


## Brief Bio-data

**Name: Prof. N. Vijayan**

<b>Designation:</b>	Sr. Principal Scientist & Professor (Academy of Scientific and Innovative Research; AcSIR)	
<b>DP No. and Name:</b>	5.01; In-House BND Group	
<b>DU No. and Name:</b>	5.0; BND (Indian Reference Materials) Division	
<b>Email:</b>	<a href="mailto:nvijayan@nplindia.org">nvijayan@nplindia.org</a> ; <a href="mailto:vjnphy@yahoo.com">vjnphy@yahoo.com</a>	
<b>Date of Joining CSIR-NPL:</b>	27 <sup>th</sup> Aug. 2004	
<b>Phone (office)</b>	011-45608263/45609371	
<b>Mobile (optional)</b>	-	

### Research Area/ Interest

- Growth of Technologically Important Single crystals by Melt and Solution Growth techniques
- Preparation of Indian Reference Materials (Bharatiya Nirdeshak Dravyas: BNDs) for the calibration of Sophisticated Instruments
- Preparation of Nano and allied materials

### Educational Qualifications

(Please write latest qualification first)

Degree	Subject	University/ Institute	Year
Ph.D.	Materials Science	Anna University, Chennai	2005
M.Phil.	Physics	Bharathidasan University, Trichirappalli	2001
B.Ed.	Physical Sciences	Bharathidasan University, Trichirappalli	1999
M.Sc.	Physics	Bharathidasan University, Trichirappalli	1998
B.Sc.	Physics	Bharathidasan University, Trichirappalli	1996

### Academic / Research Experience

Grade / Post	Institute	Duration		Research Field
		From	To	
Senior Principal Scientist	CSIR-NPL	27 <sup>th</sup> Aug. 2020	Till Date	Preparation of BNDs, Preparation of Nanomaterials, Growth of Technologically Important Single Crystals & Characterization of Materials

Principal Scientist	CSIR-NPL	27 <sup>th</sup> Aug. 2015	26 <sup>th</sup> Aug. 2020	Preparation of BNDs, Preparation of Nanomaterials, Growth of Technologically Important Single Crystals & Characterization of Materials
Senior Scientist	CSIR-NPL	27 <sup>th</sup> Aug. 2011	26 <sup>th</sup> Aug. 2015	Preparation of Nanomaterials, Growth of Technologically Important Single Crystals & Characterization of Materials
Scientist	CSIR-NPL	27 <sup>th</sup> Aug. 2007	26 <sup>th</sup> Aug. 2011	Growth of Technologically Important Single Crystals, preparation of nanomaterials, & Characterization of Materials
Junior Scientist	CSIR-NPL	27 <sup>th</sup> Aug. 2004	26 <sup>th</sup> Aug. 2007	Growth of Single Crystals & Characterization of Materials

#### No. of Publications

No. of Publications in SCI Journals	No. of Publications in non-SCI Journals	No. of Publications in Conference Proceedings/Abstracts	Book Chapter	Total
230	10	~201	05	446

#### Selected Publications

<ul style="list-style-type: none"> <li>➤ A Comparative study on solution and Bridgman grown single crystals of benzimidazole by high-resolution XRD, FTIR, microhardness, laser damage threshold and SHG measurements, <b>N.Vijayan</b>, G.Bhagavannarayana, R.Ramesh Babu, R.Gopalakrishnan, K.K.Maurya and P.Ramasamy Crystal Growth and Design 6 (2006) 1542-1546 (ACS).</li> <li>➤ Growth of benzimidazole single crystal by Sankaranarayanan-Ramasamy method and its characterization by HRXRD, TG/DTA and birefringence <b>N.Vijayan</b>, K.Nagarajan, Alex M Z Slawin, C.K.Shashidharan Nair, G.Bhagavannarayana, Crystal Growth and Design 7 (2007) 445-448. (ACS)</li> <li>➤ Development of CdZnTe Doped with Bi for Gamma radiation detection V. Carcelén, J. Rodríguez-Fernández, <b>N.Vijayan</b>, P. Hidalgo, J. Piqueras, N.V.Sochinskii, J.M. Perez, E. Dieguez, Crystal Engineering Communication 12 (2010) 507-510 , (RSC)</li> <li>➤ Crystalline Perfection, EPR, Prism Coupler and UV-VIS-NIR studies on Cz-grown Fe-doped LiNbO<sub>3</sub>: A Photorefractive Nonlinear Optical Crystal S.K. Kushwaha, K.K. Maurya, <b>N. Vijayan</b> and G. Bhagavannarayana Crystal Engineering Communications 13 (2011) 4866-4872 (RSC)</li> <li>➤ Zirconia Grafted Multiwalled CNT Nanocomposite Platform for Biosensing Maumita Das, Chetna Dhand, Gajjala Sumana, Avanish Kumar Srivastava,</li> </ul>
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**N.Vijayan**, Rajamani Nagarajan, and Banshi Dhar Malhotra, Applied Physics Letters 99 (2011) 143702-143704

- Crystalline perfection, Raman, UV-VIS-NIR and prism coupler investigations on Cz-grown pure and Zn-doped LiNbO<sub>3</sub> single crystals  
S. K. Kushwaha, K. K. Maurya, **N. Vijayan**, Binay Kumar, Rajeev Bhatt, S. Ganesamoorthy and G. Bhagavannarayana, Crystal Engg. Commun. 14 (2012) 3297-3305, (RSC)
- Faster response of NO<sub>2</sub> sensing in graphene-WO<sub>3</sub> nanocomposites  
Shubhda Srivastava, Kiran Jain, Sukhvir Singh, **N. Vijayan**, Nita Dilawar, Govind and T. D. Senguttuvan, Nanotechnology (IOP Science) 23 (2012)
- Effect of crucible design on crystalline perfection and the enhanced optical properties of benzimidazole single crystals grown by the vertical Bridgman technique, B. Riscob, **N. Vijayan**, M. Shakir, M.A. Wahab and G. Bhagavannarayana, J. Applied Crystallography 46 (2013) 276-278
- Phase matching, X-ray Topography, Optical and Thermal Analysis of L-Alanine Cadmium Chloride Monohydrate: A nonlinear optical material  
Anuj Krishna, **N. Vijayan**, S.K. Halder, Jacob Philip, G. Bhagavannarayana Applied Physics A 114 (2014) 1257-1265
- Synthesis and single crystal growth of L-proline cadmium chloride monohydrate and its characterization for higher order harmonic generation applications, Kanika Thukral, **N.Vijayan**, Brijesh Rathi, G.Bhagavannaryana, S.Verma, J. Philip, Anuj Krishna, M.S.Jeyalakshmy, S.K. Halder Crystal Engineering Communication 16 (2014) 2802-2809 (RSC)
- Enhancement of thermoelectric figure of merit in Bi<sub>2</sub>Se<sub>3</sub> crystals through a necking process, S. Gupta, **N. Vijayan**, A. Krishna, K. Thukral, K. K. Maurya, S. Muthiah, A. Dhar, B. Singh and G. Bhagavannarayana J. Applied Crystallography 48 (2015) 533-541)
- Growth, structural and mechanical analysis of a single crystal of L-prolinium tartrate: a promising material for nonlinear optical applications  
Kanika Thukral, **N. Vijayan**, Budhendra Singh, Igor Bdikin, D. Haranath, K. K. Maurya, J. Philip, H. Soumya, P. Sreekanth and G. Bhagavannarayana Cryst. Eng. Communication, 16 (2014) 9245-9254 (RSC)
- Effect of ampoule support on the growth of organic benzimidazole single crystals by vertical Bridgman technique for nonlinear optical applications  
Anuj Krishna, **N. Vijayan**, Chandan Bagdia, Kanika Thukral, Sonia, D. Haranath, K. K. Maurya, G. Bhagavannarayana, CrystEngComm., 18 (2016) RSC
- Seasonal characteristics of aerosols (PM<sub>2.5</sub> and PM<sub>10</sub>) and their source apportionment using PMF: A four year study over Delhi, India  
S Jain, SK Sharma, **N Vijayan**, TK Mandal, Environmental Pollution, 114337, 2020
- Single crystal growth of l-tartaric acid and its characterization for optical applications, N Khan, **N Vijayan**, K Shandilya, R Kumar, A Krishna, S Chopra, S Yadav, Journal of Materials Science: Materials in Electronics 31 (6), 4494-4502, 2020
- Studies on the third-order nonlinear behaviour of Itaconic acid single crystal using femto-second laser, D Nayak, **N Vijayan**, M Kumari, P Vashishtha, G Gupta, N Vashishtha, Journal of Materials Science: Materials in Electronics, 1-8, 2021
- Significance of Reference Materials for Calibration of Powder X-ray

Diffractionmeter, M Kumari, **N Vijayan**, D Nayak, DK Misra, RP Pant, MAPAN, 1-10, 2021

- Investigations on Crystalline Perfection, Raman Spectra and Optical Characteristics of Transition Metal (Ru) Co-Doped Mg:LiNbO<sub>3</sub> Single Crystals, M. K. Raseel Rahman, B. Riscob, Rajeev Bhatt, Indranil Bhaumik, Sarveswaran Ganesamoorthy, **Narayanasamy Vijayan**, Godavarthi Bhagavannarayana, Ashwini Kumar Karnal, and Lekha Nair, Vol. 6, 16, PP. 10807–10815, ACS Omega, 2021
- Investigation on synthesis, growth, Hirshfeld surface and third order nonlinear optical properties of Urea-Succinic Acid single crystal: A potential candidate for self-defocusing lasing application, Debabrata Nayak, **N.Vijayan**, Manju Kumari, Kiran, Pargam Vashishtha, Subasis Das, B.Sridhar, Govind Gupta, R.P.Pant, Optical Materials, Vol. 124, pp. 112051, 2022

### Patents

- Patent was granted for the “**SEMICONDUCTOR MONO-CRYSTAL GROWTH SYSTEM BY VARIABLE GROWTH SPEED**”; Inventors: **N. Vijayan** et al (Spanish Patent No. 2352623)

### Current Activities

(Not more than 100 words)

- Growth of Nonlinear and Piezoelectric single crystals by VBT and Solution growth techniques
- Preparation of (Si, Alpha Alumina, ZnO, LaB<sub>6</sub>) Indian Reference Material (BND) for the calibration of Powder X-ray Diffractometer
- Preparation of Nanomaterials by Microwave and Hydrothermal methods
- Characterization of Materials by different sophisticated Instrumentation Techniques

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

1. Selected for the **Young Achiever Award 2022** by Elavenil - Indian Science and Technology Association, Chennai.
2. Recipient of **Raman Research Fellowship (RRF 2021)** sponsored by CSIR, New Delhi.
3. **Outstanding Performance Award (for group)** for the dissemination of Metrological Traceability through Bharatiya Nirdeshak Dravyas (BNDs) on 27th Sept. 2018.
4. **Dr S. Gunasekaran Award in the area of Spectroscopy** during March 2018 at AMET University, Chennai.
5. **Outstanding Researcher and Scholar Icon 2017** by Jupiter Journal Consortium, Chennai on 22<sup>nd</sup> July 2017
6. **Best Innovative Researcher Award**, for the outstanding contribution in the field of Crystal Growth and Characterization and it is Awarded by Noorul Islam University (A Deemed University), Kumaran Koil, Kanniyakumari, Tamil Nadu during 28<sup>th</sup> March 2015.
7. **Bharat Excellence Award-2014**, for outstanding contribution to Materials Science and it is Awarded by International Friendship Forum, New Delhi during 26<sup>th</sup> July 2014, at India International Centre, New Delhi
8. Many **BEST POSTER & BEST PAPER AWARD** received by his students in National and International Conferences
9. DST Sponsored “**BOYSCAST**” **Fellowship** in Physical Sciences in the year 2007-2008 and carried out his research work at UAM, Madrid, Spain

10. **Prestigious CSIR Young Scientist Award -2007** (Cash prize, citation, plaque) in Physical Sciences along with performance incentive upto the age of 45 years.
11. **“Prof. P. Ramasamy National Award for Crystal Growth-2007”** (Cash Prize, citation and plaque).
12. **IUCR Student award** to participate in the ICCG14, held at Grenoble, France, during August 09-13, 2004.
13. **Prof.S.E.Subramania Iyer Medal** during M.Sc., - 1997 (St.Joseph’s College, Trichy).
14. **Dr.R.Sebastian Cash Award** during M.Sc., - 1997 (St.Joseph’s College, Trichy).
15. **Rev.Fr.Irudayam’s cash Award** for good conduct during M.Sc., - 1998 (St.Joseph’s College, Trichy).
16. Placed in the **Principal’s list of Honor** during B.Sc., - 1994 (A.V.V.M. Sri Pushpam College, Poondi, Thanjavur (Dt.)).
17. **Good conduct awards** during Higher Secondary courses (HSC) – 1992 & 1993, Uma Maheshwara Hr.Sec.School, Karanthai, Thanjavur (Dt.).

### **Contributions to AcSIR**

- **Faculty in AcSIR** for Ph.D/M.Tech., course entitled **“Advanced Materials Characterization Techniques”**.
- Supervising Doctoral Students for their Ph.D.
- Member of the Doctoral Advisory Committee (DAC) in AcSIR

### **Membership of Professional Societies/ Institutions**

1. **Dr.N. Vijayan** has elected as a Member in National Academy of Sciences (NASI), Allahabad (MNASc).
2. **Dr. N. Vijayan** has elected as a Fellow of Academy of Sciences, Chennai (FASCh)
3. **Life Member in:** (i) Indian Laser Association (ILA), (ii) Indian Association of Crvstal Growth (IACG)

### **Any other Information**

*(Not more than 100 words)*

- **Principal Investigator** of BND Project: **Grant of Rs. 32.55 Cr (Sponsored by MoC and CSIR)**
- **Group Head, In-House BND Group of BND Division, CSIR-NPL.**
- Co-PI of few Sponsored Research Projects (CSIR, DST etc)
- **Reviewer** in: Crystal Growth and Design (ACS), Crystal Engineering Communication (RSC), J. Appl. Crystallography (IUCr.), Wiley Interscience, Springer, Elsevier Journals in the area of Materials Science.
- Released Bharatiya Nirdehsak Dravya (BND) for the calibration of Powder X-ray diffractometer: **Alpha Alumina (BND 2001)**
- Examiner for Ph.D. thesis for various Academic Institutions (NITs, Central & State Universities)
- Google Scholar Citations: (Citations: More than 4500, h index: 35)  
<http://scholar.google.co.in/citations?user=fJZeIMAAAAAJ&hl=en>
- **Academic Board Member for the following Universities**

Central University of Tamil Nadu, Tiruvarur  
Dept. of Physics, Chadhary Devi Lal University, Sirsa, Haryana  
Dept. of Physics, Sathyabama University, Chennai

- **Many Invited Talks in International/National Conferences**
- **One of the Team Members for the preparation of NPL quality manual for ISO 17025:2017**
- **Acted as a Member in Various Committees formed by CSIR-NPL, New Delhi.**
- **Chaired various Sessions in International/National Conferences.**
- **Guest Editor for the Special Issue Smart Materials and Technology for Bio and Energy Applications 2022 for Applied Surface Science Advances (Elsevier)**

#### **Experimental facilities**

- **High Temperature Furnaces for Synthesis**
- **Vertical Bridgman System for the growth of Single Crystals**
- **Microwave Furnace cum Autoclave for the preparation of nanoparticles**
- **Shock Damage Threshold for the generation of Shockwaves in Crystalline system**
- **Constant Temperature Bath and Seed Rotation System for the growth of Good Quality Single Crystals**
- **Microhardness and XRF Measurement facilities**