively utilized as photoanode materials in dye-sensitized solar cells (DSSCs) [1]. Due to their cost-effectiveness, ease of manufacturing, and higher light conversion efficiency, DSSCs have become important alternatives to traditional silicon solar cells [2,3]. Various metal oxide semiconductors, such as ZnO, TiO_2, Nb_2O_5, and SnO_2, have been explored as photoanode materials for the development of high-performance DSSCs [4–7]. The contributing factors that establish the TiO_2 semiconductor electrodes as the best photoanodes are their charge transport capability and chemical stability. TiO_2 plays a very important role in DSSCs as it provides a high surface for adsorption of

materials

MDPI

Article

Influence of Tin Doped TiO_2 Nanorods on Dye Sensitized Solar Cells

Sandeep B. Wategaonkar [1,2,3], Vinayak G. Parale [4], Sawanta S. Mali [5], Chang-Kook Hong [5], Rani P. Pawar [6], Parvejha S. Maldar [7,8], Annasaheb V. Moholkar [8], Hyung-Ho Park [4,*], Balasaheb M. Sargar [2] and Raghunath K. Mane [3,*]

1 Department of Chemistry, Sanjay Ghodawat Polytechnic, Atigre 416118, Maharashtra, India; sandip.wate@gmail.com
2 DST-FIST Sponsored Material Research Laboratory, Department of Chemistry, Jaysingpur College, Shivaji University, Kolhapur 416001, Maharashtra, India; sargarbalasaheb@gmail.com
3 Department of Chemistry, K. R. P. Kanya Mahavidyalaya, Shivaji University, Kolhapur 415409, Maharashtra, India
4 Department of Materials Science and Engineering, Yonsei University, Seoul 03722, Korea; vinayakparale3@gmail.com
5 Polymer Energy Materials Laboratory, School of Chemical Engineering, Chonnam National University, Gwangju 61186, Korea; sawanta@jnu.ac.kr (S.S.M.); hongck@jnu.ac.kr (C.-K.H.)
6 Department of Physics, Sanjay Ghodawat University, Kolhapur 416118, Maharashtra, India; rani.ddrrpp.pawar@gmail.com
7 Department of Physics, D.Y. Patil College of Engineering, Salokhenagar, Kolhapur 416007, Maharashtra, India; parvezmaldar8@gmail.com
8 Thin Films Nanomaterials Laboratory, Department of Physics, Shivaji University, Kolhapur 416004, Maharashtra, India; avmoholkar@gmail.com
* Correspondence: hhpark@yonsei.ac.kr (H.-H.P.); rkmanekrp1970@gmail.com (R.K.M.); Tel.: +82-2-2123-2853 (H.-H.P.); +91-992-148-2155 (R.K.M.)

check for updates

Citation: Wategaonkar, S.B.; Parale, V.G.; Mali, S.S.; Hong, C.-K.; Pawar, R.P.; Maldar, P.S.; Moholkar, A.V.; Park, H.-H.; Sargar, B.M.; Mane, R.K. Influence of Tin Doped TiO_2 Nanorods on Dye Sensitized Solar Cells. *Materials* **2021**, *14*, 6282. https://doi.org/10.3390/ma14216282

Academic Editor: Vincenzo Baglio

Received: 26 September 2021
Accepted: 17 October 2021
Published: 21 October 2021

Abstract: The one-step hydrothermal method was used to synthesize Sn-doped TiO_2 (Sn-TiO_2) thin films, in which the variation in Sn content ranged from 0 to 7-wt % and, further, its influence on the performance of a dye-sensitized solar cell (DSSC) photoanode was studied. The deposited samples were analyzed by X-ray diffraction (XRD) and Raman spectroscopy, which confirmed the existence of the rutile phase of the synthesized samples with crystallite size ranges in between 20.1 to 22.3 nm. In addition, the bare and Sn-TiO_2 thin films showed nanorod morphology. A reduction in the optical band gap from 2.78 to 2.62 eV was observed with increasing Sn content. The X-ray photoelectron spectroscopy (XPS) analysis confirmed Sn^{4+} was successfully replaced at the Ti^{4+} site. The 3-wt % Sn-TiO_2 based DSSC showed the optimum efficiency of 4.01%, which was superior to 0.87% of bare and other doping concentrations of Sn-TiO_2 based DSSCs. The present work reflects Sn-TiO_2 as an advancing material with excellent capabilities, which can be used in photovoltaic energy conversion devices.

Keywords: Sn-doped TiO_2; Hydrothermal method; X-ray diffraction; photoelectrode; dye-sensitized solar cells

1. Introduction

Nanostructured, nanoporous semiconducting metal oxides with large surface areas and high diffusion rates are exclusively utilized as photoanode materials in dye-sensitized solar cells (DSSCs) [1]. Due to their cost-effectiveness, ease of manufacturing, and higher light conversion efficiency, DSSCs have become important alternatives to traditional silicon solar cells [2,3]. Various metal oxide semiconductors, such as ZnO, TiO_2, Nb_2O_5, and SnO_2, have been explored as photoanode materials for the development of high-performance DSSCs [4–7]. The contributing factors that establish the TiO_2 semiconductor electrodes as the best photoanodes are their charge transport capability and chemical stability. TiO_2 plays a very important role in DSSCs as it provides a high surface for adsorption of

Journal of Energy Storage xxx (xxxx) xxx

Contents lists available at ScienceDirect

Journal of Energy Storage

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

Sol-gel synthesized nickel oxide nanostructures on nickel foam and nickel mesh for a targeted energy storage application

Suprimkumar D. Dhas [a], Parvejha S. Maldar [a,d], Meenal D. Patil [a], Maqsood R. Waikar [b,c], Rajendra G. Sonkawade [b], Annasaheb V. Moholkar [a,*]

[a] Thin Film Nanomaterials Laboratory, Department of Physics, Shivaji University, Kolhapur, Maharashtra 416004, India
[b] Radiation and Materials Research Laboratory, Department of Physics, Shivaji University, Kolhapur, Maharashtra 416004, India
[c] Padmabhooshan Vasantraodada Patil Institute of Technology (PVPIT), Sangli (Budhgaon), Maharashtra 416304, India
[d] D.Y. Patil College of Engineering, Salokhenagar, Kolhapur Maharashtra 416007, India

ARTICLE INFO

Keywords:
NiO-nickel foam
NiO-nickel mesh
Mesoporous channels
Sol-gel
Supercapacitors
XPS

ABSTRACT

The nickel-based oxides are treated as favourable pseudocapacitive electrode materials for energy storage application owing to their inexpensive nature, well-defined redox activity, as well as liberty in tuning the microstructures by changing the synthesis process optimizing its vital parameters. However, a real challenge for fabricating nickel-based materials is to sustain the uniform morphology onto a conductive substrates like FTO, ITO, stainless steel, nickel foam, nickel mesh, and copper foam etc. Herein, nickel oxide (NiO) nanostructures (NSs) with high pseudocapacitive performance have been prepared via the sol-gel technique for energy storage application. The structural identity of NiO-NSs is documented by X-ray diffraction, which confirmed the monoclinic crystal structure of the synthesized NSs. The X-ray photoelectron spectroscopy confirmed the valence state of the nickel as '+2' and oxygen as '-2'. The field-emission scanning electron microscopy of NiO-NSs revealed non-uniform large spherical clusters agglomerated onto the surface. The NiO-NSs manifested the mesoporous channels and exhibit a surface area of 31.4 m^2g^{-1}, which is evaluated through Brunauer-Emmett-Teller analysis. The fabricated NiO-nickel foam (NF) electrode exhibit a high specific capacitance of 871 Fg^{-1} at a scan rate of 5 mVs^{-1} in 4 M KOH solution. Moreover, the NiO−NF electrode displayed the cyclic retention of 86.5 % after 10,000 cycles. The mesoporous channels of the electrode material afford plentiful, accessible, active sites to the effective charge transportation of electrolyte charges over the electrolyte-electrode interface and boost the electrochemical performance of NiONF −electrodes. Moreover, an asymmetric supercapacitor device constructed with NiO−NF as the anode and AC−NF as the cathode delivers high specific energy and specific power (24 $Whkg^{-1}$ at 2.9 $kWkg^{-1}$), and good cycling stability (retention of 89.7 % over 5 000 cycles)

1. Introduction

With the speedy progress of the world economy, the decrement in fossil fuels, and raising natural issues, there has been tremendous increase of energy demand. Considering the present issues, it is inevitable to accomplish this energy need cleanly and sustainably through high energy storage and conversion technology involving portable electronic components. Conventional capacitors, batteries, fuel cells, and supercapacitors (SCs) are promising energy storage devices in many applications [1–3]. SCs have much greater specific power and specific energy than lithium rechargeable batteries and ordinary capacitors respectively, and are capable of bridging the gap between them [4, 5]. In this concern, SCs can accumulate the charges at the surface of active materials that are effective for future energy storage devices because of high specific energy, long cyclic stability, excellent intercalation-deintercalation rate, and frequent use in numerous applications such as, electric vehicles, portable electronics, and power backups [6–8]. Derived from the charge storage mechanism, SCs are mainly categorized in electric double-layer capacitors (EDLCs) and pseudocapacitors. EDLCs involve reversible ion movement and adsorption-desorption at the electrode-electrolyte interface, whereas the pseudocapacitors imply quick redox reaction on the surface of active electrode material [9–10]. Recently, assorted challenges have been completed by the researchers to boost the specific capacitance (Cs) of

* Corresponding author.
E-mail address: avmoholkar@gmail.com (A.V. Moholkar).

https://doi.org/10.1016/j.est.2021.103658
Received 21 August 2021; Received in revised form 12 November 2021; Accepted 19 November 2021

EXPERIMENTAL STUDY ON I-SHAPE AND C-SHAPE RCC STRUCTURE BEHAVIOUR DUE TO WIND LOAD

Published Feb 25, 2021

Download

pdf (https://repo.journalnx.com/index.php/nx/article/view/2316/2275)

Statistic

2018: RIT PG Con-18 (https://repo.journalnx.com/index.php/nx/issue/view/68)

Shweta Sunil Khandagale
PG Student, Civil Structural Engineering Department Rajarambapu Institute of Technology Islampur, India

Dr. P. S. Patil
Professor, Civil Engineering Department Rajarambapu Institute of Technology Islampur, India

Abstract

Wind induced load is an important and essential design issue in the design of structures. This study present pressure coefficient for RCC structure of different geometric shapes. These shapes are C-shape, I-shape. The geometry of different shapes of building model were drawn by using CAD software. The pressure coefficient was calculated by IS code method. The IS 875 (Part 3)-1987 was used for the analysis of RCC structure of various geometric shapes. The experimental investigation & finite element analysis will be carried out to compare the results with IS code method. Experimental investigation is carried out in open circuit wind tunnel while the IS code analysis will be carried out using IS 875 (Part 3)-1987.

DOI: 10.14569/IJACSA.2021.0120671

Cluster based Certificate Blocking Scheme using Improved False Accusation Algorithm

Author 1: Chetan S Arage Author 2: K. V. V. Satyanarayana

International Journal of Advanced Computer Science and Applications(IJACSA), Volume 12 Issue 6, 2021.

Abstract: The aggregation of mobile nodes without the use of a base station is known as Mobile Ad Hoc Networks (MANETS). In nature, the nodes are moving. These networks are not connected and thus subject to security attacks due to their mobility. There are several mechanisms proposed to prevent mishaps while routing of the packets in such networks methods: The methodology outlined in Mobile Ad Hoc Networks to protect against various types of assaults is based on a recent method known as Cooperative Bait Detection Scheme. Its implementation scenario demonstrates that in the event of Sybil assaults, the packet delivery ratio and performance are low. on the network. Our goal is to propose a cluster-based methodology to improve delays, packet delivery ratio, and other performance assessment criteria. Improved Cooperative Bait Detection recommends a disjointed multipath technique to avoid attacks. Until date, the dropped packet delivery ratio has been the key to preventing collaborative and Sybil assaults. In the Hybrid Cooperative Bait Detection Scheme, nodes are verified in two stages: first, on the basis of packet delivery ratio, and then, in the second stage, the exact cause of performance decline is explored to check node behavior. In order to improve security, certifying procedures must be used to clustered networks. For malevolent entities, the false accusation algorithm provided certificate revocation and blocking approaches. An algorithm is proposed that remembers false accusations for a set period of time in order to increase the number of normal nodes in the network and hence improve the system's performance. Results: With the help of NS2 simulation, the clustering approach was evaluated by considering several Sybil-attack network scenarios. When the