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(DEEMED TO BE UNIVERSITY)

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KONERU LAKSHMAIAH EDUCATION FOUNDATION

(Deemed to be University estd., u/s 3 of UGC Act 1956)

Greenfields, Vaddeswaram, Guntur (Dist.), AP-522502

www.kluniversity.in

Seed Research Grant Policy

SEED RESEARCH GRANT POLICY

INTRODUCTION

KLEF provides seed research grant to encourage faculty to undertake innovative research in emerging areas of national and international importance. Seed grant facilitates faculty to execute their ideas up to the proof-of-concept level enabling them to fetch external grant from various funding agencies.

OBJECTIVES

1. To support faculty to establish independent research in basic and applied research areas.
2. To generate preliminary results of innovative ideas/concepts to submit proposals for external funding
3. To inspire faculty to generate intellectual property rights/products/technologies and create strong interdisciplinary research groups
4. To support faculty initiatives for collaborative research

DURATION AND FINANCIAL ASSISTANCE

The maximum duration of the seed grant shall be one year from the date of sanction and each project submitted under this scheme will be supported up to maximum of Rs. 10 lakhs.

ELIGIBILITY CRITERIA

1. All faculty with a Ph.D. degree
2. Faculty who has completed sponsored project/s or ongoing project/s are also eligible with new ideas
3. Senior professors are not encouraged to apply however they can act as mentor for junior faculty

Dean R&D 15/12/21

Vice Chancellor 15/12/21

PROJECT SUBMISSION PROCESS

1. Faculty are eligible to apply for seed grant against the call for proposals which is announced every year in July.

2. All proposals must be submitted to Dean (R&D) through the proper channel in the prescribed format (Annexure-I).

EVALUATION PROCESS

1. All submitted proposals will be reviewed by the screening committee and the Principal Investigator/s (PI) will be called for presentation for their proposed work.

2. Based upon the merit of proposals and competitiveness of the PI, the list of shortlisted PIs/projects will be submitted to Vice-Chancellor for consideration and approval.

SELECTION CRITERIA

1. Innovative research and novelty of the project

2. Skill and capacity of the Research team (PI, Co-PI)

3. Track record of PI in terms of publications, patents etc.

4. Potential to generate IPR and fetch external grant

EXPECTED OUTCOME

1. Minimum one SCI publication or filing of one patent.

2. Submit research proposal/s to funding agencies.

TERMS AND CONDITIONS

1. Under the seed grant, travel, contingencies, and manpower heads are not applicable. However, travel/contingencies charges may be permitted on a case-by-case basis depending on the nature of the project.

Dean R&D 15/12/21.

Vice Chancellor 15/12/21

2. The maximum duration for implementation of the internal funding projects is 12 months only. The extension for a maximum of 6 months, in special circumstances may be granted.

3. Any deviation in the procurement of approved item/s, prior approval should be taken.

4. Procurement of consumables/equipments should be through purchase department.

5. Faculty should acknowledge the seed grant in his/her all publications arising from the approved projects.

6. If the Principal Investigator leaves the institute during the project duration Co-PI has to complete the project.

7. After completion of project, PI has to submit utilization certificate, statement of expenditure and project completion report.

15/12/21.
Dean R&D

15/12/21
Vice Chancellor

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Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002. Ph: +91 - 866 -2577715, Fax: +91-866-2577717

ANNEXURE-I

FORMATS FOR SUBMISSION OF SEED GRANT PROJECTS

(To be filled by applicant)

1. Project Title :
2. Principal Investigator :
3. Designation :
4. Department :
5. Broad Subject :
6. Duration in months :
7. Total cost of the Project :
8. Date of Birth: Sex (M/F) :
9. Telephone and e-mail :
10. Co-Investigator :
11. Designation :
12. Department :
13. Date of Birth: Sex (M/F):
14. Telephone and e-mail :
15. Project summary (maximum 150 words)
16. Key words (maximum 6)
17. Technical details:
18. Introduction (under the following heads)
    - 18.1. Origin of the proposal :
    - 18.2. Definition of the problem :
    - 18.3. Objectives :

19. Review of status of Research and Development in the subject

19.1. International status :

19.2. National status :

20. Novelty Importance of the proposed project in the context of current status

21. Work plan

21.1. Methodology.
21.2. Organization of work elements.
21.3. Time schedule of activities giving milestones.

22. **BUDGET ESTIMATES: SUMMARY**

S. No	Head	Item Specifications	BUDGET (in Rupees)
1	Equipment		
	Major		
	Minor		
2	Consumables		
3	Others if any		
	TOTAL		

23. Justification for the proposed equipment.

24. Detailed Bio-data of the Investigator(s)/Co-Investigator(s) including Name, Address, Date of Birth, Institution's Address etc. Academic Qualifications (University/College from where attained, year of passing, class, Thesis title etc.) Publications list (Title of paper, authors, Journal details, pages, year etc.) Patent list, if any, List of Projects implemented if Any.

FORWARDED BY

Principle Investigator **Co- Investigator**

(Full Name) **(Full Name)**

Head of the Department **Dept. RPAC Chairman**

(Full Name) **(Full Name)**

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ANNEXURE-II

Statement of Expenditure

1. SEED Project Sanction Order No and date: ----- and DATE----

2. Name of the PI & Dept:

Sr. No	Sanctioned Heads	Total Amount Sanctioned (Rs.)	Total Amount Utilized (Rs.)	Balance Amount (Rs.)	Remarks (if any)
1	Equipment				
2	Consumables				
3	Contingencies				
4	Total				

Name and Signature of Principal Investigator

Signature of financial officer

Date:

Date:

UTILISATION CERTIFICATE

Certified that out of **Rs. /-** of grants-in- aid sanctioned during the year **--FY--** in favour ---PI NAME--- and -------- on account of unspent balance of the previous year, a sum of -------- has been utilised for the purpose of executing the project for which it was sanctioned.

Signature of PI

Signature of Registrar

Signature of Finance Officer

Date:

Date:

Date:

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ANNEXURE-III
PROJECT COMPLETION REPORT

Notes: 1. The PCR should be in bound form.
2. Cover page should include the title of the project, file number, names and addresses of the investigation.

1. Title of the project:
2. Principal Investigator(s) and Co-Investigator(s):
3. Implementing Institution(s) and other collaborating Institution(s):
4. Date of commencement:
5. Planned date of completion:
6. Actual date of completion:
7. Objectives as stated in the project proposal:
8. Deviation made from original objectives if any, while implementing the project and reasons thereof:
9. Experimental work giving full details of experimental set up, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:
10. Detailed analysis of results indicating contributions made towards increasing the state of knowledge in the subject:
11. Conclusions summarizing the achievements and indication of scope for future work
12. List of Research publications and Patents taken, if any

Name & Signature of PI **Name & Signature of Co-PI**

SEED Research Grant Funding Model Documents

1) Call for Proposal
2) Proposal Copy from PI
3) Project Screening Committee
4) Minutes of the Meeting
5) Sanction Order
6) Statement of Expenditure
7) Project Completion Report

Internal Research Funding - Call for proposals – Reg.

Registrar

Fri 7/15/2022 11:25 AM

To:PRESIDENT <president@kluniversity.in>;Havish <havish@kluniversity.in>;Raja Harin koneru <krh@kluniversity.in>;PRO-CHANCELLOR <prochancellor@kluniversity.in>;Vice Chancellor - KLU <vc@kluniversity.in>;Dr.G.P.S. Varma, Vice- Chancellor <gpsvarma@kluniversity.in>;N Venkat Ram <venkatram@kluniversity.in>;Dr Jagadeesh Anne <drjagadeesh@kluniversity.in>;Dr.Veera raghavaiah <rvagridirector@kluniversity.in>;KRISHNANANDA P INGLE <krishna_agri@kluniversity.in>;P SENTHIL MURUGAN <agilanagri2008@kluniversity.in>;Jamindar Buddiga <jamindarbuddiga@kluniversity.in>;MSR Krishna <msrkrishna_bt@kluniversity.in>;PILLI MANASA <pmanasa@kluniversity.in>;MANOHARMAYUM DOLPRIYA DEVI <dolpriya.ag@kluniversity.in>;ATUL SINGH <atulsingh@kluniversity.in>;Shiva Sai Prasad <shivsaiprasad@kluniversity.in>;Dr.B.Rama Devi <bonuramadevi@kluniversity.in>;Dr.M.Gayathri <gayathrimungara@kluniversity.in>;ANZER UL ISLAM <anzer.gene@kluniversity.in>

1 attachments (52 KB)

Call for proposal IF -2022-2023.doc;

Ref: KLEF/RO/R&D/2022-23 Date: 15-07-2022

Orders of the Vice Chancellor dt.15.07.2022

CIRCULAR

Sub: Internal Research Funding - Call for proposals – Reg.
Ref: Letter dated 14.07.2022 from Dr.B.Jayakumar Singh, Dean (R&D).

***

This is to inform all the faculty members of both KLEF Vaddeswaram and KLH campuses that KLEF is inviting project proposals under **"Internal Research Funding".**

Last date of submission is 20th August, 2022.

Copy of call for project proposal and application format are attached herewith.

All the eligible faculty members are informed to submit their project proposals within the stipulated time.

I/c.REGISTRAR

Encl: Call for project proposal and application format.

Mail & Hard copy to: Hon'ble President, KLEF

Mail to: Hon'ble Vice-Presidents, KLEF

Mail & Hard copy to: Hon'ble Pro Chancellor

Mail & Hard copy to: Hon'ble Vice Chancellor

Mail & Hard copy to: Hon'ble Pro Vice Chancellor (Administration)

Mail to: Advisor – NAAC & Hyderabad Operations - Prof. K.Koteswara Rao

Mail to: All Advisors / All Deans / All Principals / All Directors

Mail to: Controller of Examinations-Dr.A.S.C.S.Sastry

Mail to: Principal-Engg.College /HoD-Business School

Mail to: Vice-Principal-Coll. of Science & Humanities & Coordinator-FED.Dr.VKR

Mail & Hard copy to: HoDs.. AI&DS / BT / CE / CSE / Comp.Engg. / CS&IT / ECE / EEE / ECM / ME

HoDs..Maths / PHY / CHEM / ENG / BES-I / BES-II

HoDs.. BBA / COM / HM / CSS / CA&MS / Law / Architecture / Pharmacy / CSA / Arts

Mail & Hard copy to: Head of Division..Communication Skills / Soft Skills / Quant & Reasoning

Mail to: All Dy. HoDs / All Alt. HODs

Mail to: KL H HoDs..CSE / AI&DS / ECE / Coordinator-FED

Mail to: All faculty

Thanks & Regards

Dr. A. Jagadeesh
I/c. REGISTRAR
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“Solar-induced antibiotic degradation and highly selective CO_2 reduction by a bifunctional photocatalyst material”

PROPOSAL FOR FINANCIAL SUPPORT (F.Y. 2022-23)
Chemical Science

SUBMITTED TO

KONERU LAKSHMAIAH EDUCATION FOUNDATION

(DEEMED TO BE UNIVERSITY)

Submitted by

“Dr. Naresh Mameda”

DEPARTMENT OF CHEMISTRY

KONERU LAKSHMAIAH EDUCATIONAL FOUNDATION

(Deemed to be University u/s 3 of UGC Act 1956)

VADDESWARAM – 522 302

ANDHRA PRADESH INDIA

1. Project Title: Solar-induced antibiotic degradation and highly selective CO_2 reduction by a bifunctional photocatalyst materials

2. Principal Investigator: Dr. Naresh Mameda

3. Designation: Assistant Professor

4. Department: Chemistry

5. Broad Subject: Catalysis

6. Duration in months: 12

7. Total cost of the Project: Rs. 4,00,000/-

8. Date of Birth: Sex (M/F): M

9. Telephone and e-mail: +91-7671026830 and nareshmameda@kluniversity.in

10. Co-Investigator: NA

11. Designation: NA

12. Department: NA

13. Date of Birth: Sex (M/F):NA

14. Telephone and e-mail: NA

15. Project summary: The goal of the project is to develop a bifunctional S-scheme hybrid photocatalyst comprised of CdS nanorods and $BiOIO_3$ (BIO) nanosheets for efficient antibiotic degradation and sacrificial reagent-free CO_2 reduction. Combining visible light-responsive one-dimensional (1D) CdS and UV-light-responsive 2D BIO results in a CdS/BIO hybrid photocatalyst with effective 1D/2D (line) interfacial contact and a broadened optical absorption range. Notably, the CdS/BIO hybrid exhibits exceptional diclofenac degradation, mineralization, and outstanding CO_2 reduction activity for CO production, with 95.4% CO selectivity over H_2 production. The exceptional performance of the hybrid catalyst is primarily attributed to the accelerated photoexcited charge transfer caused by the 1D/2D line interfacial contact and the high charge separation, both of which stem from the effective S-scheme charge transfer process. In addition, photo corrosion of CdS is substantially mitigated, resulting in the high photocatalytic performance of the hybrid catalyst even after repeated test runs.

16. Keywords (maximum 6): CdS; $BiOIO_3$; Bifunctional photocatalyst; S-scheme mechanism; Antibiotic degradation; CO_2 reduction

17. Technical details:

17.1. Origin of the proposal: Carbon dioxide (CO_2) levels in the atmosphere have increased dramatically over the past few decades due to the widespread utilization of fossil fuels for energy, indisputably the leading cause of global warming. However, CO2 can be converted into hydrocarbons used as fuels or feedstocks in other industries, resulting in a win-win scenario for the global carbon balance [1,2]. With this paradigm in mind, substantial research has been conducted to identify techniques for simultaneously reducing atmospheric CO_2 levels and increasing CO_2 utilization. On the other hand, the rapid expansion of new industries has led to the release of various pollutants that harm the ecosystem [3,4]. Photocatalysis, which mimics natural photosynthesis, is the most promising method for addressing the rising CO2 concentration in the atmosphere and eliminating harmful industrial pollutants [5–9]. It uses abundantly available solar energy to convert CO_2 and water into hydrocarbon fuels while simultaneously helping to mitigate the use of fossil fuels [10]. However, CO_2 photoreduction reactions require significant energy to break the C=O bond in the linear CO_2 molecule due to the former's high enthalpy (750 kJ mol–1) [11]. In pollutant degradation processes, photocatalyst

poisoning by intermediate degradation products and highly reactive oxidative species is a major concern [12]. For the practicability of this photocatalytic technique for CO_2 reduction and pollutant elimination, the development of bifunctional photocatalysts with high efficiency, stability, and significant solar energy harnessing potential is paramount.

17.2. Objectives:

The objectives of this project are to:

- Develop a novel bifunctional photocatalyst material, i.e., 2D BIO nanosheets and 1D CdS nanorods, capable of efficiently degrading antibiotics under solar irradiation (Fig. 1).
- Characterize the newly synthesized materials' structural, optical, and photocatalytic properties.
- Enhance the selectivity and efficiency of the same bifunctional photocatalyst under solar illumination.
- Evaluate the mechanism behind the simultaneous antibiotic degradation and CO_2 reduction processes.

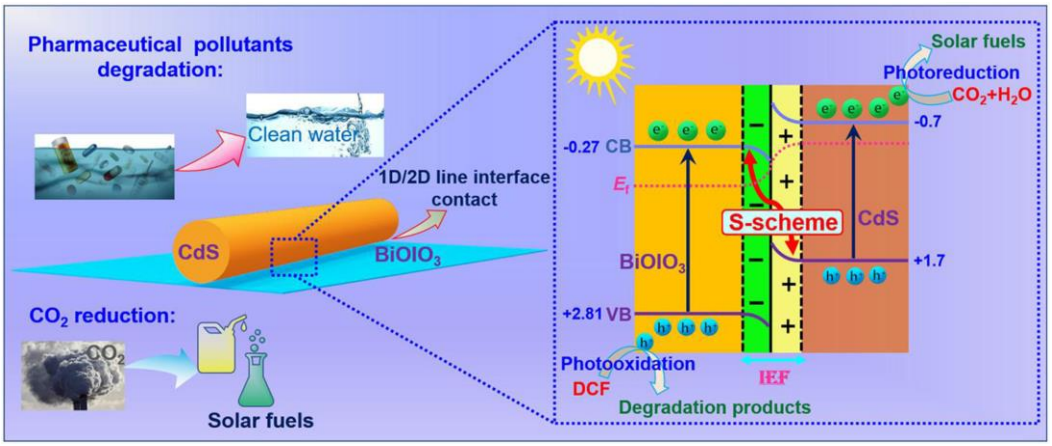

Fig. 1. Antibiotic degradation and highly selective CO_2 reduction by bifunctional photocatalyst materials.

18. Review of status of Research and Development in the subject (National and International): Bismuth-based semiconductor materials have attracted significant attention for photocatalysis applications due to their remarkable physicochemical properties and distinctive layered structure [13,14]. Some Bi-based layered photocatalysts such as Bi_2WO_6, Bi_2MoO_6, BiOCl, and $BiVO_4$ have been widely used for photocatalytic CO_2 reduction and pollutant degradation [15]. Recently, $BiOIO_3$ (BIO), which belongs to the Aurivillius materials family, has been identified as a promising photocatalyst for removing organic pollutants [16,17]. BIO has a layered structure composed of $(Bi_2O_2)^{2+}$ layers of the Aurivillius type interspersed with polar $(IO_3)^-$ units [18]. On the other hand, Cadmium sulfide (CdS) is a well-established semiconductor with a narrow bandgap that enables efficient solar absorption [21]. It is inexpensive and straightforward to produce. CdS is regarded as one of the most promising candidates for various photocatalytic applications, including the degradation of gaseous and liquid pollutants [22], the production of H2 [23,24], and the reduction of CO_2 [25]. The performance of CdS as a photocatalyst is heavily influenced by its morphology, particle size, and crystal structure. It has been demonstrated that one-dimensional (1D) CdS nanorods possess superior photocatalytic properties compared to other morphologies [26].

19. Novelty Importance of the proposed project in the current status: The present research proposal is innovative in different aspects. Rationally coupled 2D BIO nanosheets and 1D CdS nanorods via a facile method, yielding a hybrid CdS/BIO S-scheme catalyst with a 1D/2D line

interfacial contact. The combination of UV-light-responsive BIO and visible-light-responsive CdS resulted in an increased optical absorption range, thereby overcoming the primary limitation of solely using BIO. Moreover, the 1D/2D interfacial arrangement of the CdS/BIO hybrid provides a broad avenue for charge transfer, preventing the recombination of photoexcited charges, thereby resolving the primary limitation of CdS. The outcomes of several experiments conducted in this study demonstrate that the CdS/BIO photocatalyst follows an S-scheme mechanism, which allows for high charge separation while maintaining the strong redox capacity of the separated charges.

20. Work plan

20.1. Methodology:

a) **Material Synthesis**: The project will focus on synthesizing bifunctional photocatalyst materials. Various strategies, such as doping, surface modification, and nanostructuring, will be explored to enhance their photocatalytic properties. b) **Characterization**: Comprehensive material characterization techniques, including X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), and energy-dispersive X-ray spectroscopy (EDS), will be employed to analyze the structure and composition of the synthesized photocatalysts. c) **Photocatalytic Antibiotic Degradation**: The photocatalysts' efficiency in degrading antibiotics will be assessed under simulated solar irradiation. Commonly found antibiotics in wastewater will be selected as target pollutants, and degradation kinetics will be studied. d) **Selective CO2 Reduction**: The photocatalysts' performance in reducing CO2 to valuable chemical compounds, such as methanol or ethylene, will be evaluated. Gas chromatography and mass spectrometry will be used to analyze the reaction products. e) **Photocatalyst Optimization**: The most promising photocatalyst compositions will be optimized based on the initial results. Factors like catalyst loading, reaction temperature, and pH will be investigated to maximize the degradation and reduction rates.

20.2. Organization of work elements:

Develop a novel bifunctional photocatalyst material, i.e., 2D BIO nanosheets and 1D CdS nanorods: 2D BIO nanosheets will be synthesized using a simple hydrothermal approach. Bismuth nitrate pentahydrate will be dissolved in water under vigorous magnetic stirring, and potassium iodate will be added. The reaction solution will be placed in a 100 mL stainless steel reactor and treated hydrothermally at 150 °C for 6 h. After allowing the reactor to cool naturally, the resulting substance will be collected and oven-dried at 60 °C. Similarly, a simple hydrothermal method will be used to prepare the CdS nanorods via the following synthesis procedure. Cadmium acetate dihydrate and thioacetamide were added to ethylenediamine, after which the mixture will be vigorously stirres. The resulting homogeneous suspension will be placed in a 100 mL stainless steel reactor and heated in a programmable oven at 200 °C for 3 h. The resulting yellow product will be centrifuged and repeatedly rinsed with water and ethanol before being dried overnight at 60 °C. Finally, the CdS/BIO hybrid is prepared using these subsequent steps. First, the as-prepared BIO was suspended in a 1:1 water/methanol solution using ultrasonication. Subsequently, CdS powder was added to the suspension, and the mixture was ultrasonicated. It will then magnetically agitate under ambient conditions for 12 h, followed by carefully evaporating off the solvents via heating. The final product is a dried powder containing 10 wt% CdS and designated CdS-10/BIO. The other CdS-5/BIO, CdS-15/BIO, and CdS-20/BIO hybrid catalysts will also be synthesized using 5, 15, and 20 wt% CdS, respectively.

Characterization of the synthesized photocatalysts: The surface properties of the bifunctional photocatalyst material prepared will be visualized using a scanning electron microscope (SEM); the composition of the photocatalyst material will be analyzed by X-ray photoelectron

spectroscopy (XPS). Scanning electron microscopy-energy dispersive X-ray (SEM-EDX) mapping of the electrode's surface and its cross-section will be performed to analyze the structure of the photocatalyst material.

Degrading antibiotics and CO_2 reduction under solar irradiation by 2D BIO nanosheets and 1D CdS nanorods: Photocatalytic experiments for diclofenac (DCF) degradation conducted under simulated sunlight irradiation to evaluate the performance of the prepared hybrid CdS/BIO catalysts as well as their BIO and CdS components. Before the photocatalytic experiments, two controlled tests will be conducted: one in the dark with a catalyst and the other under light without a catalyst. Photocatalytic CO2 reduction will be measured on all the prepared samples under simulated sunlight illumination without sacrificial reagents or cocatalysts. **Evaluate the mechanism behind the simultaneous antibiotic degradation and CO2 reduction processes:** We will be conducted the necessary experiments to investigate the photocatalytic mechanism underlying the remarkable CO_2 reduction and degradation performances of the developed hybrid photocatalyst. Ultraviolet photoelectron spectroscopy (UPS), in conjunction with a bandgap energy assessment, was utilized to investigate the band structure of the hybrid photocatalyst. dentification of highly efficient bifunctional photocatalyst materials capable of solar-induced antibiotic degradation and CO_2 reduction.

- Insight into the photocatalytic mechanisms involved in the degradation of antibiotics and CO_2 reduction.
- Optimization guidelines for practical applications of the photocatalysts.
- A foundation for potential industrial applications in wastewater treatment and renewable energy production.
- Photocatalyst Material Characterization.

20.3. Time schedule of activities giving milestones:

Activities	Quarter 1 (4 months)	Quarter 2 (4 months)	Quarter 3 (4 months)
Develop a novel bifunctional photocatalyst material, i.e., 2D BIO nanosheets and 1D CdS nanorods.			
Characterize the structural, optical, and photocatalytic properties of the synthesized materials.			
Enhance the selectivity and efficiency of the same bifunctional photocatalyst under solar illumination.			
Evaluate the mechanism behind the simultaneous antibiotic degradation and CO_2 reduction processes.			
Publications and Knowledge Dissemination			

21. **BUDGET ESTIMATES: SUMMARY**

S. No	Head	Item Specifications	BUDGET (in Rupees)
1	Equipment	-	-
	Major	-	-
	Minor		
2	Consumables	Chemicals and photoreactors	2,50,000
3	Others if any	Characterization of catalysts	1,50,000
	TOTAL		4,00,000

22. Justification for the proposed equipment: *NA*

References:

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23. Detailed Biodata of the Investigator(s)/Co-Investigator(s) including

Dr: **Naresh Mameda**, Ph. D.

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kunchanapalli, KLU road, guntur, Andhra Pradesh-522501

Institution's Address: Koneru Lakshmaiah Education Foundation (KLEF), Vaddeswaram, Guntur-522 502 A.P-India

DOB: 02/09/1986

Professional Career

June. 2022-Present **Assistant Professor**
Department of chemistry
Koneru Lakshmaiah Education Foundation (KLEF)
Vaddeswaram, GUNTUR-522 502 A.P-INDIA

Apr. 2021-May 2022 **Research Professor**
Kyungpook National University
School of Architecture, Civil, Environmental, and Energy Engineering
Daegu, South Korea.

Oct. 2016 – Mar.2021 **Post-doctoral Researcher**
Kyungpook National University
Environmental engineering
Daegu, South Korea.

Academic Qualifications

Jun. 2011 – Jul. 2016 **Doctor of Philosophy (Ph.D.), Chemistry**
CSIR-Indian Institute of Chemical Technology, Telangana, India.
Supervisor: Dr. N. Narender
Dissertation: Development of Zeolite Catalyzed C-C, C-N and C-O Bond Formation Reactions and Oxidative Halogenations Using Ammonium Bromide and Oxone.

Jun. 2007 – May 2009 **Master of Science (M.Sc.), Organic Chemistry**
Osmania University, Hyderabad, Telangana, India.

Jun. 2004 – May 2007 **Bachelor of Science (B.Sc.), Botany, Zoology & Chemistry**
Kakatiya University, Warangal, Telangana, India.

Publications/Citations Data

1. N. Tabassum, R. k. Pothu, A. Pattnaik, R. Boddula, P. Balla, R. Gundeboyina, P. Challa, R. Rajendiran, V. Perugopu, *M. Naresh,* A. B. Radwan, A. M. Abdullah, N. Al-Qahtani. Heterogeneous Catalysts for Conversion of Biodiesel-Waste Glycerol into High-Added-Value Chemicals, *Catalysts Journal, 7, (2022), 767.*
2. N. N. Shu, H. Park, S. S. A. Shah *M. Naresh*, H. J. Yoo, J. Min, K-Ho. Choo. Probiotic strategy for biofouling control through direct injection of quorum quenching bacteria into membrane bioreactors, *Chemical Engineering Journal, 438, (2022), 135572.*
3. V. Amrutham, M. Naresh, N. Nama. A heterogeneous catalytic strategy for facile production of benzimidazoles and quinoxalines from primary amines using Al-MCM-41 catalyst, *Green Chemistry, 23, (2021), 9439-9446.*
4. V. Ya, Y. H. Chou, Y. H. Chen, K. H. Choo, N. Mameda, P. Noophan, C. W. Li, Complete Cu removal through Fe (II) mediated decoupling of CuEDTA complexes with simultaneous precipitation, *Environmental Technology & Innovation, 23, (2021) 101726.*

5. H. Park, *M. Naresh*, C. W. Li, H-W, Jeong, H. Park, K-Ho. Choo. Optimizing RuO_x-TiO_2 composite anodes for enhanced durability in electrochemical water treatments, *Chemosphere. 265, (2021), 129166*
6. M. *Naresh*, H. Park, K-Ho. Choo. Hybrid electrochemical microfiltration treatment of reverse osmosis concentrate: A mechanistic study on the effects of electrode materials, *Desalination, 493, (2020) 114617*
7. W. Cao; C. Zeng, X. Guo; Q. Liu, *M. Naresh*, X. Zhang. Enhanced electrochemical degradation of 2,4-dichlorophenol with the assist of hydrochar, *Chemosphere, 260, (2020), 127643.*
8. M. *Naresh*, H. Park, S. S. A. Shah, K. B. Lee, C. W. Li, V. Naddeo, K-Ho. Choo. Highly robust and efficient Ti-based Sb-SnO_2 anode with a mixed carbon and nitrogen interlayer for electrochemical 1,4-dioxane removal from water, *Chemical Engineering Journal, 393 (2020), 124794.*
9. V. Amrutham, M. gliullin, M. Naresh, D. Chevella, K.S. Gajula, N.G. Grigor'eva, K. Boris, A. Venugopal, N. Nama. A heterogeneous catalytic and solvent-free approach to 1,2-dihydroquinoline derivatives from aromatic amines and alkynes by tandem hydroarylation-hydroamination, *Catalysis Communications, 135 (2020) 105888.*
10. X. Zhang, K. Lee, H. Yu, Naresh. M, K-Ho. Choo. Photolytic quorum quenching: A new anti-biofouling strategy for membrane bioreactors, *Chemical Engineering Journal, 378 (2019) 122235.*

List of Patent(s)

1. *Naresh Mameda* and Kwang-Ho Choo
   Electrode and method for producing the same and apparatus for treating water including the same, Granted *Korean Patent*; Application No: 1020190130779.

List of Book Chapter(s)

1. *Naresh Mameda* and Kwang-Ho Choo
   Electrochemical Membrane Technology for Water and Wastewater Treatment: Electrochemical membrane technology for fouling control, Elsevier., Netherlands, Chapter 7, 2022; 978-0-12-824470-8 (ISBN);

7/8/2022

Signature of Principle Investigator

(Dr. Naresh Mameda)

7/8/2022

Signature of RPAC Chairman Co-Investigator

(Dr. Naresh Mameda)

7/8/2022

Signature of Head of the Department

Dr. J.V. Shanmukha Kumar
Head of the Department
Department of Chemistry
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, Vaddeswaram-522
Guntur Dist., A.P., India

Ref: KLEF/RO/R&D/2022-23 **Date: 20-08-2022**

Sub: Constitution of Project Screening Committee for Seed Research Grant 2022-23

With reference to the Office Circular Ref: KLEF/RO/R&D/2022-23 dated 15th July 2022 inviting proposals for Seed Money Funding, the Vice-Chancellor, KLEF has constituted a screening committee to examine the submitted proposals under seed research grant and give recommendations for approval of the grant.

The Project Screening Committee shall consist of the following members:

S. No.	Name	Designation
1	Dr. B Jayakumar Singh, Dean R&D	Chairman
2	Dr. Sanjeev Rao, Advisor, R&D	Member
3	Dr. Pradeep Kumar Brahman, Associate Dean R&D	Member
4	Dr. B.Nageswara Rao, Professor, ME	Member
5	Dr. K. Koteswara Rao, Professor, ECE	Member
6	Dr. PVV Kishore, Professor, ECE	Member
7	Dr. Suryakanth V Gangashetty, Professor, CSE	Member
8	Dr. Debnath Bhattacharyya, Professor, CSE	Member

Functions of the Committee:

1. To review all submitted proposals
2. To call for presentation shortlisted Faculty/Principal Investigator
3. To examine/evaluate the impact of research proposed in the projects and faculty research background
4. To recommend projects for approval and suggest revision/rejection of proposals

The committee shall submit its recommendations/suggestions by 10-09-2022.

(Dr. A. Jagadeesh)
Registrar
KLEF

REGISTRAR
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, VADDESWARAM-522 302.
Guntur District, Andhra Pradesh.

Copy To,

1. The Hon'ble Vice-Chancellor
2. Office of Dean R&D
3. All members
4. Finance Officer

Minutes of Project Screening Committee Meeting held on September 4th to 7th 2022

Chairman: Dr. B. Jayakumar Singh, Dean R&D
Members: Dr. Sanjeev Rao, Advisor, R&D
Dr. Pradeep Kumar Brahman, Associate Dean R&D
Dr. B.Nageswara Rao, Professor, ME
Dr. K. Koteswara Rao, Professor, ECE
Dr. PVV Kishore, Professor, ECE
Dr. Suryakanth V Gangashetty, Professor, CSE
Dr. Debnath Bhattacharyya, Professor, CSE

1. A Meeting was conducted with the Committee constituted for selection of project for seed money funding on September 4th to 7th 2022 from 10.00 AM to 5.00 PM in Dean R&D office with department specific sub-committees.
2. A total of 92 proposals were submitted for seed money funding.
3. A total of 79 PIs were called for presentation based on eligibility criteria, merit of proposal and research track of PIs.
4. Each proposal was evaluated based on the novelty of research proposals and PI's research experience.
5. Based on screening, the 68 proposals have been recommended for approval.

(Dr. A. Jagadeesh)
Registrar
KLEF

REGISTRAR
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, VADDESWARAM-522 302.
Guntur District, Andhra Pradesh.

Copy To,
5. The Hon'ble Vice-Chancellor
6. Office of Dean R&D
7. All members
8. Finance Officer

Date: 19.09.2022

SANCTION ORDER

To,
Dr. MAMEDA NARESH
DEPARTMENT OF CHEMISTRY

Subject: Financial sanction of the SEED RESEARCH GRANT (SRG) Titled **"Solar-Induced Antibiotic Degradation And Highly Selective CO2 Reduction By A Bifunctional Photocatalyst Materials"**.

Ref. Minutes of project screening committee, dated 10.09.2022

Sanction of SRG is here by accorded to the above mentioned Principal Investigator at a total cost of **Rs. 2,82,500/-** for duration of 12 Months.

1. The total allocated budget shall be utilized for minor equipment, consumables and contingencyif any.
2. The Sanction has been issued based on the recommendations of the SRG proposal review committee for the academic year 2022-23.
3. Sanction of the grant is subject to the conditions as detailed in SRG Utilization guidelines.
4. As per the SRG utilization guidelines the accounts of the project shall be open to inspectionby sanction authority/audit wherever necessary.
5. The PI should furnish utilization certificate to the Dean (R&D) KLEF and an audited statementof accounts pertaining to the grant immediately after the end on each financial year/project.
6. The sanctioned equipment shall be procured as per KLEF guidelines with prior approval ofDean (R&D).
7. The project file no. **KLEF/SRG/2022-23/CHEMISTRY/027** should also be mentionedin all research communications arising from the above project.

Copy to:

1. Vice-Chancellor
2. Dean R & D
3. HOD, RPAC – Department of CHEMISTRY
4. PI

(Dr. A. Jagadeesh)
Registrar

REGISTRAR
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, VADDESWARAM-522 302.
Guntur District, Andhra Pradesh.

STATEMENT OF EXPENDITURE

1. SEED RESEARCH GRANT Order No and date: **KLEF/SRG 2022-23/CHEMISTRY/027** and19.09.2022

2. Name of the PI & Dept:**Dr.MAMEDA NARESH & CHEMISTRY**

Sr.No	Sanctioned Heads	Total AmountSanctioned(Rs.)	Total AmountUtilized(Rs.)	Balance Amount (Rs.)	Remarks (ifany)
1	Consumables	1,50,000	1,50,000	Nil	
2	Contingency	1,33,000	1,33,000	Nil	
3	MinorEquipments	Nil	Nil	Nil	
4	Total	2,83,000	2,83,000	Nil	

Signature of Principal Investigator
Date:12.10.2023

Signature of Finance Officer
Date:12.10.2023

FINANCE OFFICER
Koneru Lakshmaiah Educational Foundation
(Deemed to be University)
Green Fields, VADDESWARAM-522 302.
Guntur District, Andhra Pradesh.

UTILISATIONCERTIFICATE

Certified that out of **Rs.2,83,000/-**of grants-in-aid sanctioned during the year **2022-23** in favour **Dr. MAMEDA NARESH** vide SEED RESEARCH GRANT order No. **KLEF/SRG2022-23/CHEMISTRY/027**,dated19.09.2022 and Rs.**Nil** on account of unspent balance of the previous year ,a sum of **Rs. 2,83,000/-** has been utilized for the purpose of executing the project for which it was sanctioned.

SignatureofPI
Date:12.10.2023

(Dr.A.Jagadeesh)
I/c.Registrar
I/C. Registrar
Koneru Lakshmaiah Education Foundation
(Deemed to be University)
Green Fields, VADDESWARAM-522 302.
Guntur District, Andhra Pradesh

SignatureofFinanceOfficer
Date:12.10.2023

FINANCE OFFICER
Koneru Lakshmaiah Educational Foundation
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Green Fields, VADDESWARAM-522 302.
Guntur District, Andhra Pradesh.

Project Completion Report

"Solar-induced antibiotic degradation and highly selective CO_2 reduction by a bifunctional photocatalyst material"

Submitted by

Dr. Naresh Mameda and Chemistry Department
File No. KLEF/SRG/2022-23/CHEMISTRY/027

Submitted to

Dean R&D

Koneru Lakshmaiah Education Foundation, Green Fields, Vaddeswaram, Guntur-522502, Andhra Pradesh

1. Title of the project: Solar-induced antibiotic degradation and highly selective CO_2 reduction by a bifunctional photocatalyst materials
2. Principal Investigator(s) and Co-Investigator(s): Dr. Naresh Mameda
3. Implementing Institution(s) and other collaborating Institution(s): KLEF
4. Date of commencement: 19-09-2022
5. Planned date of completion: 18-09-2023
6. Actual date of completion: 18-09-2023
7. Objectives as stated in the project proposal:
   - ✓ Develop a novel bifunctional photocatalyst material, i.e., 2D BIO nanosheets and 1D CdS nanorods, capable of efficiently degrading antibiotics under solar irradiation.
   - ✓ Characterize the newly synthesized materials' structural, optical, and photocatalytic properties.
   - ✓ Enhance the selectivity and efficiency of the same bifunctional photocatalyst under solar illumination.
   - ✓ Evaluate the mechanism behind the simultaneous antibiotic degradation and CO_2 reduction processes.
8. Deviation made from original objectives if any, while implementing the project andreasons thereof: **No deviations**

9. Experimental work giving full details of experimental setup, methods adopted, data collected supported by necessary table, charts, diagrams & photographs:

Based on a previous study, 2D BIO nanosheets were synthesized using a simple hydrothermal approach. Briefly, 0.485 g of bismuth nitrate pentahydrate was dissolved in 80 mL of water under vigorous magnetic stirring. After 30 minutes, 0.214 g of potassium iodate was added, followed by another 10 minutes of stirring. The reaction solution was placed in a 100 mL stainless steel reactor and treated hydrothermally at 150 °C for 6 h. After allowing the reactor to cool naturally, the resulting substance was collected, initially rinsed with water until the pH of the effluent reached 7, and then again with ethanol. The final product was oven-dried at 60 °C.

Similarly, a simple hydrothermal method was used to prepare the CdS nanorods via the following synthesis procedure. 0.5 g of cadmium acetate dihydrate and 0.25 g of thioacetamide were added to 50 mL of ethylenediamine, after which the mixture was vigorously stirred for 30 min. The resulting homogeneous suspension was placed in a 100 mL stainless steel reactor and heated in a programmable oven at 200 °C for 3 h. After naturally cooling to ambient temperature, the resulting yellow product was centrifuged and repeatedly rinsed with water and ethanol before being dried overnight at 60 °C.

Finally, the CdS/BIO hybrid was prepared using these subsequent steps. First, 90 mg of as-prepared BIO was suspended in 50 mL of a 1:1 water/methanol solution for 30 min using ultrasonication. Subsequently, 10 mg of CdS powder was added to the suspension, and the mixture was ultrasonicated for an additional 30 min. It was then magnetically agitated under ambient conditions for 12 h, then carefully evaporated off the solvents *via* heating. The final product is a dried powder containing 10 wt% CdS and designated as CdS-10/BIO.

X-ray diffraction (XRD) analysis was performed to characterize the crystal phases of the fabricated BIO, CdS, and hybrid CdS/BIO catalysts. UV–vis DRS was carried out to investigate the light absorption properties of the synthesized samples. The surface morphologies of BIO,

CdS, and the hybrid CdS- 10/BIO catalyst was determined from scanning electron microscope (SEM) and transmission electron microscope (TEM) images.

10. Detailed analysis of results indicating contributions made towards increasing the state ofknowledge in the subject:

The diffraction peaks of BIO are consistent with those of the orthorhombic phase of $BiOIO_3$ (ICDD:04–018–7220), demonstrating their impurity-free synthesis. Moreover, the high-intensity peaks indicate that BIO had good crystallinity. On the other hand, CdS exhibited intense diffraction peaks, indicating its high crystallinity, with a diffraction pattern that nicely matched the hexagonal phase of CdS (JCPDS: 41–1049).

As shown in Fig. 1(b), BIO displays an absorption edge at 405 nm, reflecting that it can only absorb UV light, thereby revealing this fundamental limitation for harnessing solar energy. In contrast, CdS has an absorption edge of around 510 nm, demonstrating its exceptional capability to capture visible light. All the CdS/BIO hybrid samples displayed two absorption edges corresponding to BIO and CdS, indicating they contained both BIO and CdS. Although pristine BIO absorbs only UV light, hybridization with CdS significantly expanded the light absorption range to include visible light, thereby indicating enhanced solar energy harnessing efficiency.

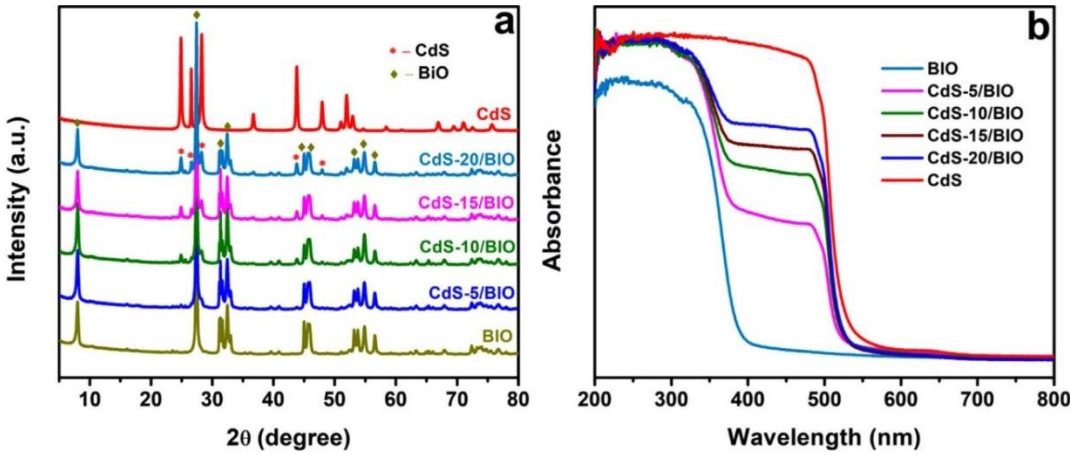

Fig. 1. (a) XRD and (b) UV–vis DRS profiles of the prepared samples.

11. Conclusions summarizing the achievements and indication of scope for future work:

The proposed project addresses environmental and energy challenges by developing efficient bifunctional photocatalyst materials. By harnessing solar energy, this research can contribute significantly to antibiotic degradation and CO_2 reduction, fostering a more sustainable future in sustainable energy generation and environmental remediation. The optimized hybrid CdS/BIO catalyst outperformed its separate CdS and BIO counterparts and other previously reported promising catalysts regarding DCF degradation and CO production. Notably, the S-scheme mechanism significantly prevented photocorrosion of the CdS nanorods, and consequentially, the hybrid catalyst demonstrated excellent stability during repeated test cycles with no discernible decrease in DCF degradation or CO_2 reduction. Therefore, the photostable CdS-10/BIO hybrid heterojunction shows great promise for applications in wastewater treatment and renewable energy conversion processes.

12. List of Research publications and Patents taken, if any

SNo	Authors	Titleofpaper	Nameofthe Journal	Volume	Pages	Year
1	D. Eun Lee, N. Mameda, K. Prabhakar Reddy,B. M. Abraham W. K. Jo, S. Tonda,	Bifunctional S-scheme hybrid heterojunction comprising CdS nanorodsand $BiOIO_3$ nanosheets for efficient solar-induced antibiotic degradation and highly selective CO_2 reduction	Journal of Materials Science & Technology	161	74-87	2023

Dr. Mameda Naresh M. 12/10/2023

Name & Signature of PI

12/10/2023

Name & Signature of Head of the Department

Dr. J.V. Shanmukha Kumar
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Green Fields, Vaddeswaram-522 502
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