Punyashlok Ahilyadevi Holkar Solapur University

Criterion III – Research, Innovations and Extension

Key Indicator - 3.7 Collaboration

Metric No.	
3.7.1	*Number of collaborative activities with other institutions/ research establishment/industry for research and academic development of faculty and students during the year*

3.7.1 Number of collaborative activities with other institutions/ research establishment/industry for research and academic development of faculty and students during the year

3.7.1.1: Total number of Collaborative activities with other institutions/ research establishment/industry for research and academic development of faculty and students during the year

Sl. No.	Title of the collaborative activity	Name of the collaborating agency with contact details	Name of the participant	Year of collaboration	Duration	Nature of the activity	Link to the relavant document
1	Research Activity	National Dong Hwa University, Taiwan	Dr.Sujit Kadam	2021	Continue	Research Paper	https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/slct.202202504
2	Research Activity	Hanyang University, Korea	Dr.G.T.Chavan	2022	Continue	Research Paper	https://link.springer.com/article/10.1007/s11664-022-10019-9
3	Research Activity	Mumbai University	Dr.R.C.Ambare	2017	Continue	Research Paper	https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/slct.202204750
4	Research Activity	Pune University	Prof.H.M.Pathan	2016	Continue	Research Paper	https://www.sciencedirect.com/science/article/abs/pii/S1387700323006103X#:~:text=The%20capacitive%20nature%20and%20internal,%2Dstate%20device%20(ASSD).
5	Research Activity	Pune University	Prof.P.D.More	2020	Continue	Research Paper	https://www.espublisher.com/uploads/article_pdf/esee8c785.pdf
6	Research Activity	Pune University	Prof. S.D.Sartale	2020	Continue	Research Paper	https://www.sciencedirect.com/science/article/abs/pii/S2352507X23000276
7	Hydrous and amorphous cobalt phosphate thin-film electrodes synthesized by SILAR method for high-performing flexible hybrid energy storage devices	Department of Material science and Enginee	Mukund Mali	2022	1 Year	Research Collaboration	https://pubs.acs.org/doi/abs/10.1021/acs.energyfuels.2c02202
8	A Novel Recyclable Bi-Mg-O Composite Nano-Catalyst Promoted Rapid and Efficient Synthesis of Spirooxindole and 4H-Pyran Derivatives	Department of Environmental Engineering,	Mukund Mali	2022	1 Year	Research Collaboration	https://www.tandfonline.com/doi/abs/10.1080/10406638.2022.2124280
9	Magnetically separable mixed metal oxide nanocomposite (Pd/MnFe2O4) for Suzuki cross-coupling in aqueous medium	Department of Chemical and Biological Engineering, Gachon University, 1342 Seongnam-aero, Sujung-gu, Seongnam-si, Gyeonggi-do 461-701, Republic of Korea	Mukund Mali	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S0022328X22002893
10	Interface engineering of polyoxotungstocobaltate with fern-leaf like $BiVO_4$ microstructures for enhanced photocatalytic and supercapacitive performance	Department of Chemical and Biological Engineering, Gachon University, 1342 Seongnam-aero, Sujung-gu, Seongnam-si, Gyeonggi-do 461-701, Republic of Korea	Mukund Mali	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S0927775723000584
11	Multifunctional polyoxotungstocobaltate anchored fern-leaf like $BiVO_4$ microstructures for enhanced photocatalytic and supercapacitive performance	Department of Chemical and Biological Engineering, Gachon University, 1342 Seongnam-aero, Sujung-gu, Seongnam-si, Gyeonggi-do 461-701, Republic of Korea	Mukund Mali	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S0927775723000584
12	Surface plasmon resonance based colorimetric probe for vitamin B1 detection: Applications to bio-fluid analysis	Fluorescence Spectroscopy Research Laboratory, Department of Chemistry, Shivaji University, Kolhapur, 416 004, Maharashtra, India	Mukund Mali	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/pii/S2666016423000853
13	3-Substituted-2-oxindole derivatives: Design, synthesis and their anti-tuberculosis and radical scavenging dual-action studies	The Material Science Research Institute, King Abdulaziz City for Science and Technology (KACST), Riyadh 11442, Saudi Arabia	Vikas Kadu, Raghunath B Bhosale	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S0022286022005737
14	Green Synthesis, Molecular Docking, In Silico ADME and Biological Evaluation of Methoxy Substituted 1,5-Benzodiazepines as Potential Antioxidant, Anti-Inflammatory, and Antidiabetic Agents	Department of Pharmaceutical Chemistry, DKSS's Institute of Pharmaceutical Sciences and Research, Swami-Chincholi, Pune, Maharashtra, India	Raghunath B Bhosale	2022	1 Year	Research Collaboration	https://www.tandfonline.com/doi/abs/10.1080/10406638.2021.1878244
15	Syntheses, Molecular Docking and Biological Evaluation of 2-(2- hydrazinyl)thiazoles as Potential Antioxidant, Anti-Inflammatory and Significant Anticancer Agents	College of pharmacy vita Dist. Sangli	Raghunath B Bhosale, Anjana S Lawand, Vikas kadu	2022	1 Year	Research Collaboration	https://www.ingentaconnect.com/content/ben/raiad/2022/00000016/00000002/art00005
16	Effect of embedding aluminium and yttrium on the magneto-optic properties of lanthanum spinel ferrite nanoparticles synthesised for photocatalytic degradation of methyl red	Department of Pharmaceutical Chemistry, College of Health Sciences, University of KwaZulu-Natal (Westville), Durban, 4000, South Africa	Sadanand N Shringare	2022	1 Year	Research Collaboration	https://link.springer.com/article/10.1007/s10971-022-05951-5
17	3-Substituted-2-oxindole derivatives: Design, synthesis and their anti-tuberculosis and radical scavenging dual-action studies	Centre for Drug Discovery and Development, Col. Dr. Jeppiaar Research Park, Sathyabama Institute of Science and Technology, Rajiv Gandhi Road, Chennai, Tamil Nadu 600 119, India	Vikas Kadu, Raghunath B Bhosale	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S0022286022005737
18	Synthesis, Molecular Docking and Biological Evaluation of 2-(2-hydrazinyl) thiazoles as Potential Antioxidant, Anti-inflammatory and Anticancer Agent.	College of pharmacy vita Dist. Sangli	Raghunath B Bhosale, Anjana S Lawand, Vikas kadu	2022	1 Year	Research Collaboration	https://www.ingentaconnect.com/content/ben/raiad/2022/00000016/00000002/art00005
19	Room-temperature ammonia gas sensor based on carboxylic acid-doped polyaniline	Department of Chemistry, Karmaveer Bhaurao Patil Mahavidyalaya (KBP), Pandharpur, 413304, Maharashtra, India	Anil A Ghanwat	2022	1 Year	Research Collaboration	https://link.springer.com/article/10.1007/s00289-022-04215-0
20	High-performance supercapacitive polyazomethines: Room temperature synthesis and their characterizations	Department of Physics, D.B.F. Dayanand College of Arts & Science, Solapur MS-413002, India	Anil A Ghanwat	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S0022286023022639
21	Synthesis of Novel Hydrazones of Levofloxacin Related Molecule and their In Vitro Evaluation as Antioxidant, and Molecular Docking Studies	Wockhardt Ltd, Aurangabad	Anil A Ghanwat	2022	1 Year	Research Collaboration	https://www.ingentaconnect.com/content/ben/cchts/2022/00000025/00000002/art00008
22	Development of new efficient and cost effective liquid-liquid extractive determination method for cobalt (II): Analysis of water, alloys and nano powder	Department of Chemistry, N. K. Orchid College of Engineering and Technology, Solapur, Maharashtra 413002, India	Anjana S Lawand	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/pii/S2773050622000258
23	In Vitro Anticancer Screening, Molecular Docking and Antimicrobial Studies of Triazole-Based Nickel(II) Metal Complexes	Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Solapur 413 411, Maharashtra, India	Umesh Barache	2022	1 Year	Research Collaboration	https://www.mdpi.com/1420-3049/27/19/6548
24	Analytical optimization of liquid–liquid extractive spectrophotometric assessment protocol for tetravalent platinum: Analysis of environmental samples and cisplatin	Materials Research Laboratory, Department of Chemistry, C.B. Khedgi's Basaveshwar Science, Raja Vijaysinh Commerce and Raja Jaysinh Arts College, Akkalokot 413216, Maharashtra, India	Anjana S Lawand	2022	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S1386142522010666
25	Potential arsenic–chromium–lead Co-contamination in the hilly terrain of Arunachal Pradesh, north-eastern India: Genesis and health perspective	Escuela de Ingeniería y Ciencias, Tecnologico de Monterrey, Campus Monterey, Monterrey 64849, Nuevo Leon, Mexico	Umesh Barache	2023	1 Year	Research Collaboration	https://www.sciencedirect.com/science/article/abs/pii/S004565352300334X
26	Cyber Security Awareness: A Movement of Digital Literacy Towards making of Digital India	Bharathi Vidyapeeth, Solapur	Dr. Shriram D. Raut	2022	1	Research Paper	https://www.indianjournalofmanagement.com/index.php/ibmrd/article/view/172617
27	Cyber Security Awareness: A Movement of Digital Literacy Towards making of Digital India	Bharathi Vidyapeeth, Solapur	Dr. Ashok R. Shinde	2022	1	Research Paper	https://www.indianjournalofmanagement.com/index.php/ibmrd/article/view/172617
28	Acupressure Consultany Program	School of Allied Health Sciences and Shree Sai Samarth Educational and Research Society Nagpur	39	Dec. 2020	3 Years	Consultancy	NIL
29	Summer Internship Program	Maharashtra University of Health Sciences, Nashik	10	Jan. 2018	5 Years	Internship	NIL

Spray Synthesized Mn-doped CuO Electrodes for High Performance Supercapacitor

Pravin More,*[a] Sujit A. Kadam,*[b] Yuan-Ron Ma,[b] Yan-Ruei Chen,[c] Nilesh Tarwal,[d] Yuvraj Navale,[e] Amol Salunkhe,[e] and Vikas Patil[e]

A pristine copper oxide and manganese-doped copper oxide nanostructured films were prepared by simple spray pyrolysis technique. A study of the effects of Mn doping with three different concentrations as 2, 4, and 6 wt% were studied in the view of enhancement of supercapacitive performance of copper oxide electrode. The 6 wt% manganese-doped copper oxide thin film changed their surface morphology considerably favorable to the exchange of ions in the Na_2SO_4 electrolyte. The electrochemical properties of the pristine copper oxide and manganese-doped copper oxide were investigated in 1 M Na_2SO_4 electrolyte within the potential window of −1.0 to 0.4 V. A maximum specific capacitance of 801.61 F/g was obtained for the manganese-doped copper oxide thin film electrode.

Introduction

Supercapacitors (SCs), also known as electrochemical capacitors, are one of the most promising candidates. It exhibits attractive characteristics such as high power density, permanent charge-discharge cycle, low series resistance, longer life cycle, and wide range of operating temperature, easily maintenance, and environmental friendliness than secondary batteries.[1–4] The charges are stored in supercapacitors via two principles: diffusion controlled kinetics (pseudocapacitors) and surface-controlled kinetics (electrical double-layer supercapacitor).[5,6] Currently transition metal oxides electrodes have a great choice as sophisticated supercapacitor due to transition metal oxides abundant availability, environmentally friendly, large surface area as well as high theoretical specific capacitance.[7,8] Although, transition metal oxides/ hydroxides for example, RuO_2, V_2O_5, NiO, $Ni(OH)_2$, Co_3O_5, $Co(OH)_2$, MnO_2 were used to achieve excellent supercapacitive performance.[8,9] However RuO_2 is restricted for its commercial use due to expensive, toxic, and less abundant.[8] Among aforesaid, it is possible for transition metal oxides to have a variety of oxidation states which can enhance redox charge transfer, resulting in much higher specific capacitances.[10] A promising electrode material, manganese oxide has a high specific capacitance, an ideal charge-discharge curve, is readily available, and is stable. CuO is an attractive choice for energy storage since it is low cost, low toxicity, abundant, environmentally friendly, and has a large surface area and high conductivity.[10] Manganese oxides have been found as one of the most promising candidate for supercapacitor applications due to their natural abundance, low cost.[1] Based on above considerations, we designed a pristine and Mn-doped CuO electrodes by spray pyrolysis technique. Pang et al. synthesized MnO_2 and reported maximum specific capacitance of 689 F/g at a current density of 10 mA/cm² in 6 M KOH electrolyte.[11] More et al. deposited Mn_3O_4 and found maximum specific capacitance of 527 F/g at a scan rate of 5 mV/s in 1 M Na_2SO_4 electrolyte.[1] Xia et al. synthesized MnO_2 and reported maximum specific capacitance of 364 F/g at 10 mV/s in 1 M Na_2SO_4 electrolyte.[12] In the research community, researchers have focused on a synthesis of mixed metal oxides than single metal oxide to achieve the desired performance of supercapacitor. In addition to that following unique features of metal oxides can breakthroughs for supercapacitors such as i. co-existence of two different metal oxides in a single crystal structure could improve the electrical conductivity than single one, ii. nanoporous metal oxides can provide a higher surface area.[7] Durai et al. synthesized a pristine and Mn-doped CuO electrodes by a reactive radio frequency magnetron sputtering technique and reported maximum specific capacitance of 10 and 81.80 mF/cm² at a scan rate of 10 mV/s in 3 M KOH electrolyte, respectively.[2] Racik et al. prepared CuO and MnO_2–CuO nanocomposite electrodes and showed maximum specific capacitance of 191.06 and 279.12 F/g, respectively.[10] Suresh et al. synthesized CuO and 5 wt% Mn-doped CuO and reported maximum specific capacitance of 375 and 625 F/g in 2 M KOH electrolyte at 2 mV/s, respectively.[13] Shinde et al. deposited $CuO/Cu(OH)_2$ and Mn: $CuO/Cu(OH)_2$ hybrid electrodes at various Mn concentrations. As a result $CuO/Cu(OH)_2$ and 3%

[a] Dr. P. More
Department of Physics, Ahmednagar College, Ahmednagar, 414001, M.S., India
E-mail: pravin.more@aca.edu.in
[b] S. A. Kadam, Prof. Y.-R. Ma
Department of Physics, National Dong Hwa University, Hualien, 97401, Taiwan
E-mail: ksujit17@gmail.com
[c] Y.-R. Chen
Department of Engineering and System Science, National Tsing Hua University, Hsinchu, Taiwan
[d] Dr. N. Tarwal
Smart Materials Research Laboratory, Department of Physics, Shivaji University, Kolhapur, 416004, M.S., India
[e] Dr. Y. Navale, A. Salunkhe, Prof. V. Patil
Functional Materials Research Laboratory, School of Physical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur, 413255, M.S., India

Supporting information for this article is available on the WWW under https://doi.org/10.1002/slct.202202504

Journal of Electronic Materials
https://doi.org/10.1007/s11664-022-10019-9

ORIGINAL RESEARCH ARTICLE

Mn-Incorporated α-Fe_2O_3 Nanostructured Thin Films: Facile Synthesis and Application as a High-Performance Supercapacitor

Sujit A. Kadam[1] · Yuan-Ron Ma[1] · Yan-Ruei Chen[2] · Yuvraj H. Navale[3] · Amol S. Salunkhe[3] · Vikas B. Patil[3] · Sachin D. Ralegankar[4] · Pravin D. More[4]

Received: 9 June 2022 / Accepted: 3 October 2022

Abstract

Among all the transition metal oxides, iron oxide-based materials are excellent for supercapacitor performance. Here, Mn-incorporated α-Fe_2O_3 (Mn:α-Fe_2O_3) nanostructured thin films (with 3%, 5%, and 7% Mn) are prepared via spray pyrolysis. All the synthesized nanostructured thin films are characterized by x-ray diffraction (XRD), optical study, Fourier transform infrared spectroscopy (FTIR), field emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), and contact angle for the structural, optical, morphological and wettability analysis, respectively. The band gap of Mn:α-Fe_2O_3 nanostructured thin films is tuned by changing Mn concentration. The increasing Mn concentration shifts the valance band edge towards the conduction band edge, reducing the band gap. The linear band gap decrease of 0.44 eV with the addition of Mn concentration, along with the band gap reduction, affects supercapacitive performance. The prepared 7% Mn:α-Fe_2O_3 nanostructured electrode exhibits excellent specific capacitance of 688.6 F g^{-1} at a scan rate of 5 mV s^{-1} in 1 M Na_2SO_4 electrolyte, energy density (6 Wh kg^{-1}), and power density (12 kW kg^{-1}) at a current density of 5 mA g^{-1}.

Keywords Spray pyrolysis technique · Mn:α-Fe_2O_3 nanostructure · contact angle · electrochemical analysis · supercapacitor

Introduction

In recent years, a multiplicity of energy storage devices, viz. capacitors, supercapacitors, and batteries, are accessible in daily life. However, the consequences of such energy storage devices primarily depends not only on the effectiveness but also on the stability of the electrode resources.[1] In pursuit of more advanced storage devices, highly requested research efforts are being made in modern society for effecting large-scale employability in the area of durable energy storage devices. The currently available supercapacitors are the best devices since they act as a bridge between the traditional capacitor and secondary batteries. The supercapacitors are characterized by a high energy density, a long life cycle, excellent rate capabilities, a wide operating temperature range, enhanced safety, efficiency, and good endurance.[2,3] The charge storage mechanisms in supercapacitors are based on two principles: one is the pseudeocapacitor mechanism which relies on reversible redox reaction. The other is the electrostatic adsorption ions at the electrode/electrolyte interface and it possesses low energy density.[1–4] A supercapacitor stores charge at the electrodes; it can be charged and discharged at a higher rate and can undergo longer cycles than a battery.[5] Supercapacitors have the potential to be used in portable electronic devices and power hybrid cars.

A transition metal oxide-based supercapacitor electrode exhibits a specific capacitance that is 10–100 times higher than carbon-based materials.[6] Electrode materials with a large surface area have a high specific capacitance, while nanoscale materials tend to have higher surface area which increases electrode–electrolyte contact and enhances charge transfer reactions. A metal oxide such as iron oxide has been widely used in pigments, catalysts, sensors, environmental pollutant agents, biomedical materials and electrode

✉ Pravin D. More
drpravinmore@gmail.com

1 Department of Physics, National Dong Hwa University, Hualien 97401, Taiwan

2 Department of Engineering and System Science, National Tsing Hua University, Hsinchu, Taiwan

3 Functional Materials Research Laboratory, School of Physical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur 413255, MS, India

4 Department of Physics, Ahmednagar College, Ahmednagar 414001, MS, India

Published online: 27 October 2022

ChemistrySelect

Research Article
doi.org/10.1002/slct.202204750

Chemistry Europe
European Chemical Societies Publishing

www.chemistryselect.org

Influence of the Camphor Sulphonic Acid (CSA) Intercalation on the Micro-structural and Gas Sensing Properties of Polyaniline-CeO_2 Nanohybrid for NH_3 Gas Detection

Reshma N. Dhanawade,[a] Nanasaheb S. Pawar,[a] Manik A. Chougule,[a] Gajanan M. Hingangavkar,[a] Tanaji M. Nimbalkar,[a] Ganesh T. Chavan,[b] Chan-Wook Jeon,[b] and Vikas B. Patil*[a]

Developing a high performance sensing materials operating at room temperature (30 °C) is eminently a challenging task. The facile chemical oxidative polymerization route was employed for the synthesis of PAni-CeO_2 nanohybrids with CSA intercalation (10–50 wt%) on the chains of protonated PAni. The cubic crystal structure of PAni-CeO_2-CSA nanohybrids were revealed by X-ray diffractometry (XRD). Scanning electron microscopy (SEM) and transmission electron microscopy (TEM) were employed for the structural and morphological investigations. X-ray Photoelectron Spectroscopy (XPS) and Raman spectroscopy confirmed the formation of PAni-CeO_2-CSA nanohybrid. The consequences of CSA intercalation on the gas sensing performance of PAni-CeO_2 nanohybrids are explored through custom designed sensing system. The gas sensing investigations revealed that PAni-CeO_2-CSA (50 wt%) nanohybrid exhibited highest response (93%) towards 100 ppm NH_3 at 30 °C. Advantageously, CSA intercalated PAni-CeO_2 nanohybrid gas sensor delivered fast response and quick recovery (8 sec and 482 sec) with admirable stability (84.09%) towards NH_3 at 30 °C.

Introduction

Reproducible, inexpensive and highly active gas sensors are considered significant for versatile applications such as manufacturing, environmental, health and military operations to avoid impending hazards for human being and environment.[1–3] Ammonia (NH_3) is a toxic and combustible contaminant, posturing continuous risks to human health and ecology if it reaches to 25 ppm in 8 hrs.[4] NH_3 spoils the ecosystem because of natural and artificial sources like industrialization,[5] automobile exhaustion[6] and household activities. Therefore, an excessive efforts have been carried out for developing NH_3 gas sensor that is miniaturized, convenient and highly sensitive towards harmful NH_3 gas at room temperature for human being and environmental protection. Many gas sensing materials are available, such as conducting polymers,[7,8] semiconducting metal oxides (SMO)[9,10] and carbon-based materials,[11,12] differ in their behaviors and gas sensing performances. Nowadays, semiconducting metal oxides such as cerium oxide (CeO_2), tungsten oxide (WO_3), iron oxide (Fe_2O_3) and tin oxide (SnO_2) are used in gas sensors because of excellent stability and improved gas sensing properties. Cerium oxide (CeO_2) is n-type semiconductor metal oxide with outstanding electrical conductivity and excellent redox reactions that improve gas sensing characteristics.[13,14] On the other hand, cerium oxide (CeO_2) comprising high operating temperature with heat that induced crystal growth and hazard of explosion, it restricts the practical applications.[15] Conducting polymers are more reliable candidates due to their low price, most significant selectivity, fast response and recovery time at room temperature as compared with metal oxides.[16] Amongst the conducting polymers, PAni is more efficient for revelation of toxic NH_3 gas at 30 °C.[17,18] Moreover, pristine PAni is simple to synthesize and it comprises with distinct molecular structure and excellent stability. But, it has some drawbacks, including low selectivity, long-term stability and extended response and recovery time.[19] The gas sensing performances of cerium oxide and pristine PAni are inconvenient and they constrained by a number of factors. Therefore, for the achievement of excellent gas sensing performance, the composite material comprising with organic and inorganic material properties such as PAni-CeO_2 nanohybrid was synthesized.

In the present research work, CSA intercalated PAni-CeO_2 nanohybrid was synthesized utilizing a facile polymerization process to improve the gas sensitivity, selectivity, stability and response-recovery time.[20,21] The role of CSA is a potential dopant, which increases the conductivity as well as stability of PAni-CeO_2 nanohybrids.[22,23] Therefore, CSA intercalated PAni-CeO_2 nanohybrids delivers excellent gas response towards NH_3 at 30 °C. The related investigations for gas sensors were studied. Navale et.al[22] described the fabrication of CSA (10–50 wt%) intercalated PPy-Fe_2O_3 hybrid nanocomposites for

[a] R. N. Dhanawade, N. S. Pawar, Dr. M. A. Chougule, G. M. Hingangavkar, T. M. Nimbalkar, Prof. Dr. V. B. Patil
Functional Materials Research Laboratory, School of Physical Sciences
Punyashlok Ahilyadevi Holkar Solapur University
413 255 Solapur, Maharashtra, India
E-mail: vbpatil@sus.ac.in
[b] Dr. G. T. Chavan, Prof. C.-W. Jeon
School of Chemical Engineering,
Yeungnum University,
38541 Gyeongsan, Gyeongbuk, Republic of Korea

ScienceDirect

Inorganic Chemistry Communications
Volume 154, August 2023, 110998

Short communication

Nanoarchitectonics of Bi_2CuO_4 electrodes for asymmetric Bi_2CuO_4//AC solid-state device in supercapacitor application

R.G. Bobade, U.T. Nakate, P. Rosaiah, M. Ouladsmane, B.J. Lokhande, R.C. Ambare

Show more

Share Cite

https://doi.org/10.1016/j.inoche.2023.110998
Get rights and content

Abstract

The fashionable investigates the bismuth oxide nano-materials were synthesized using bismuth nitrate as an ingredient. The samples were deposited using the electrodeposition technique via an aqueous route with varying deposition time variations. Prepared samples were annealed at 573K in a muffle furnace. All deposited thin film electrodes were physical and electrochemical characterized via X-ray diffraction (XRD), Field emission scanning electron microscopy (FE-SEM), Elemental mapping, Energy dispersive X-ray spectroscopy (EDX), Contact Angle, X-ray photoelectron spectroscopy (XPS) and supercapacitive measurements. XRD of all deposited samples reveals polycrystalline nature with a tetragonal crystal structure. FE-SEM shows revolutionary morphological images of spruce leaf-like architecture. EDX analysis shows the elemental mapping of the deposited materials. TEM revels the formation of nano granules structures indicating the formation of the crystalline bismuth oxide. XPS confirms the formation of Bi_2CuO_4. All samples show the hydrophilic nature of deposited materials from contact angle. Cyclic voltammetry (CV), Galvanostatic charge--discharge (GCD), and impedance measurements are used to examine the supercapacitive characteristics in an aqueous 1 M KOH electrolyte. All CV curves show mixed capacitive nature. The results of the investigations are highest specific capacitance (SC) of 706.47F/g at a scan rate of 2mV/s was calculated. The specific energy (SE) of 49.89 Wh/kg, and specific power (SP) of 17.51kW/kg were calculated at 40mA/cm^2 current density. The capacitive nature and internal resistance were observed using the Nyquist plot for the optimized electrode which is about 2.11 Ohm. CV, GCD, and impedance measurements are used to characterize the electrochemical parameters of the asymmetric supercapacitor

ES Energy & Environment

DOI : https://dx.doi.org/10.30919/esee8c785

Preparation of Magnesium Oxide (MgO) Thin Films by Spray Pyrolysis and Its Capacitive Characterizations

M. T. Mhetre, H. M. Pathan, A. V. Thakur and B. J. Lokhande*

Abstract

Magnesium oxide (MgO) electrodes for the supercapacitor applications have been prepared using automatic spray pyrolysis technique. 100 ml of 1 M aqueous $Mg(NO_3)_2.6H_2O$ solution was sprayed at 2 ml/min. on to the stainless steel (SS) substrate heated to 673 K. The prepared electrodes were analyzed structurally by X-ray Diffraction (XRD) technique, field emission scanning electron microscope (FESEM) analysis, energy dispersive X-ray analysis (EDX), and contact angle measurement, functional group by Fourier transform infrared spectroscopy (FTIR) analysis and electrochemically by cyclic voltammetric analyses (CV), electrochemical impedance spectroscopy (EIS) and the galvanostatic charge discharge (GCD) technique. Different peaks in XRD pattern coincide with the standard database of JCPDS 01-1235 indicating the formation of MgO. The formation of crystalline MgO has further been corroborated by EDX. The formation of MgO was studied the molecular interactions between the metal, oxygen and carbon elements though FTIR analysis. Peaks in the CV curves confirm the redox behavior of the MgO during the CV. The measured specific capacitance (SC) was as high as 202.36 Fg^{-1}. Superb electrochemical stability is observed at 100 mV/s scan rate. Using GCD analyses show different behavior from the normal capacitors. The charging and discharging times were found nearly same for different applied currents. The observed maximum specific capacitance (SC) was 163.55 Fg^{-1} which is comparable with that obtained by CV.

Keywords: Magnesium Oxide; Spray pyrolysis; Contact angle; Supercapacitive study.

Received: 26 April 2022; Revised: 19 September 2022; Accepted: 15 October 2022

Article type: Communication.

1. Introduction

Climate change and fossil fuel depletion have triggered intense scientific research to explore renewable and sustainable energy Sources; demands from hybrid electric vehicles and pulsed power systems also promote the development of alternative energy.[1-4] The supercapacitor is one of the promising devices to meet the ever-growing need, with its higher energy density than that of common capacitors and better power density than that of batteries.[5] Exploring electrode materials with high specific capacitance (SC) is necessary to improve the energy density of supercapacitors. Carbon materials, conducting polymers and transition metal oxides/ hydroxides with high surface area are commonly used as supercapacitor electrode materials.[3] Carbon based materials (carbon aerogels, carbon nanotubes and graphene)[4-6] as electrode materials for electrical double-layer capacitors have been extensively studied to increase their low SC which directly limited their practical application.[3] Conducting polymers such as polyaniline, polypyrrole, poly(3,4- ethylene dioxy thiophene), etc. have significant drawbacks of low rate of charge–discharge due to slow ion diffusion within the bulk of the electrode.[7] Transition metal oxides[8,9]/hydroxides[9]/sulphides[10] are promising candidates owing to their low environmental toxicity and high SC, which have been widely investigated in an attempt to attain high SC and long cycle life.

Pseudocapacitors/ redox capacitors store the charge via fast faradaic reactions. Redox capacitors are used for high power applications due to quick discharging.[3,11] Variety of materials including not only electrically conducting polymers in pure[12,13] and composite/hybrid forms[14-16] but plenty of transition-metal oxides (TMO). RuO_2,[11] Co_3O_4,[12] Fe_2O_3,[13] NiO,[14] Fe_3O_4,[15] $FeOOH$,[11,16] $Cu(OH)_2$, $NiCo_2O_4$, $MnCo_2O_4$[15-18] *etc.*, are being tested for fabrication of redox capacitors. Ubiquitous need of alternatives for RuO_2 resulted due to high cost and limited sources of Ru. Although, due to large bandgap of MgO (~7.8 eV) the electrochemical charge storage capability of the MgO is quite less. However, even not belonging to the transition metal oxide group, the MgO has been reported for improving the stability of the electrochemical energy storage electrode materials studied by K. Karthikeyan *et al.*[19]. Also, it produces

Lab of electrochemical studies, School of Physical Sciences, P.A.H Solapur University, Solapur

**E-mail:* bjlokhande@yahoo.com (B. J. Lokhande)

Nano-Structures & Nano-Objects 34 (2023) 100964

Contents lists available at ScienceDirect

Nano-Structures & Nano-Objects

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

Intercalation of two-dimensional graphene oxide in WO_3 nanoflowers for NO_2 sensing

Gajanan M. Hingangavkar [a,b], Sujit A. Kadam [c], Yuan-Ron Ma [c], Shrikrishna D. Sartale [d], Ramesh N. Mulik [a], Vikas B. Patil [b,*]

[a] Department of Physics, DBF Dayanand College of Arts & Science, Solapur, (MS), 413002, India
[b] Functional Materials Research Laboratory, School of Physical Sciences, PAH Solapur University, Solapur, (MS), 413255, India
[c] Department of Physics, National Dong Hwa University, Hualien 97401, Taiwan
[d] Department of Physics, Savitribai Phule Pune University, Pune, (MS), 411007, India

ARTICLE INFO

Article history:
Received 14 November 2022
Received in revised form 20 January 2023
Accepted 1 March 2023

Keywords:
WO_3-GO nanohybrid
Hydrothermal
XPS
BET
NO_2 sensor

ABSTRACT

Chemiresistive WO_3-GO (WG) nanohybrid sensors were designed by a cost-effective hydrothermal process. The structure, morphology, composition and surface features of the prepared WG nanohybrids were explored by an array of analytical techniques, such as X-ray diffractometry (XRD), Raman spectroscopy, X-ray photoelectron spectroscopy (XPS), field emission scanning electron microscopy (FESEM), energy dispersive X-ray analysis (EDAX), high-resolution transmission electron microscopy (HRTEM) and Brunauer–Emmett–Teller (BET) surface profiling. The gas sensing performance of the WG nanohybrids reveals that the small amount of GO significantly impacts the sensor performance. The enhanced gas sensing performance of the WG nanohybrid sensor with a GO content of 3 weight% exhibits an excellent response to 100 ppm of NO_2, attaining 239%, which is nearly fourfold higher than that of pristine WO_3 (61%) at 150 °C, and shows outstanding selectivity, reproducibility and stability (84.5%). Impedance spectroscopy was employed to understand the interaction between the NO_2 gas molecules and the WG nanohybrid.

1. Introduction

A rapid economic boom throughout the early decades fueled the speedy increase in global energy consumption. Energy is mainly obtained from the burning of fossil fuels. As a result, the environment gets contaminated with poisonous gases released from burning fossil fuels. Pollutant gases emitted by the combustion of fuels, such as nitrogen dioxide (NO_2), carbon monoxide (CO), hydrogen disulfide (H_2S) and others, pollute the atmosphere. These are harmful to both living organisms and humans. In a short period, exposure to NO_2 ($\geq$ 10 ppm) may lead to fast nasal and throat irritation, as well as edema and distress. NO_2 concentrations exceeding 100 ppm cause death by suffocation when inhaled within a short time frame. Additionally, NO_2 causes photochemical smog, acid rain and accelerates microscopic particle formation. Thus, for environmental and health monitoring, cost-effective and simple chemiresistive sensors with outstanding NO_2 sensing capability are of the utmost importance [1–4].

Transition metal oxides, such as WO_3, TiO_2, SnO_2, ZnO, and Fe_2O_3 [5,6], have been extensively studied in the last few decades for NO_2 detection because of their semiconducting nature. Y.H. Navale et al. have reported a CuO nanocube sensor for NO_2 detection using the thermal evaporation technique [2]. Lizhai Zhang et al. have worked on a CeO_2/Graphene heterostructure for NO_2 sensing using a hydrothermal approach [1]. Hongwen Zhang et al. have explored WO_3 decorated using Au nanoparticles for the selective detection of NO_2 gas [4]. Shibin Sun et al. have synthesized nanocomposites of graphene nanoplatelets and $WO_3 \cdot H_2O$ using a simple precipitation method [7]. WO_3 nanoflowers (NFs) are 3D nanostructures [8–17] with an ability to detect NO_2 gas that have been extensively investigated over a few decades, attributable to their low cost, excellent chemical stability, crystal structures and superior sensitivity. It is recognized that the effect of gas-sensing of WO_3 NFs is initiated after the interaction among oxygen ionic species (O^{2-}, O_2^- and O^-) adsorbed on the nanostructured surfaces and the gas molecules [7,18].

The inherent properties of WO_3 NFs, such as absorption of low visible light and fast recombination of carriers, reduce its utility in some applications, such as photocatalysis and gas sensing. We can straightforwardly overcome the shortcomings of pristine WO_3 NFs by hybridization with nanomaterials of the carbon family (carbon nanotubes and graphene) to improve their performance [19,20]. Graphene oxide (GO) is the most impressive graphene-based structure, because of its exclusive surface

* Corresponding author.
E-mail address: vbpatil@sus.ac.in (V.B. Patil).

https://doi.org/10.1016/j.nanoso.2023.100964
2352-507X/

RETURN TO ISSUE

< PREV **BATTERIES AND ENERGY...** NEXT >

Hydrous and Amorphous Cobalt Phosphate Thin-Film Electrodes Synthesized by the SILAR Method for High-Performing Flexible Hybrid Energy Storage Devices

Vinod V. Patil, Sachin S. Pujari, Shraddha B. Bhosale, Sambhaji S. Kumbhar, Vinayak G. Parale, Jayavant L. Gu… okhande, Mukund G. Mali, Dattakumar S…

Sachin S. Pujari

Centre for Interdisciplinary Research (CIR), D. Y. Patil Education Society (Deemed to be University), Kolhapur416006, India

More by Sachin S. Pujari

Cite this: *Energ…*
Publication Date: …
https://doi.org/10.…

SI Supporting Info (1) »

SUBJECTS: Capacitors, Cobalt, Electrical properties, Electrodes, Phosphates

Polycyclic Aromatic Compounds ›
Volume 43, 2023 - Issue 7

Research Articles

A Novel Recyclable Bi-Mg-O Composite Nano-Catalyst Promoted Rapid and Efficient Synthesis of Spirooxindole and 4H-Pyran Derivatives

Abhijeet Mulik, Vishvanath Ghanwat, Mukund Mali, D.-Y. Kim, Dae Sung Lee, ...s

b Department of Chemistry, Yashwantrao Chavan Institute of Science, Satara, India

View further author information

Pages 6665-6678 | Receiv... e: 25 Sep 2022

Abstract

A novel Bi-Mg-O composite nano-catalyst was prepared by using $Bi(NO_3)_3$ and nano-MgO. Prepared catalyst was characterized using x-ray diffraction (XRD) analysis, scanning electron microscope (SEM), X-ray photoelectron spectroscopy (XPS) technique which confirms its nano-crystalline nature and composition. The synthesized novel catalyst Bi-Mg-O was found to be competent catalyst for the s...hesis of spirooxindole derivatives by multicomponent reaction of isatin, ...done, malononitrile and 4H-pyran derivatives by reaction of dimedone, aryl

ScienceDirect

Colloids and Surfaces A: Physicochemical and Engineering Aspects

Volume 662, 5 April 2023, 130974

Multifunctional polyoxotungstocobaltate anchored fern-leaf like $BiVO_4$ microstructures for enhanced photocatalytic and supercapacitive performance

Gopal Mali [a], Laxman Walekar [b], Nagesh Kolhe [b], Abhijit N. Kadam [c f], Rohan Kore [d], Dattakumar Mhamane [e], Harichandra Parbat [f], Sang-Wha Lee [c], Balkrishna Lokhande [d], Vaishali Patil [g], Gavisiddapa Gokavi [a], Mukund Mali [b]

Show more

https://doi.org/10.1016/j.colsurfa.2023.130974

Get rights and content

Abstract

In this study, a simple sonochemical approach for molecular anchoring of $CoW_{12}O_{40}$ [12-tungstocobaltate (II)] on fern-leaf like $BiVO_4$ microstructures was employed. The various compositions were prepared by varying contents (0.5%, 1%, 1.5%, 2% and 5%) of $CoW_{12}O_{40}$ (hereafter denoted as CoWO). The as-synthesized samples were characterized and confirmed by various physicochemical tools. Furthermore, the performance of resulting composites was tested toward visible light driven photocatalytic treatment of organic pollutants and supercapacitor. Among them, 1CoWO/BVO composites showed optimal performance as compared to other composites and bare fern-leaf like $BiVO_4$. To be specific, the photocatalytic performance of 1CoWO/BVO showed 97% and 78% degradation of methylene blue dye (MB) and tetracycline drug (TC), respectively. Additionally, the reusability of optimal 1CoWO/BVO photocatalyst was confirmed by performing its five consecutive runs towards degradation of MB and TC. Moreover, 1CoWO/BVO electrode yielded the specific capacitance of $245\,Fg^{-1}$ at 2 mV/s scan rate, supporting its applicability as an efficient supercapacitor electrode. The synergistic effect of CoWO and $BiVO_4$ dominated their bare counterparts towards photocatalytic as well as electrochemical performance. Thus, this work rationally opens up the avenues to employ POMs based novel hybrid materials for future environmental and energy storage application.

Graphical Abstract

ScienceDirect

Case Studies in Chemical and Environmental Engineering

Volume 8, December 2023, 100380

Case Report

Surface plasmon resonance based colorimetric probe for vitamin B_1 detection: Applications to bio-fluid analysis

Uttam R. Kondekar [a], Laxman S. Walekar [b], Samadhan P. Pawar [a c], Mukund G. Mali [b], Dilip D. Anuse [d], Chandrakant G. Gardi [e], Shamkumar Deshmukh [f], Prashant V. Anbhule [a], Govind B. Kolekar [a]

Show more

https://doi.org/10.1016/j.cscee.2023.100380

Abstract

This study reports simple analytical approach for thiamine (Vitamin B_1) detection based on induced aggregation and alternation in colorimetric properties of gold nanoparticles (AuNPs), which was synthesized through citrate reduction approach. Furthermore, the citrate capped AuNPs are characterized by various analysing tools. The addition of thiamine persuades the aggregation of citrate-AuNPs and further leading to red to blue colour transition with decrease in absorbance intensity. The proposed method achieves good linearity with a correlation coefficient of 0.9843. By using our proposed strategy, thiamine was detected by unassisted vision as well as absorption spectroscopy. Under the most favorable condition method achieves good linear relationship between concentration range 0.01–0.8 $\mu g mL^{-1}$ with limit of detection of 0.0067 $\mu g mL^{-1}$. Under the premium condition, the method offers excellent selectivity towards thiamine detection in presence of different interfering species. Further practical applicability of the method was checked by using blood serum and urine sample via standard addition method. The obtained recoveries were acceptable in the range of 98.70–102.97% for added thiamine concentration. Thus, the proposed method may emerge as a target specific and highly sensitive tool towards thiamine detection.

Previous Next

Keywords

Gold nanoparticles; Thiamine; Aggregation; Colour change; Bio-fluids; SPR; Absorption

1. Introduction

Vitamins are one of the most required micronutrient for human body to work properly. Anabolic processes do not produce some vitamins, food and medicines are good candidate to provide it [1]. B complex is a combination of Vitamin B_1, B_6 and B_{12} and important participant in various functions of metabolism and excess or deficiency of

ScienceDirect

Journal of Molecular Structure

Volume 1261, 5 August 2022, 132903

3-Substituted-2-oxindole derivatives: Design, synthesis and their anti-tuberculosis and radical scavenging dual-action studies

Mahesh Hublikar [a], Vikas Kadu [a], Dattatraya Raut [a], Sachin Shirame [a], Sivaraj Anbarasu [b], Muhanna K. Al-Muhanna [c], Parameshwar Makam [d e], Raghunath Bhosale [a]

Show more

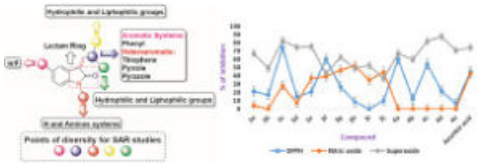
https://doi.org/10.1016/j.molstruc.2022.132903

Get rights and content

Abstract

Despite the fact that the oxindole has long been thought to be the best structural scaffold, research shows that oxindole derivatives are being studied the least against tuberculosis (TB), a historically airborne illness. The present research focuses on the development of 3-substituted-2-oxindole derivatives with a combination of structural and functional alterations in order to create dual-active new chemical entities with anti-TB, anti-oxidant, and radical-scavenging properties. The physicochemical properties of these compounds are in line with the theories of Lipinski, Veeber, and Leeson. SWISSADME was used to assess the drug-like molecular nature and pharmacokinetics features. Multistep synthetic procedures were used to synthesise the chemicals. Based on *in vitro* anti-TB and radical scavenging property analyses, the synthesised 3-substituted-2-oxindole derivatives were confirmed as dual-active compounds. The synthesised 3-substituted-2-oxindole derivatives were confirmed to possess the dual therapeutics action. The discovery of radical scavengers **4d, 4a, 4c, 3d, 3c, 3f, 3e, 3h, 3g,** and **3j** that are more potent than Ascorbic acid, the standard. The molecules, **3c, 3j, 3b,** and **4b** have exhibited moderate to active anti-TB properties with a % reduction values of 46.42%, 40.89%, 39.76% and 39.32%, respectively. The findings suggest that fine-tuning molecules might result in compounds with better anti-TB and radical-scavenging properties.

Graphical abstract



Download : Download high-res image (117KB)

Download : Download full-size image

Polycyclic Aromatic Compounds ›
Volume 42, 2022 - Issue 7

Research Articles

Green Synthesis, Molecular Docking, *In Silico* ADME and Biological Evaluation of Methoxy Substituted 1,5-Benzodiazepines as Potential Antioxidant, Anti-Inflammatory, and Antidiabetic Agents

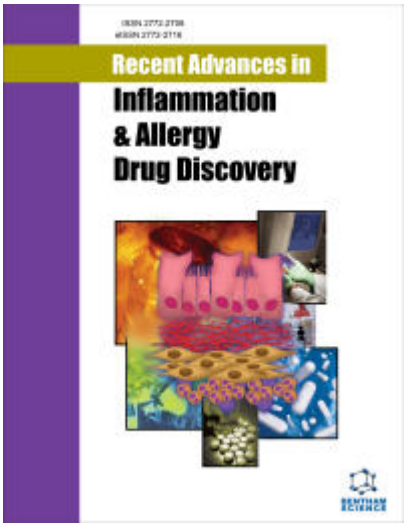
Nargisbano A. Peerzade, **Shravan Y. Jadhav**, Bhushan D. Varpe, Amol A. Kulkarni & Raghunath B. Bhosale

Pages 3939-3952 | Received 23 Mar 2020, Accepted 12 Jan 2021, Published online: 08 Feb 2021

Cite this article https://doi.org/10.1080/10406638.2021.1878244 Check for updates

Abstract

Present work involves the green and environmentally benign synthesis of 1,5-benzodiazepines using iodine as a catalyst and PEG-400 as a green solvent at room temperature that gives an excellent yield of products. All the synthesized compounds were screened for their anti-inflammatory, antioxidant, and antidiabetic activity. All the synthesized compounds showed excellent antioxidant activity against DPPH and



Syntheses, Molecular Docking and Biological Evaluation of 2-(2- hydrazinyl)thiazoles as Potential Antioxidant, Anti-Inflammatory and Significant Anticancer Agents

Authors: Raut, Dattatraya G.; Bhosale, Raghunath B.; Lawand, Anjana S.; Hublikar, Mahesh G.; Kadu, Vikas D.; Patil, Sandeep B.; Choudhari, Prafulla B.
Source: Recent Advances in Inflammation & Allergy Drug Discovery, Volume 16, Number 2, 2022, pp. 96-106(11)
Publisher: Bentham Science Publishers
DOI: https://doi.org/10.2174/2772270816666220902094019

Abstract | References | Citations | Supplementary Data

Background: Recently, researchers have worked on the development of new methods for the synthesis of bioactive heterocycles using polyethylene glycol as a green solvent. In this context, we report the synthesized 2-(2-hydrazinyl) thiazoles for their in vitro antioxidant, in vitro anti-inflammatory and in vitro anti-cancer activities.

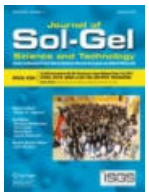
Objective: The objective of the study was to develop novel antioxidant, anti-inflammatory and anti-cancer drugs.

Methods: At the outset, the condensation of substituted acetophenones 1, thiosemicarbazide 2, and α-haloketones 3 was carried out using PEG-400 (20 mL) in the presence of 5 mol% glacial acetic acid to afford thiosemicarbazones intermediate. Furthermore, these thiosemicarbazones were reacted with α-haloketones 3 to obtain appropriate 2-(2-hydrazinyl) thiazoles. The synthesized compounds were in vitro tested for their antioxidant, anti-inflammatory, and anti-cancer activity.

Effect of embedding aluminium and yttrium on the magneto-optic properties of lanthanum spinel ferrite nanoparticles synthesised for photocatalytic degradation of methyl red

Original Paper: Nano-structured materials (particles, fibres, colloids, composites, etc.)
Published: 08 October 2022

Volume 104, pages 354–364, (2022) Cite this article



Subiya K. Kazi, Radhakrishnan M. Tigote, Vandana A. Gaikwad, Dhanraj P. Kamble, Pravin S. Bhale, Sadanand N. Shringare, Pramod G. Musrif & Shaukatali N. Inamdar

Abstract

The sol-gel approach was used to synthesise lanthanum and aluminium doped yttrium ferrite nanoparticles. The absorption peak is observed at ~265 nm corresponds to band gap of 2.9–3.1 eV. X-ray diffraction (XRD), field emission scanning electron microscopy (FE-SEM) and High-Resolution Transmission Electron Microscopy (HR – TEM) were used to analyse the structural and microstructural properties of the product. The particle size calculated to be 60–110 nm from the HR-TEM analysis. The vibrating sample

ScienceDirect

Journal of Molecular Structure

Volume 1261, 5 August 2022, 132903

3-Substituted-2-oxindole derivatives: Design, synthesis and their anti-tuberculosis and radical scavenging dual-action studies

Mahesh Hublikar [a], Vikas Kadu [a], Dattatraya Raut [a], Sachin Shirame [a], Sivaraj Anbarasu [b], Muhanna K. Al-Muhanna [c], Parameshwar Makam [d e], Raghunath Bhosale [a]

Show more

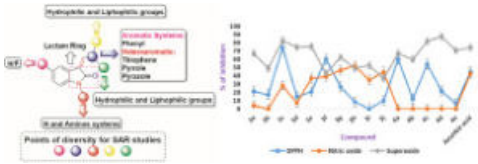
https://doi.org/10.1016/j.molstruc.2022.132903

Get rights and content

Abstract

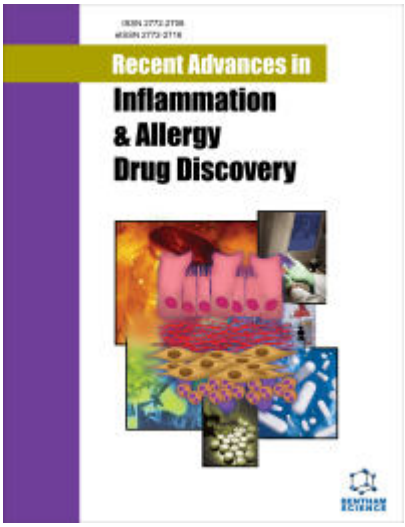
Despite the fact that the oxindole has long been thought to be the best structural scaffold, research shows that oxindole derivatives are being studied the least against tuberculosis (TB), a historically airborne illness. The present research focuses on the development of 3-substituted-2-oxindole derivatives with a combination of structural and functional alterations in order to create dual-active new chemical entities with anti-TB, anti-oxidant, and radical-scavenging properties. The physicochemical properties of these compounds are in line with the theories of Lipinski, Veeber, and Leeson. SWISSADME was used to assess the drug-like molecular nature and pharmacokinetics features. Multistep synthetic procedures were used to synthesise the chemicals. Based on *in vitro* anti-TB and radical scavenging property analyses, the synthesised 3-substituted-2-oxindole derivatives were confirmed as dual-active compounds. The synthesised 3-substituted-2-oxindole derivatives were confirmed to possess the dual therapeutics action. The discovery of radical scavengers **4d, 4a, 4c, 3d, 3c, 3f, 3e, 3h, 3g,** and **3j** that are more potent than Ascorbic acid, the standard. The molecules, **3c, 3j, 3b,** and **4b** have exhibited moderate to active anti-TB properties with a % reduction values of 46.42%, 40.89%, 39.76% and 39.32%, respectively. The findings suggest that fine-tuning molecules might result in compounds with better anti-TB and radical-scavenging properties.

Graphical abstract



Download : Download high-res image (117KB)

Download : Download full-size image



Syntheses, Molecular Docking and Biological Evaluation of 2-(2- hydrazinyl)thiazoles as Potential Antioxidant, Anti-Inflammatory and Significant Anticancer Agents

Authors: Raut, Dattatraya G.; Bhosale, Raghunath B.; Lawand, Anjana S.; Hublikar, Mahesh G.; Kadu, Vikas D.; Patil, Sandeep B.; Choudhari, Prafulla B.
Source: Recent Advances in Inflammation & Allergy Drug Discovery, Volume 16, Number 2, 2022, pp. 96-106(11)
Publisher: Bentham Science Publishers
DOI: https://doi.org/10.2174/2772270816666220902094019

Abstract | References | Citations | Supplementary Data

Background: Recently, researchers have worked on the development of new methods for the synthesis of bioactive heterocycles using polyethylene glycol as a green solvent. In this context, we report the synthesized 2-(2-hydrazinyl) thiazoles for their in vitro antioxidant, in vitro anti-inflammatory and in vitro anti-cancer activities.

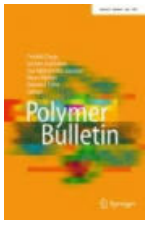
Objective: The objective of the study was to develop novel antioxidant, anti-inflammatory and anti-cancer drugs.

Methods: At the outset, the condensation of substituted acetophenones 1, thiosemicarbazide 2, and α-haloketones 3 was carried out using PEG-400 (20 mL) in the presence of 5 mol% glacial acetic acid to afford thiosemicarbazones intermediate. Furthermore, these thiosemicarbazones were reacted with α-haloketones 3 to obtain appropriate 2-(2-hydrazinyl) thiazoles. The synthesized compounds were in vitro tested for their antioxidant, anti-inflammatory, and anti-cancer activity.

Room-temperature ammonia gas sensor based on carboxylic acid-doped polyaniline

Original Paper Published: 04 April 2022

Volume 80, pages 3183–3195, (2023) Cite this article



Polymer Bulletin

Aims and scope

Submit manuscript

Renukacharya G. Khanapure, Anil A. Ghanwat, Sharad K. Awate, Uttam S.Gawali, Rajesh J. Kavade, Pravin H. Salunkhe & Suresh V. Patil

Abstract

Polyaniline films modified by carboxylic acid dopents have been formed by in situ chemical oxidative polymerization using ammonium persulfate as an oxidizing agent and investigated for NH_3 gas sensor. We demonstrate that butyric acid-doped polyaniline (BPANI) film is highly selective to NH_3 with high selectivity (513% at 100 ppm), fast response time (8.94 s). Furthermore, good reproducibility was also observed at 100 ppm. The room-temperature functioning of the sensor is critical, which facilitate low-power operation and also enhances the life time of the sensor. The results indicate that the carboxylic acid-doped polyaniline films are promising for NH_3 gas detection.

ScienceDirect

Journal of Molecular Structure

Volume 1299, 5 March 2024, 137173

High-performance supercapacitive polyazomethines: Room temperature synthesis and their characterizations

Amburaya S. Birajdar [a], Shailesh G. Pawar [b], Anil A. Ghanwat [c], Vijaykumar P. Ubale [a]

Show more

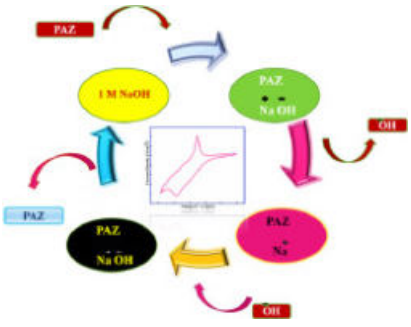
https://doi.org/10.1016/j.molstruc.2023.137173

Get rights and content

Abstract

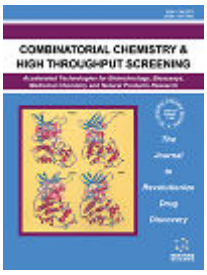
A room temperature synthesized polyazomethine (PAZ) series via polycondensation route comprising monomer as 5-[4-(5-formylfuran-2-yl)phenyl]furan-2-carbaldehyde (III) and various diamines to engineer PAZ-1 to PAZ-5 polymers. Physico-chemical properties of as-prepared PAZ series have confirmed by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), energy dispersive X-ray analysis (EDAX), transmission electron microscopy (TEM) and spectroscopic techniques. In FTIR, –CH=N– peak at 1600 cm^{-1} attributed to the successful conversion of dicarbaldehyde (III) and diamines into polyazomethine. The amorphous nature of PAZ series is depicted by XRD diffractograph. The marigold like morphology of polyazomethines has revealed in FESEM and TEM images. The chemical composition and elemental distribution on PAZ surface has mapped using EDAX technique. The electrochemical activity of as-prepared polyazomethine electrodes has investigated by cyclic voltammetry (CV), galvanostatic charge discharge (GCD) and electrochemical impedance spectroscopy (EIS) techniques. The supercapacitive performance of PAZ-1 to PAZ-5 electrodes in various electrolytes as NaOH, KOH, Na_2SO_4, and LiCl by varying concentrations, the PAZ-2 electrode exhibits elevated specific capacitance (C_p) of 831 Fg^{-1}, specific energy (SE) 22.99 $Whrkg^{-1}$, specific power (SP) 82.87 $KWkg^{-1}$ in optimum 1 M NaOH electrolyte. The distinguished PAZ-2 electrode after successive 500 cycles has delivered exceptional stability, 71.65% in 1 M NaOH.

Graphical Abstract



Download : Download high-res image (118KB)

Download : Download full-size image



Synthesis of Novel Hydrazones of Levofloxacin Related Molecule and their In Vitro Evaluation as Antioxidant, and Molecular Docking Studies

Authors: Kashid, Bharat B.; Kilbile, Jaydeo T.; Wani, Kishor D.; Pawar, Suhas. M.; Khedkar, Vijay M.; Ghanwat, Anil A.
Source: Combinatorial Chemistry & High Throughput Screening, Volume 25, Number 2, 2022, pp. 274-283(10)
Publisher: Bentham Science Publishers
DOI: https://doi.org/10.2174/1386207323666201229150734

Abstract | References | Citations | Supplementary Data

Objective: The research work aims to synthesize novel series of hydrazones and antioxidant screening. It also aims to evaluate the binding affinities and in silico methods for identifying possible drug targets of synthesized compounds.

Methods: This report briefly explains the synthesis of a novel series of hydrazones. It was synthesized via. hydrazinolysis of esters to obtain hydrazide, treated with aldehyde and acetophenone to get hydrazones. The spectral confirmed hydrazones exhibited excellent to comparable anti-oxidant as compared to the standard drugs Butylated hydroxytoluene (BHT) and Ascorbic acid. Molecular docking on myeloperoxidase (MPO) demonstrated the ability of this scaffold to correctly recognize the target and engage in significant bonded and non-bonded interactions with key residues therein.

Results and Discussion: In this study, we report effectively synthesized compounds BK-35, BK- 41, BK-26, BK-28, and BK-39 that showed the best DPPH radical scavenging activity. The docking results clearly showed the binding mode of hydrazones into the active site of Myeloperoxidase (MPO). In in-silico results, none of the synthesized compounds, BK-24 to BK- 41, violated Lipinski's rule of five (miLog P ≤ 5).

Conclusions: In vitro preliminary anti-oxidant screening results in support by in Silico binding affinity data of novel hydrazones of levofloxacin related molecules BK-24 to BK-41 reported here have emerged as excellent anti-oxidant agents. The inference derived from the in vitro anti-oxidant screening data and the quantitative insights derived from the per-residue interaction analysis with MPO enzyme are now being fruitfully utilized for site-specific mutation around the nucleus to identify selective and potent anti-oxidants.

ScienceDirect

Journal of Trace Elements and Minerals

Volume 2, December 2022, 100026

Development of new efficient and cost effective liquid-liquid extractive determination method for cobalt(II): Analysis of water, alloys and nano powder

Ashwini V. Sadlapurkar [a b], Umesh B. Barache [b c], Abdul B. Shaikh [b], Anjana S. Lawand [c], Shashikant H. Gaikwad [b], Tukaram N. Lokhande [b]

Show more

Outline | Share Cite

https://doi.org/10.1016/j.jtemin.2022.100026

Get rights and content

Abstract

Background

The renowned biological role of cobalt is it is main component of vitamin B12, however other cobalt compounds have been listed as toxic for the environment as well as to human.

Methods

Various samples from different sources are analyzed for their cobalt(II) content by extraction followed by UV–visible spectrophotometry and compared with atomic absorption spectrophotometry.

Results

In this article, the chromogenic reagent 2-chlorobenzaldehyde thiocarbohydrazone is introduced for extractive spectrophotometric determination of cobalt(II) from various samples. This reagent forms yellow colored 1:2:2 [Co(II)–2CBTCH–iodide] complex in dichloromethane which was extracted from an acetate buffer having pH of 4.2 in presence of potassium iodide solution which was stable up to 48 h. The absorbance of the complex exhibit peak absorbance at 400 nm. The present technique was optimized for numerous influences and the interference of other ion has also been cautiously studied. The calculated values of molar absorptivity and Sandell's sensitivity of the complex are found to be 0.3006×10^4 mol^{-1} cm^{-1} and 0.0196 μg cm^{-2} respectively. The technique conforms Beer's law up to 13 μg mL^{-1} with 0.999 correlation coefficient of the [Co(II)–2CBTCH–iodide] complex, which specifies linearity between the two variables. For five replicate determinations (n=5), the relative standard deviation was 1.18 with the regression equations as y=0.0672 x+0.01 with R^2=0.999 as the correlation coefficient. The recovery percentages were warranted the accuracy and found around 99.0%.

Conclusion

In Vitro Anticancer Screening, Molecular Docking and Antimicrobial Studies of Triazole-Based Nickel(II) Metal Complexes

by

Sachin A. Deodware (https://sciprofiles.com/profile/1704715?utm_source=mdpi.com&utm_medium=website&utm_campaign=ava
[1,2],

Umesh B. Barache (https://sciprofiles.com/profile/1672219?utm_source=mdpi.com&utm_medium=website&utm_campaign=avata
[3] **(https://orcid.org/0000-0001-7046-3164)**,

Pratibha C. Dhale (https://sciprofiles.com/profile/author/UjBsYWR2RVMycVUxbllrd2o4K0cwL05uaUtzQjdlZlgvT0NGbjVXUk1Qcz0
[2],

Kundalkesha D. Gaikwad (https://sciprofiles.com/profile/author/VHd6b1daSVBlMUY3Wnc5ckorZys2VmFUaldDUUE0NnA0UTQ0M
[2],

Chandan Shivamallu (https://sciprofiles.com/profile/359968?utm_source=mdpi.com&utm_medium=website&utm_campaign=avat
[4] **(https://orcid.org/0000-0002-1886-139X)**,

Panchsheela A. Ubale (https://sciprofiles.com/profile/1268568?utm_source=mdpi.com&utm_medium=website&utm_campaign=av
[5],

Ali A. Shati (https://sciprofiles.com/profile/1935807?utm_source=mdpi.com&utm_medium=website&utm_campaign=avatar_name
[6],

Mohammad Y. Alfaifi (https://sciprofiles.com/profile/918505?utm_source=mdpi.com&utm_medium=website&utm_campaign=avat
[6] **(https://orcid.org/0000-0003-4310-3539)**,

Serag Eldin I. Elbehairi (https://sciprofiles.com/profile/633453?utm_source=mdpi.com&utm_medium=website&utm_campaign=av
[6,7] **(https://orcid.org/0000-0003-4680-3215)**,

Raghu Ram Achar (https://sciprofiles.com/profile/1733646?utm_source=mdpi.com&utm_medium=website&utm_campaign=avata
[8] **(https://orcid.org/0000-0001-8196-3703)**,

Ekaterina Silina (https://sciprofiles.com/profile/1021099?utm_source=mdpi.com&utm_medium=website&utm_campaign=avatar_
[9] **(https://orcid.org/0000-0002-0246-5149)**,

Victor Stupin (https://sciprofiles.com/profile/3104125?utm_source=mdpi.com&utm_medium=website&utm_campaign=avatar_nar
[9],

Juan Frau (https://sciprofiles.com/profile/380508?utm_source=mdpi.com&utm_medium=website&utm_campaign=avatar_name)
[10] **(https://orcid.org/0000-0003-2562-9975)**,

Norma Flores-Holguín (https://sciprofiles.com/profile/31710?utm_source=mdpi.com&utm_medium=website&utm_campaign=ava
[11] **(https://orcid.org/0000-0002-4836-233X)**,

Shashikant H. Gaikwad (https://sciprofiles.com/profile/1704716?utm_source=mdpi.com&utm_medium=website&utm_campaign=
[2,*] **(mailto:rasayanshg@gmail.com)**,

Shiva Prasad Kollur (https://sciprofiles.com/profile/457753?utm_source=mdpi.com&utm_medium=website&utm_campaign=avata
[12,*] **(mailto:shivachemist@gmail.com)** **(https://orcid.org/0000-0003-3914-3933)** and

Daniel Glossman-Mitnik (https://sciprofiles.com/profile/author/NjNSdlAxOGVnZW5KUlErQUdqNUxZbi9pWFQwcDlMYURZWHQ3M
[11] **(https://orcid.org/0000-0002-9583-4256)**

[1] Arts, Science and Commerce College, Naldurg, Osmanabad 413 602, Maharashtra, India

[2] Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Solapur 413 411, Maharashtra, India

[3] School of Chemical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur 413 255, Maharashtra, India

[4] Department of Biotechnology and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, Karnataka, India

[5] Department of Chemistry, N. K. Orchid College of Engineering and Technology, Solapur 413 002, Maharashtra, India

[6] Biology Department, Faculty of Sciences, King Khalid University, Abha 61421, Saudi Arabia

[7] Cell Culture Lab, Egyptian Organization for Biological Products and Vaccines (VACSERA Holding Company), 51 Wezaret El-Zeraa St., Agouza, Giza 12311, Egypt

[8] Division of Biochemistry, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, Karnataka, India

[9] Department of Hospital Surgery, N.I. Pirogov Russian National Research Medical University (RNRMU), 117997 Moscow, Russia

[10] Departament de Química, Facultat de Ciènces, Universitat de les Illes Balears, E-07122 Palma de Mallorca, Spain

+ **Show full affiliation list**

[*] Authors to whom correspondence should be addressed.

Molecules **2022**, *27*(19), 6548; **https://doi.org/10.3390/molecules27196548 (https://doi.org/10.3390/molecules27196548)**

Submission received: 8 September 2022 / Revised: 27 September 2022 / Accepted: 29 September 2022 / Published: 3 October 2022

(This article belongs to the Special Issue **Chemistry of Nitrogen Heterocyclic Compounds (/journal/molecules/special_issues/nitrogen_heterocycl_compd)**)

ScienceDirect

Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy

Volume 285, 15 January 2023, 121918

Analytical optimization of liquid–liquid extractive spectrophotometric assessment protocol for tetravalent platinum: Analysis of environmental samples and cisplatin

Abdul B. Shaikh [a], Umesh B. Barache [a b], Anjana S. Lawand [b], Ganesh S. Kamble [c d], Muddsar L. Gaur [e], Shashikant H. Gaikwad [a]

Show more

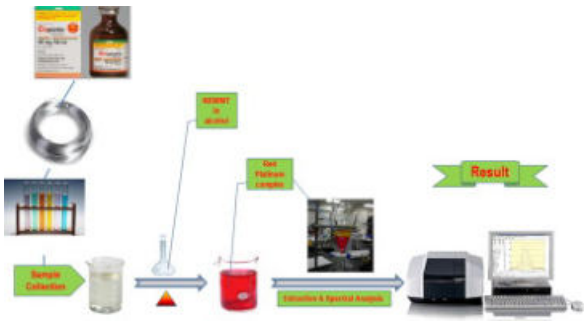
https://doi.org/10.1016/j.saa.2022.121918

Get rights and content

Abstract

An easy and reliable method is optimized for extractive spectrophotometric assessment of platinum(IV) with 4-(4′-nitrobenzylideneimino)-3-methyl-5-mercapto-1,2,4-triazole as an extractant. The basis of this method is the formation of red platinum(IV) complex with the above reagent in acetate buffer medium (pH 5.0) and extraction in chloroform. Good linearity with regression equation as $y=1.011\times10^{4}\times+0.002$ having correlation coefficient (R^2) of 0.998 over concentration up to 17.5μgmL^{-1} of platinum(IV) was achieved with apparent molar absorptivity of 1.011×10^{4} L mol^{-1} cm^{-1}. The limit of detection (0.22μgmL^{-1}), limit of quantification (0.73μgmL^{-1}) and Sandell's sensitivity (0.0193μgcm^{-2}) were also estimated. The interference of various cations was removed by using proper masking agents and consequently by using EDTA and citrate to mask certain transition metals, the method becomes highly specific for platinum(IV), including the effects of platinum group metals. The method is effectively used for determination of platinum(IV) from environmental and real samples such as alloys, catalysts, thermocouple wire and pharmaceutical sample.

Graphical abstract



Download : Download high-res image (112KB)

ScienceDirect

Chemosphere

Volume 323, May 2023, 138067

Potential arsenic–chromium–lead Co-contamination in the hilly terrain of Arunachal Pradesh, north-eastern India: Genesis and health perspective

Ritusmita Goswami [a], Chandrashekhar Bhagat [b f], Igo Lollen [c], Nikita Neog [a], Umesh B. Barache [d], Ritu Thakur [e], Jurgen Mahlknecht [g], Manish Kumar [f g]

Show more

https://doi.org/10.1016/j.chemosphere.2023.138067

Get rights and content

Abstract

In the recent times, multi-metal co-contamination in the groundwater of various parts of the globe has emerged as a challenging environmental health problems. While arsenic (As) has been reported with high fluoride and at times with uranium; and Cr & Pb are also found in aquifers under high anthropogenic impacts. The present work probably for the first time traces the As–Cr–Pb co-contamination in the pristine aquifers of a hilly terrain that are under relatively less stress from the anthropogenic activities. Based on the analyses of twenty-two (n=22) groundwater (GW) samples and six (n=6) sediment samples, it was found that Cr being leached from the natural sources as evident from 100% of samples with dissolve Cr exceeding the prescribed drinking water limit. Generic plots suggests rock-water interaction as the major hydrogeological processes with mixed Ca^{2+}-Na^{+}-HCO_3^{-} type water. Wide range of pH suggests localized human interferences, as well as indicative of both calcite and silicate weathering processes. In general water samples were found high only with Cr and Fe, however all sediment samples were found to contain As–Cr–Pb. This implies that the groundwater is under-risk of co-contamination of highly toxic trio of As–Cr–Pb. Multivariate analyses indicate that the changing pH as the causative factor for Cr leaching into the groundwater. This is a new finding for a pristine hilly aquifers, and we suspect such condition may also be present in other parts of globe, and thus precautionary investigations are needed to prevent this catastrophic situation to arise, and to alert the community in advance.

Graphical abstract

Print ISSN : 2277 - 7830 Online ISSN : 2348 - 5922 indexed with J Gate,i scholar and Google scholar
IBMRD's Journal of Management & Research
Biannual Peer reviewed Blind fold Journal

Cyber Security Awareness: A Movement of Digital Literacy Towards making of Digital India

Dr. Shriram D. Raut [1*], Dr. Ashok R. Shinde [2], Dr. M. K. Patil [3]

Affiliations

1. School of Computational Sciences, P. A. Holkar Solapur University, Solapur, India
2. School of Computational Sciences, P. A. Holkar Solapur University, Solapur
3. Bharati Vidyapeeth, AKIMSS, Solapur, India

DOI: 10.17697/ibmrd/2022/v11i2/172617

Punyashlok Ahilyadevi Holkar Solapur University

Solapur Pune National Highway
Kegaon
Solapur

Consultancy Charges School of Allied Health Sciences

Ledger Account

1-Apr-2022 to 31-Mar-2023

Date		Particulars	Vch Type	Vch No.	Debit	Credit
5-8-2022	Dr	**Central Bank of India NEFT A/c No. 3177057679** *UTR No - BD22071278613618 Dt - 12/07 /2022*	**Receipt**	8589		10,000.00
10-8-2022	Cr	**(as per details)** **Kane Manali -Payable** **Shri Gardi Chandrakant Gopal -Payable** **Ghorpade Sujay Annaso -Payable** **Dr.Jagtap Abhijit Hanumant -Payable** *Being Amount Credited Against Consultancy Charges*	**Journal** **2,500.00 Cr** **2,500.00 Cr** **2,500.00 Cr** **2,500.00 Cr**	923	10,000.00	
					10,000.00	**10,000.00**

Application No.	Last Name	First Name	Middle Name	Background	Year	College	Mobile	Email	Gender	SIP Centre	Learning Goal
2022/SIP/1226	GUPTA	SUMEDHA		MBBS	1st	RGMC Thane	9873945500	guptasumedha.75@gmail.com	F	PAHSUS	BIOSTATISTICS
2022/SIP/1243	KUMARI	KHUSHBU	KRISHNA KUMAR	MBBS	3rd	NKP Salave Nagpur	7387321872	khushbukumari180598@gmail.com	F	PAHSUS	BIOSTATISTICS
2022/SIP/413	BHUSKUTE	ANURAG	SUNIL	BAMS	3rd	GAC Jalgaon	7709915286	Anuragsb09@gmail.com	M	PAHSUS	BIOSTATISTICS
2022/SIP/592	SOLANKE	BHUSHAN	BALASAHEB	MBBS	1st	CGMC Gondia	8261860412	drbhushanbsolanke99@gmail.com	M	PAHSUS	BIOSTATISTICS
2022/SIP/937	QAZI	MD ZAID	ATA UR REHMAN	MBBS	3rd	GMC Latur	7385475850	zaidqazi003@gmail.com	M	PAHSUS	BIOSTATISTICS
2022/SIP/1002	MANDAKE	PRAJAKTA	HANMANTRAO	MBBS	3rd	MIMER Talegaon	9096272149	prajaktamandake@gmail.com	F	PAHSUS	NUTRITION & DIETETICS
2022/SIP/1022	KARALE	SAKSHI	SUNIL	BDS	1st	HSRSM Dental Hingoli	8767701985	sakshikarale1234@gmail.com	F	PAHSUS	NUTRITION & DIETETICS
2022/SIP/217	GUNNAL	PAVAN	MOTIRAM	MBBS	3rd	ARMCH Solapur	7083706219	pavangunnal2@gmail.com	M	PAHSUS	NUTRITION & DIETETICS
2022/SIP/418	SHINGADE	SNEHA	UTTARESHWAR	BAMS	1st	MAD Ayurvedic Yeola	9075844573	satish.shingade@rediffmail.com	F	PAHSUS	NUTRITION & DIETETICS
2022/SIP/498	GUND	VAISHNAVI	RAOSAHEB	BDS	3rd	YC Dental Ahmednagar	9834799494	gundvaishnavi1999@gmail.com	F	PAHSUS	NUTRITION & DIETETICS

PAHSUS Summer Internship Program Attendance Nutrition & Dietetics- FIRST WEEK							
		23rd May	24th May	25th May	26th May	27th May	28th May
	Student's Name	Monday	Tuesday	Wedensday	Thursday	Friday	Saturday
Morning Schedule	Prajakta Madake	Mandake	Mandake	Mandake	Mandake	Mandake	Mandake
	Sakshi Karale	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi
	Sneha Shingade	Shingade	Shingade	Shingade	Shingade	Shingade	Shingade
	Vaishnavi Gund	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu
	Pawan Gunnal	Pawan	Pawan	Pawan	Pawan	Pawan	Pawan
Sign of Head							
Afternoon Session	Prajakta Madake	Mandake	Mandake	Mandake	Mandake	Mandake	Mandake
	Sakshi Karale	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi
	Sneha Shingade	Shingade	Shingade	Shingade	Shingade	Shingade	Shingade
	Vaishnavi Gund	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu
	Pawan Gunnal	Pawan	Pawan	Pawan	Pawan	Pawan	Pawan
Sign of Head							

Verified.

18/24

Medical Officer
Health Centre
Punyashlok Ahilyadevi Holkar
Solapur University, Solapur.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur * Health Centre

PAHSUS Summer Internship Program Attendance Nutrition & Dietetics- SECOND WEEK								
		30th May	31st May	1st June	2nd June	3rd June	4th June	5th JUNE
	Student's Name	Monday	Tuesday	Wedensday	Thursday	Friday	Saturday	SUNDAY
Morning Schedule	Prajakta Madake	Mandake	Mandake	Mandake	Mandake	Mandake	Mandake	Mandake
	Sakshi Karale	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi
	Sneha Shingade	Shingade	Shingade	Shingade	Shingade	Shingade	Shingade	Shingade
	Vaishnavi Gund	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu
	Pawan Gunnal	Pawan	Pawan	Pawan	Pawan	Pawan	Pawan	Pawan
Sign of Head								
Afternoon Session	Prajakta Madake	Mandake	Mandake	Mandake	Mandake	Mandake	Mandake	Mandake
	Sakshi Karale	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi	Sakshi
	Sneha Shingade	Shingade	Shingade	Shingade	Shingade	Shingade	Shingade	Shingade
	Vaishnavi Gund	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu	Vaishu
	Pawan Gunnal	Pawan	Pawan	Pawan	Pawan	Pawan	Pawan	Pawan
Sign of Head								

Verified

31/5/18

Medical Officer
Health Centre
Punyashlok Ahilyadevi Holkar
Solapur University, Solapur.

Punyashlok Ahilyadevi Holkar Solapur University, Solapur * Health Centre

CERTIFICATE COURSE IN ACUPRESSURE			
Sr. No.	Course Name	FormNo	Student Name
1	CERTIFICATE COURSE IN ACUPRESSURE	AP22-01	MANE AMAR ASHOK
2	CERTIFICATE COURSE IN ACUPRESSURE	AP22-02	JOSHI ASHWINI DURGAPRASAD
3	CERTIFICATE COURSE IN ACUPRESSURE	AP22-03	MAYNALE SACHIN IRANNA
4	CERTIFICATE COURSE IN ACUPRESSURE	AP22-04	KASBE RAJRATNA JAGJERAO
5	CERTIFICATE COURSE IN ACUPRESSURE	AP22-05	DUPARGUDE VIJAYALAXMI NAGNATH
6	CERTIFICATE COURSE IN ACUPRESSURE	AP22-06	SHAH KAUSHIK MAHENDRABHAI
7	CERTIFICATE COURSE IN ACUPRESSURE	AP22-07	DILPAK AJIT SURESH
8	CERTIFICATE COURSE IN ACUPRESSURE	AP22-08	MASKE SAMBHAJI SIDRAM
9	CERTIFICATE COURSE IN ACUPRESSURE	AP22-09	DUPARGUDE PRASNNAJIT NAGNATH
10	CERTIFICATE COURSE IN ACUPRESSURE	AP22-10	EKHANDE SANGEETA PRASHANT
11	CERTIFICATE COURSE IN ACUPRESSURE	AP22-12	KATOTE RAJENDRA SHRINIVAS
12	CERTIFICATE COURSE IN ACUPRESSURE	AP22-13	MUJAWAR IBRAHIM MAHIBUB
13	CERTIFICATE COURSE IN ACUPRESSURE	AP22-14	RATHOD SANKET BHARAT
14	CERTIFICATE COURSE IN ACUPRESSURE	AP22-15	ALAGUNDGI SHRIKANT MALAKAPPA
15	CERTIFICATE COURSE IN ACUPRESSURE	AP22-16	SHAIKH SULEMAN SIRAJAHMED
16	CERTIFICATE COURSE IN ACUPRESSURE	AP22-17	HAMBIRE SHRINIWAS DAYANANDRAO
17	CERTIFICATE COURSE IN ACUPRESSURE	AP22-18	TIKE SACHIN GOVINDRAO
18	CERTIFICATE COURSE IN ACUPRESSURE	AP22-19	GHADGE SWATI GOPALRAO
19	CERTIFICATE COURSE IN ACUPRESSURE	AP22-20	GAIKWAD RAJNI NANASAHEB
20	CERTIFICATE COURSE IN ACUPRESSURE	AP22-21	RATHI RAJESH SHIVNARAYAN
21	CERTIFICATE COURSE IN ACUPRESSURE	AP22-22	UDANSHIV SHRUTIKA MOHAN
22	CERTIFICATE COURSE IN ACUPRESSURE	AP22-23	SHAIKH SAIMAAMBARI NAIMODDIN
23	CERTIFICATE COURSE IN ACUPRESSURE	AP22-24	SHAIKH SAIF ABDUL SALAM
24	CERTIFICATE COURSE IN ACUPRESSURE	AP22-25	BHOSALE DIGVIJAY KALIDAS
25	CERTIFICATE COURSE IN ACUPRESSURE	AP22-27	PATIL RUPALI SIDRAM
26	CERTIFICATE COURSE IN ACUPRESSURE	AP22-28	ADAM GANESH KRISHNAHARI
27	CERTIFICATE COURSE IN ACUPRESSURE	AP22-29	BHORE MANISHA SANTOSH
28	CERTIFICATE COURSE IN ACUPRESSURE	AP22-30	JOSHI ARTI CHINTAN
29	CERTIFICATE COURSE IN ACUPRESSURE	AP22-31	MARU DHANASHRI NITEN
30	CERTIFICATE COURSE IN ACUPRESSURE	AP22-32	SALE SHRIMANT CHANDRU
31	CERTIFICATE COURSE IN ACUPRESSURE	AP22-33	PAWAR PORNIMA SANJAY
32	CERTIFICATE COURSE IN ACUPRESSURE	AP22-34	AIWALE KARISHMA ABA
33	CERTIFICATE COURSE IN ACUPRESSURE	AP22-35	POLANI DARSHANA NARESH
34	CERTIFICATE COURSE IN ACUPRESSURE	AP22-36	SATHE ANITA RAMCHANDRA
35	CERTIFICATE COURSE IN ACUPRESSURE	AP22-37	ALANDKAR CHETANA ANIL
36	CERTIFICATE COURSE IN ACUPRESSURE	AP22-38	PATIL DHARMRAJ VASANTRAO
37	CERTIFICATE COURSE IN ACUPRESSURE	AP22-41	KULKARNI SURYAKANT SUDHAKAR
38	CERTIFICATE COURSE IN ACUPRESSURE	AP22-42	ALANDKAR ANIL BHALCHANDRA
39	CERTIFICATE COURSE IN ACUPRESSURE	AP22-43	GURAV SATAPPA RAJARAM

Punyashlok Ahilyadevi Holkar Solapur University, Solapur
School of Allied Health Science

Co-ordinator
School of Allied Health Science
Punyashlok Ahilyadevi Holkar
Solapur University, Solapur

Director
School of Allied Health Science
Punyashlok Ahilyadevi Holkar
Solapur University, Solapur