FACULTY PROFILE

Mr.R. KARTHIKEYAN, M.Sc., M.Phil., MTech

Department of Physics

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PROFESSIONAL SUMMARY

- A Dedicated and passionate Physics faculty with 20+ years of experience in higher education.
- Materials science graduate with 10 years of materials engineering and research experience.
- Demonstrated excellence in teaching, research, and academic leadership.
- Proficient in developing innovative curricula and fostering student engagement.
- Strong collaboration skills, having worked with multiple research groups regularly.
- Skilled mentor in specialized areas of physics, such as nano photocatalytic materials
- Regularly involved in mentorship activities, guiding graduate and undergraduate students to successful project completion.
- Committed to promoting critical thinking and interdisciplinary collaboration.
- Efficient in experimental design and statistical analysis methods.
- Extensive experience in solid-state laser generation crystals, nonlinear optics, and synthesis of semiconductor quantum dots and metal nanoparticles using wet chemical solution processes and sol-gel techniques.
- Recognized for exceptional communication skills and ability to inspire students.

TECHNICAL SKILLS AND PROFICIENCIES

- Ability to identify and work with physics laboratory equipment, supplies, and materials.
- Set up, modify, service, adjust, and make minor repairs to laboratory apparatus and equipment.
- Analyze equipment malfunctions and perform repairs on optical, electrical, and mechanical equipment.
- Construct circuit diagrams and sketches for amplifiers, oscillators, digital electronics, logic gates, and half/full adder and subtractor circuits.
- Familiar with digital sensors, balances, traveling microscopes, telescopes, and spectrometers.
- Follow standard operating procedures.
- Maintain organized and accurate records.

EDUCATIONAL QUALIFICATION

Sl.No.	Degree	Specialisation	University/ Institute	Year of Passing	Marks (%/CGPA)
1.	Ph.D (Doing)	Metal/Semiconductor Nanocomposite Photocatalyst	Anna University	Jan 2022 - Till Date	
3.	M.Tech	Nanoscience and technology	Anna University Regional Campus Coimbatore	2010	8.28
3.	M.Phil	Physics	Madurai Kamaraj University	2000	65
4.	M.Sc	Physics	Madurai Kamaraj University	1999	78.4
5.	B.Sc	Physics	Madurai Kamaraj University	1997	79.5
6.	HSC	TN state Board	KVS Hr.Sec.School, Virudhunager	1994	70.25
7.	10th	TN state Board	KVS Hr.Sec.School, Virudhunager	1992	81

Ph.D Thesis title: Synthesis of metal ions (Ag/Cu/Fe) decorated functional metal sulfide (MS) (M: Zn, Cu, Sn) nanocomposite photocatalysts for environmental water purification

Current Research work

Preparation of Metal ions (Ag/Cu/Fe) decorated @ MetalSulfide Nanocomposites

Objective: The primary objective of this research is to synthesize and characterize nanocomposites like Cu@ZnS, Fe@SnS_2 Cu@SnS metal/semiconductor nanocomposites with varying metal ions content to tailor their band gaps and explore their structural and functional properties for specific light absorption and enhanced photocatalytic efficiency.

WORKING EXPERIENCE

Sl. No.	Designation	Organisation	From	To	Years of Experience
1.	Teaching Fellow	Anna University Regional campus Tirunelveli	12-09-2018	Till Date	5.09
2	Assistant professor	AAA College of Engineering and Technology, Virudhunager	03-06-2013	05-06-2018	5
3	Assistant professor	Kamaraj College of Engineering and Technology, Virudhunager	1-08-2001	31-05-2013	11.10
			Total Years of Experience		**22.07**

WORK STYLE

- Willing to perform basic tasks and progress to solving complex problems.
- Quick learner, able to adapt to new knowledge and environments rapidly.
- Strong independent work style, well-organized, and passionate.
- Smart working approach.
- Self-motivated and success-oriented

LEADERSHIP ACTIVITIES

- Led curriculum meetings and evaluated/reviewed the syllabus.
- Set and evaluated examination papers, supervised university examinations, and conducted/evaluated practical examinations.
- Held and led regular departmental meetings, ensuring accurate minute-keeping.
- Provided mentorship and guidance to junior faculty members.
- Developed and implemented strategies to improve departmental efficiency and effectiveness.
- Collaborated with faculty members to develop innovative teaching methodologies.
- Facilitated workshops and training sessions for faculty development.
- Represented the department in university-wide committees and initiatives.
- Served as a Science Fair Judge, evaluating projects and fostering scientific inquiry among students.

LIST OF WORKSHOPS/FDP/SKILL DEVELOPMENT PROGRAMS ATTENDED

Date/Period	Course Title	Conducted by	Sponsored by
8-12/12/2003	Materials Science (PH231)	College of Engg. Guindy	Anna University
18-29/11/2002	Energy management and conservation	Arasan Ganesan polytechnic Sivakasi	AICTE, New Delhi
10-15/2/2003	Ideal Trainer	Millennium's	KCET, Virudhunager

CURRICULUM PROJECTS

- Amplitude Modulation: Designed and analyzed a system for amplitude modulation in communication engineering
- Decomposition of Piezoelectric Tensor: Investigated and decomposed the piezoelectric tensor to understand its components and applications

- Sol-Gel Synthesis and In Vitro Characterization of Bioactive Ceramics Using Rice Husk Ash Waste Material: Developed bioactive ceramics using rice husk ash waste and characterized their properties through in vitro testing
- Processing of Porous Hydroxyapatite Scaffold: Fabricated and evaluated porous hydroxyapatite scaffolds for potential applications in bone tissue engineering

ACTIVITIES AND ACHIEVEMENTS

- Highly experienced in managing university examinations.
- Acted as exam nodal center in-charge.
- Served as Fine Arts Club Secretary.
- Conducted the college cultural festival.
- Conducted aptitude coaching classes for placements.
- Active member of the blood donation club.
- Participated in faculty development programs.
- Achieved a 100% pass rate five times.
- Member of the photography and audio club.

PROFICIENCY ON RESEARCH

- Proficient in conducting cutting-edge research on nano photocatalytic materials, with a focus on developing and optimizing semiconductor-based catalysts such as Tin di sulfide (SnS2) and Zinc sulfide (ZnS)
- Expertise in synthesizing and characterizing nanomaterials to enhance their photocatalytic efficiency for environmental applications, including air and water purification.
- Skilled in various modification techniques, such as doping, compositing, and surface engineering, to improve the photocatalytic activity under visible light. Experienced in utilizing advanced analytical methods to study the physicochemical properties and reaction mechanisms of these materials

- Adept at designing experiments to evaluate the performance of photocatalysts in degrading organic pollutants and generating renewable energy
- Strong background in collaborating with interdisciplinary teams to drive innovation in sustainable technologies
- Proven track record of publishing research findings in peer-reviewed journals and presenting at international conferences
- Committed to advancing the field of nano photocatalysis through continuous learning and application of novel research methodologies

RESEARCH INTEREST IN NANOCOMPOSITES FOR PHOTOCATALYSIS

- My research interest lies in the development and optimization of nanocomposite photocatalysts such as Cu@ZnS, Fe@SnS_2 for environmental and energy applications.
- I focus on designing advanced nanocomposite materials that synergistically combine the properties of different nanomaterials to enhance photocatalytic efficiency under visible light.
- My work involves the synthesis, characterization, and functionalization of nanocomposites to improve their stability, reactivity, and pollutant degradation capabilities.
- I am particularly interested in exploring novel doping and surface modification techniques to tailor the electronic and structural properties of nanocomposite photocatalysts.
- By integrating experimental and computational approaches, I aim to develop sustainable solutions for air and water purification, as well as renewable energy generation.

ADMINISTRATIVE RESPONSIBILITIES

- Designing and updating course syllabi, ensuring alignment with departmental standards and student learning outcomes.
- Advising students on academic matters, including course selection, research opportunities, and career paths in physics.

- Participating in faculty meetings and committees to contribute to departmental decision-making and policy development.
- Coordinating laboratory facilities and equipment maintenance to ensure safe and efficient operations.
- Collaborating with department heads and administrators on budget planning, resource allocation, and program assessment initiatives.

MEMBERSHIP IN PROFESSIONAL / CULTURAL BODIES / SOCIETIES

The Indian Society for Technical Education Life member LM 39388

LIST OF PUBLICATIONS IN PEER-REVIEWED IN JOURNALS

R. Vidhya, P. Malliga, **R. Karthikeyan**, K. Neyvasagam, Influence of nickel dopant concentration on structural, optical, magnetic and electrochemical, properties of TiO2 nanoparticle Int. J. Nanotechnol., yVol. 18, No. 5-8, pp 610-621, 2021

R Vidhya, R Gandhimathi, **R Karthikeyan**, K Neyvasagam, Visible light driven enhancement in photodegradation of organic dyes using FexTi1-xO2 thin films, Materials Today: Proceedings 47, 1819-1828,2021

R Gandhimathi, R Vidhya, **R Karthikeyan**, Study on effect of Cu integration and Oxygen vacancy/defect creation in electronic properties of TiO2 photocatalyst using first principles calculations, SCIREA Journal of Materials, Volume 6, Issue 4, August 2021

LIST OF PUBLICATIONS IN INTERNATIONAL/NATIONAL CONFERENCES/SEMINARS

R Karthikeyan, M. Gunasekaran, Hands-on Training on Electrochemical Analysis and Photocatalysis for Nanomaterials" during March 18-20th March 2024, organized by Centre for Nanoscience and Nanotechnology, Centre of Excellence for Energy Research, Sathyabama Institute of Science and Technology, Chennai - 600 119, Tamil Nadu, India

R. Karthikeyan, A THREE-DAY ONLINE WORKSHOP ON RECENT TRENDS IN CRYSTAL GROWTH TECHNOLOGY (RTCGT-2024), SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY, Department of Chemistry & School of Science and Humanities, Centre for Nanoscience and Nanotechnology, during8-10, February2024.

R. Karthikeyan, M. Gunasekaran, Exploring the Photocatalytic and Optical Properties of ZnS Nanostructures through the Formation of Cu@ZnS Nanocomposites, International Conference on Recent Advancements in Materials Science and Nuclear Energy Research, (ICRAMNR-2024), Feb 16, 2024, Government Arts and Science College, Kovilpatti, Thoothukudi

R. Karthikeyan, M. Gunasekaran," Structural, morphological, and optical properties of Zinc Sulphide nano photocatalyst prepared by wet chemical method", International Conference on Nanoscience and Nanotechnology – ICONN 2023 (Virtual Conference, March 27-29, 2023. SRM, Chennai.

R. Karthikeyan, M. Gunasekaran, Influence of proximity of Ag and Cu metal nanoparticles in the bandgap modification of Tin disulfide (SnS2) nanoparticles, Department of Physics, SRM INSTITUTE OF SCIENCE & TECHNOLOGY, RAMAPURAM, Hierarchically Structured Materials, 2 nd Virtual International Conference on (ICHSM - 2022)

R. Karthikeyan, M. Gunasekaran*, Synthesis of Cu metal ions decorated Zinc Sulfide (ZnS) nanocomposites for catalytic applications, 2nd international conference on sustainable aspects in Engineering Technology management and science,(ICSAETMS 2K22), 26 th August 2022, Udaya Scholl of Engineering, Udaya Nager, Vellamodi, Ammandi Viali post, Kanyakumari Dist, India

R. Vidhya , R. Gandhimathi , **R. Karthikeyan**, K. Neyvasagam, Effect of Co doping on Optical and Photocatalytic activity of TiO_2 nanoparticles by precipitation method, One day Virtual International Conference on "Current Trends in Materials, Science and Technology (CTMST-2021)",Nehru Institute of Technology, Coimbatore, 26th July 2021.

R.Vidhy, R.Gandhimathi, **R.Karthikeyan,** K.Neyvasagam, Visible light driven enhancement in photodegradation of organic dyes using $FexTi_{1-xO2}$ thin films, INTERNATIONAL WEB CONFERENCE ON ADVANCED MATERIALS SCIENCE AND ENGINEERING(ICAMSE) organized by the Department of Physics, Bannari Amman Institute of Technology during September 11-12, 2020.

R Gandhimathi, R Vidhya, **R Karthikeyan**, Study on effect of Cu doping and oxygen vacancy creation in Cu doped TiO2 photocatalyst using first principle calculations, INTERNATIONAL WEB CONFERENCE ON ADVANCED MATERIALS SCIENCE AND ENGINEERING(ICAMSE) organized by the Department of Physics, Bannari Amman Institute of Technology during September 11-12, 2020.

R. Vidhya, **R. Karthikeyan**, R. Gandhimathi 3 , K. Neyvasagam, Photocatalytic performance of visible light irradiated Tin disulfide (SnS_2) nanoparticles prepared with different aged times , DAE SSPS 2021 to be held at DAE Convention Centre, Anushaktinagar, Mumbai during December 15-19, 2021.

R. Karthikeyan, M. Gunasekaran, Photoluminescence in Degenerate States of Heavily Doped SnS Nanoparticle, DAE-Solid State Physics, Symposium-2018, held at Guru Jambheshwar University of Science and Technology, Hisar, Haryana, December, 18-22, 2018

R. Karthikeyan, Preparation and characterization of cu doped tio2 thin films with dip coating cycle 5, 7 & 9 for the degradation of methylene orange pollutant, International Conference on Frontier Areas in Chemical Technologies-2017 (FACTs-2017) which will be held from, July 6th to 8th 2017, at Alagappa University, Karaikudi, Tamilnadu, India.

R. Karthikeyan, Effect of Thickness on Catalytic Performance of Cu Doped TiO_2 Thin Films, International confernece on Advanced materials, Department of Physics, School of Physical Sciences, St.Joseph's College, Tiruchirappalli, 620002 on Dec 14-15, 2017

R. Vidhy, **R. Karthikeyan**, R. Gandhimathi , K. Neyvasagam, “Phtotocatalytic degradation of Methyelene Blue by Cu doped TiO2 thin films, under Visible light irradiation, Mechanics, Materials Science & Engineering, Month YEAR – ISSN 2412-5954, MMSE Journal.