
50
द्वारिका प्रसाद 'विप्र' महाविद्यालय बिलासपुर (छ.ग.)
स्थापित १९६९
श्रद्धावान लभते ज्ञानम्
स्वर्ण जयंती वर्ष

D.P. VIPRA COLLEGE
BILASPUR
ACCREDITED "A" GRADE BY NAAC

# 3.1.1

Grants received from Government and non-governmental agencies for research projects, endowments, Chairs in the institution during the last five years (INR in Lakhs)


**D.P. Vipra College**

Old High Court Road, Bilaspur

Chhattisgarh, India 495001

OFFICE OF THE PRINCIPAL
**D. P. VIPRA COLLEGE, BILASPUR (C.G.)**
**Accredited "A" by NAAC, ISO-9001:2015 Certified**
Phone No.- 07752-424497, Web. – *www.dpvipracollege.in*, Email- *dpvipracollege@gmail.com*

# Summary-Sheet

| | |
|---|---|
| Criteria | 3 –Research, Innovation and Extension |
| Key Indicator | 3.1 Resource Mobilization for Research |
| Metric | 3.1.1**:** Grants received from Government and non-governmental agencies for research projects, endowments, Chairs in the institution during the last five years (INR in Lakhs) |
| Total Grants from Government and non-governmental agencies for research projects , endowments, Chairs in the institution during the last five years (INR in Lakhs) | |

| Year | 2016-17 | 2017-18 | 2018-19 | 2019-20 | 2020-21 |
|---|---|---|---|---|---|
| Total Grants from Government and non-governmental agencies | **4.05** | **5.0** | **Nil** | **Nil** | **Nil** |

**Note:**
Since all supporting documents for this metric exceeds the upload limit of 5Mb, hence we have hosted the scanned documents as per SOP on institutional website on the following links,

| **Description** | **Relevant link** |
|---|---|
| 1) e-copies of the grant award letters for research projects attested by the principal are attached. **(Appendix-I)** | https://dpvipracollege.in/wp-content/uploads/2022/04/3.1.1.pdf |
| 2) Income highlighted in the annual income/expenditure account sheet for the FY where grant is received with signatures of the CA and the principal is also attached. **(Appendix-II)** | |

IQAC Co-ordinator
D.P. Vipra College
BILASPUR (C.G.)
IQAC Coordinator

PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)
Principal

OFFICE OF THE PRINCIPAL

# D. P. VIPRA COLLEGE, BILASPUR (C.G.)

NAAC ACCREDITED "A" GRADE

**PHONE : 07752-424497, E-mail - dpvipracollege@gmail.com**

3.1.1 Grants received from Government and non-governmental agencies for research projects, endowments, Chairs in the institution during the last five years (INR in Lakhs) (5)

3.1.3 Percentage of departments having Research projects funded by government and non government agencies during the last five years (5)

## 2016-17

| Name of the Project/ Endowments, Chairs | Name of the Principal Investigator/Co-investivator | Department of Principal Investigator | Year of Award | Amount Sanctioned | Duration of the project | Name of the Funding Agency | Type (Government/non-Government) |
|---|---|---|---|---|---|---|---|
| Thermoluminescence and Machanoluminescence behaviour of Rare earth activated borate and phosphate based phosphors | Renu Nayar | Chemistry | 2016 | 4.05 Lakhs | 2 Years | UGC | Government |

## 2017-18

| Name of the Project/ Endowments, Chairs | Name of the Principal Investigator/Co-investivator | Department of Principal Investigator | Year of Award | Amount Sanctioned | Duration of the project | Name of the Funding Agency | Type (Government/non-Government) |
|---|---|---|---|---|---|---|---|
| Ecological Studies of Microbes, Macrophytes and Physic-chemical Properties of Water Bodies in Ratanpur Nagar Palika of Bilaspur District in Chhattisgarh State. | Renu Nayar | Chemistry | 2017 | 5 Lakhs | 2 Years | State Planning Commision | Government |

**Principal**

**D.P. Vipra College, Bilaspur (C.G.)**

PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

D.P. VIPRA COLLEGE
BILASPUR
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# Appendix I


## D.P. Vipra College

Old High Court Road, Bilaspur

Chattisgarh, India 495001

D.P. VIPRA COLLEGE
BILASPUR
ACCREDITED "A" GRADE BY NAAC

# 2016-17

## D.P. Vipra College

Old High Court Road, Bilaspur

Chattisgarh, India 495001

# UNIVERSITY GRANTS COMMISSION - CENTRAL REGIONAL OFFICE,

Tawa Complex (Bittan Market), E-5, ARERA COLONY, BHOPAL-462 016
Ph. : 0755 – 2467418, 2467892, Fax. : 0755 – 2467893, web site : www.ugc.ac.in

F.No.:MS-133/201002/XII/14-15/CRO -96-

Date : 17 JUL 2015

**Code : 201002**

**To**
**The Principal,**
**Dwarika Prasad Vipra College**
**Highe Court Road, Bilaspur (C.G.)**
**495001**

Sub. : Financial Assistance for undertaking Minor Research Project by Renu Nayar, Asstt. Professor(Chemistry) Dwarika Prasad Vipra College, Bilaspur (C.G.), in "Thermoluminescence and Mechanoluminescence behaviour of rare earth activated borate and phosphate based phosphors".

Sir,

The Commission on the recommendations of the Selection Committee has approved the research project entitled in "Thermoluminescence and Mechanoluminescence behaviour of rare earth activated borate and phosphate based phosphors". of by Renu Nayar, Asstt. Professor(Chemistry) Dwarika Prasad Vipra College, Bilaspur (C.G.),and has agreed to provide a grant of Rs.405000/-.

| Particular | | Allocation | | Grant being released | |
|---|---|---|---|---|---|
| **NON RECURRING** | | | | | |
| 1. | Books & Journals | Rs. | 50000.00 | Rs. | 50000.00 |
| 2. | Equipments | Rs. | 200000.00 | Rs. | 200000.00 |
| **RECURRING** | | | | | |
| 3. | Travels, Field work | Rs. | 20000.00 | Rs. | 10000.00 |
| 4. | Contingency | Rs. | 30000.00 | Rs. | 15000.00 |
| 5. | Chemical & Glassware | Rs. | 80000.00 | Rs. | 40000.00 |
| 6. | Special Needs | Rs. | 25000.00 | Rs. | 12500.00 |
| | **TOTAL** | **Rs.** | **405000.00** | **Rs.** | **327500.00** |

I am directed to convey the sanction of the Commission for Payment of Rs. 327500/- as first installment to The Principal, Dwarika Prasad Vipra College, Bilaspur (C.G.), under following terms and condition.

1. The effective date of implementation of the Project will be the date of receipt of fund by the institution.
2. The tenure for the Minor Research Project will be 2 year, which would be permissible only under special circumstances and will be without any Financial Assistance.
3. On receipt of this letter the Principal Investigator must sign and return the Acceptance Certificate as enclosed duly countersigned by the Principal within 3 month of issue of this letter, failing which the approval should stand withdrawn.
4. In case, the grant is not settled within six months from the date of completion of the project, the same will lapse and no representation will be entertained on this behalf and Principal Investigator has to refund the whole grant.
5. Principal Investigator may undertake only one project at a time under UGC funding either by the UGC, H.O., New Delhi or by the C.R.O., Bhopal. The letter of undertaking enclosed may be sent to this office immediately after receiving this sanction. Failure to the submission of this and also in running two parallel projects funded by the UGC (Regional Office/Main Office at New Delhi), the Principal Investigator will be held solely responsible and have to refund the amount as and when it comes to the notice, of the authorities.
6. **The College shall maintain proper accounts of the expenditure out of the Grants which shall be utilised only on approved item of expenditure as per detailed in XII Plan Guidelines.**

D.P. VIPRA COLLEGE
BILASPUR
ACCREDITED "A" GRADE BY NAAC

# 2017-18

## D.P. Vipra College

Old High Court Road, Bilaspur

Chattisgarh, India 495001

राज्य योजना आयोग
छत्तीसगढ़,
योजना भवन, सेक्टर –19, नार्थ ब्लॉक,
केपिटल कॉम्पलेक्स, नया रायपुर

## प्रशासकीय स्वीकृति आदेश

नया रायपुर, दिनांक 05/08/2017

[illegible]/ मू.स./2017, छत्तीसगढ़ शासन, वित्त विभाग, मंत्रालय, महानदी भवन, नया रायपुर क्रमांक 436/एफ 2016–23–00119/वित्त/नियम/चार नया रायपुर दिनांक 07 नवंबर, 2016, के [illegible] में प्रदत्त अधिकारों का उपयोग करते हुए शोध प्रस्तावों के अनुमोदन, मूल्यांकन एवं [illegible] के निर्धारण हेतु गठित मूल्यांकन समिति की बैठक दिनांक 05 अगस्त, 2017 की अनुशंसा पर [illegible] आयोग, छत्तीसगढ़ द्वारा बिलासपुर विश्वविद्यालय, बिलासपुर के परियोजना प्रस्ताव – [illegible]search project on wet lands of Ratanpur को अनुमोदन करते हुए प्रथम किस्त की राशि रू. 5.00 [illegible] लाख) मात्र, व्यय की प्रशासकीय स्वीकृति प्रदान की जाती है।

[illegible] वर्ष 2017–18 के आबंटन से मांग संख्या – 31, योजना, आर्थिक एवं सांख्यिकी विभाग से [illegible] योजना क्रमांक 7639–राज्य योजना का सुदृढ़ीकरण मूल्यांकन एवं अनुसंधान के अंतर्गत [illegible] सेवाओं हेतु अदागियॉ, उप शीर्ष 003–परामर्श सेवाएं मद में विकलनीय होगा।

[illegible] एजेंसी – बिलासपुर विश्वविद्यालय, बिलासपुर छ.ग.

**Work Detailed :**

[illegible] comprise of several wetland complexes of interconnected pond/tanks. These are mainly:

Dulahara wetland complex (Dulahara), Bikhama wetland complex (Bikhama, Girajaband, Aathabisha), Ved Ratneswar Pond system: (Ved Ratneswar) and Krishnajuni wetland complex (Jagdevban and Krishnajuni)

The larger tanks and a few (4-5) of the smaller ones in each complex will have to be studied. The hydrological connectivity has to be checked and the sequence of water flow mapped.

Water quality samples : near surface and near bottom (if < 2 m depth); also middle layer (about 1-1.5 depth if >3 m deep)

Number of samples: near mrgin (2-3 m distance) – all along the periphery – approx every 100 m; in the middle (~10 m from shore) -5 or more samples depending upon area of the tank

Parameters : Total depth at sampling point, pH, DO, Temp., Conductivity, Transparency, Alkalinity, TSS, TDS/salinity, NO 3-N, PO4-P, calcium, magnesium, BOD; Coliforms.

Also record: smell, colour if any; presence of algae/plankton and macrophytes, and fish; Detailed study of biota will require appropriate protocol. visible sources and nature of pollution around the waterbody

Record date and time of the day (hr) of sampling

As far as possible same sampling point every time: record it on map (with reference landmark or GPS)

--- (2)

प्रशासकीय स्वीकृति निम्नांकित शर्तों के अधीन दिया जाता है :–

1. प्रदत्त स्वीकृति वित्तीय वर्ष 2017–18 के लिए स्वीकृत शोध/अनुसंधान हेतु हो यह सुनिश्चित किया जावे।
2. वेट लैण्ड, रतनपुर परियोजना का डाटा संकलन कार्य को मानसून सीजन में ही पूर्ण कराया जाना है।
3. प्रदेय राशि का पूर्ण उपयोग होने संबंधी प्रमाण–पत्र, व्यय राशि का बिल एवं व्हाउचर्स की फ़ोटो कापी राज्य योजना आयोग छत्तीसगढ़ को उपलब्ध कराया जाना है।
4. परियोजना की शेष नियम एवं शर्तें स्वीकृत कार्य योजना अनुसार होंगी।

(अमिताभ पाण्डा)
सदस्य सचिव
राज्य योजना आयोग
छत्तीसगढ़

क्रमांक 946 /रायोआ/ मू.स../2017, नया रायपुर, दिनांक 05/08/2017

प्रतिलिपि :–

1. निज सचिव, मान. उपाध्यक्ष, राज्य योजना आयोग, छ.ग. नया रायपुर।
2. सचिव, छत्तीसगढ़ शासन, वित्त विभाग, मंत्रालय, नया रायपुर।
3. निज सहायक, सदस्य सचिव, राज्य योजना आयोग, छ.ग. नया रायपुर।
4. अवर सचिव, छत्तीसगढ़ शासन, योजना, आर्थिक एवं सांख्यिकी विभाग, मंत्रालय, नया रायपुर।
5. सर्व सदस्य, मुल्यांकन समिति, राज्य योजना आयोग की ओर सूचनार्थ।
6. वरिष्ठ कोषालय अधिकारी, इन्द्रावती कोषालय, नया रायपुर ।
7. कुलपति, बिलासपुर विश्वविद्यालय, बिलासपुर छ.ग. की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु।
8. संयुक्त संचालक वित्त, राज्य योजना आयोग, छ.ग. रायपुर स्वीकृत परियोजना के लिए क्रियान्वयन एजेंसी को रू. 5.00 लाख (रूपये पॉच लाख) मात्र जारी करने हेतु सूचनार्थ प्रेषित।

सदस्य सचिव
राज्य योजना आयोग
छत्तीसगढ़

**Prof. G.D. Sharma**
Vice-Chancellor
**BILASPUR UNIVERSITY**
Bilaspur (C.G.) 495001
Former Vice-Chancellor, Nagaland University &
Former Pro-Vice-Chancellor, Assam University (Central)

**प्रो. जी. डी. शर्मा**
कुलपति
**बिलासपुर विश्वविद्यालय**
बिलासपुर (छ.ग.) 495001
पूर्व कुलपति, नागालैण्ड विश्वविद्यालय एवं
सह-कुलपति असम विश्वविद्यालय (केन्द्रीय)

No/**1610**/P.A./2017

Bilaspur, **Date - 31.10.2017**

To,

**J. S. Virdee,**
Member Secretary,
State Planning commission
Raipur, Chhattisgarh, Yojna Bhawan ,
North Block, Sector-19, Capital Complex
Naya Raipur (C.G.)

**Subject: Interim Progress Report of Research project on "Wet land of Ratanpur".**

Reference: Letter No. - 1406/SP/2017, Dated 18.10.2017 and
Sanction letter No. - 945/SP/2017dated 5.08.2017.

Under the subject in connection to your Sanction letter as cited above the **'Interim Progress Report'** is being enclosed herewith for your kind perusal and consideration.

Thanking You,

Yours Sincerely,

G. D. Sharma

**(Prof. G. D. Sharma)**

Address : Gandhi Chowk, Bilaspur (Chhattisgarh) 495001
Telfax + 91-7752-220007 (O), +91-7752-260294, Mob : +91-9406218401, 09435500660
E-mail : gdurtasharma@yahoo.co.in, bilaspur.university2012@gmail.com, Website : bilaspuruniversity.ac.in

## INVESTIGATOR TEAM:


**Principal Coordinator:** **Prof. G. D. Sharma**
**Vice-Chancellor,**
**Bilaspur University, Bilaspur (C.G.)**

**Coordinator:** **Dr. D. K. Shrivastava**
**Department of Botany & Microbiology**
Govt. E. Raghavendra Rao Postgraduate Science College, Bilaspur.

**Member Investigators:** **Dr. P. K. Singh**
**Department of Chemistry**
Govt. T. C. L. College, Janjgir, Dist. Janjgir-Champa (C.G.)

**Dr. Rashmi Parihar**
**Department of Microbiology**
Govt. E. Raghavendra Rao Postgraduate Science College, Bilaspur

**Dr. Seema Berolkar,**
**Department of Microbiology & Bioinformatics**
Bilaspur University, Bilaspur.

**Dr. Renu Nayar**
**Department of Chemistry**
D. P. Vipra College, Bilaspur.


## REFEREES:

**Dr. E. N. Siddique**
**Retired Professor in Botany (Retired)**
**Binoba Bhawey University, Hazaribag, Jharkhand.**

**Dr. S. K. Sahu**
**Professor & Head, Department of Environmental Science,**
**Sambalpur University, Odisha.**

**Dr. A. K. Shukla**
**Professor in Botany**
**Indira Gandhi National Tribal University, Amarkantak, MP**

***

# Progress Report (Interim)

*Of*

## Interdisciplinary-Collaborative Project

*On*

## 'ECOLOGICAL STUDIES OF MICROBES, MACROPHYTES AND PHYSICO-CHEMICAL PROPERTIES OF WATER BODIES IN RATANPUR NAGAR PALIKA OF BILASPUR DISTRICT IN CHHATTISGARH STATE'

**By**


**Bilaspur University**

*in association with*

**Affiliated Colleges of Bilaspur (Chhattisgarh)**


*Funded by -*

**State Planning Commission, Chhattisgarh**

**Sector -19, North Block, Yojna Bhawan**

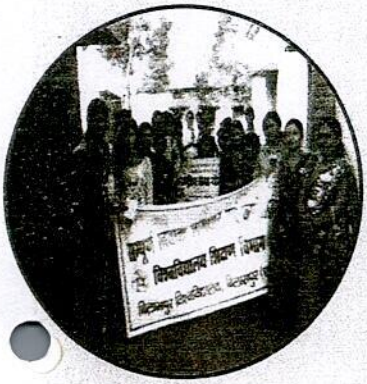
**New Raipur**

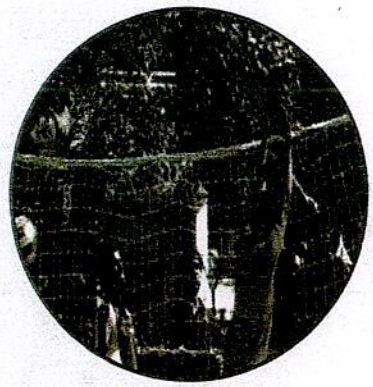
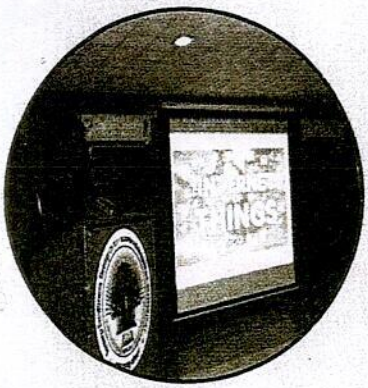
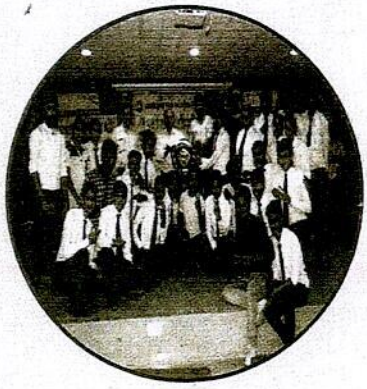
**2017**

# NEWS Letter Vol-6 (2)

Bilaspur University, Bilaspur (C.G.) July 2017 to December 2017, Vol-6 (2)



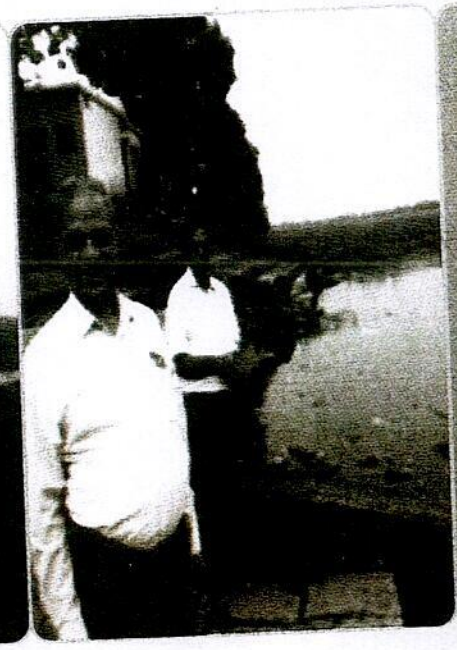


(A state University established under Chhattisgarh Act No. 07, 2012)

Recognised by the UGC (Letter No. F.9.8/2012 (CPP-1/PU) AIU
(Letter no. MEET/MEM/2012/July 31.2012) and Bar Council of India (BCI)
Bilsapur - 495001, Chhattisgarh (India)
ww.bilaspuruniversity.ac.in

## State planning commission Sanctioned a project on Lakes of Ratanpur

State Planning Commission has Sanctioned a Research project on "Wet lands of Ratanpur." The project is for two years. The first installment of Rs. 5 lack was released by it on September-2017 under the Co-ordinatorship of Honorable Vice-Chancellor Prof. G.D. Sharma,Co-coordinator, Dr.D.K. Shrivastava, Govt. E. RaghavendraRao Postgraduate Science College, Bilaspur, Dr. P. K. Singh, Govt. T. C. L. College, Janjgir, Dist. Janjgir-Champa (C.G.), Dr. RashmiParihar, Govt. E. RaghavendraRao Postgraduate Science College, Bilaspur, Dr. Seema Belorkar, Bilapur University, Bilapur,Dr. RenuNayar, D. P. Vipra College. After survey of lakes in Ratanpur, Five lakes systerms namelyDulahara wetland complex (Dulahara),



Bikhama wetland complex (Bikhama, Girajaband, Aathabisha), Ved Ratneswar Pond systen (VedRatneswar) and Krishnajuni wetland complex (Jagdevban and Krishnajuni) and a few (4-5) of tl smaller ones in each complex will bestudied for hydrological connectivity, Water quality,pH, DO, Tem Conductivity, Transparency, Alkalinity, TSS,TDS/- Salinity, NO3-N, PO4-P, Calcium, Magnesium, BC and Coliforms. Along with this Odour, colour if any; presence of algae/plankton and macrophytes, and fi biota and nature of pollution around the water body has also been analysed.

**DEPARTMENT OF ENVIRONMENT STUDIES**
**PANJAB UNIVERSITY, CHANDIGARH – 160 014**

**Dr. Rajeev Kumar**
Assistant Professor

Mobile:- 8146767744
email:- rajeev@pu.ac.in

Dated: 17 November, 2016

## Certificate

This is the certificate that **Dr. Renu Nayar** of Department of Chemistry, D. P. Vipra College, Bilaspur, Chattisgarh has visited our lab in the Department of Environment Studies, Panjab University, Chandigarh on 17.11.2017 for familiarization of the desired experimental work pertaining to her project entitled "Ecological Studies of Microbes, Marcophtytes and Physico - Chemical Properties of Water bodies in Ratanpur Nagar Palika of Bilaspur District in Chattisgarh State.

Rajeev Kumar

**(Rajeev Kumar)**
Dr. Rajeev Kumar
Assistant Professor
Department of Environment Studies
Panjab University, Chandigarh

**PANJAB UNIVERSITY**
DEPARTMENT OF CHEMISTRY
CHANDIGARH-160014

# Certificate

This is to certify that **Dr. Renu Nayar** of **Department of Chemistry, D. P. Vipra College, Bilaspur, Chhatisgarh** has visited our lab in the **Department of Chemistry and Centre of Advance Studies in Chemistry, Panjab University, Chandigarh** on **17-11-2017** for familiarization of the desired experimental work pertaining to her project entitled "Ecological Studies of Microbes, Macrophytes and Physico-Chemical Properties of Water Bodies in Ratanpur Nagar Palika of Bilaspur District in Chhattisgarh State.

Jasvir Chaudhary
17/11/17

रतनपुर के स्मारकों को संरक्षित करेगा पुरातत्व विभाग

राष्ट्रीय विद्वत संगोष्ठी सम्पन्न...

तालाबों का पर शोध कार्य शुरू-शर्मा

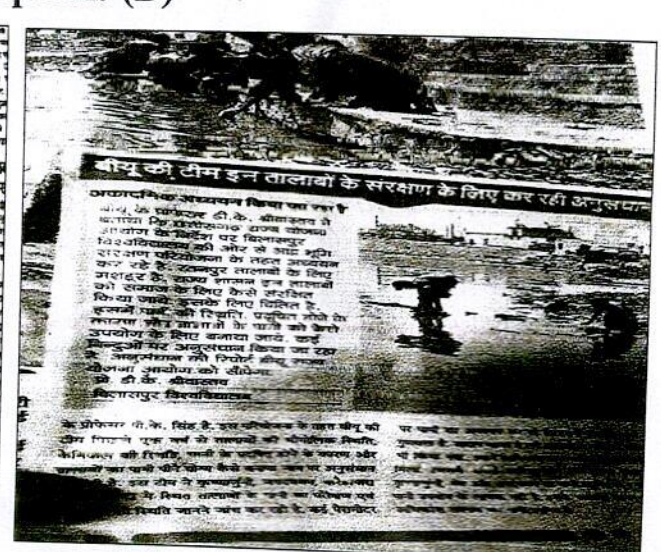
Media Speaks (A)

ऐतिहासिक तालाबों

भारतीय संस्कृति सबसे पुरानी और सबसे समृद्ध : शर्मा

Media Speaks (B)

स्वच्छता को जन आंदोलन बनाने की आवश्यकता



Media Speaks (C)

D.P. VIPRA COLLEGE
BILASPUR
ACCREDITED "A" GRADE BY NAAC

# Appendix II


## D.P. Vipra College

Old High Court Road, Bilaspur

Chattisgarh, India 495001

D.P. VIPRA COLLEGE
BILASPUR
ACCREDITED "A" GRADE BY NAAC

# 2016-17

## D.P. Vipra College

Old High Court Road, Bilaspur

Chattisgarh, India 495001

## DWARKA PRASAD VIPRA COLLEGE , HIGH COURT ROAD , BILASPUR (C.G)

### Audited Statement of Expenditure

**In respect of financial assistance( under the 1st installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) by U.G.C C.R.O Bhopal vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 31-3-2016**

| S.No | Sanction Letter No/Dt | Amount Allocated | Amount Released | Amount Utilized | Unspent Balance | Remark |
|---|---|---|---|---|---|---|
| 01 | F:No MS-133/201002/ XII/14-15/CRO-97 dated 7-7-2015 | | | | | |
| | **Total (Rs)** | **327500.00** | **327500.00** | **327544.56** | **Nil** | |

Principal Investigator

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D. Vipra P.G. College
BILASPUR (C.G.)

Principal
In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

Statutory Auditor

MANOJ KUMAR SINHA
F.C.A. M.No.077582
Bilaspur

Dr. Renu Nayar

Assistant Professor (Chemistry), Dwarika Prasad Vipra College,

Bilaspur (C.G.)

Name of the Minor Research Project :"Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors "

UGC letter No F: No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015

## AUDITED RECEIPTS AND PAYMENTS ACCOUNT

| RECEIPTS | AMOUNT (Rs) | PAYMENTS (RS) | AMOUNT (RS) |
|---|---|---|---|
| TO OPENING BALANCE | 0 | By Equipments | 201785.00 |
| TO GRANT IN AID | | By Books/Journals | 50000.56 |
| RECEIVED FROM UGC | 327500.00 | By Contingency | 30046.00 |
| To Contribution of PI | 77673.56 | By Field work/ Travel | 18255.00 |
| | | By Chemical/ Glassware | 80047.00 |
| | | By Special Needs | 25040.00 |
| | | By Closing Balance | 0 |
| TOTAL (RS) | 405173.56 | TOTAL (RS) | 405173.56 |

1. Certified that the above statement is true and correct
2. Bill wise Detail of above Expenditure is Enclosed

Signature of the
Principal Investigator

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

Principal
(Seal)

In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

Statutory Auditor
(Seal)

Dr. Renu Nayar

Assistant Professor (Chemistry), Dwarika Prasad Vipra College,

Bilaspur (C.G.)

Name of the Minor Research Project: "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors "

UGC letter No F: No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015

**Details of Expenditure of the grant of Rs. 405000/- (Rs. Four lakh Five Thousand only) sanctioned by the University Grants Commission under the scheme of support for Minor Research Project.**

| Particular | Amount approved in Rs | Expenditure Incurred (Rs) |
|---|---|---|
| 7. Equipments | 200000.00 | 201785.00 |
| 8. Books | 50000.00 | 50000.56 |
| 9. Contingency | 30000.00 | 30046.00 |
| 10. Field work/ Travel | 20000.00 | 18255.00 (Balance amount reallocated to the Equipment Grant) |
| 11. Chemical/ Glassware | 80000.00 | 80047.00 |
| 12. Special Needs | 25000.00 | 25040.00 |
| Total (Rs) | 405000.00 | 405173.56 |

Signature of the Principal Investigator

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

Principal
(Seal)
In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

Statutory Auditor
(Seal)

**Annexure- V**

# UTILIZATION CERTIFICATE

Certified that the grant of Rs. 405000/- (Rs. Four lakh five thousand only) was sanctioned by the University Grants Commission to Dr. Renu Nayar, Assistant Professor (Chemistry), Dwarika Prasad Vipra College, Bilaspur (C.G.) under the scheme of support for Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015. Out of the above Rs. 405000/- only Rs. 327500/- (Rs. Three lakh Twenty seven thousand Five Hundred only) was released by the University Grants Commission for above project. Dr.Renu Nayar has incurred Rs.405173.56 /- (Rs. Four lakh five thousand one hundred seventy three and fifty six paise only) for the purpose for which it was sanctioned and in accordance with the terms and conditions laid down by the University Grant Commission.

Signature of the

Principal Investigator

HEAD
Dept. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

Principal

In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

Statutory Auditor

MANOJ KUMAR SHUKLA
F.C.A. M.No.077582
Bilaspur

Encl.: Detail of expenditure & Audited Receipts and Payments Account

Bilaspur (C.G.)

Date:

## Consolidated Audited Statement of Expenditure

**In respect of financial assistance( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015, from the period 7-10-2015 to 28-3-2017.**

### DETAILS OF EXPENDITURE

| Particular | Expenditure (Rs) | Amount Allocated Rs 50000.00 |
|---|---|---|
| **Non Recurring 1. Books & Journals (under the 1st installment only)** | | **Amount received Rs 50000.00** |
| Invoice No: 484548325 dt. 13-2-2016 | 16290.87 | |
| B2A UK Chennai (Paid via Amazon.in) | | |
| Invoice No: 484551393 dt. 14-2-2016 | 4972.56 | |
| B2A UK Chennai (Paid via Amazon.in) | | |
| Bill No. 544 dt. 24-2-2016 | 28737.13 | |
| Students Friends, Bilaspur | | |

**Total Expenditure: Rs 50,000.56**

### DETAILS OF EXPENDITURE

| Particular | Expenditure (Rs) | Amount Allocated Rs 200000.00 |
|---|---|---|
| **Non Recurring 2. Equipments (under the 1st installment only)** | | **Amount Received Rs 200000.00** |
| Invoice No. 1369 dt. 6-1-2016 | 200103.00 | |
| Matushri Trading Co., Bilaspur | | |
| Invoice No. 1436 dt. 18-1-2016 | 1682.00 | |
| Matushri Trading Co., Bilaspur | | |

**Total Expenditure: Rs 201785.00**

**Rs 200000.00 under Equip. grant +Rs 1785.00 re-appropriated from Travel Grant as per section 3(f) of UGC XII plan guidelines on MRP.**

**Principal Investigator**

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

**Principal**

In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

**Statutory Auditor**

F.C.A. M.No.077[illegible]
Bilaspur

## Consolidated Audited Statement of Expenditure

**In respect of financial assistance( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 28-3-2017**

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**Recurring 3. Travel, Field work Under the 1st installment Amount Allocated & Received Rs 10000.00**

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Bill No. 494 dt. 23-12-2015 : Rs 2216 (T.A)+Rs 400 (D.A)= Rs 2616.00 , BSP to Raipur and back by Road

Bill No. 496 dt. 23-01-2016 : Rs 2385 (T.A)+Rs 400 (D.A)= Rs 2785.00, BSP to Raipur and back by Road

PNR No: 6248959151 17.2.16

PNR No: 8643961241 18.2.16

Rs 1920(Rail Fare)+Rs 710 (400 D.A +310 T.A at Nagpur)= Rs 2630.00

Visit to GGU Bilaspur : Travelled by own car Rs 184.00 (T.A)

**Expenditure : Rs 8215.00 (under the 1st installment)**

**Balance of Rs 1785.00** reappropriated from Travel Grant to purchase of Equipments as per section 3(f) of UGC XII plan guidelines on MRP)

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**Travel, Field work (under the 2nd installment) Amount Allocated Rs 10000.00**

**Amount To be received Rs 10000.00**

Bill No. 265 dt. 14-10-2016 : Rs 7080(T.A)+Rs 400 (D.A)= Rs 7880 , BSP to Nagpur and back by Road

Bill No. 266 dt. 15-01-2017 : Rs 1960(T.A)+Rs 200 (D.A)= Rs 2160 , BSP to HardiBazar and back by Road

**Total Expenditure : Rs 10040.00 (under the 2nd installment)**

---

**Total Amount Allocated (1st and 2nd Installment) = Rs 20000.00**

**Consolidated expenditure (1st and 2nd Installment) = Rs 18255.00**

**Balance of Rs 1785.00 (under the 1st installment) reappropriated from Travel Grant to purchase of Equipments (under the 1st installment) as per section 3(f) of UGC XII plan guidelines on MRP.**

---

**Principal Investigator**

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

**Principal**

In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

**Statutory Auditor**

MANOJ KUMAR SHUKLA
Bilaspur
F.C.A. M.No.077582

## Consolidated Audited Statement of Expenditure

**In respect of financial assistance( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 28-3-2017**

### DETAILS OF EXPENDITURE

| Particular | Expenditure (Rs) | Amount Allocated & Received(Rs) |
|---|---|---|
| Recurring 4. Contingency | (under the 1st installment only) | 15000.00 |
| 1. Bill No. 172, dt 10-10-2015 | 380.00 | |
| Sarvodaya Pustak Bhavan, Bilaspur | | |
| 2. Bill No. 519, dt 20-10-2015 | 176.00 | |
| Arti Computer & Photocopy, Bilaspur | | |
| 3. Bill No. 455, dt 21-10-2015 | 435.00 | |
| Poojashri Collection, Bilaspur | | |
| 4. Bill No. 465, dt 25-10-2015 | 450.00 | |
| Poojashri Collection, Bilaspur | | |
| 5. Bill No. 550, dt 27-10-2015 | 532.00 | |
| Arti Computer & Photocopy, Bilaspur | | |
| 6. Bill No. 381 dt 11-11-2015 | 1545.00 | |
| Popular Electronics | | |
| 7. Bill No. 369 dt 10-2-2016 | 890.00 | |
| Osho Mangal Book Depo, Bilaspur | | |
| 8. Bill No. 370 dt 12-2-2016 | 438.00 | |
| Osho Mangal Book Depo, Bilaspur | | |
| 9. Invoice No. CS0920, dt 10-3-2016 | 5756.00 | |
| Kuber Stationary Distributor, Bilaspur | | |
| 10. Invoice No. 624 , dt 25-3-2016 | 2400.00 | |
| DCS Enterprises, Bilaspur | | |
| 11. Audit Fees | 2000.00 | |

**Total Expenditure : Rs 15002.00**

**Principal Investigator**

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

**Principal**
In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

MANOJ KUMAR SHUKLA
Bilaspur
M.No.077582

**Statutory Auditor**

## Consolidated Audited Statement of Expenditure

**In respect of financial assistance( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphatebased phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 28-3-2017**

**DETAILS OF EXPENDITURE**

| Particular | Expenditure (Rs) | Amount Allocated Rs 15000.00 |
|---|---|---|
| Recurring 4. Contingency (under the 2nd installment) | | Amount To be received Rs 15000.00 |
| 1. Bill No. 758, dt 08-09-2016 | 1845.00 | |
| PoojaShri Computer and Stationary, Bilaspur | | |
| 2. Bill No. 1259, dt 02-01-2017 | 6399.00 | |
| Bhatia Enterprises, Bilaspur | | |
| 3. Bill No. 5330, dt 28-03-2017 | 4800.00 | |
| MicroTrends Computer, Bilaspur | | |
| 4. Audit Fees | 2000.00 | |
| **Total Expenditure : Rs 15044.00** | | |

**Total Amount Allocated (1st and 2nd Installment) = Rs 30000.00**

**Consolidated expenditure (1st and 2nd Installment) = Rs 30046.00**

**Principal Investigator**

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

**Principal**
In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

**Statutory Auditor**

MANOJ KUMAR SHUKLA
Bilaspur
F.C.A. M.No.077582

## Consolidated Audited Statement of Expenditure

**In respect of financial assista nce( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 28-3-2017**

**DETAILS OF EXPENDITURE**

| Particular | Expenditure (Rs) | Amount Allocated & Received |
|---|---|---|
| Recurring 5. Chemicals and Glass ware (under the 1st installment only) | | Rs 40000.00 |
| Invoice No. 1304, dt. 1-1-2016 | 40042.00 | |
| Matushri Trading Co., Bilaspur | | |
| **Total Expenditure : Rs 40042.00** | | |

| Particular | Expenditure (Rs) | Amount Allocated Rs 400000.00 |
|---|---|---|
| Recurring 5. Chemicals and Glass ware (under the 2nd installment) Amt.To be received 40000.00 | | |
| Invoice No. 1795, dt. 18-01-2017 | 40005.00 | |
| Matushri Trading Co., Bilaspur | | |
| **Total Expenditure : Rs 40005.00** | | |

**Total Amount Allocated (1st and 2nd Installment) = Rs 80000.00**

**Consolidated expenditure (1st and 2nd Installment) = Rs 80047.00**

**Principal Investigator**
Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

**Principal**
In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

**Statutory Auditor**
MANOJ KUMAR SHUKLA
Bilaspur
F.C.A. M.No.077582

## Consolidated Audited Statement of Expenditure

**In respect of financial assistance( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 28-3-2017**

**DETAILS OF EXPENDITURE**

| Particular | Expenditure (Rs) | Amount Allocated & Received (Rs) |
|---|---|---|
| Recurring 6. Special Needs (under the 1st installment only) | | 12500.00 |
| 1. Invoice No. 4943, dt 23-10-2015 Micro-Trends Computer, Bilaspur | 1200.00 | |
| 2. Invoice No. 4989, dt 8-10-2015 Micro-Trends Computer, Bilaspur | 3000.00 | |
| 3. Bill No. 704 dt 9-10-2015 Parmanand Furniture, Bilaspur | 900.00 | |
| 4. Bill No. 973, dt 12-10-2015 J.B.Engineering Works, Bilaspur | 800.00 | |
| 5. Bill No. 544, dt 9-11-2015 Computer Services, Bilaspur | 300.00 | |
| 6. Invoice no. 380, dated 17-11-2015 Computer Services, Bilaspur | 4830.00 | |
| 7. Invoice no. 383, dated 15-10-2015 Computer Services, Bilaspur | 870.00 | |
| 8. Invoice No 1436, dt 2-1-2016 Matushri Trading Co., Bilaspur | 300.00 | |
| 9 .Challan No. 151651344, dt 21-3-2016 GGU Bilaspur | 300.00 | |

**Total Expenditure : Rs 12500.00**

**Principal Investigator**

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D. Vipra P.G. College
BILASPUR (C.G.)

**Principal**

In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

MANOJ KUMAR SHUKLA
M.No.07282
Bilaspur

**Statutory Auditor**

## Consolidated Audited Statement of Expenditure

**In respect of financial assistance( under the 1st and the 2nd installment) for undertaking Minor Research Project entitled "Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors" sanctioned to Dr.Renu Nayar, D.P.Vipra College, Bilaspur (C.G) vide UGC letter No F:No MS-133/201002/XII/14-15/CRO-97 dated 7-7-2015 from the period 7-10-2015 to 28-3-2017**

**DETAILS OF EXPENDITURE**

| Particular | Expenditure (Rs) | Amount Allocated Rs 12500.00 |
|---|---|---|
| **Recurring 6. Special Needs (under the 2nd installment)** | | **Amount To be received Rs 12500.00** |
| 1.Bill No 566 , dt 15-6-2016 | 2425.00 | |
| Computer Services | | |
| 1. Invoice No. 4457, dt 28-03-2017 | 6615.00 | |
| Micro-Trends Computer, Bilaspur | | |
| 2. Invoice No. 5331, dt 28-03-2017 | 2900.00 | |
| Micro-Trends Computer, Bilaspur | | |
| 3. Bill No. 533Q, dt 28-03-2017 | 600.00 | |
| MicroTrends Computer, Bilaspur | | |

**Total Expenditure : Rs 12540.00**

**Total Amount Allocated (1st and 2nd Installment) = Rs 25000.00**

**Consolidated expenditure (1st and 2nd Installment) = Rs 25040.00**

**Principal Investigator**

Dr. Renu Nayar
HEAD
Deptt. of Chemistry
D.P. Vipra P.G. College
BILASPUR (C.G.)

**Principal**

In. PRINCIPAL
D.P. Vipra College
Bilaspur (C.G.)

**Statutory Auditor**

MANOJ KUMAR
MANOJ KUMAR & CO.
Bilaspur
F.C.A. M.No.077582

# SUMMARY OF THE PROJECT REPORT

SUBMITTED

TO

UGC, CRO BHOPAL

**Title of the Project :** Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and phosphate based phosphors

**Name of the Principal Investigator:** Dr.Smt. Renu Nayar,

**Name and address of the Institution:** Department of Chemistry,
D.P.Vipra College, Bilaspur(C.G)

UGC APPROVAL LETTER NO. : F:No MS-133/201002/XII/
14-15/CRO-97, dated 07-07-2015

DATE OF IMPLEMENTATION : 7-10-2015

Dr. Renu Nayar
Department of Chemistry
D.P.Vipra College, Bilaspur (C.G)

# Summary

**Minor Research Project entitled :Thermoluminescence and Mechanoluminescence behavior of rare earth activated borates and posphate based phosphors**

Very few borate and phosphate based phosphors and nanophosphors has been prepared which possesses all the characteristics needed in an ideal thermoluminescence (TL) and mechanoluminescence (ML) radiationdosimetryphosphors. There have always been attempts either to prepare new nanophosphors with better TL and ML characteristics or simply improve upon the already existing phosphors by using easy techniques or varying the concentration of the dopants of the phosphor or by co-doping well known phosphors with other elements.

In the present investigation we have studied the ML and TL in borate and phosphate based phosphors. Photoluminescence (PL) have also been recorded for better understanding of TL and ML mechanisms.

$LaBO_3:xDy^{3+}$ (x = 0.05 mol%, 0.1 mol%,0.2 mol%, 0.5 mol%, 1 mol% and 2 mol%) phosphors weresynthesized by solid-state reaction method. X-ray diffractiontechnique was used to confirm the formation of compound.Photoluminescence emission spectra shows two emissionpeaks at470 nm and 575 nm when excitation wavelength isset at 352 nm. Photoluminescence intensity increaseš upto1 mol % of $Dy^{3+}$ and then starts decreasing. Dipole-dipoleinteraction is found to be responsible for concentrationquenching of photoluminescence intensity. CommissionInternationale de I'Eclairage (CIE) chromaticity diagram demonstratesthat the phosphor emits in bluish white region of thevisible spectrum. Critical energy transfer distance between dopantions was determined. The mechanoluminescence characteristicswere studied by the impact method. The peaks of both themechanoluminescence (ML) intensity and the total ML intensityof the UV exposed phosphors increases with increasingimpact velocity for 1 mol % concentration of Dy3+. The MLsensitivity of the $LaBO_3:Dy^{3+}$ ($Dy^{3+}$ = 1 mol %) phosphor is

comparable with the reported ML of various inorganic phosphors.The thermoluminescence characteristics of the sampleswere also investigated. Thermoluminescence glow peaks were recorded with 480 Gy, 80 Gy and 20 Gy dose of γ-irradiationfrom Co60 Source. TL trapping parameters were determined by Chen's peak shape method and glow curve deconvolutionmethod. $LaBO3:Dy^{3+}$ phosphors were found to be goodmechanoluminescent materials and can be used in stress sensingapplication.

The series of $Li_6Gd(BO_3)_3:Dy^{3+}$ phosphor were prepared by combustion synthesis technique with the $Dy^{3+}$activator concentration *ranging from 0.05 to 1.5 mole %.*The *phosphors were* studied for phase and morphology with the help of XRD *which* confirms the crystalline nature of the phosphor. The photoluminescence (PL) and mechanoluminescence (ML) characteristics of $Li_6Gd(BO_3)_3:Dy^{3+}$phosphor has been investigated. PL study depicts that the phosphor emits appreciably owing to energy transfer from $Gd^{3+}$ to $Dy^{3+}$ ions when excited at 274 nm and also due to $Dy^{3+}$ ions at 352 nm excitation *wavelength*. Emission spectra consists of peaks in the blue region at 482 nm ($^4F_{9/2}$ -$^6H_{15/2}$) and in the yellow region at 580nm ($^4F_{9/2}$ - $^6H_{13/2}$) due to $Dy^{3+}$ transitions .The phosphor emits substantial white light when excited at $Dy^{3+}$excitation of 352 nm with the CIE co-ordinates corresponding to (0.276, 0.303) and hence can extensively be used as an activator ion in designing mercury free and eco-friendly LED based white light sources.

$Li_6Y(BO_3)_3$ was prepared by solid state synthesis with varying activator concentration(0.05 to 1.0mole %).The phosphor is analyzed for phase, crystallinity, morphology and functional group with XRD, SEM and FTIR. Magnificent photoluminescence characteristics suitable for mercury free solid state lighting are achieved.Uniaxial compression experiments show thelinear dependence of the ML intensity with the mechanical power. A theoretical model, based on the physics of delayed processes (in analogy of viscoelasticity), is proposed. This model accurately predicts, the ML intensity changes, induced by a complex mechanical loading and provides a convincing description of the ML response. The elastic ML in Dy And Eu doped $Li_6Y(BO_3)_3$phoshors arise because of the piezo electrification of the crystals, where by the electric fied reduces the trap-depth of hole traps, and therefore, transfer of holes from traps to the valence band takes place. When a pressure is applied on rare-earth doped $Li_6Y(BO_3)_3$ phosphor mixed in an epoxy resin, initially the ML intensity increases with time,attains a peak value $I_m$ at a particular time $t_m$, and further decreases with increase in time. After $t_m$, the ML intensity decreases exponentially,initially at a faster rate which further slows down.

It has been observed that the ML intensity depends on the method of incorporation of impurity (Ce, Dy, Eu and Tb) in mixed phosphate system. On the basis of the descending order of total ML intensity, the samples can be arranged in the following order

$$Li_3PO_4 > LaPO_4 > Sr_5(PO_4)_3Cl > Li_2BaP_2O_7$$

The ML intensity of the quenched samples has been found higher than that of the unquenched samples. At higher temperature the atoms of the lattice get disturbed. Due to quenching (quick cooling to room temperature) the ions/atoms do not get sufficient time to re-arrange themselves to their normal positions in the lattice, consequently more defect centres are created thereby more sites for ions after irradiation are available and the radiative recombination of these defects results higher luminescence efficiency in the quenched samples.

The peak ML intensity and total ML intensity of $Li_3PO_4$, $Li_2BaP_2O_7$, $Sr_5(PO_4)_3Cl$, $LaPO_4$ phosphorinitially increase with increasing concentration of impurity doped (Ce, Dy, Eu and Tb), attain an optimum value then decrease with further increase in the concentration of impurity. However, time corresponding to the ML peak ($t_m$) does not changes significantly with concentration of impurity doped. It is observed that $Li_3PO_4$sample has optimum ML efficiency for 1 mole % of Tb .

It is observed that the total ML intensity intensity increases linearly with increasing mass of the piston and also with increasing mass of the sample. It is found that $Sr_5(PO_4)_3Cl$doped with 1 mole % Eu, quenched sample has lowest fading among $LaPO_4$ samples.

In the mechanism of ML, it may be speculated that during the fracture of the sample by the impact of piston, oppositely charged new surfaces are created and an intense electric field is produced near the crack tip. This electric field may cause the bending of valence band, conduction band and trapping levels, consequently tunneling of holes from the holecentres to valence band may take place.