



B.M.S COLLEGE OF ENGINEERING, BENGALURU-19
Autonomous Institute, Affiliated to VTU
Department of Physics

AY 2020-21 (1st of July 2020- 31st of June 2021)

1) Dr. Murugendrappa M.V

HOD & Associate Professor, Dept. of Physics

July 20th, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics presented a research paper entitled “DC Conductivity and Thermo-electric Power Studies of multiphase Polypyrrole/Vanadium Oxide-Aluminium Oxide Nano Composites” in One day online International conference on “Advanced Materials” organised by Department of Physics of KLE Society’s P. C. Jabin Science College, Vidya Nagar, Hubballi, Karnataka – 580031

August 08th, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics published a research paper entitled “Temperature-dependent transport properties of micro and nano-sized zinc cobalt oxide ($ZnCo_2O_4$) and zinc manganese oxide ($ZnMn_2O_4$) particles synthesized by a hydrothermal route” in Elsevier: **Ceramics International : Q1 Journal with Impact Factor: 3.83 Volume 46, Issue 14, 1 October 2020, Pages 22492-22503**
<https://doi.org/10.1016/j.ceramint.2020.06.009>

August 19th, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics delivered a talk as a guest speaker for the online FDP on "Recent Advances in Science & Technology" organised by Department of Physics, Don Bosco Institute of Technology, Bengaluru.





August 20th, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics delivered a talk as a guest speaker for the two Day National Level Faculty Development Programme on "Current trends in Research" organised by Department of Basic Science and R&D Center, by Tontadarya College of Engineering, Mundaragi Road, Gadag - 582 101, Karnataka, INDIA.



TONTADARYA COLLEGE OF ENGINEERING
MUNDARAGI ROAD, GADAG-582101
 Karnataka, India
 Recognized By AICTE, New Delhi,
 Affiliated To VTU, Belagavi
 Accredited By NBA (CV, ME, EEE)




Department of Basic Science And R&D Center
Organizing Two Days Online Faculty Development Program
 on
CURRENT TRENDS IN RESEARCH
 19th & 20th August 2020
 Inauguration at 10.30AM & Sessions 11.15 AM to 01.00 PM



Keynote Speaker
Dr. M. M. Awati
 Principal, TCE, Gadag.



Nanotechnology in Consumer Products, Innovation and Research
Dr. Jaysukh Markna
 Associate Professor & HoD of Nanotechnology
 VVP Engineering College Rajkot – 360005.



Synthesis and Characterization of Conducting Polymers for Sensors Application
Dr. Murugendrappa M V
 Associate Professor and Head - Department of Physics
 BMS College of Engineering, Bangalore

INSTRUCTIONS TO PARTICIPANTS

- No Registration Fee
- Conducted through Microsoft Team
- Assessment test after every session
- E-Certificate will be issued

WHO CAN PARTICIPATE?

- Faculty of Engineering and Science College
- Research scholars

Registration form link
<https://forms.gle/g2i8bGtha61tKxPXA>

CONVENER	HOD	DEAN R&D	PRINCIPAL
Prof. H. Shashidhargowda (8310526797)	Prof. Sunilgouda S Patil	Dr. V. T. Magalad (8123353536)	Dr. M. M. Awati

COORDINATORS: Dr. Jayashree Radder (9886928791), Prof. Anand Halli (9845800705),
 Prof. Jyoti Reddy (9538163983), Prof. Madhu K. N (959132416),
 Prof. Kavya Abbigeri (9448458720)

August 24th, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics published a research paper entitled “Effect of Cobalt Aluminum Oxide Nanoparticles on the Structural, DC Conductivity and Humidity Sensing Properties of Polypyrrole” in **Taylor & Francis: Journal of Macromolecular Science, Part B:** with the Impact Factor: 0.911
<https://doi.org/10.1080/00222348.2020.1807691>

September 16th, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics participated in One Day National Webinar on “Recent Advances in Carbon Nanomaterials”, Organized by Department of Physics, Dr.Ambedkar Institute of Technology, Bengaluru-56. In association with Institute of Engineering and Technology,Dr. Rammanohar Lohia Avadh University, Ayodhya, UP, India.



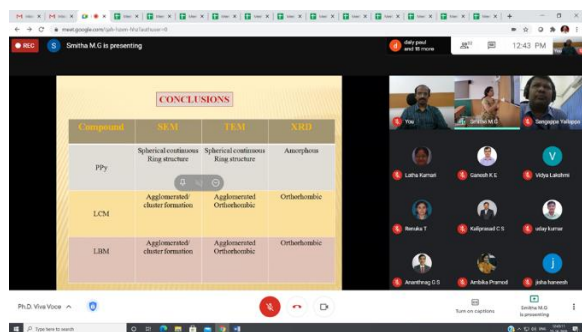
September 1, 2020: Dr. Murugendrappa M V, Head, Department of Physics published a research paper entitled “Synthesis and characterization of WO₃ - doped polyaniline to sense biomarker VOCs of Malaria” in **Springer: Applied Nanoscience**, 1-16, ISSN 2190-5509 **Q3 Journal with Impact Factor: 2.88**
<https://doi.org/10.1007/s13204-020-01551-3>

September 19, 2020: Dr. Murugendrappa M V, Head, Department of Physics published a research paper entitled “Three-Dimensional Variable Range Hopping and Thermally Activated Conduction Mechanism of Polypyrrole/Zinc Cobalt Oxide Nanocomposites” in **ACS Publications: The Journal of Physical Chemistry C** Volume 124, Issue 39, pp 21772–21781, **Q2 Journal with Impact Factor: 4.189**
<https://doi.org/10.1021/acs.jpcc.0c05889>

October 14, 2020: A New research laboratory allocated to Department of Physics in P.G Block 5th floor named “Functional ceramics and Atmospheric Aerosols research lab” was inaugurated in esteemed presence of Principal Dr. B.V Ravishankar, Vice Principal Dr. S. Muralidhara and HOD Dept. of Physics Dr. Murugendrappa M.V. with other department colleagues.

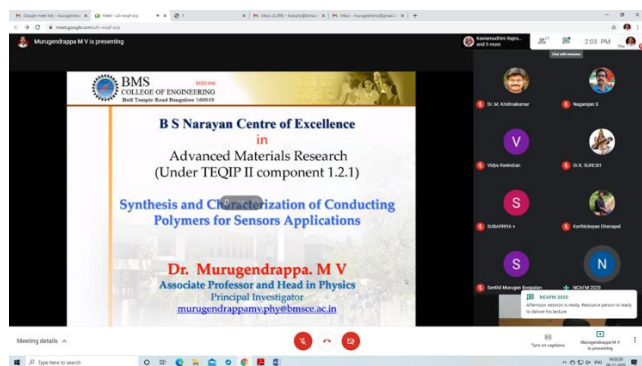


October 23, 2020: Department of Physics organized Ph.D. Final Viva Voce of Mrs. Smitha M G, 1BM15PGJ02, on the title “Synthesis, characterization & Transport studies of polypyrrole Nano composites” under the guidance of Dr. Murugendrappa M V, Associate Professor and Head of the Department in Room No. 202, II Floor, New Building, BMSCE at 11.30 AM. Dr. Y Sangappa, Professor of Physics, Mangalore University, Mangalore was the External Examiner with google meet link meet.google.com/qah-hzxm-hhz.



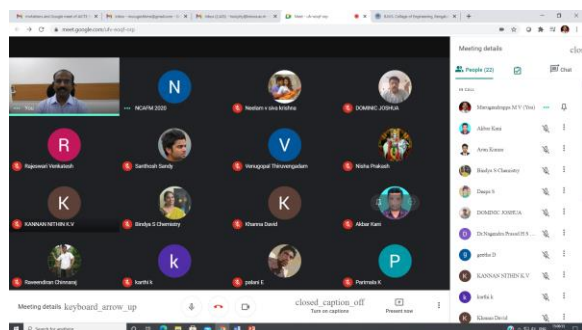
November 6, 2020: Dr. Murugendrappa M V, Head, Department of Physics published a research paper entitled “Effect of rare earth oxide nanoparticles on the photoluminescence and conductivity properties of PVA films” in **AIP Conference Proceedings Volume no - 2265, Issue 1 030048 (2020)**; <https://doi.org/10.1063/5.0017068>

November 9, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics delivered a talk as a Resource person on the topic “Synthesis and Characterization of Conducting Polymers For Sensors Applications” in the AICTE Sponsored Two-week online Faculty Development programme on “Advanced Physics for Engineers” organised by Thanthai Periyar Government Institute of Technology, Vellore – 632 002. Tamil Nadu. India from November 04-17, 2020.

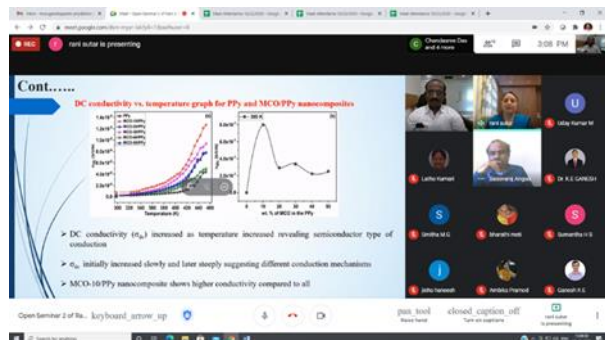


November 11, 2020: Dept. of Physics, Polymer composites lab under Centre of Excellence, BMSCE and Acharya Pathashala College of Arts and Science, N.R Colony, Bengaluru entered into a MOU regarding sharing of Research Knowledge and Research activities among student and faculty Members.

November 30, 2020: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics delivered a talk as a Resource person on the topic “Synthesis and Characterization of Conducting Polymers For Sensors Applications” in the AICTE Sponsored Two-week online Faculty Development programme on “Advanced Physics for Engineers” organised by Thanthai Periyar Government Institute of Technology, Vellore – 632 002. Tamil Nadu. India from 25.11.2020 to 08.12.2020.



December 10, 2020: Mrs Sutar Rani Ananda Research scholar, Department of Physics doing her PhD under the guidance of Dr. Murugendrappa M V, Associate professor and Head, Department of Physics, delivered an Open seminar 2 of her PhD work online from 02.30 PM to 3.30 PM. The doctoral committee members Dr Basavaraj Angadi, Professor, Dept. of Physics, Bangalore University, Bangalore an external domain expert and Dr. Latha Kumari, Assistant Professor, Dept. of Physics, BMSCE an internal domain expert and the faculties and research scholars of BMSCE were present.



January 04, 2021: Dr. Murugendrappa M.V – HOD & Associate Professor of Department of Physics got the Sanction of Financial support towards seed money of Rs.3, 00,000/-for R & D activates. Title of the Proposal – Studies on the effects of structural modifications in the polypyrrole based nanocomposites on the gas sensing performance.

January 12, 2021: Dr. Murugendrappa M V, Associate Professor and Head, Department of Physics was invited as an expert member for BOE meeting in the Bangalore University to scrutinize the Engineering Physics.

March 15, 2021: Dr. Murugendrappa M V, Head, Department of Physics published a research paper entitled “Facile Use of Silver Nanoparticles-Loaded Alumina/Silica in Nanofluid Formulations for Enhanced Catalytic Performance toward 4-Nitrophenol Reduction” in International Journal of Environmental Research and Public Health, 2021, 18, 2994. **Q1 Journal with Impact Factor: 2.849** <https://doi.org/10.3390/ijerph18062994>

April 06th, 2021: Dr. Murugendrappa M V, Head, Department of Physics published a research paper entitled “Fabrication, characterization and malaria biomarker VOC - sensing properties of WO₃ - doped polyaniline” in an International Springer Published Journal of Materials Science: Materials in Electronics, Issue 8, 2021, **Q2 Journal with Impact Factor: 2.220**

June 06th, 2021: Dr. Murugendrappa M V, Head, Department of Physics published a research paper entitled “Dy³⁺ doped Y₂MoO₆ nanopowders for white light emission: Spectroscopic and transport properties for optoelectronic and energy harvesting applications” in an International Colloid and Interface Science Communications, [Volume 43](#), July 2021, 100447, Q1 Journal with Impact Factor: 2.831 <https://doi.org/10.1016/j.colcom.2021.100447>

Colloid and Interface Science Communications 43 (2021) 100447



Contents lists available at ScienceDirect

Colloid and Interface Science Communications

Journal homepage: www.elsevier.com/locate/colcom



Rapid Communication

Dy³⁺ doped Y₂MoO₆ nanopowders for white light emission: Spectroscopic and transport properties for optoelectronic and energy harvesting applications

K.R. Bhagya^a, R.B. Banavara^{b,c}, K.R. Jyothi^d, H. Nagabhushana^e, M.V. Murugendrappa^a, A. P. Gnana Prakash^f, N.M. Nagabhushana^g, Vinayakrasanna N. Hegde^h

^aDepartment of Physics, RVV Engineering College, Bellary 582104, India
^bDepartment of Physics, IISc Institute of Technology and Management, VYSR Adugodi, Bangalore 560064, India
^cDepartment of Physics, A. M. S. College of Engineering, Bangalore 560010, India
^dDepartment of Studies in Physics, University of Jammu, Baramulla, Jammu 191006, India
^eProf. C.R.R. Rao Centre for Advanced Materials Research, Tatyasaheb Kore, Tumkur University, Tumkur 572101, India
^fDepartment of Physics, Vidyaniketan College of Engineering, Mysore 570012, India

ARTICLE INFO

Keywords:
Nanopowder
Photoluminescence
White-light
Color purity, quantum efficiency

ABSTRACT

In this communication, we report the white light emitting Dy³⁺ ion doped Y₂MoO₆ (YMO) nanopowders (NPs) prepared via green combustion synthesis route by utilizing the Al₂O₃ wet gel as surfactant. For the comparison to the endow, we represent YMO:0.05Dy³⁺ as YMO. The cubic structure of the YMO is confirmed by the results of powder X-ray diffraction (PXRD). The energy band gap values are studied by diffuse reflectance spectra (DRS) plot and the observed values are found to be in the range of 2.33–2.61 eV. The block-like structure of the fabricated nanopowders is analyzed by means of scanning electron microscope (SEM) images. Transmission electron microscope (TEM) images are used to evaluate the particle size of the prepared powders. The crystallinity and interplane spacing are analyzed by means of selected area diffraction (SAED) and high-resolution TEM (HRTEM) images respectively. In order to study the luminescence behaviour of the fabricated powders, the photoluminescence spectra are recorded in the range of 400–675 nm under 366 nm excitation wavelength. There are three prominent peaks positioned at 460, 495 and 637 nm which are corresponding to the ⁷F₂ → ⁷F₀, ⁷F₃ → ⁷F₀ and ⁷F₄ → ⁷F₀ respectively. The direct current conductivity is studied in the temperature range from 30 to 400 °C. The DC conductivity of 8% increases with increase in temperature. The color coordinate of the fabricated powder is studied by means of color diagrams namely, CIE and CCT. It is noticed from the color diagram that, the emission color lies in the bright white region (0.33, 0.32) which is a characteristic emission of the Dy³⁺ doped powders. The obtained CCT value (5428 K) indicates that the prepared powder can be effectively utilized for cool LED sources in the indoor lighting applications. The average color purity (CP) values are found to be 80%. The quantum efficiency of the prepared nanopowders is found to be ~46.42%. The above findings substantiate the ability of YMO: Dy³⁺ phosphor to be used in photoelectric and display device applications.

1. Introduction

In latest days, conventional luminous and bright lamps are being substituted by LEDs (white light-emitting diodes) owing to their superior applications namely, energy harvesting, lengthy life and eco-friendliness [1–3]. The present solid-state light fixtures use trivalent rare earth (RE) doped powders, which are necessary for the production of light-emitting diode (LED) components [1–3]. For illumination, dosimetry and 3D holographic design applications, lanthanide ion doped phosphors and crystals are extensively studied [1]. The Y₂MoO₆ is an excellent host for doping trivalent RE ions owing to its high thermal and chemical stability, in the display, the areas of lighting and offer suitable sites [1–3]. When related to the RE materials the high degree of nonradiative relaxation in transition metal ions has made them to be rare material for the luminescence properties [1–3]. The Dy³⁺ ions have the best radii of 0.96 Å which can easily replace the Y³⁺ ions 0.90 Å.

^{*} Corresponding author.
 E-mail address: vinayakrasanna@gmail.com (K.R. Banavara), nagabhushana@gmail.com (N.M. Nagabhushana).
<https://doi.org/10.1016/j.colcom.2021.100447>
 Received 16 March 2021; Received in revised form 6 June 2021; Accepted 7 June 2021
 2215-0882/© 2021 Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1) Dr. T.S Pranesha

Professor, Dept. of Physics

January 04, 2021: Dr. T.S Pranesha – Professor of Department of Physics got the Sanction of Financial support towards seed money of Rs.1, 50,000/- for R & D activates. Title of the Proposal – Synthesis and Characterization of endohedral cluster fullerene to improve anharmonicity and ZT value for SnSe compound.

4) Dr. B.L Suresha

Asst. Professor, Dept. of Physics

August 27th to 28th, 2020: Dr. B L Suresha, Asst. Professor, Department of Physics participated in international webinar in physics on Laser, Space Programme and low temperature Physics organised by Department of Physics, Vijaya college, Bangalore.

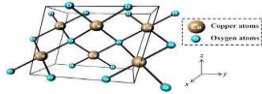


December 21 to 23, 2020: Dr. B.L Suresha, Asst. Professor, Department of Physics, Mrs Ambika A.V & Mrs. Navya N Research scholars, Department of Physics presented a Flash Talk (Poster) Presentations of the Paper titled as “Electrochemical Determination of Dopamine Using Multiwalled Carbon Nanotubes” in NCLC 2020. Technical Program organised by Department of Applied Physics, Amity Institute of Applied Sciences, Amity University, Uttar Pradesh, Noida-201313, India

January 1, 2021: Dr. B.L Suresha, Asst. Professor, Department of Physics, Mrs. Navya N Research scholar, Department of Physics presented a Flash Talk (Poster) Presentation of the Paper titled as “Synthesis and Characterization of copper oxide nanoparticles ” in NCLC 2020. Technical Program organised by Department of Applied Physics, Amity Institute of Applied Sciences, Amity University, Uttar Pradesh, Noida-201313, India.

**FLASH TALK PRESENTATION
ON**

**Synthesis and characterization of Copper oxide
nano particle by facile solution combustion
method.**



NAVYA N
DEPARTMENT OF PHYSICS
BMS COLLEGE OF ENGINEERING
BANGALORE - 560019

January 04, 2021: Dr. B.L Suresha – Assistant Professor of Department of Physics got the Sanction of Financial support towards seed money of Rs.2, 50,000/- for R & D activates. Title of the Proposal – Synthesis and Characterization of Nano materials doped with Liquid Crystal for liquid crystal for Liquid Crystal display and drug delivery application.

January 07, 2021: The Department of Physics conducted the Pre PhD comprehensive Viva voce of the Research Scholar Mrs. Navya. N in 2nd floor, Platinum Jubilee block room no 202 with external member Dr. K. Fakruddin, Prof & HOD of Dept. of Physics Ghousia college of Engineering, Ramanagaram.



January 08, 2021: The Department of Physics conducted the Pre PhD comprehensive Viva voce of the Research Scholar Mrs. Ambika A.V in 2nd floor, Platinum Jubilee block room no 202 with external member by Dr. Dhananjaya. N, Assosiate Prof & HOD of Dept. of Physics B.M.S.I.T & M.



May 16th, 2021: Dr. B.L Suresha, Assistant Professor of Department of Physics, published a research paper entitled “Electrochemical sensor studies of dopamine using multiwalled carbon nanotubes by CVD technique” in an Elsevier Published journal Physica B: Physics of Condensed Matter DOI <https://doi.org/10.1016/j.physb.2021.413137> **Q2 Journal with Impact Factor: 2.4**

May 19th-21st, 2021: Dr. B.L Suresha, Assistant Professor of Department of Physics, presented a research paper entitled “Synthesis and characterization of Anatase Titanium Dioxide Nanoparticles with High Photo-catalytic Activity by facile solution combustion method” in International Conference on Sustainable Materials and Technologies for Bio and Energy Applications (SMTBEA-2021) organized by Department of Electronics and Communication Engineering (ECE) & SSN Research Centre (SSNRC), Sri Sivasubramaniya Nadar College of Engineering, Chennai, India.

June 16th, 2021: Dr. B L Suresha, Assistant Professor and Mr. H S Sumantha, Research Scholar, Dept. of Physics published a research paper entitled “Facile and eco-friendly combustion synthesis of NiO particles for photodegradation studies” in Chemical Physics Letters, Volume 779, 16 September 2021, 138837. **Q2 Journal with Impact Factor: 2.029**
<https://doi.org/10.1016/j.cplett.2021.138837>

Chemical Physics Letters 779 (2021) 138837

Contents lists available at ScienceDirect

Chemical Physics Letters

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

Research paper

Facile and eco-friendly combustion synthesis of NiO particles for photodegradation studies

H.S. Sumantha^a, S. Rajagopal^a, G. Nagaraju^a, M. Shaashank^d, B.L. Suresha^{a,*}

^a Department of Physics, J.M.S. College of Engineering (Affiliated to Vellore Institute of Technology, Vellore), Bangalore 560019, Karnataka, India
^b Department of Physics, School of Science, Block-1, Center for Two-Dimensional (2D) and Graphene (CGP), IISc (Dated to IIT University), Agrahara 2nd Block, Bangalore 560012, Karnataka, India
^c Department of Chemistry, Siddaganga Institute of Technology (Affiliated to Vellore Institute of Technology, Vellore), Tumkur 572 323, Karnataka, India
^d Department of Studies and Research in Industrial Chemistry School of Chemical Science, Kuvempu University, Shivamogga 577481, Karnataka, India

ARTICLE INFO

Keywords:
NiO particles
Solid-state combustion method
DFT
Photocatalytic degradation

ABSTRACT

Nickel oxide (NiO) particles were synthesized by varying temperature through solid-state combustion method. The effects of annealing temperatures such as 600, 750, 850, 950, and 1050 °C, on the crystallite size, absorption properties, and photodegradation of methylene blue (MB) were studied. Progressive enhancement of crystallinity of the samples was clearly observed in FE-SEM images. The photocatalytic degradation of MB with different crystallite size was studied, showing that degradation increases with increasing the sample's crystallinity. The percentage of degradation of MB dye is found to be 96% in three hours. Furthermore, the density functional theory (DFT) studies have been performed for NiO to understand the linear optical and chemical properties. The DFT results are found to have a good correlation with the experimental findings.

1. Introduction

Transition metal oxides (TMOs) have shown remarkable properties such as structural flexibility, electrical, optical, and magnetic properties due to their electronic structure, surface properties, and defects [1]. Among other TMOs, the NiO particles show many unique magnetic, optical, electronic, and chemical properties, so they have shown great potential for application in various electrochemical systems as cathode material, solid oxide fuel cells (SOFC), dye-sensitized solar cells, semi-conductors, p-type transparent conducting films, catalysis, anti-ferromagnetic layers, gas sensors, etc [2,3]. NiO particles are the p-type semiconductor material with a band gap between 3.0 and 4.0 eV, and it is attached to an excess of oxygen and vacant nickel atoms in the octahedral system [4,5]. NiO phases' oxides are NiO, Ni₂O₃, Ni₃O₄, superoxide NiO₂, and Peroxide Ni(O₂). Metal oxides(MO) are synthesized by different methods as spray pyrolysis, sputtering, electrodeposition, thermal decomposition, sol-gel techniques, chemical bath deposition, co-precipitation, hydrothermal method, etc. [6–13]. Table 4a suggests that there is one stop solution to directly correlate bandgap, crystallite size and percentage of degradation as every technique is unique and thus the methodology employed in preparation of nanoparticle plays a vital role. According to the data, the NiO particles synthesized through solid state combustion technique has significantly surpassed all other methods viz., hydrothermal, solgel, chemical precipitation, green synthesis and calcined hydrothermal method. As the result of present work lead to very lesser band gap energy which there by improvised the efficacy of photodegradation upto 96% for the duration of 3 h. However, from Table 4b, there is a quite contradicting and imperative results which could be found in 3d transition elements. As per previously reported work in the solid state combustion technique, it can be concluded that as the annealing temperature increases, the crystallite size also increases, thereby leading to enhanced photodegradation of MB. Though, NiO at operational 600 °C exhibits very low percentage of photodegradation compared to CuO and ZnO, it was an inquisitive interest to establish the fact that the photodegradation enhanced as annealing temperature increases and thus leading to much better photodegradation. Though photocatalysis is low, the plot of this work is to establish a suitable material which can photocatalyze at visible wavelength.

Nandiyanto et al. have shown the direct correlation between crystallite size and degradation efficiency [14]. According to Almqvist and colleagues, the photocatalytic efficiency of particles improves as the crystallite size grows due to optimization of optical properties and charge carrier dynamics [15]. The technique of fine-tuning crystallite

* Corresponding author.
E-mail address: srj2001@gmail.com (S. Rajagopal), suresha@phy@ssnec.ac.in (B.L. Suresha).

<https://doi.org/10.1016/j.cplett.2021.138837>
Received 23 March 2021; Received in revised form 4 June 2021; Accepted 12 June 2021
Available online 16 June 2021
0009-2614/© 2021 Elsevier B.V. All rights reserved.

5) Dr. K.E Ganesh

Asst. Professor, Dept. of Physics

July 14th, 2020: Dr. K.E Ganesh, Asst. Professor & Dr. T.S Pranesha, Professor Department of Physics jointly published a research paper entitled “Assessment of Radon and Thoron Exhalation from Soils and Dissolved Radon in Ground Water in the Vicinity of Elevated Granitic Hill, Chikkaballapur District, Karnataka, India”, In Radiation Protection Dosimetry (2020), pp. 1–8, ISSN: **0144-8420 / 1742-3406** (Print) with Impact Factor = 0.831. <https://doi.org/10.1093/rpd/ncaa099> Print version Volume No 190, Pages -185-192, Issue - 2

ASSESSMENT OF RADON AND THORON EXHALATION FROM SOILS AND DISSOLVED RADON IN GROUND WATER IN THE VICINITY OF ELEVATED GRANITIC HILL, CHIKKABALLAPUR DISTRICT, KARNATAKA, INDIA

C.G. Poojitha¹, B.K. Saboo², K.E. Ganesh^{1*}, T.S. Pranesha¹ and B.K. Sagar²
¹Department of Physics, B.M.S. College of Engineering, Bengaluru 560019, Karnataka, India
²Radiological Physics & Advisory Division, Bhabha Atomic Research Centre, Mumbai 400094, Maharashtra, India

*Corresponding author: drkgephy@bmcce.ac.in

Received 19 March 2020; revised 8 June 2020; editorial decision 17 June 2020; accepted 17 June 2020

In this paper, we intend to evaluate the rate of radon and thoron exhalation from soil with reference to the underlying bedrock and gamma dose rate in the environment of elevated granitic hill—Nandi hills of Karnataka. The measurement of exhalation rates for all the soil samples collected from study area was carried out using a continuous radon-thoron monitor (CST-1000). The surface exhalation rate of thoron from soil samples were found to vary from 4160 ± 326 to 21 822 ± 634 mBq m⁻² s⁻¹. The mean exhalation rate of radon from soil samples were found to vary from 76.14 to 249 ± 19 mBq kg⁻¹ h⁻¹. Concentrations of radon activity measurements were carried out for all the groundwater samples from study area. A detailed analysis along with physicochemical parameters of water has been made and discussed in this research paper.

INTRODUCTION

The primordial radionuclides uranium, thorium and their progenies can be found in all kinds of rocks and soils. Radiation exposure caused by naturally occurring radioactive materials to all living organisms is inevitable, and it is a sustained process⁽¹⁾. Our study concerns soils, which are the most important natural source. Soils are primarily formed by physical and chemical weathering of rocks (parent material) and present in the upper layer of earth crust⁽²⁾. One of the major environmental pathways leading to human ingestion from naturally occurring radionuclides is soil to plant transfer^(3, 4). In this context, radon and thoron being radioactive gases can diffuse out of soil matrix through emanation, transport and exhalation processes. Radon and thoron activity concentration found in soil or rock is dependent on their parent radium and thorium, respectively⁽⁵⁾.

Radon has a much long half-life (3.82 d) than thoron (55 s), therefore, thoron movement in environment is quite different from that of radon even in the same medium⁽⁶⁾. Before undergoing further radioactive decay process, radon and thoron gases emanate from mineral grains to pore space. Radon and thoron gases that formed are transported through pore space of the soil caused by diffusion and advection processes, and finally, they exhale to atmosphere^(7, 8). About 75% of radon and thoron sources in the atmosphere can be due to emanation of soil derived out of its bedrock^(9, 10). Prime factors that govern exhalation rate are (1) radium distribution within and on the

surface of soil particles, (2) emanating power of radon from soil pores, (3) soil moisture content and (4) permeability of soils.

Radionuclides presence in soil provides us information about possible hazard by the use of soil for domestic purpose such as agriculture and building material. Radon and thoron being inert gases do not undergo chemical reactions. Therefore, the studies on radon-thoron exhalation rates provide an information on the pure transfer of gaseous exchange between soil and atmosphere.

The present study is focused on the assessment of rate of radon and thoron exhalation from soil with reference to the underlying bedrock and gamma dose rate in the environment of elevated granitic hill—Nandi hills of Karnataka.

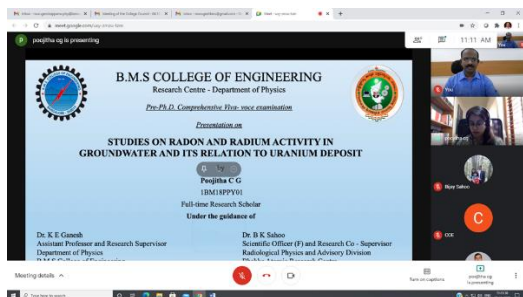
MATERIALS AND METHODS

Geology of the study area

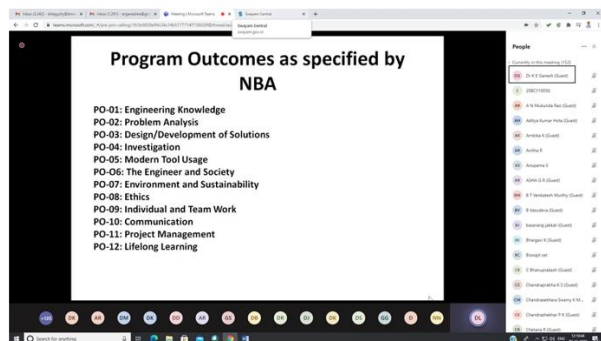
Chikkaballapur taluk is the district headquarters of the Chikkaballapur district. Taluk forms typical granite and gneissic terrain of Archean age, which can be noticed in south-western portion of the taluk near Nandi village. The eastern portion of taluk is mainly composed of laterites and gneissic granites, whereas hilly terrain forming the western portion is composed of coarse-grained granites. The main tributaries of taluk is grass, grain and silk. It is surrounded by five hills namely: Nandigiri, Chandragiri, Skandagiri, Beshimgiri and Hemagiri.

October 14, 2020: A New research laboratory allocated to Department of Physics in P.G Block 5th floor named “Functional ceramics and Atmospheric Aerosols research lab” was inaugurated in esteemed presence of Principal Dr. B.V Ravishankar, Vice Principal Dr. S. Muralidhara and HOD Dept. of Physics Dr. Murugendrappa M.V. with other department colleagues.

November 07, 2020: Department of Physics organized Online Pre-Ph D Comprehensive Viva Voce Examination of Mrs. Poojitha C G, 1BM18PPY01, on the title “Studies on Radon and Radium Activity in Ground Water and Its Relation to Uranium Deposit” under the guidance of Dr. K.E Ganesh, Asst. Professor, Dept. of Physics Google meet link: <https://meet.google.com/uxy-zmzu-tzm>

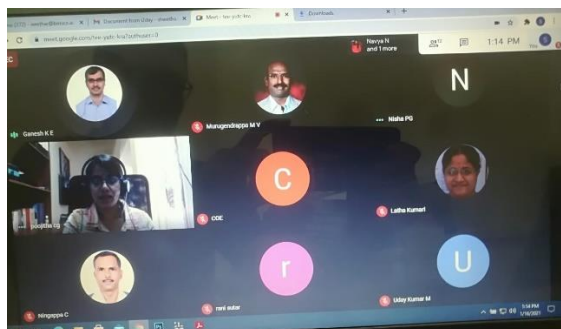


December 07 – 08, 2020: Dr. K.E Ganesh Asst. Professor Dept. of Physics attended two days online Capsule/Refresher Workshop on ‘Examination Reforms Mandate’ being conducted for TEQIP 1.1 and 1.3 institutions.



January 04, 2021: Dr. K.E Ganesh – Assistant Professor of Department of Physics got the Sanction of Financial support towards seed money of of Rs.40, 000/- for R & D. Title of the Proposal – Consumables towards PM1 analyzer.

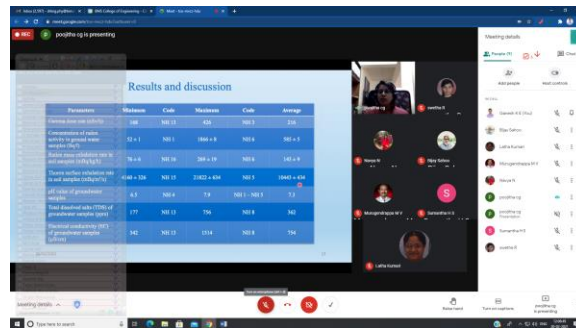
January 16, 2021: The Physics Department Research scholar Mrs Poojitha C G (1BM18PPY01) delivered the Open seminar 1 online on the title “Studies On Radon And Radium Activity In Ground Water And Its Relation To Uranium Deposit” in : With the google link <https://meet.google.com/tee-yutc-kra?hs=122&authuser=0> An external member Dr. Ningappa.C ,VVIET, Mysore, and research scholars were present for the seminar.



January 14, 2021: Dr. K.E Ganesh, Assistant Professor, Dept. of Physics successfully completed the Four weeks NPTEL online certification Program and obtained the certificate on Infrared spectroscopy for pollution monitoring.



February 20th, 2021: Mrs. Poojitha C G Research scholar, Department of Physics doing her PhD under the guidance of Dr. K. E. Ganesh, Asst. Professor, Department of Physics, delivered an Open seminar 2 of her PhD work online on the Title of the work: “Studies On Radon And Radium Activity In Ground Water And Its Relation To Uranium Deposit” internal domain expert and the faculties and research scholars of BMSCE were present.



March 03rd, 2021: Dr. K.E Ganesh, Asst. Professor of Dept. of Physics published a research paper entitled “Satellite Data Based Study On Long Term Variation Of Black Carbon Over Bengaluru, Karnataka, India” in Asian Journal of Microbiology & Biotechnology And Environmental Sciences. With the Volume no 23, Issue No. (1): 2021: with page no 61-65 © Global Science Publications with the ISSN-0972-3005.

March 23, 2021: Mrs. Poojitha C.G, Research Scholar, Department of Physics oral presented a paper titled “Estimation of radon and radium activity in ground water: A case study at Bengaluru, Karnataka, India” in 21st National Conference on Solid State Nuclear Track Detectors and Their Applications (SSNTDs-21) Jointly Organized by Department of Physics, Ramjas College and Department of Physics & Astrophysics, University of Delhi In Collaboration with Nuclear Track Society of India (NTSI)




6) Dr. Latakumari

Asst. Professor, Dept. of Physics

July 14th 2020: Dr. Latakumari, Assistant Professor, Dept. of Physics participated “How to Choose Right Journal” conducted by the B.M.S.C.E Research and development centre, Jointly Organized by IEEE Bangalore Section.

July 15th, 2020: Dr. Latakumari, Asst. Professor Dept. of Physics invited as a resource person for one day webinar on “Thermoelectric Nanomaterials for Green Energy Applications” about 350 participants attended the Webinar, organised by SJR College of Women, Bengaluru.

https://youtu.be/6_1gnK_4yKU?t=9035

S.J.R Education Society (Reg. 1945)
S.J.R COLLEGE FOR WOMEN
 Rajajinagar, Bengaluru-10
 Accredited with 'A' Grade by NAAC

Department of Physics
 Cordially invites you to
One day National Webinar on
Thermoelectric Nanomaterials for Green Energy Application
 Resource Person
Dr. Latha Kumari
 Assistant Professor, Department of Physics
 BMS College of Engineering, Bengaluru

Presided by
Dr. Prema Siddaraju
 Principal, S.J.R College for Women
15.7.2020, Wednesday, 11:00 a.m. to 1:00 p.m.

- Platform: Google meet & Youtube Streaming
- No Registration fee
- E-Certificates will be issued to all the active participants

Sri. Shivaprakash Sri. Nandish.N.R Sri. Nataraj C
 Hon. President, SRES Hon. Secretary, SRES Hon. Treasurer, SRES
Principal & Staff

S.J.R College for Women
 #1/3, 59th 'C' Cross, 4th M Block, Rajajinagar, Bengaluru-560010
 Contact No. 080-23359474/080-23381734
 Email Id: sjrwomenscollege@gmail.com

July 31th, 2020: Dr. Latakumari, Asst.Professor Dept. of Physics invited as a resource person for one day webinar on “Metal Oxide Nanomaterials for Nanodevice Applications”, about 350 participants attended the Webinar, organised by Sri Kuvempu First Grade College and PG Centre, Chennapatna.

Sri. Hombegowda Education Trust^(R)
Sri. Kuvempu First Grade College and PG Centre
 Kengal - Channapatna, Ramanagara (Dist.) - 562 161, Karnataka.
 (Affiliated to Bangalore University NAAC Re-Accredited with "B" Grade)

Department of Physics
LIVE WEBINAR ON
METAL OXIDE NANOMATERIALS FOR NANODEVICE APPLICATIONS


DR. LATHA KUMARI 
 Assistant Professor
 Department of Physics
 BMS College of Engineering
 Bangalore-19


31st JULY 2020
11:30 am - 1:00 pm

PLATFORM **zoom** Video Conferencing
 Registration Open
 Reg Link: <https://tinyurl.com/webinarphysics2020>
 E-certificate will be provided to all

Chief Patron
SRI. MAHESH CHANDRA R
 Donour - Secretary

PROF. SHIVALINGAIAH
 Principal

SMT. K. MOOKKAMMAL
 Organizing Secretary and Convener

PROF. N. S. PUTTASWAMY
 Co - Convener

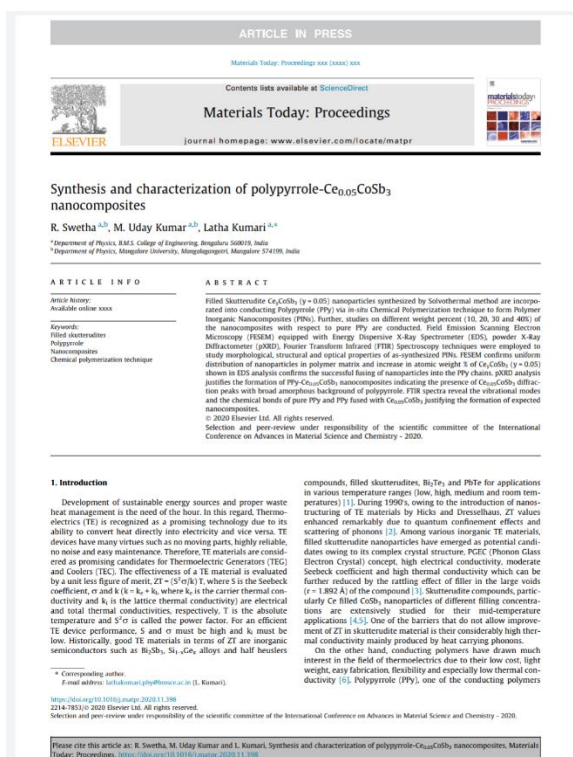
FOR MORE INFORMATION: 9632473797

September 16th, 2020: Dr.Latakumari, Assistant Professor, Department of Physics participated in One Day National Webinar on “Recent Advances in Carbon Nanomaterials”, Organized by Department of Physics, Dr.Ambedkar Institute of Technology, Bengaluru-56. In association with Institute of Engineering and Technology,Dr. Rammanohar Lohia Avadh University, Ayodhya, UP, India.

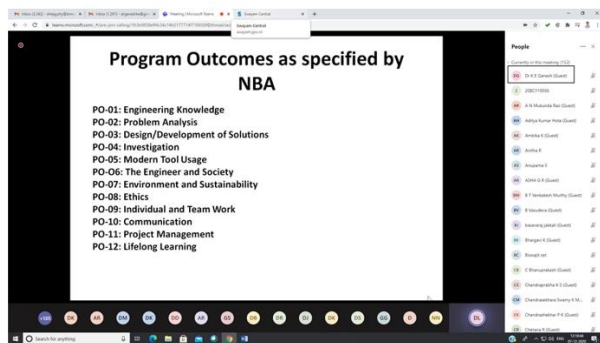
September 25th, 2020: Dr. Latakumari, Assistant Professors, Department of Physics participated in the national level webinar on Future of Higher Education in India- Turning Challenges into Opportunities, Organized by BMSIT, Bangalore.

December 29, 2020: Dr. Latha Kumari, Assistant Professor and Swetha R, Uday Kumar M, Research Scholars, Department of Physics published a Paper entitled “Synthesis and characterization of polypyrrole-Ce_{0.05}CoSb₃ nanocomposites” in Materials Today: Proceedings.

<https://doi.org/10.1016/j.matpr.2020.11.398>



December 07 – 08, 2020: Dr. Latha Kumari Asst. Professors Dept. of Physics attended two days online Capsule/Refresher Workshop on ‘Examination Reforms Mandate’ being conducted for TEQIP 1.1 and 1.3 institutions.



January 04, 2021: Dr. Latha kumari – Assistant Professor of Department of Physics got the Sanction of Financial support towards seed money of Rs.2, 50,000/- for R & D. Title of the Proposal – Polymer - Thermoelectric Nanocomposites for Green Energy Conversion

January 05, 2020: Dr. Latha Kumari, Assistant Professor, Uday Kumar M, Swetha R, Research Scholars, Department of Physics published an online Paper entitled “Structural and Optical Studies on Strontium-Filled CoSb₃ Nanoparticles Via a Solvo-/Hydrothermal Method” in Journal of Electronic Materials with the impact factor 1.66 <https://doi.org/10.1007/s11664-020-08629-2>

January 02, 2021: Dr. Latha kumari, Assistant Professor, Dept. of Physics successfully completed the Four weeks NPTEL online certification Program and obtained the certificate on Structural analysis of Nanomaterials offered by Indian Institute of Technology, Roorkee.



7) Dr. Ramya Hariharan

Asst. Professor, Dept. of Physics

20th June 2020: Dr. Ramya Hariharan, Assistant Professor, Dept. of Physics, Attended The Bodhi Tree and SAFE Tools July 01th to 04th, 2020 for Effective Online Teaching: A Hands-On Workshop conducted by Teaching Learning Centre (ICT) at IIT Bombay.



September 01st, 2020: Dr. Ramya Hariharan, Assistant Professor, Department of Physics is approved of a research grant under RGS/F Scheme of VGST (VISION GROUP ON SCIENCE AND TECHNOLOGY), of Government of Karnataka. She will be the Principal Investigator for the project entitled: “Combined Studies of Materials Discovery with Machine Learning and Experimentation for the Development of High Performance Piezoelectric Materials” under the subject: Metallurgical & Materials Engineering (M & M) with the Total Amount (Rs. Three lakhs) VGST Grants.

27	Dr. Ramya Hariharan, Assistant Professor, Department of Physics, B.M.S. College of Engineering, Gul Feroze Road, Basavanagali, Bangalore- 560 013	Combined Studies of Material Discovery with Machine Learning and Experimentation for the Development of High Performance Piezoelectric Materials	Metallurgical & Materials Engineering (M & M)	3.00	3.00	NA, VGT/Grants	NA, VGT/Grants	30/07/2020	01/09/2021	Alakshai Devi	Heaven Engineering Group, BMS College of Engineering campus, Bangalore - 560113
----	---	--	---	------	------	----------------	----------------	------------	------------	---------------	---

September 07th, 2020: Dr. Ramyahariharan, Assistant Professor, Department of Physics participated in Basic series of the web of science Training & certification program 2020, Organized by clarivate.



September 25th, 2020: Dr. Ramyahariharan, Assistant Professors, Department of Physics participated in the national level webinar on Future of Higher Education in India- Turning Challenges into Opportunities, Organized by BMSIT, Bangalore.



September 25, 2020: Dr. Ramya Hariharan, Assistant Professor, Department of Physics is approved a research grant for the project entitled: “Combined Studies of Materials Discovery with Machine Learning and Experimentation for the Development of High Performance Piezoelectric Materials” under the subject: Metallurgical & Materials Engineering (M & M) with the Total Amount of Rs. Three lakhs under RGS/F Scheme of VGST (VISION GROUP ON SCIENCE AND TECHNOLOGY), of Government of Karnataka.

October 14, 2020: A New research laboratory allocated to Department of Physics in P.G Block 5th floor named “Functional ceramics and Atmospheric Aerosols research lab” was inaugurated in esteemed presence of Principal Dr. B.V Ravishankar, Vice Principal Dr. S. Muralidhara and HOD Dept. of Physics Dr. Murugendrappa M.V. with other department colleagues.

October 23, 2020: Dr. Ramya Hariharan, Assistant Professor, Department of Physics published a Book Chapter in “Hybrid Perovskite Composite Materials”, 1st Edition Elsevier, (458 pages) October 2020. Editors: Imran Khan, Anish Khan, Mohammad Ali Khan, Shakeel Khan, Francis Verpoort and Arshad Umar. The Contributed Chapter is: (6) “High-sensitivity piezoelectric perovskites for magnetoelectric composites”, pages 147-167.

Web link: <https://doi.org/10.1016/B978-0-12-819977-0.00006-8>

November 02, 2020: Dr. Ramya Hariharan, Asst. Professor Dept. of Physics Published an online research paper entitled “COVID-19: A Boon for Tropical Solar Parks? A Time Series Based Analysis and Forecasting of Solar Irradiance” in, International Journal Taylor & Francis: Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, ISSN: 1556-7036 Q3 Journal with Impact Factor: 1.184. <https://doi.org/10.1080/15567036.2020.1839603>

January 04, 2021: Dr. Ramya Hariharan – Assistant Professor of Department of Physics got the Sanction of Financial support towards seed money Rs.2, 50,000/- for R & D activates. Title of the Proposal – Hybrid Microwave Assisted Synthesis of Perovskite Oxides for Ferroelectric Applications

January 22, 2020: Dr. Ramya Hariharan, Assistant Professor, Department of Physics published a research paper titled “Random forest regression analysis on combined role of meteorological indicators in disease dissemination in an Indian city: A case study of New Delhi” in Elsevier: Urban Climate ISSN: 2212-0955 Q2 Journal with Impact Factor: 3.834 <https://doi.org/10.1016/j.uclim.2021.100780>

8) **Dr. Kaliprasad**

Asst. Professor, Dept. of Physics

August 10th, 2020: Dr. Kaliprasad C.S, Asst. Professor, Department of Physics published a research paper entitled “A systematic investigation on grain size enrichment of radionuclides and assessment of radiation hazards along the southern coastal environment of Kerala, India” in Int. J. Nuclear Energy Science and Technology, Vol. 14, No. 1, 2020, **Pages 28-37**
DOI: [10.1504/IJNEST.2020.108799](https://doi.org/10.1504/IJNEST.2020.108799)

August 03rd to 05th, 2020: Dr.Kaliprasad C.S, Asst.Professor of Dept. of Physics participated in 3-Days FDP on Lifestyle Change and Self-Management for Future Scenario organised by Department Of Basic Science And Humanities – Physics, New Horizon College of Engineering, Bengaluru in association with the Heartfulness Institute.



August 26th to 28th, 2020: Dr. Kaliprasad C.S, Assistant Professor, Department of Physics participated in the International Virtual Conference, AFM-2020, Organized by Department of Physics, Kalinga Institute of Industrial Technology (KIIT) Deemed to be University, Bhubaneswar, Odisha, India.



September 16th, 2020: Dr.Kaliprasad C.S, Assistant Professor, Department of Physics participated in One Day National Webinar on “Recent Advances in Carbon Nanomaterials”, Organized by Department of Physics, Dr.Ambedkar Institute of Technology, Bengaluru-56. In

association with Institute of Engineering and Technology, Dr. Rammanohar Lohia Avadh University, Ayodhya, UP, India.



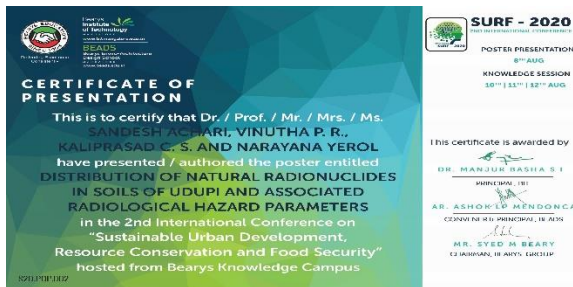
September 25th, 2020: Dr. Kaliprasad C.S, Assistant Professors, Department of Physics participated in the national level webinar on Future of Higher Education in India- Turning Challenges into Opportunities, Organized by BMSIT, Bangalore.



August 6, 2020: Dr. Kaliprasad C.S, Assistant Professor Department of Physics, Presented four papers in the 2nd international Conference Online SURF-2020: on Sustainable Urban Development, Resource Conservation and Food Security held at Bearys Knowledge Campus, Mangalore from August 6-8, out of four one Poster titled **"IOT based automated irrigated system"** fetched **Second Best poster & 5000 Cash Award**



“Distribution of Natural Radionuclides in Soils of Udupi and Associated Radiological Hazard Parameters”

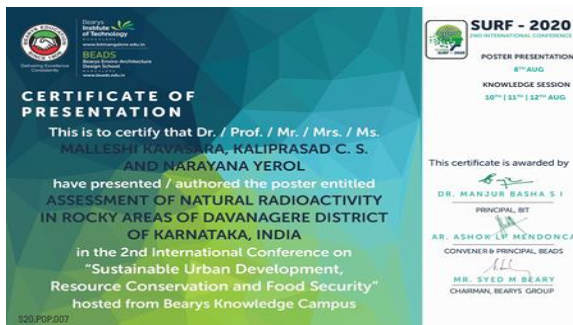


“Natural Radioactivity in Soils of Belagavi District

in Karnataka”



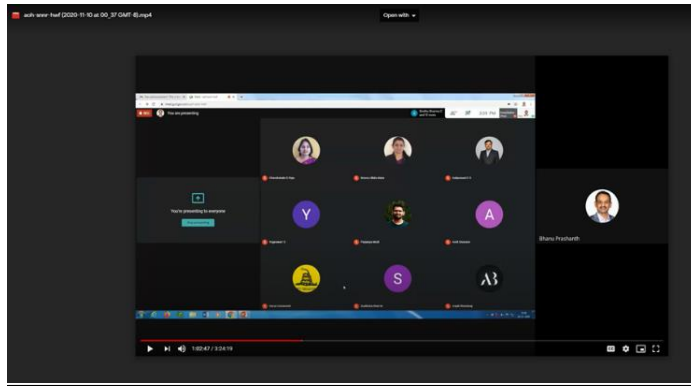
“Assessment of Natural Radioactivity in rocky areas of Davangere district of Karnataka, India”



October 13 to 14, 2020: Dr. Kaliprasad C.S, Asst. Professor Department of Physics attended an International Virtual Conference on Frontiers in Manufacturing Technology (FMT 2020) organised by Department of Physics, school of applied sciences, Kalinga institute of Industrial Technology(KIIT), Bhubaneswar, Odisha, India.

October 19 to 23, 2020: Dr. Kaliprasad C.S, Asst. Professor Department of Physics Participated in Five day online Faculty development program on “New Generation Solar Cells” organised by Department of Physics, BNMIT, Bangalore.

November 09 to 21, 2020: Department of Physics had organised Two Week Training Program on “Internet of Things (IoT)” in association with TEQIP III. 37 Students participated in the Program & 4 Speakers were invited to give the talk to the students from various branches of BMSCE participated in the event. Dr. Kaliprasad C S, Asst.Professor of the Dept was the Coordinator for



the event.

December 22, 2020: Dr. Kaliprasad C.S, Asst. Professor Department of Physics participated in the Webinar on “Modelling and Simulation” in Organised by the Department of Mathematics, School of Basic & Applied Sciences, Harcourt Butler Technical University, Kanpur.

