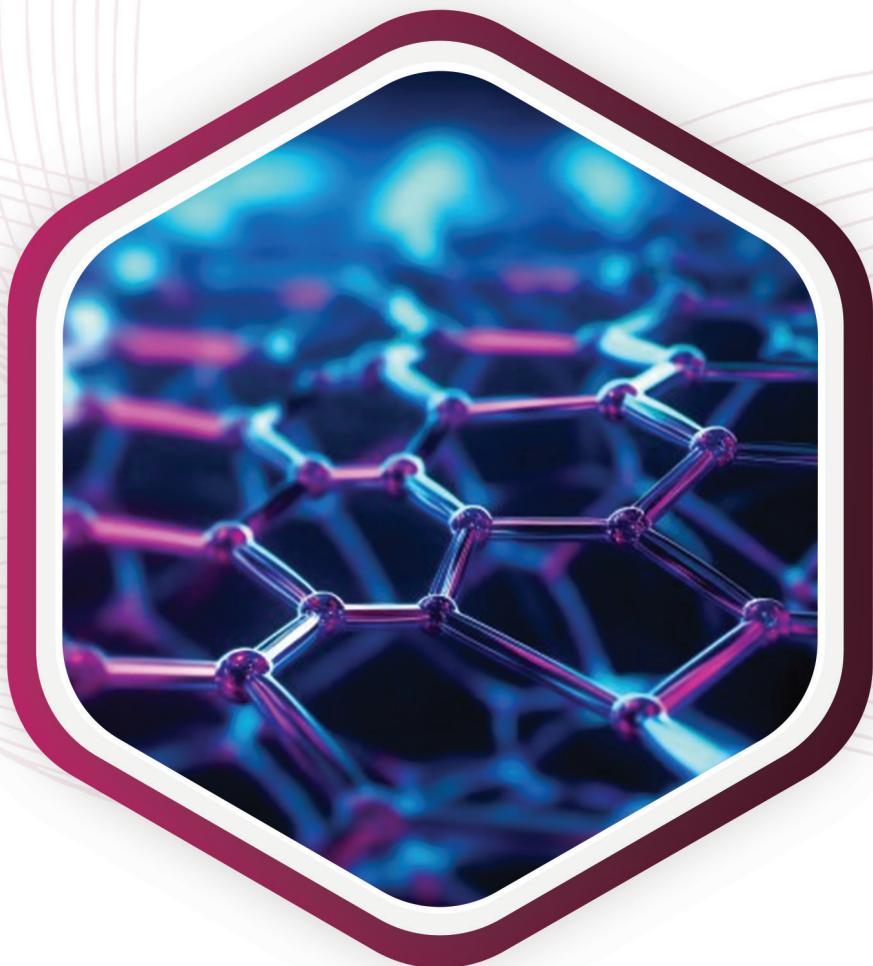


DEPARTMENT OF PHYSICS



EMERGING MATERIALS RESEARCH CENTRE

EMERGING MATERIALS CENTRE



ABOUT THE RESEARCH CENTRE

Emerging Materials Research Center was established in the year 2019 by the Department of Physics with the support of Department of Science and Technology under DST-FIST Level - 1 project with File No. SR/FST/PS-1/2018/35(C), worth of Rs. 107 Lakhs. In this project we procured the instruments multipurpose X-Ray Diffractometer (P-XRD-Malvern PANalytical) and Fourier Transform Infrared Spectroscopy (JASCO FT/ IR-4700). The main objective is to carry out quality research to deepen the understanding of emerging materials for potential applications, also to maintain state-of-the-art research facilities and technologies to support high-quality research. X-Ray Diffractometer is used for basic characterization of materials to know the material is amorphous or Crystalline, crystalline size, and morphology of materials. FTIR is a powerful analytical technique used to identify and analyze the chemical composition and molecular structure of substances by measuring the absorption of infrared light.



VISION

To drive forward globally the frontiers of materials science and contribute to technological and societal advancements through advanced research.



MISSION

- To carry out quality research to deepen the understanding of new and emerging materials, including their properties and potential applications.
- To develop novel materials for functionalities that address future challenges in various industries, such as energy, electronics, healthcare.
- To bridge the gap between theoretical research and practical applications by working on projects that can be implemented in real-world applications.
- To maintain state-of-the-art research facilities and technologies to support high-quality research.



OBJECTIVES

- To analyze the samples received from academicians, researchers, and other organizations.
- To provide instrumentation facility for researchers who are working in material science area.
- To maintain state-of-the-art research facilities and technologies to support high-quality research.

IMPLEMENTATION GROUP MEMBERS



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HIGHLIGHTS OF RESEARCH CENTRE

78

Scopus/SCI
Papers Published

13

Workshops &
webinars Organized

04

International and National
Conferences Organized

45

PG Students and Ph.D scholars
trained & benefited

11

Ph.D's awarded
(during 2019-2024)

1

Patent
Doc No. 202341080126

Consultancy:

- Generating consultancy with minimum charges.
- Amount generated RS. 1.5L

- XRD samples: 950

- Inhouse : 811

- Outside :139

- FTIR samples: 850

- Inhouse : 829

- Outside :21

HIGHLIGHTS OF RESEARCH CENTRE

Sri. Rohit Kumar, DST member visited DST - FIST Lab on 5th March 2022

Expert Talk on “Semiconductor Nanostructures for Optoelectronic Applications” by Prof. Chennupati Jagadish garu,



Dr.T.S.Rao, Fr.Sr.Advisor, Department of Bio-Technology, Government of India, visited on 11-03-2023



Workshop on FTIR Research and Data Analysis. FTIR is an effective analytical instrument for detecting functional groups and characterizing covalent bonding information. III year Bio-Technology students visited on 05-03-2024 to Emerging Materials Research centre.

FACILITY UTILIZED DEPARTMENTS

01 PHYSICS

02 CHEMISTRY

03 PHARMACY

04 CIVIL

05 ELECTRONICS & COMMUNICATION ENGINEERING

06 MECHANICAL

07 BIO-TECHNOLOGY

08 INSTRUMENTATION

Facility utilized Institutions: 8

- Andhra University, Visakhapatnam,
- GITAM University, Visakhapatnam,
- Acharya Nagarjuna University, Guntur,
- Delhi Technological University, New Delhi.
- Vijayawada Thermal Power Station, Ibrahimpatnam,
- Gudlavalleru Engineering. College, Gudlavalleru, Krishna Dt.
- SRM University, Amaravathi
- P.B.Siddartha college of Engineering, Vijayawada.
- Satya Sai university, Gulberg
- Muthaiah college, Tamilnadu

LIST OF PUBLICATION (SCI, SCIE, WOS)

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- Himabindu, B., N. S. M. P. Latha Devi, P. Nagaraju, and B. Rajini Kanth "Synthesis and Characterization of Flower-Like Cobalt-Doped ZnO Nanostructures for Ammonia Sensing Applications." *ECS Journal of Solid State Science and Technology* 13, no. 2 (2024): 027006. IF=2.2(SCI)
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LIST OF PUBLICATION (SCI, SCIE, WOS)

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- A.M. Gandhi, S. Shanmugan, S. Gorjani, C.I. Pruncu, S. Sivakumar, A.H. Elsheikh, F.A. Essa, Z.M. Omara, H. Panchal, Performance enhancement of stepped basin solar still based on OSELM with traversal tree for higher energy adaptive control, *Desalination*, 502, (2021), 114926, 10.1016/j.desal.2020.114926.
- P. Thamizharasu, S. Shanmugan, S. Sivakumar, C.I. Pruncu, A.E. Kabeel, J. Nagaraj, L.S. Videla, K. Vijai Anand, L. Lamberti, M. Laad, Revealing an OSELM based on traversal tree for higher energy adaptive control using an efficient solar box cooker, *Solar Energy*, 218, (2021), 320 -336, 10.1016/j.solener.2021.02.043.
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- Microstructural parameters from Xray peak profile analysis by Williamson-Hall models: A review, B.Himabindu, N.S.M.P.Latha Devi, B.Rajanikanth, *Materials today proceedings*, 01 July 2021, Vol 47, Part 14, Pages:4891-4896.

LIST OF PUBLICATION (SCI, SCIE, WOS)

2021

- Broadband NIR emission at 1.53 Qm in trivalent erbium ions doped $\text{SrO-Al}_2\text{O}_3\text{-B}_2\text{O}_3\text{-BaCl}_2\text{-10TeO}_2$ glasses for optical fiber and NIR laser applications, P. Sailaja, Sk. Mahamuda, K. Swapna, M. Venkateswarlu, Mohini Gupta, A.S. Rao, Journal of Non-Crystalline Solids, 567 (2021) 120937.
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- Photoluminescence properties of Sm^{3+} ions doped Bismuth Boro tellurite glasses, Ananthalakshmi, Y., Swapna, K., Mahamuda, S., Venkateswarlu, M., Rao, A.S., Solid State Sciences, (2021), 116, 106609
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- Structural, vibrational, morphological, optical and electrical properties of NiS and fabrication of SnS/NiS nanocomposite for photodetector applications N. Abhiram, D. Thangaraju , R. Marnadu , G. Johnsy Arputhavalli , S. Gunasekaran, P. Vetrivelan, N.S.M.P. Latha Devi, Mohd. Shkir , H. Algarni, Inorganic Chemistry Communications 133 (2021) 108882.
- The CALIPSO retrieved vertical structures of AOD and extinction coefficient for different aerosol types during 2007-2019 - A perspective over global and regional scales, Honglin Pan, Jianping Huang, Kanike Raghavendra Kumar, Lin Li An, et al. Atmospheric Environment, 274 (2022), 118986.

LIST OF PUBLICATION (SCI, SCIE, WOS)

2021

- Electrochemical and AC Conductivity Studies of PVA based Gel Polymer Electrolytes for Silver Ion Batteries V. Parthiban, G. Sunita Sundari, C.V.S. Brahmananda Rao, and Harikrishna Erothu, Asian J. Chem 34(5) (2022) 1303-1309
- Conducting Polymer Nanocomposite for Energy Storage and Energy Harvesting Systems, Advances in Materials Science and Engineering, Sonali Biswas, Hindawi (2022) 2266899
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- Dyes prepared from leaf extract of siriyangai (Andrographis Paniculata) with the effect of TiO_2 based DSSCs, Gottipati Dedeepya, S. Shanmugan, G. Sunita Sundari, N.S.M.P. Latha Devi M. Meenachi, M. Gnana Kiran, P. Selvaraju, Materials Today: Proceedings 66, Part 8, (2022) 3644-3650.
- Optical and spectroscopic studies of Dy^{3+} ions doped Alumino tungsten borate glasses for w-LEDs applications, V.R.L. Murty, M. Venkateswarlu, K. Swapna, Sk. Mahamuda, P. Rekha Rani, A.S. Rao, Polyhedron 227 (2022) 116137.
- Rupesh A. Talewar, Sk. Mahamud, A.S. Rao, S.V. Moharil, Journal of Luminescence, Intense infrared emission of Er^{3+} in ZnB_2O_4 phosphors from energy transfer of Bi^{3+} by broadband UV excitation, 244 (2022) 118706, I.F=2.776 (SCI)
- V. Murali Krishna, Sk. Mahamuda, P. Sailaja, K. Swapna, M. Venkateswarlu, Ch.B. Annapurna Devi, A.S. Rao, Near-IR luminescence in Nd^{3+} ions doped Na_2O - BaF_2 - CaF_2 - B_2O_3 - TeO_2 glasses for 1064 nm laser and fiber amplifier applications, Journal of Non-Crystalline Solids 590 (2022) 121671, I.F=3.2 (SCI)
- P.Sailaja, Sk. Mahamuda, K. Swapna, M.Venkateswarlu, A.S.Rao, Near-infrared photoluminescence studies of neodymium ions doped SrO - Al_2O_3 - $BaCl_2$ - B_2O_3 - TeO_2 glasses for laser and fiber amplifier applications, Optics and Laser Technology, 156 (2022)108569, I.F= 3.6 (SCI) .
- A. Heera Durga Prakash, Sk. Mahamuda, Jamila S. Alzahrani, P. Sailaja, K. Swapna, M. Venkateswarlu, A.S. Rao, Z.A. Alrowaili, I.O. Olarinoye, M.S. Al-Buriahi, Synthesis and characterization of B_2O_3 - Bi_2O_3 - SrO - Al_2O_3 - PbO - Dy_2O_3 glass system: The role of Bi_2O_3 / Dy_2O_3 on the optical, structural, and radiation absorption parameters, Materials Research Bulletin 155 (2022) 111952, I.F=5.3 (SCI).
- G. Palani, A.H.S. Shanmugan, V. Chithambaram, Growth, characterisation and anti-bacterial activity of LHCdBr single crystal, Materials Research Innovations, 25, 6, (2021), 331-337, 10.1080/14328917.2020.1814028.

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2021

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- NIR photoluminescence studies of Nd³⁺ doped B₂O₃-BaF₂-PbF₂-Al₂O₃ glasses for 1.063 Qm laser applications P. Rekha Rani, M. Venkateswarlu, K. Swapna, Sk Mahamuda, Rupesh A. Talewar, Ch. B. Annapurna Devi, A.S. Rao, *Journal of Luminescence* 229 (2021) 117701.
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- Seasonal change in the recent decline of dual high PM2.5 and O₃ pollution and associated chemical and meteorological drivers in the Beijing-Tianjin-Hebei region, China, Yuehan Luo, Tianliang Zhao, Yuanjian Yang, Lian Zong, Kanike Raghavendra Kumar, Hong Wang, et al., *Science of the Total Environment* 838 (2022), 156312.
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LIST OF PUBLICATION (SCI, SCIE, WOS)

2021

- H. Pan, J. Huang, K. R. Kumar, L. An, et al., The CALIPSO retrieved vertical structures of AOD and extinction coefficient for different aerosol types during 2007-2019 - A perspective over global and regional scales, *Atmospheric Environment*, 274 (2022), 118986, IF=4.2 (SCI).
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FACULTY ACHIEVEMENTS

- Early Career Research Awards (DST-SERB, Govt. of India)
- Young Scientist Award (DST, Govt. of India)
- Core Research Grant (DST. Govt. of India)
- Woman Scientists (DST, Govt. of India)
- Best Researcher Awards from various agencies
- Best Teacher awards
- AP Academy of Sciences- Associate Fellow

FACULTY NAME	PUBLICATIONS	PROJECTS	PATENTS	PH.D AWARDED	CITATIONS	H- INDEX	I10- INDEX
Dr.N.S.M.P. Latha Devi	30	1	6	2	523	13	14
Dr.K.Swapna	78	5	3	4	3092	30	50
Dr.Sk.Mahamuda	81	5	6	3	3128	31	58
Dr.G.Sunita Sundari	40	1	4	3	478	15	18
Dr.A.Venkateswara Rao	32	2	6	4	441	11	13

SUSTAINABLE DEVELOPMENT GOALS

PUBLICATIONS MEET 12 SDG's

2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	17 PARTNERSHIPS FOR THE GOALS

WORKSHOPS





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