


Brief Bio data

Name: Dr. Bipin Kumar Gupta

Designation:	Senior Principal Scientist	
DP No. and Name:	4.2 and Photonic Materials Metrology	
DU No. and Name:	4 and Advanced Materials and Device Metrology	
Email:	guptabgupta@nplindia.org	
Date of Joining CSIR-NPL:	03-08-2007	
Phone (office)	+91-011-45608284	
Phone Lab (optional)	+91-011-45608608	

Research Area/ Interest

He has more than 20 years of research experience in the field of Experimental Solid State and Condensed Matter Physics: Materials Science (Luminescent Materials: Bulk and Nano phosphors), Nanotechnology, Bio-nanotechnology and Hydrogen Energy: Storage and its applications in Hydrogen Fuelled Vehicles and Devices. His current research interest is focused on development of luminescent materials (bulk/nano), luminescent graphene quantum dots and 2-D new emerging materials for applications in luminescent security ink, security codes, optoelectronic devices, biological fluorescence labeling, fluorescence quenching, field emission displays and luminomagnetic nanophosphors as nano probe for drug delivery and external magnetic tracking applications.

Educational Qualifications

Degree	Subject	University/ Institute	Year
B.Sc (Hons.)	Physics	Banaras Hindu University, Varanasi-221004	1996
M. Sc.	Solid State Physics	Banaras Hindu University, Varanasi-221004	1998
PhD	Physics	Banaras Hindu University, Varanasi-221004	2004

Title of the Ph.D. thesis: "Investigations on the Synthesis, Characterization and Hydrogenation Behavior of Hydrogen Storage Materials: (a) Graphitic Nanofibre (b) Sodium-Aluminum Hydride (c) AB₅ type alloy"

Name of the guide: Prof. O. N. Srivastava, Department of Physics, Banaras Hindu University, Varanasi-221005, India.

Current Research Activities

- Design, synthesis and applications of optical materials specializing in multifunctional novel luminescent materials, two-dimensional materials and color shift/optically variable pigments for security ink formulation to combat the counterfeiting of currency, passports and important documents.
- Development of invisible ink (red luminescent visible under 365 nm ultraviolet LEDs) to be used as deterrent against voting twice.
- Development of luminomagnetic materials for high-contrast fluorescent cellular imaging as well as MRI high-contrast imaging for drug delivery applications.
- Development of yellow phosphor integrated with blue diode laser to produce white light for automobile headlight applications.
- Development of carbon exotic materials (Graphene, Graphene Quantum Dots, Carbon Nanotubes and Nanofibres) for optical displays and energy storage applications.
- Design of indigenously developed CVD setup for continuous growth of highly reproducible "Monolayer of MoS₂/MoSe₂/WSe₂" deposition on Si/SiO₂ substrate for metrology, terahertz and photo-detector devices.

Academic / Research Experience

S No	Period	Place of Employment	Designation	Scale of pay
1	Oct. 2006- Aug 2007	Department of Physics, Lucknow University, Lucknow	Lecturer	Rs 8000-13500 (Then)
2	Aug. 2007- Aug 2010	CSIR-NPL, New Delhi	Scientist B (Then)	Rs 8000-13500 (Then)
3	Aug. 2010-Aug 2014	CSIR-NPL, New Delhi	Scientist	Rs 15600-39100 (11 th Level)
3	Aug. 2014-Aug 2017	CSIR-NPL, New Delhi	Senior Scientist	Rs 15600-39100 (12 th Level)
4	Aug. 2017-Aug. 2021	CSIR-NPL, New Delhi	*Principal Scientist	Rs 37400-67000 (13 th Level)
5	Aug. 2021-till date	CSIR-NPL, New Delhi	#Senior Principal Scientist	Rs 37400-67000 (13 th A Level)
6	Oct. 2010- Sept. 2011	Rice University, USA	Visiting Scientist (Deputation)	USD 3000/- pm (Fixed)

* Senior Scientist to Principal Scientist is Merit Promotion.

#Principal Scientist to Senior Principal Scientist is also Merit Promotion.

Selected Publications

1. A Strategic Approach to Design Multi-Functional RGB Luminescent Security Pigment Based Golden Ink with Myriad Security Features to Curb Counterfeiting of Passport. **Small**, **2023**, 2206397 (Impact Factor; **I.F.:** **13.3** and **Citations :** **5**), Article appears as **Hot article: Gold as well as Magnetic Materials** (11th March 2023), Research Highlights covered and news telecasted in **Science Monitor /Gyan Vigyan (DST, Govt. of India)** as well as Highlights of this Research work is **published at Nature India** Platform as “Security ink could prevent counterfeiting of passports”, 25th April 2023, doi: <https://doi.org/10.1038/d44151-023-00043-x>
2. Temperature dependent Raman scattering of directly grown twisted bilayer graphene film using LPCVD method, **Carbon**, **177**, **2021**, 366-376 (Impact Factor; **I.F.:** **9.59** and **Citations :** **2**)
3. A novel approach to design luminomagnetic pigment formulated security ink for manifold protection to bank cheques against counterfeiting, **Advanced Materials Technologies**, **6**, **2021**, 2000973 (**I.F.:** **7.84** and **Citations :** **4**), After first online published on 6th December **2020**, this article is considered as **HOT TOPIC ARTICLE of Magnetic materials** in Wiley publication and Highlights of this research work is published in Science Wire; Vigyan Prasar Science Portal, 29th January, 2021; EET (Electronics Engineering community for news) India portal on 2nd February 2021; CSIR News in Media, 1-5th 2021, page number : 14, Vigyan Pragati; CSIR-News Bulletin, page number: 50, February, 2021; Science Reporter; page number : 52-53, March, 2021 in CSIR Technology Showcase.
4. Ultrasensitive wearable strain sensors based on a VACNT/PDMS thin film for a wide range of human motion monitoring, **ACS Applied Materials & Interfaces**, **13**, **2021**, 8871-8879 (**I.F.:** **9.23** and **Citations :** **15**) and the highlights of this research work is published at Nature India Platform as “Wearable sensors for monitoring heart beats, blood pressure”, 22nd March 2021, doi:10.1038/nindia.2021.43.
5. Single excitable dual emissive novel luminescent pigment to generate advanced security features for anti-counterfeiting applications, **Journal of Materials Chemistry C**, **7**, **2019**, 13867-13877 (**I.F.:** **7.39** and **Citations:** **20**), the highlights of this research work is recognized as **List of Science and Technology 2020 & 2019 : Inventions and Discoveries**, 3rd February, 2020 and 31st December, **2019** and also covered by **The Hindu News**; 13th October, **2019**, **Science Chronicle**; 12th October, **2019**, **Science Wire**; Vigyan Prasar Science Portal, 24th December, **2019**, **CSIR-News Cover Page**; volume 70, number : 1 & 2nd, January, **2020**, **Science Reporter**; February, **2020** in **CSIR Technology Showcase**, Indus Dictum News; 24th December, **2019**, **India Times News**; 1st January **2020**, **Telly Updates TV**; 27th December, **2019** and **The Print**; 19th December 2019.
6. Highly-efficient, chemically-stable, UV/blue light excitable bi-luminescent security ink to combat counterfeiting, **ACS Applied Materials & Interfaces**, **10**, **2018**, 44570–44575 (**IF:** **9.23** and **Citations :** **31**) and cited by **Science India Portal** as Research Highlights: **UV/Blue-LED excitable bi-luminescent security ink to combat counterfeiting**, Published online 12th February, **2018**.
7. Unclonable security codes designed from multicolour luminescent lanthanide-doped Y₂O₃ nanorods for anticounterfeiting, **ACS Appl. Mater. Interfaces**, **9**, **2017**, 14301–14308 (**I.F.:** **9.23** and **Citations :** **86**).
8. Hybrid 2D nanomaterials as dual-mode contrast agents in cellular imaging, **Advanced Materials**, **24**, **2012**, 2992-2998 (**I.F.:** **30.85** and **Citations:** **70**).
9. Graphene quantum dots derived from carbon fibers, **Nano Letters**, **12**, 844-849, **2012** (**I.F.:** **11.18** and **Citations:** **2057**) Considered among top ten works in several disciplines of science and engineering: **Material sciences** (6th in top ten list), **Chemical Engineering** (5th in top ten list), **Engineering** (5th in top ten list) and **Chemistry** (10th in top ten list) in a recent survey “International Comparative Performance of India’s Research Base (2009-2014)” of the Department of Science and Technology, Govt. of India, published in April, **2016**, **web link:** http://ijgm.res.in/uploads/awards/DST_NSTMIS_Report.pdf, News Covered by BIOS SPIE PHOTONICS WEST MEDIA USA on 18th Jan. 2012, Cited by Photonics Spectra: **One-step process turns carbon fibers into graphene QDs**, Cited by Laser Focus World: **Graphene quantum dots are fabricated in bulk from ordinary carbon fiber**, Cited by Science Daily: **Graphene quantum dots: The next big small thing**.
10. Optical bi-functionality of europium-complexed luminescent graphene nanosheets, **Nano Letters**, **11**, **2011**, 5227-5233 (**IF:** **11.18** and **Citations:** **91**) and research work was also selected in top ten finalist in **Merck Millipore-India innovation award-2012** (No age bar), Merck Specialties Pvt. Ltd. Mumbai-400018, India.

Patents

- a) **Total number of patents granted: 2**
 - **Indian Patent on Graphitic Nano fibers, Indian Patent No. 202340, 2006**
 - **US Patent in Bi-luminescent Security in and formulation , Patent No. : US 11,247,506 B2, 2022**
- b) **Total number of patents filed and in progress: 2 (applied)**
 - **Indian Patent Ref. No. 201711037004**, dated on 18th October 2017, Title-**Printable bi-luminescent security pigment for security ink formulation and process for the preparation thereof; Bipin Kumar Gupta, Pawan Kumar, Ajay Dhar and D.K. Aswal.**
 - **Indian Patent Ref. No. 201811002025**, dated on 18th January 2018, Title- **A process for the synthesis of luminescent undoped Zn₂SiO₄ nanophosphor; Dhiraj, Bipin Kumar Gupta, S.P. Singh, Sukhvir Singh, Govind and A.K. Srivastava.**

Honour(s)/Award(s)/ Fellowship(s)

- i. Awarded the prestigious “**INDO-US Fellowship Award 2010**” in “**Physical Sciences,**” by **INDO-US Science & Technology Forum, New Delhi.**
- ii. Awarded **Academician Fellow of Asia- Pacific Academy of Materials (APAM-2017)**
- iii. Awarded the prestigious “**MRSI Medal Award-2018**” by **Materials Research Society of India** for his significant contributions to the field of Material Science and Engineering.

Membership of Professional Societies/ Institutions

Public engagement: Memberships in organizational committees of national/international conferences/forums:

- **Vice-President of Indian Association for Hydrogen Energy and Advanced Materials (IAHEAM).**
- Editorial Board Member of **Samichha, Rajbhasa** Unit CSIR-NPL, India.
- Life Membership of **Indian Physics Association (IPA)**, Banaras Hindu University, Varanasi Chapter.
- Founder Member (Delhi Zone) of National Hydrogen Energy Board (NHEB).
- Life Membership of **Luminescence Society** of India.

- Member of **Carbon Society of India**.
- Served as a **Jury member** for the **National Level Exhibition and Project Competition (NLEPC)**-2012, 2013, 2014, 2015, 2018 and 2019 under MANAK DST INSPIRE Awards component of Department of Science and Technology, organized by Department of Science & Technology, GOI, New Delhi.
- **Elected member** of Grievances committee of CSIR-NPL for Group (IV) scientists, New Delhi-110012.
- Giving lectures/demonstrations to students in school/colleges/CSIR open day and Jigyasa Program of CSIR -NPL for Kendriya Vidyalya students to **motivate towards science**.
- Giving Hand-on Training on **PL mapping** to participants of “**International Workshop and Conference on Perovskite & Hybrid Photovoltaics ICPHPV-2019**.” At CSIR-NPL, New Delhi on 6th-8th February, **2019**.
- Giving Hands-on Training on **PL mapping** to participants of- **Short Term Course on “Organic photovoltaics & electronics technology 2018” (OPET2018)** organized by CSIR-National Physical Laboratory, New Delhi, India on 6th- 10th September, **2018**.
- Membership and Reviewer award by ACS in recognition of ACS’s mission of service to the global community of Chemists.

Membership in governing and advisory bodies of national/international academic/industrial societies and associations:

- ❖ **Member of Advisory Board** of Applied Physics, Amity University, Noida, Sector-125, UP, India.
- ❖ **Member of Editorial Board** of “International Journal of Alternative Energy and Ecology” Russia.
- ❖ **Review Editor** of Journal Thin Solid Films, Frontier of Material Section, Switzerland.
- ❖ **Editorial board member** of International Journal of Nanomaterials, Nanotechnology and Nano medicine (IJNMM), India.
- ❖ **Editorial board member** as assistant editor (Physical Sciences) Science India web portal, India.

Any other Information

- **Appointed as nominated member** for the revise the specification of **Bi-fluorescent features in Indian Passport at ISP, Nashik**.
- **Recognised as top 10% highly cited author in Materials portfolio of RSC journals-2019**.
- **Selected in List of Science and Technology 2019: Inventions and Discoveries, 31st December, 2019**.
- **Recognised among TOP 130 Scientist List 2022 of India in Materials Science released by Research.com** <https://research.com/scientists-rankings/materials-science/in?page=2>
- His work on **bi-luminescent security ink for anti-counterfeiting applications for the protection of currency and passport** was covered by **ZEE Business News media** and was telecast on 28th May **2018** and also available at website: https://www.youtube.com/results?search_query=npl+ink
- His work on **bi-luminescent security ink for anti-counterfeiting applications for the protection of currency and passport** was covered by **Rajya Sabha TV (Science Monitor & Gyan Vigyan)** and was telecast on 15th March **2020**; also available at website : https://www.youtube.com/watch?v=f6l4tgcKe0I&list=PLVOgwA_DiGzpd3_Iz7J-81Vh4QqU-ZGA9&index=2&t=1088s
- His work on “**Single layer graphene deposition using indigenously developed LPCVD set-up at CSIR –NPL**” News was covered by **Rajya Sabha TV in Gyan Vigyan (Hindi) & Science Monitor (English)** and telecasted on 1st June, **2019**. The covered news is also available at website: <https://www.youtube.com/watch?v=LyaH0ck>
- His work on **bi-luminescent security ink** was discussed entitled, “**Episode 3: What will it take to make currency notes hard to counterfeit**” at **Nature India Platform on PODCAST** 26th August 2019 and also available at website: <https://www.nature.com/articles/d44151-021-00043-9>, DOI: <https://doi.org/10.1038/d44151-021-00043-9>
- Recent US patent granted (15th Feb. 2022) on “**Printable bi-luminescent pigment for security ink formulation and process for the preparation thereof**” was telecast by **INDIA SCIENCE CHANNEL** (India Science is an internet based science OTT television channel launched in 2019 as part of an initiative of the Department of Science and Technology, Govt of India) in **Science Monitor & Gyan Vigyan programme** on 18th April **2022**; also available at website: <https://www.indiascience.in/videos/science-monitor-e-18-slash-04-slash-2022> <https://www.indiascience.in/videos/gyan-vigyan-h-18-slash-04-slash-022-1>
- Recent research work on “**Ultrasensitive Boron–Nitrogen-Codoped CVD Graphene-Derived NO₂ Gas Sensor**” was covered by India Science and telecasted in Science Monitor Programme of **INDIA SCIENCE CHANNEL** (India Science is an internet-based science OTT television channel launched in 2019 as part of an initiative of the Department of Science and Technology (DST), Govt of India) in **Science Monitor & Gyan Vigyan programme** on 9th May **2022**; also available at website : <https://www.indiascience.in/videos/science-monitor-e-09-slash-05-slash-2022> <https://www.indiascience.in/videos/gyan-vigyan-h-09-slash-05-slash-022>
Also highlights of this research work is published at **Nature India Platform** as “**Ultrasensitive sensor detects unhealthy air pollutant**”, 30th April 2022, doi.org/10.1038/d44151-022-00046-0.
- Development of “**Epidermal Inspired Flexible Sensor with Buckypaper/PDMS Interfaces**” for Multimodal and Human Motion Monitoring Applications News was telecasted by **INDIA SCIENCE CHANNEL** (India Science is an internet-based science OTT television, Department of Science and Technology, Govt of India) in **Science Monitor & Gyan Vigyan** on **31st October 2022**; also available at website: <https://www.indiascience.in/videos/science-monitor-e-31-slash-10-slash-2022> <https://www.indiascience.in/videos/gyan-vigyan-h-31-slash-10-slash-2022>
- Development of luminescent yellow phosphor doped ceramic based “**Blue laser-induced white light generator**” News was telecasted by **INDIA SCIENCE CHANNEL** (Department of Science and Technology, Govt of India) in **Science Monitor & Gyan Vigyan** on **5th December 2022**; also available at website: <https://www.indiascience.in/videos/science-monitor-e-5-slash-12-slash-2022-1> <https://www.indiascience.in/videos/gyan-vigyan-h-5-slash-12-slash-022-2>
- Development of “**Multi-functional RGB luminescent security pigment based golden ink**” with myriad security features to curb counterfeiting of passport News was telecasted by **INDIA SCIENCE CHANNEL** (India Science, Department of Science and Technology, Govt of India) in **Science Monitor & Gyan Vigyan** on **10th April 2023**; also available at website: <https://youtu.be/74OTD8sRr1Y>
Also highlights of this research work is published at **Nature India Platform** as “**Security ink could prevent counterfeiting of passports**”, **25th April 2023**, doi: <https://doi.org/10.1038/d44151-023-00043-x>.
- Development of “**Invisible Election Ink**” News was telecasted by **INDIA SCIENCE CHANNEL** (India Science, Department of Science and Technology, Govt of India) in **Science Monitor & Gyan Vigyan** on **19th December 2023**; also available at website: <https://youtu.be/om7vNJJqkw?si=er6oXYJnS-hkRiOj>

Details about number of Ph.D. and Postdoctoral fellows (from all sources) working at present with the mentor

Present Postdoctoral fellows (from all sources): 02

1. Dr. Garima Kedawat, (Ph.D., Rajasthan University, Jaipur) joined on 26th February, 2023 as Research Associate-II, CSIR- NPL entitled “**Development of Mono-/Bi-invisible Fluorescent Pigments and visible/invisible fluorescent Security Threads/Fibres for Anti-counterfeiting Technology.**”
2. Dr. Shubhda Srivastava, (Ph.D., AcSIR, CSIR-NPL, New Delhi) joined on 26th February, 2023, as Research Associate -I, CSIR- NPL entitled “**Development of Mono-/Bi-invisible Fluorescent Pigments and visible/invisible fluorescent Security Threads/Fibres for Anti-counterfeiting Technology.**”

Postdoctoral Fellows Mentored Earlier (CSIR-SRA/CSIR-RA, SERB-NPDF/ Project RA-I, RA-II): 07

1. Dr. Garima Kedawat, (Ph.D., Rajasthan University, Jaipur) joined on 1st November, 2019 (two years) as Research Associate-II, CSIR- NPL entitled “**Make in India –Indigenous Development of Colour Shift Intaglio Ink.**” -**Completed**
2. Dr. Prashant Kumar Tripathi, (Ph.D., Department of Physics, Institute of Science, Banaras Hindu University, Varanasi) joined on 30th May, 2019 (three years), as Research Associate, CSIR-NPL entitled “**Metrological grade graphene synthesis for quantum hall resistance standard.**” -**Completed**
3. Dr. Vikash Kumar Tripathi, (Ph.D., Department of Chemistry, Faculty of Science, University of Delhi, Delhi) joined on 26th December, (two years) 2019, as Research Associate (N-PDF), CSIR-NPL entitled “**Design of rare-earth substitution at metalorganic framework to highly-efficient luminescent security feature for anti-counterfeiting applications.**” -**Completed**
4. Dr. Shubhda Srivastava, (Ph.D., AcSIR, CSIR-NPL, New Delhi) joined on 5th October, 2020 (fifteen months), as Research Associate -I, CSIR-NPL entitled “**Development of PCR free, facile luminescence based kit for ultra-sensitive detection of covid-19(GAP200132).**” – **Completed**
5. Dr. Garima Kedawat, (Ph.D., Rajasthan University, Jaipur) joined on 12th October, 2017, as Research Associate (NPDP), CSIR- NPL entitled “**Investigations on the uncloneable security functions generated from plasmonic nanostructures for anti-counterfeiting applications.**” -**Completed**
6. Dr. Akhilesh Kumar Singh, (Ph.D., IIT Banaras Hindu University, Varanasi) joined on 29th November, 2017, as Senior Research Associate, CSIR-NPL entitled “**Hybrid inorganic/organic materials for photovoltaic applications; nanophotonic light management.**” - **Completed**
7. Dr. Indu Sharma, (Ph.D., AcSIR, CSIR-NPL Campus, New Delhi) joined on 29th May, 2018, as Research Associate, CSIR-NPL entitled “**Development of hybrid CVD graphene/ silicon quantum dot nanostructures for optoelectronic device applications.**” - **Completed**

Present PhD Scholars Supervising: 05

1. Supervising, Ms. Saloni Sharma as a UGC-JRF at CSIR-NPL, New Delhi, Ms. Saloni Sharma as a CSIR-JRF at CSIR-NPL, New Delhi, “**Investigations on the Synthesis and Characterizations of Two Dimensional Materials Derived Heterostructures for Tuneable Optical and Electronic Properties**”(Physical Sciences, Enrollment No. 10PP20A32004) PTOC done on 29th November 2024 (Joined CSIR-NPL August 2020).
2. Supervising, Ms. Pooja Chauhan as a CSIR-JRF at CSIR-NPL, New Delhi, Ms. Pooja Chauhan as a CSIR-JRF at CSIR-NPL, New Delhi, “**Investigations on the Synthesis, Characterizations and Optical Properties of Graphene/BN derived 2D Heterostructures**”(Physical Sciences, Enrollment No. 10PP21A32023) underway (Joined CSIR-NPL August 2021).
3. Supervising, Ms. Toshi Shankar Dhapodkar as a DST-INSPIRE at CSIR-NPL, New Delhi, “**Novel Approach to Design Multifunctional Luminescent Hydrogels for Anticounterfeiting and Finger-marks Detection in Forensic Science Applications**”(Physical Sciences, Enrollment No. 10PP23J32011) underway (Joined CSIR-NPL January 2023).
4. Supervising, Ms. Leeza Dutta as a DST-INSPIRE at CSIR-NPL, New Delhi, “**Novel Approach to Design 2D Heterostructure Quantum Materials derived from CVD Grown Graphene/Dichalcogenide Monolayer Alloy for Terahertz Applications**”(Physical Sciences, Enrollment No. 10PP23A32003) underway (Joined CSIR-NPL August 2023).
5. Supervising, Ms. Nishu Rani as a UGC-JRF at CSIR-NPL, New Delhi, “**Selective Investigations on the 2D Materials derived Plasmonic Induced Luminescence Spectroscopy** ” (Physical Sciences, Enrollment No. 10PP24J32008) underway (Joined CSIR-NPL January 2024).

PhD Scholars Supervised: 06

1. Supervised Ph.D. Thesis of Dr. Pawan Kumar, a student of AcSIR, CSIR-NPL Campus, New Delhi, entitled “**Investigations on the synthesis, characterizations and spectroscopy study of luminescent (0D to 3D) nanomaterials for various strategic materials**”(Physical Sciences, Enrolment No. 10PP12A32005)- **Ph.D. Completed.**
2. Supervised Ph.D. Thesis of Dr. Amit Kumar Gangwar, a student of AcSIR, CSIR-NPL Campus, New Delhi, entitled “**Synthesis of luminescent materials for security ink applications**” underway (Physical Sciences, Enrolment No. 10PP14A32010)- **Ph.D. Completed.**
3. Supervised Ph.D. Thesis of Dr. Satbir Singh, a student of AcSIR, CSIR-NPL Campus, New Delhi, entitled “**Synthesis and characterizations of luminomagnetic materials for strategic applications**”(Physical Sciences, Enrolment No. 10PP15A32002) -**Ph.D. Completed.**
4. Supervised Ph.D. Thesis of Dr. Girija Shankar Papanai, a student of AcSIR, CSIR-NPL Campus, New Delhi, entitled “**Investigation on the synthesis, characterization and spectroscopic studies of 2D materials: (a) Graphene (b) MoS₂ (c) WSe₂ (d) MoSe₂**”(Physical Sciences, Enrolment No. 10PP17J3209) **Ph.D. Completed.**
5. Supervised Ph.D. Thesis of Dr. Pradeep Kumar Kashyap, a student of AcSIR, CSIR-NPL Campus, New Delhi, entitled “**Synthesis and characterizations of two dimensional materials: Graphene and its analogous structures**”(Physical Sciences, Enrolment No. 10PP16J32002)- **Ph.D. Completed.**
6. Supervised Dr. Kanika Nagpal as a CSIR-SRF at CSIR-NPL, New Delhi, “**Investigations on the synthesis and characterization of novel security pigments (luminescent and optical variables) for anti-counterfeiting applications** (Engineering Sciences, Enrolment No. 10CC18A32058)- **Ph.D. Completed.**

Summary of Academic Achievements

Total Number of Publications : >199

Total Number of Citations: > 11000

PhD Produced: 06

Current PhD Scholar: 05

Postdoctoral Mentored: 07 (CSIR-SRA, CSIR-RA, N-PDF and Project RA)

Major Projects: 02 (Security ink project under Make in India, Mono and Bi-luminescent pigments project for Anticounterfeiting Applications and DST Project on Mxenes assisted 2D material wearable electronic sensor for monitoring the motor symptoms of Parkinsons disease)