Curriculum Vitae

Satya Kamal Chirauri

Department of Physics, Adikavi Nannaya University, Rajamahendravarm, Andhra Pradesh, India / Chemistry Division, Bhabha Atomic Research Center, Mumbai, India

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Work Experience

Asst. Professor Jan 2018-Present
B.V.C Engineering College, Odalarevu, Amalapuram, Affiliated to JNTU, Kakinada, Andhra Pradesh, India
Teaching and Research

August, 2015 – Jan 2018

Doctoral Fellow
Department of Physics, Adikavi Nannaya University, Rajamahendravarm, Andhra Pradesh / Chemistry Division, Bhabha Atomic Research Center, Mumbai, India

Mentors: Dr. K. Ramachandra Rao/Dr. V Sudarsan

Jan, 2014 – July 2015

M.Phil.
Department of Physics, Andhra University, Vishakhapatnam, India

Mentor: Dr. K. Ramachandra Rao

July 2009 – Jan 2014

Lecturer (Contractual/Adhoc)
BVC College of Engineering, Affiliated to JNTU, Kakinada, Andhra Pradesh, India
Teaching and Research

Career Highlights

April 2016 Senior Research Fellow (SRF), DAE (Govt. of India) Sponsored Project, *Functional Materials Section, Chemistry Division, BARC, Mumbai, India.*

Jan 2014 March 2016, Junior Research Fellow (JRF), DAE (Govt. of India), Sponsored Project, *Functional Materials Section, Chemistry Division, BARC, Mumbai, India.*

Supervisor: Dr. K. Ramachandra Rao, Collaborator: Dr. V. Sudarsan

Research Interest

Single Crystal Growth
Nano particle synthesis
Photo and Electroluminescence studies
Display device fabrication using Screen printing technology.

Education

2015-2018	***Doctor of Philosophy*** in Physics ***(Ph.D)*** *Adikavi Nannaya University, Rajamendravaram, Andhra Pradesh, India.*
Thesis Title	*Photo and electroluminescence studies on Gallium based oxide nanophosphors*
2014–2015	***Master of Philosophy (M.Phil)***
Score–71%	Physics, *Andhra University, India.*
Dissertation	*Photo and Electroluminescence Studies of Bulk And Nano Zns:Cu Phosphor*
2013–2014	***Bachelor of Education (B.Ed)***
Score–70 %	Physical Sciences *Andhra University, India.*
2005–2007	***Master of Science*** *Physics* ***(M.Sc.)***
Score–64.9 %	*Andhra University, India.* Specialization *Solid State Physics*
2002–2005	***Bachelor of Science (B.Sc.)***
Score–63%	Non-Medical Acharya Nagarjuna University, India.

Skills

OS/Software's	MS OS/Office, Origin, PowderX, Retvield (GSAS) software, Hardware & Support
Instrument Skills	*X-Ray Diffraction (Philips powder XRD PW 1071)* *Luminescence Measurements (Edinburgh Instruments FLSP 920 system)* *Fourier Transform Infrared Spectroscopy (Bomem MB102 machine)* *High Resolution Scanning Electron Microscope (Sirion)* *UV-Vis spectrophotometer (Cary 100 model, Varian)* *Screen printing instrument (MTI corporation)*
Personal	music, cricket, photography, travelling.
Languages	Telugu (mother tongue), Hindi & English

Numbers

Publications/Conference papers: **18+3**
Sem. /Workshops: **9**
Journals–Citations: ***43***
Total impact factor (2017): **~ 30**
Patents: ***1 Filed-Indian Patent***

Publications

1. Effect of structure, size and copper doping on the luminescence properties of ZnS
   Satya kamal.Ch, RK Mishra, DK Patel, KR Rao, V Sudarsan, RK Vatsa
   Materials Research Bulletin 81, 127-133(2016) Impact factor (2.45)

2. Luminescence and bandgap studies from Indium doped β- Gallium oxide nanoparticles
   Satya kamal.Ch, K. Srinivasu, KR Rao, V Sudarsan
   (Manuscript about to submit to Optical Materials)

3. Blue luminescence from $ZnGa_2O_4$: Effect of lattice distortion and particle size
   Ch. Satya Kamal, Sanyasi Naidu Boddu, B. Vishwanadh, K. Ramachandra Rao, V. Sudarsan, R. K. Vatsa
   Journal of Luminescence 188 (2017) 429–435 Impact factor (2.69)

4. Electroluminescence studies on Ge^{4+} doped $ZnGa_2O_4$ System
   Satya kamal.Ch, RK Mishra, KR Rao, V Sudarsan, RK Vatsa.
   (Manuscript communicated to Dalton Transactions)

5. Blue to Magenta tunable luminescence in Bi^{3+} doped LaGaO3:Cr^{3+} phosphors for field emission display application.
   Satya kamal.Ch, TKV Rao, P Reddy, T. Samuel, Y. Ramakrishna, MC Rao, J.B. Jasinski, KR Rao
   RSC Advances 7 (71), 44915-44922 Impact factor (3.10)

6. Color tunable luminescence from $LaAlO_3$:Bi^{3+}, Ho^{3+}doped phosphors for field emission displays

   TKV Rao, **Satya kamal.Ch**, T. Samuel, V.S.Rao, Vanukuru S.Rao, PVSSN Reddy, KR Rao ***J Mater Sci: Mater Electron (2017) https://doi.org/10.1007/s10854-017-8000-5 Impact Factor (2.09)***

7. Eu^{3+} ions imminence impact on its photoluminescence in Y_2O_3 host
   S Nigam**, Satya Kamal. Ch**, KR Rao, V Sudarsan, RK Vatsa
   Journal of Luminescence 178, 219 225 (2016) Impactfactor (2.69)

8. Unravelling the energy transfer mechanism in bismuth co-activation of $LaInO_3$: Sm^{3+}/Ho^{3+} nanophosphor for color-tunable luminescence
   Satya kamal.Ch, TKV Rao, P Reddy, K Sujatha, BP Ajayi, J.B. Jasinski, KR Rao ***RSC Advances 7 (16), 9724-973 (2017) Impact factor (3.10)***

9. High purity green photoluminescence emission from Tb^{3+}, Bi^{3+} co-doped $LaGaO_3$ nanophosphors optical Materials
   T. Samuel, **Ch. Satya Kamal**, R. Srikanth, B P Ajayi V.Veeraiah, V. Sudarsan, K.Ramachandra Rao ***Optical Materials 69 (2017) 230-237 Impact factor (2.18)***

9. Photoluminescence enhancement and energy transfer mechanism of Bismuth added $LaGaO_3$: Eu nanophosphor for display applications
   T Samuel, **Satya Kamal. Ch**, K Sujatha, V Veeraiah, Y Ramakrishana, KR Rao ***Optik-International Journal for Light and Electron Optics 127 (22), 10575- 10587 (2016) Impact factor (0.75)***

10. Optical emissions of Ce^{3+} doped Sulphamic acid single crystals by low temperature unidirectional growth technique B Brahmaji, S Rajyalakshmi, **Ch.Satya Kamal**, V Atla, V Veeraiah, KV Rao, K R Rao
Optical Materials 64, 100-105,(2017). Impact factor (2.18)

11. Unique optical properties of Eu $^{3+}$ doped L-histidine hydrochloride mono hydrate single crystals from low temperature growth technique.
K Ramachandra Rao, S Rajyalakshmi, **Ch Satya Kamal**, B Brahmaji, Jacek B Jasinski, TK Visweswara Rao. ***Spectrochi Acta Part A: Molec. and Biomol. Spectroscopy 176 (5) 52–57, 2017 Impact factor (2.65)***

12. Structural and photoluminescence studies of Eu3+ doped L-Tartaric single crystal through evaporation technique
PV Prasad, TKV Rao, Ch.Satya Kamal, SR Lakshmi, RK Ramachandra Rao
Journal of Molecular Structure 1085, 115-120(2015) Impact factor (1.78)

13. Studies on influence of Cd2+ ions in unidirectional growth and characterization of L-Cysteine hydrochloride monohydrate single crystals.
PV Prasad, TKV Rao, KR Rao, **Ch.Satya Kamal**, T Samuel
Spectrochi Acta Part A: Molec. and Biomol. Spectroscopy, 136, 1950,(2015) Impact factor (2.65)

14. Enhanced photoluminescence of Tb^{3+} co-doped La_2O_3:Bi^{3+}nanophosphors material using ethylene glycol route PVSSSN Reddy, **Ch. Satya Kamal**, K. Sujatha, T. Samuel, M. Indiradevi , Y.Rama Krishna and K.Ramachandra Rao ***International Journal of ChemTech Research Vol.8, No.12 pp 741-751, (2015) Impact factor (0.35)***

15. Mixed Color Emission from Europium Co-Doped La_2O_3: Bi^{3+} Nanophosphors Material by Polyol Method PVSSN Reddy, K Sujatha, **Ch. Satya kamal**, T Samuel, M Indiradevi, KRRao
International Journal of Scientific Research 5 (2),2016. Impact factor (0.2)

16. Synthesis and characterization of transition metal doped L-cysteine hydrochloride monohydrate single crystal by
conventional and unidirectional method and its comparative study
K Ramachandra Rao, PV Prasad, **Ch. Satya kamal**, TK Visweswara Rao PSV Subba Rao, MC Rao ***Materials Research Innovations 20 (7), 538-544,(2016)***
Impact factor (0.37)

17. Triggering of red and yellow emissions in bismuth activated of $LaInO_3$: Eu^{3+}/Dy^{3+} nanophosphor for color-tunable luminescence.
K Sujatha, **Satya kamal.Ch**, TKV Rao, P Reddy, , BP Ajayi, J.B. Jasinski, KR Rao ***(Communicated to Journal of Luminescence Wiely.co)***

18. Investigations on Tb^{3+}added sulfamic acid single crystals and its photoluminescence studies for opto-electric devices
B. Brahmaji, S. Rajyalakshmi, T.K. Visweswara Rao, Valluri.Srinivasa Rao, Sk. Eusb Basha, **Ch. Satya Kamal**, V. Veeraiah, K. Ramachandra Rao, **Journal of Science: Advanced Materials and Devices (Accepted Manuscript)**

Conference Papers

19. Efficient Photoluminescence studies from europium co-doped Y_2O_3: Bi^{3+} nanophosphor material
    Ch.Satya Kamal, P Reddy, K Sujatha, Y Ramakrishna, KR Rao
    Materials Today: Proceedings 3 (10), 4209-4214 (2016).

20. Luminescence from ZnS: Bulk vs nano
    RK Mishra, **Ch.Satya Kamal**, DK Patel, KR Rao, V Sudarsan, R.K Vatsa ***AIP Conference Proceedings, (1665), 050154, (2015)***

21. Structural And Photoluminescence Studies Of Europium Doped MgO Nanoparticles Synthesized By Polyol Technique KR Rao, D Vijay, K Sujatha, **Ch. Satya kamal**, T Samuel, SE Basha
    Materials Today: Proceedings 3 (10), 4249-4253

Symposium/ Conferences

1. Attended a National level Refresher Course conducted on "Experimental Physics" from 27-05-2014 to 11-06-2014 sponsored by prestigious three national institutions i.e the Indian Academy of Sciences, Bangalore, the Indian National Science Academy, Delhi, the National Academy of Sciences of India, Allahabad and the Government College(A), Rajahmundry.

2. Attended Two day IASc workshop on "Functional Materials " at Andhra University Visakhapatnam 4-4 April 2014 sponsored by Indian Academy of Sciences.

3. Attended a 17th National Seminar on " CRYSTAL GROWTH " at Centre for Crystal Growth , SSN College of Engineering, Chennai, 11th -13th Feb 2014 and presented a paper titled "Photoluminescence studies on L-Tartaric single crystal"

4. A five day Solid State Physics Symposium (SSPS) attended at VIT, Vellore and presented Paper (Luminescence from ZnS: Bulk Vs nano), which held from 17-21 December 2014.

5. Attended two day National Conference is going to conduct on ATOM-2014 "Advanced Technology Oriented Materials-2014", 7-8th Dec 2014.

6. Poster presented at ISMC-2014, BARC, Mumbai on Photoluminescence on Eu^{3+} doped ZnS nano Particles Dec-2014.

7. Attended Two day National Workshop Conducted on the eve of International Year of Light-2015, „Light Emitting Devices and Materials"-Dec-2015.

8. Participated and given a "Invited talk on Photo and electroluminescence studies from Cu doped ZnS: Role of size and structure" at International Symposium Cum Workshop On Luminescence Materials (ISWLM-2015) Organized by Luminescence Society Of India, 18-19th December, 2015, Baroda, India.

9. Poster presented at ISMC-2016, BARC, Mumbai on Electroluminescence studies on Ge^{4+} doped $ZnGa_2O_4$ System, Dec-2016.

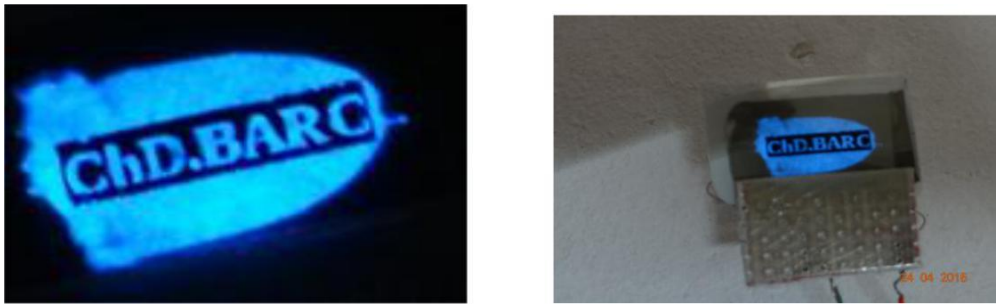
The adoption of the energy-efficient lighting, such as fluorescent lamps is evident today: about 64% of global lighting is generated by fluorescent lamps, consuming 45% of the energy for electric-lighting. Currently, fluorescent lamps account for about half of global lamps sales and will continue to have a significant share in lighting market. Moreover, the more energy-efficient and environmentally friendly technologies, so-called solid state lighting (SSL), which includes LEDs, Electroluminescence (EL) displays and organic light emitting diodes (OLED) technologies, become more competitive and are expected to penetrate fast into the general lighting market by 2020. The OLED represents a possible substitution component for LED and fluorescent lighting, in particular for backlighting in displays. This technology does not require critical rare earths, Ga, Ge or Tb, Eu, Dy. Although the OLED is already available on the display market, this technology cannot yet compete with LED in terms of lifetime (stability) and cost. Therefore, LEDs and EL devices share in general lighting and display backlighting, while a significant decrease of demand for rare earths (Eu, Tb, Dy and Y) is expected by 2020, the demand for In and, in particular, for Ga in lighting and display applications will increase. Hence due to this high demand I have chosen gallium based oxide materials for my research work.

Research Contribution

Basing on the literature studies nitride phosphors like GaN and InGaN are conventionally used as bright blue light emitters for display and LED applications. For such applications rather than powder form mainly thin films are used. Preparation of nitride materials in thin film form is an energy expensive process and is the main hindrance involved in the development of cost effective blue light emitters. Alternative to this is the blue light emitting thermally stable oxide phosphors in the powder form. Using such powder materials, EL devices can be made based on powder coating or screen printing techniques rather than the costlier vapour phase deposition processes. As blue light is a key colour component in tricolor based white light emitters, development of powder based blue light emitters is expected to facilitate the development of cost effective flat and plasma panel displays (FPDs and PDPS). Hence, I felt gallium based oxide phosphors are promising host materials for the above applications.

It is necessary that for powder electroluminescence (EL) studies the procedure (screen printing technique) which I have optimized with a standard device configuration for getting efficient light output. To verify this, I have taken the well-known phosphor ZnS both in the bulk and nano-size dimensions and made different EL configurations by varying the solvent/binder, particle size etc. Based on this study, i have arrived at the conclusion that ZnS samples doped with 1% Copper and having particle size

around few micron can give improved electro-luminescence up on application of AC voltage. Nanoparticles ZnS were found to be giving poor luminescence in different configurations. The bright blue electro-luminescence from the device up on application of AC voltages has been developed. This is the first time such a comparative study is being made on the photo and electroluminescence properties of bulk and nanoparticles of ZnS with and without doping copper ions.



EL device of Zinc Sulphide doped with Copper ions

Further I have tried to observe the photoluminescence (PL) properties of nano-crystalline zinc gallate ($ZnGa_2O_4$) phosphors on the synthesis conditions such as concentration of precursor metal ions and nature of solvents were investigated in detail. In order to study electroluminescence from undoped zinc gallate, I have heated the samples at 900^oC for 5 hours followed by proper grinding, I could observe very weak electroluminescence due to the defects in the lattice. After undoped studies, i have tried to study photo and electroluminescence properties by doping Germanium (Ge) ions in zinc gallate. By applying AC voltage to Ge doped zinc gallate samples, electrons and holes from defects/traps become more and more energetic and collide with Ga-O structural units in zinc gallate lattice. Such type of collisions leads to transferring their energy to Ga-O structural units, which undergo subsequent excitation. De-excitation of the structural unit leads to blue emission. Bright blue electro-luminescence from the device (Ge doped $ZnGa_2O_4$) up on application of AC voltages (400 Volts, 10 kHz) is observed. In addition to this studies have also been carried out on Indium doped gallium oxide powders/nanoparticles.

This is the first time that bright blue electro-luminescence is being observed from powder samples of gallium based oxide materials without using lanthanide ions. A patent application of this device is in progress.

EL device of Zinc Gallate Doped with Ge^{4+}

Latter I have concentrated on perovskite type compound ($LaGaO_3$) phosphors doped with chromium and Bismuth ions for field emission display applications. Near-infrared (NIR) photoluminescence (PL) emission was observed from the chromium doped $LaGaO_3$ samples. Energy-transfer (ET) process and efficiency between Bismuth - Chromium ions was studied and calculated by the concentration-quenching method.

These studies constitute one of the significant steps for the development of flexible displays based on Gallium and Indium based oxide materials.

References:

1. **Dr. K. Ramachandra Rao**
   Assistant Professor & Research Director,
   Crystal growth and Nano Science research Center , Department of Physics, Government College (Autonomous), Rajamahendravaram,
   Andhra Pradesh, India.
   Tel: +91-9440328736
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2. **Dr. V. Sudarsan**
   Assistant Professor, Homi Bhabha National Institute &
   Head, Functional Materials Section, Scientific Officer (H),
   Chemistry Division, Bhabha Atomic Research Centre, Mumbai 400 085, India
   Tel: +91-22-25595355
   Fax +91-22-25505151(or 25519613)
   Email: vsudar@barc.gov.in

3. **Dr D. Haranath**
   Principal Scientist & Associate Professor (AcSIR)
   Dy. Head, Alternative Energy Materials Group
   Advance Materials & Devices Division CSIR-
   National Physical Laboratory (Govt of India) Dr.
   K.S. Krishnan Road, New Delhi 110012 INDIA.
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4. **Dr. M. Senthil Pandian**
   Research Scientist SSN
   Research Centre
   SSN Institutions, Chennai-603 110, Tamil nadu
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5. **B. Sanyasi Naidu**
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   Institute of Nanoscience & Technology
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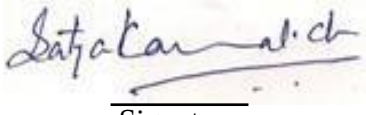
I hereby declare that above all information provided by me is true to my belief and knowledge



Place: Mumbai
Date: 19-02-2018

Signature