



KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

Opp : Yerragattu Gutta, Hasanparthy (Mandal), WARANGAL - 506 015, Telangana, INDIA.

కాకతీయ ప్రేయోగికీ एवं विज्ञान संस्थान, వరంగల్ - 506 015 తెలంగాణ, భారత

కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ - 506 015 తెలంగాణ, భారతదేశము

(An Autonomous Institute under Kakatiya University, Warangal)

(Approved by AICTE, New Delhi; Recognised by UGC under 2(f) & 12(B); Sponsored by EKASILA EDUCATION SOCIETY)

DEPARTMENT OF PHYSICAL SCIENCES

Research and Education Centre

Liquid Crystals

The Research and Education Center – Liquid Crystals is established in the Department of Physical Sciences, Kakatiya Institute of Technology and Science, Warangal on 2nd August 2023.

It is located in the Room No-226 of Block-IV.

The Center is headed by Dr.D.MadhaviLatha, Assistant Professor in Physics and has completed two major research projects worth 42 lakhs and currently, working on one more major research project worth 38 lakhs funded by the Department of Science and Technology, Government of India. She has published more than 50 research publications in reputed SCI journals with a total impact factor 100. This Center was aimed to conduct basic and applied research in the liquid crystals. The Center focuses to design novel liquid crystalline compounds, synthesis of crystal compounds, liquid crystals with Nano composites for super capacitor applications and photonic applications. The Center also currently working to integrate the material research with the disruptive technologies such as machine learning and Artificial Intelligence for the prediction of material properties using this approach.

Vision

To develop a cutting edge research laboratory specializing in liquid crystals and also to cultivate a vibrant research culture among students and maintaining the reputation of Institute.

Mission

- Designing novel materials for energy storage, sensors and photonic applications by investigating conductivity, optical, thermal properties to optimize the performance.
- Integrating the disruptive technologies to liquid crystal research to predict material properties
- Establish global collaborations to foster research collaboration with experts in related field to ensure a multidisciplinary approach.
- Engage in outreach activities to promote science and technology among the students by conducting workshops, seminar, webinars and Hand's on sessions

Objectives:

- To design and synthesis the novel compounds for desired applications such as supercapacitors, sensing applications, photonic applications etc.
- Identifying the thrust areas in the field of study and to expand the research work.
- Publish quality research in reputed journals with good impact factors.
- Apply for different funding agencies to establish state in art facilities in the lab.

Infrastructural Facilities

1. LCR Meter (Model No.: IM3536) , MAKE: Hioki, Japan
2. Pot Type High-Temperature Furnace Model No.: MI-F1000, Make: MINE
3. Sample (Thin Film & Pellet) Holder with Platinum Plating Model No.: MI-F1000P-1
Make: MINE
4. Polarising Optical Microscope- SD technical Specialities



Collaborations

1. Prof. P.V. Raja Shekar, Department of Physics, School of Sciences, SR University, Warangal, Telangana, India.
2. Dr.V.Jayalakshmi, Soft Matter Research lab, Department of Physics, National Institute of Technology Warangal(NITW), Telangana, India
3. Prof. Kusum Kumari, Department of Physics and Astronomical Sciences, Central University of Jammu, Samba, Jammu.
4. Prof. B.T.P. Madhav, Antennas and Liquid Crystal Research Centre, Department of Electronics and Communication Engineering, K L University, Vaddeswaram, Guntur, Andhra Pradesh.

Sponsored Research Projects

1. Ongoing

S. No.	Title of the Project	Funding Agency	Period	Amount	Status
1	Convolutional neural network analysis of liquid crystal images for effective prediction of properties – A machine learning approach(DST/WOS-A/PM-115/2021)	Department of Science and Technology	August, 2023 to August, 2026	38.41 Lakhs	Ongoing

2. Completed

S. No.	Title of the Project	Funding Agency	Period	Amount	Status
1	Investigations on some Novel Liquid Crystalline Compounds for Photonic Applications	Department of Science and Technology	August, 2015 to August, 2018	27.83 Lakhs	Completed
2	Optical Studies on Nanoparticles doped Liquid Crystals	Department of Science and Technology	August, 2010 to July, 2013	14.58 Lakhs	Completed

Papers Published(2022-23)

1. Spectral response of apodized fiber Bragg gratings as strain and temperature sensor, International Journal of Modern Physics B, 36, 2250207, 2022 (**SCI, Impact Factor: 1.404**).
2. Strength and deformation characteristics of L-lysine monohydrochloride dihydrate crystals, Solid State Sciences (2023) (**SCI, Impact Factor: 3.752**) – Accepted.

Student Conference Papers (2021-22)

Guided 5 students of I B.Tech. Sem-I (IT1) in presenting the following three papers on the emerging fields at Sumshodhini'21, of which the presentation on **Paper 1 secured First prize.**

Paper 1: Machines predicting properties of materials through image analysis: An artificial intelligence approach

Paper 2: Opportunities and challenges of artificial intelligence in education

Paper 3: Brain Computer Interfaces (BCI): A route towards hands-free Sci-Fi devices

Student Conference Papers (2022-23)

Guided 2 students of I B.Tech. Sem-I (IT1) in presenting the following paper on the emerging fields at Sumshodhini'22, and the presentation **secured Third prize.**

Paper 1: Quantum Information Processing – Scope and Challenges

Outreach activity:

As a part of our outreach activity to bring awareness about science and technology among student community and also to share the knowledge in science for clear understanding of the concepts on the eve of 'National Science day - Indigenous Technology for Viksith Bharath' on 28th February, 2024. We conducted an Hand's on session to the students of 9th Std in Telangana State Residential School, Hasanparthy, Telangana to demonstrate the Newton's Laws of motion using Balloon Powered Car with the aim of specific outcomes such as to make students understand the nature of forces and motion, gain knowledge to design a vehicle demonstrating Newton's laws of motion along with an idea of inculcating teamwork.

