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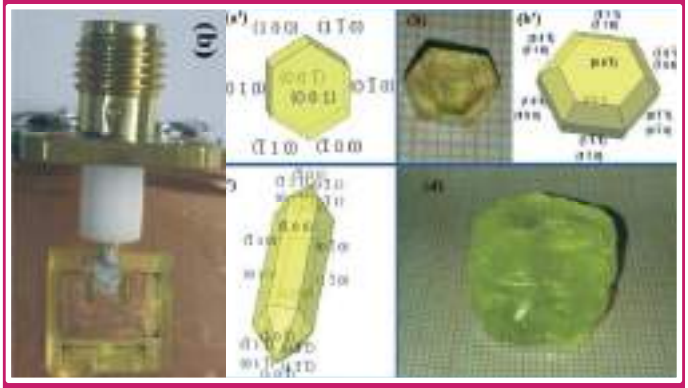
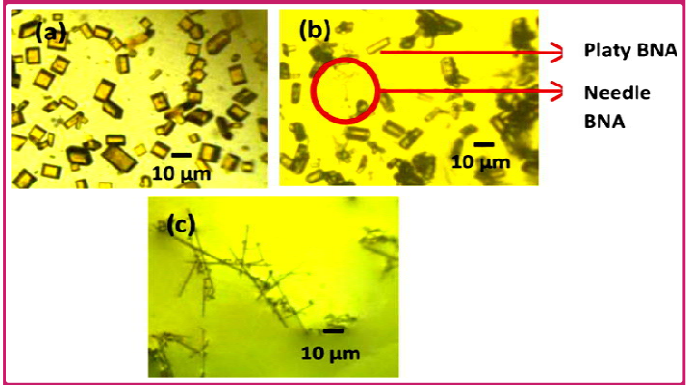
YEARLY BULLETIN OF CRYSTAL GROWTH RESEARCH AND APPLICATIONS | January 2019 | Issue 31

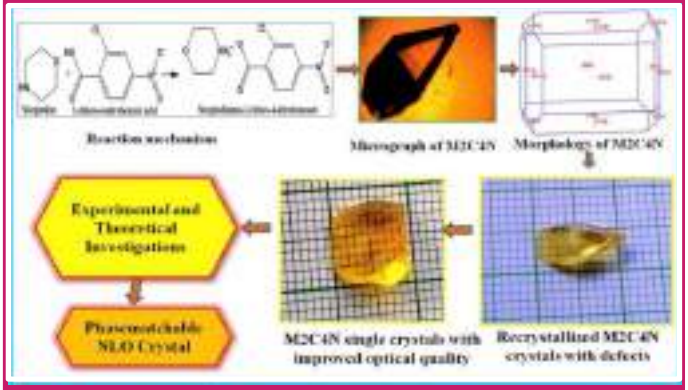
Large size piezoelectric benzil single crystals by CZ method for microstrip patch antenna device applications



Effective separation of *N*-benzyl-2-methyl-4-nitroaniline (BNA) polymorphs through antisolvent crystallization method

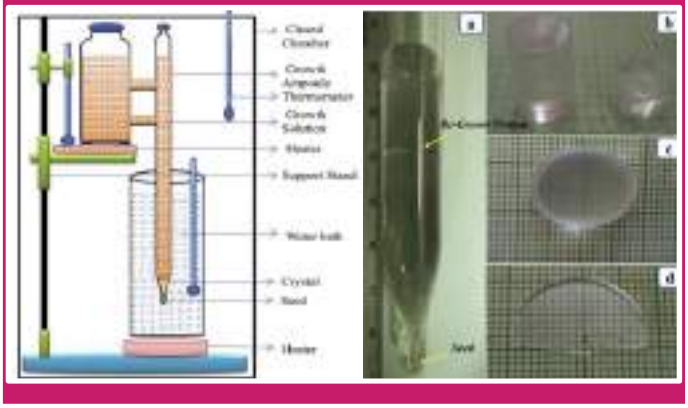


A phasematchable organic N—H- - -O hydrogen bonded helical chain type M2C4N nonlinear optical single crystal

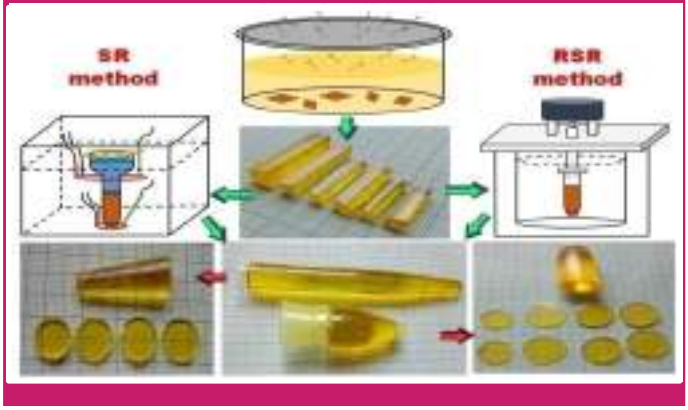


Organic Scintillator 3PB crystal for Neutron-Gamma Discrimination and Fast Neutron Detection applications

Temperature gradient based Unidirectional method for the growth of Scintillator t-stilbene single crystal

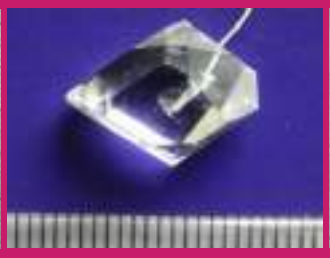


Development of high quality single crystals by Rotational Sankaranarayanan-Ramasamy method: A novel approach



RECENTLY GROWN TECHNOLOGICALLY IMPORTANT SINGLE CRYSTALS

Sb_2Te_3 – A. Raja
Dr. P. Ramasamy, SSNI



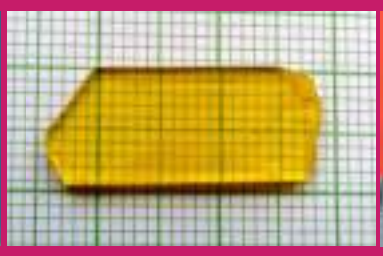
DTGS -Dr. K. Srinivasan
Bharathiar University

BP -Dr. Binay Kumar
University of Delhi

TPB -Dr. K. Sankaranaraya
-nan, Alagappa University

$LaBr_3$ – Dr. Shashwati
Sen, TPD, BARC

UTGS -Dr. Sunil Verma
LMDDD, RRCAT



4DMAB4NP -Dr. S.
Brahadeeswaran, Anna Univ

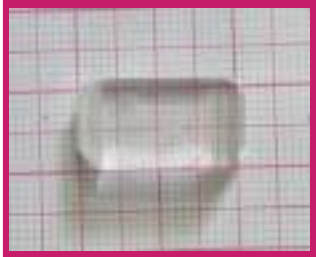
ADP:KDP – G. Iyappan
Dr. P. Rajesh, SSNI

NSH – Dr. S.A. Martin
Britto Dhas, Sacred Heart

SHG Oriented KDP –
Dr.S.K.Sharma, RRCAT

$PbMoO_4$ -Dr. Mohit Tyagi
TPD, BARC

PPTC -Dr. R. Mohan
Kumar, Presidency College



LSR – Dr. Mihir J. Joshi
Saurashtra University

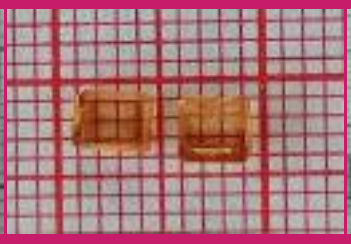
APS -Dr. R. Arun Kumar
PSG Technology

LLDP -Dr. R. Ramesh Babu
Bharathidasan University

4NP -Dr. S. Kalainathan
VIT Vellore

2AHT -Dr.RO.MU.Jauhar
Dr.G.Vinitha, VIT Chennai

BHF -Dr.G.Anbalagan
Madras University



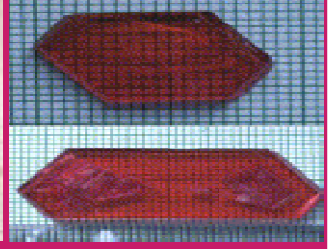
2ABP -Dr.K.Sethuraman
MK University

SR TGS -Dr. G. Ramesh
Kumar, Anna Univ- Arni

2AP4N- P.Karuppasamy
Muthu Senthil Pandian, SSNI

LT -Dr.S.Jerome Das
Loyola College

IIP -Dr.P.Murugakoothan
Pachaiyappa's, College



PCHB -Dr. S.P. Meenakshi
-sundaram, Annamalai Univ

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PREVIOUS FIVE ISSUES - IACG NEWS LETTERS

EDITORIAL MESSAGE

It is a great pleasure for me to present you the 31st issue of IACG NEWS LETTER, January-2019. An enthusiastic note is that the number of the Crystal Growth members is increasing tremendously. To date we have about 650 Crystal Growth research active life members. The immense support and encouragement we have been receiving from the Indian Crystal Growth Community has given us enthusiasm to bring out the 31st Issue of our IACG News Letter-2019. This newsletter presents the achievements by the Indian Crystal Growth community. The objectives of the association are to promote, encourage and develop the theory and practice of growth of Crystals, to organize Conferences, Seminars, Workshops, Hands on Training etc., in various parts of the country, to educate the people at various levels and offer a proper platform for reporting and discussing new developments in the field of Crystal Growth. I am happy to note that the number of sanctioned Crystal Growth Projects from national funding agencies is increasing day-by-day. This year alone 6 Crystal Growth research projects have been sanctioned for about **2.16 crore** to our IACG members from **DST, SERB** and **BRNS**. 36 Ph.D. theses have been submitted/completed in Crystal Growth during 2018. Several Crystal Growth researchers have got National Fellowship like **DST-INSPIRE, DST-WOS-C, UGC-DSK, CSR-SRF** and **CSIR-RA** to work in various reputed National research laboratories and universities. Many of our researchers have got Young Scientist Award, Best Researcher Award, Outstanding Young Scientist Award, CSIR-Outstanding Performance Award, DAE-Scientific & Technical Excellence Award and Best Paper Presentation Awards for their outstanding work in Crystal Growth.

IACG has successfully organized TWENTY TWO Crystal Growth seminars, many of them with International Participation. All major Indian Crystal Growth laboratories and research institutions participate in the National Seminar on Crystal Growth & Applications (NSCGA). XXII NSCGA-2018 was organized at Department of Physics, Sacred Heart College, Tirpattur, Tamilnadu during 29-31 January 2018. Several eminent scientists in India and few scientists from abroad participated and delivered their lecture in this event. The XXII NSCGA-2018 provided a platform for the research community in Crystal Growth and characterizations to meet, discuss and share the latest advances in these fields. Three days of togetherness has developed a strong and healthy support between the experts in the field of Crystal Growth and its Applications. To recognize Dr. R. Gopalakrishnan's research contribution, **"Dr. R. Gopalakrishnan National Award for Best Thesis in Crystal Growth"** was introduced by IACG in 2016. The young researchers who submitted thesis in the field of Crystal Growth and Applications within the previous one year period are eligible to apply for this award. Dr. N. Sivakumar, Crystal Growth Centre, Anna University, Chennai, Dr. RO.MU. Jauhar, Department of Physics, VIT, Chennai and Dr. R. Govindaraj, SSN Research Centre, SSN Institutions, Chennai, Tamilnadu received this Award in 2018.

NSCGA is held in different cities as annual event. This year it is being organized at Department of Physics, Bharathiar University, Coimbatore, Tamilnadu during 28-30th January 2019. The present "XXIII National Seminar on Crystal Growth and Applications (NSCGA-2019)" is a major event for us involving several Senior and Young Scientists. The current seminar includes 60 Invited Lectures, 15 Dr.RG National Best Thesis Award presentations, 15 Best Crystal Display Award presentations and more than 200 contributed papers as Oral and Poster presentations from many National Laboratories, Universities and Research Institutes.

Every effort has been made to bring to you the most of the news in a brief manner.

Dr. Muthu Senthil Pandian
Editor, Indian Association for Crystal Growth (IACG), News Letter

RESEARCH JOURNAL IN TAMIL – ELAVENIL PUBLICATIONS

"Elavenil" is the organization formed with the support of researchers, professors and experts from various fields in Science, Engineering and Technology to organize Conferences/ Seminars/ Workshops in order to inculcate the spirit of research among the College / Institution/ University students especially from rural background. The publication section '**Elavenil Publication**" (http://www.elavenil.com/strj/index.html) publishes the journal "Science and Technological Research Journal" regularly both in English and in Tamil. Research articles, review articles and new findings in the field of science and technology are published in this journal. An association in the name of **"Indian Science and Technology Association (ISTA)"** is formed to regularly share research ideas and discuss about various steps needed for the development of Elavenil Publications and other activities.

Science and Technological Research Journal (Tamil and English) comes in one volume per year with six issues and publishes papers in the field of Crystal Growth, Crystallography, Nanomaterials, Thin Films, Energy Materials, Heat and Mass Transfer, Fluid and Solid Mechanics, Semiconductor Nanostructures, Nanophotonics, Optoelectronics, Magnetic Materials, Functional and Smart Materials, Computational Modeling, Bio-Chemistry, Green Chemistry, Biomaterials etc,. As of now, six issues are launched during various events in Tamilnadu. To the best of our knowledge, this is the only scientific and technological Research journal in Tamil language. Elavenil and ISTA is organizing scientific (Research) Tamil event entitled "International Conference on Recent Trends in Applied Science and Technology" during August - September of every year. Recently we conducted this event at Periyar University, Salem on 23-25 August 2018. In order to spread the recent discoveries, developments and trends in applied science and technology to all young researchers with rural background and studied in Tamil medium, it is planned to have all the deliberations / presentations/ discussions in Tamil only.

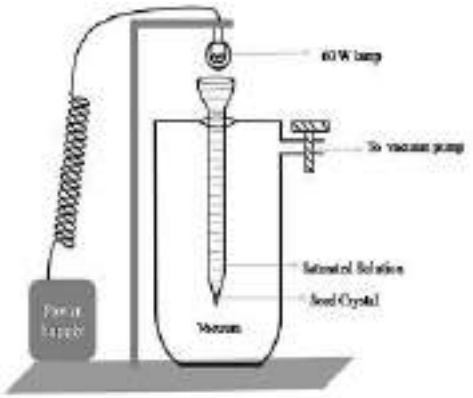
SIX ISSUES IN ELAVENIL TAMIL PUBLICATIONS

Dr. M. Srinivasan
Managing Editor, Elavenil Tamil Publications

Vacuum-assisted technique to modify the SR method for Unidirectional crystal growth

A. Saranraj, A.S. Jenipriya, S.S. Jude Dhas, M. Jose, S. A. Martin Britto Dhas*
Department of Physics, Sacred Heart College, Tirupattur-635601, Tamilnadu, India

The design and fabrication of a vacuum-assisted Sankaranarayanan - Ramasamy (SR) method is reported by making modifications in the original SR setup for the growth of bulk single crystals with selective orientation at room temperature using volatile solvents. Utilizing this technique, the growth of bulk-sized and technologically important single crystals, such as KDP, TGS, ADP, and benzophenone, is demonstrated. The powder XRD patterns of the grown crystals are obtained so as to confirm the growth plane of each crystal. UV–visible spectra show good transparency in the entire visible region for the grown crystals. The crystalline perfection of the grown crystals is analyzed using HRXRD. This handy and cost-effective technique will pave the way for the growth of single crystals satisfying the requirements of the photonic industry.



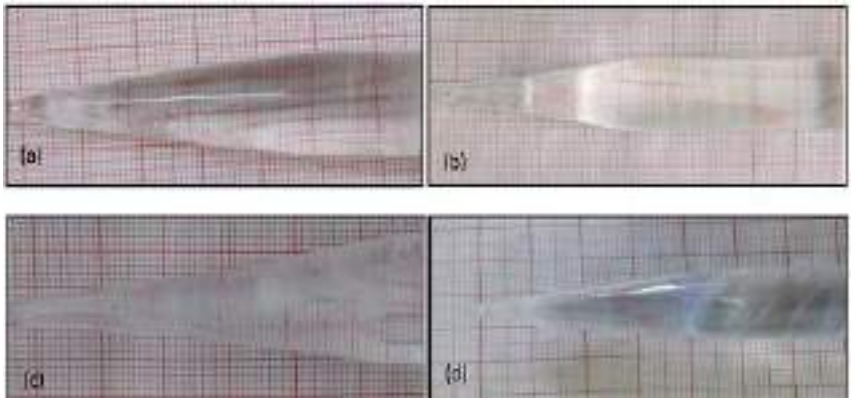
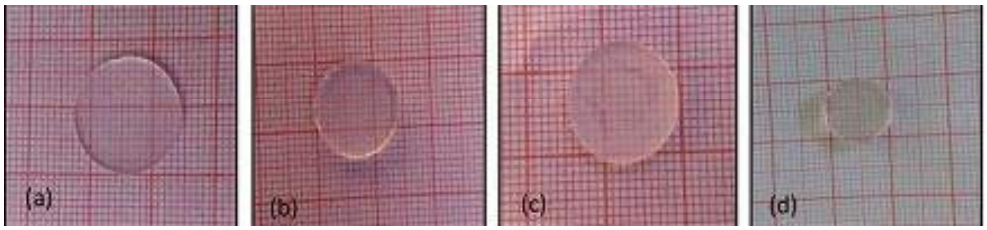


Figure.1 *Schematic diagram of VASR setup.* ***Figure.2*** *Photograph of as grown (a) KDP, (b) TGS, (c) Benzophenone (BP) and (d) ADP single crystal by VASR method*



Photograph of cut and polished (a) KDP, (b) TGS, (c) Benzophenone (BP) and (d) ADP single crystals grown by VASR method

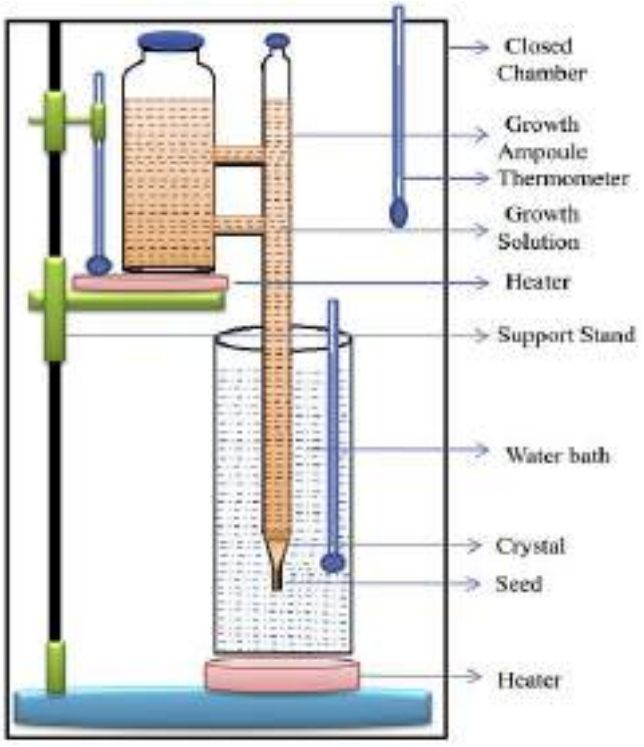
An alternate crystal growth method modifying the SR technique has been established and it was successfully tested in our laboratory for the growth of bulk-sized single NLO crystals of KDP, TGS, ADP, and benzophenone. The single prominent peaks observed for every crystal in the powder XRD pattern confirms the unidirectional growth of the crystals. Utilizing this technique, it is possible to achieve solute–crystal conversion efficiency to a value close to 100%. Good transparency in the visible region augments the potential applicability of these crystals. The single and symmetrical nature of the HRXRD curves show that the grown crystals are free from grain boundaries and defects. Hence, it is suggested that VASR method can be an alternate handy option for the crystal growers to grow cost-effective good-quality bulk single crystals.

Temperature gradient based unidirectional growth method for the growth of t-stilbene crystals for Scintillator applications

V. Govindan, D. Joseph Daniel, H.J. Kim, K. Sankaranarayanan*

Department of Physics, Alagappa University, Karaikudi-630003, Tamilnadu, India
Department of Physics, Kyungpook National University, Daegu-41566, South Korea

Temperature gradient based unidirectional solution growth set-up was specially designed to felicitate the growth of unidirectional crystals of t-stilbene with cylindrical dimension of 6 cm × 2 cm without the need of post growth machining process for scintillator application. A growth rate of 1 mm/day was achieved along <011> direction. The PXRD establishes the phase purity of the grown material. FT-IR and Micro-Raman spectrometers were utilized to justify the presence of the functional groups of the t-stilbene and anisole (solvent). The recorded narrow aromatic vibrations in FT-IR and Raman ascertain the undetectable limit of solvent inclusion in the grown crystal. Absence of new vibrations other than the expected supports the chemical purity of the crystal. The transparency in visible range establishes the suitability of the material for scintillator application where its characteristic emission wavelength under high energy radiation lies. The thermal stability up to 120 °C without any structural/phase change was evident from TG/DTA. The radio luminescence spectra were carried out under β and γ and found the grown crystal exhibits emissions at 384 and 405 nm which is very similar to the studied photoluminescence characteristics. The scintillation characteristics of the t-stilbene investigated using γ –rays from various radioactive sources such as 137Cs, 133Ba and, 109Cd. The scintillation decay time of the grown crystal also studied using the same 133Cs source and fitted with single exponential component of 12 ns.



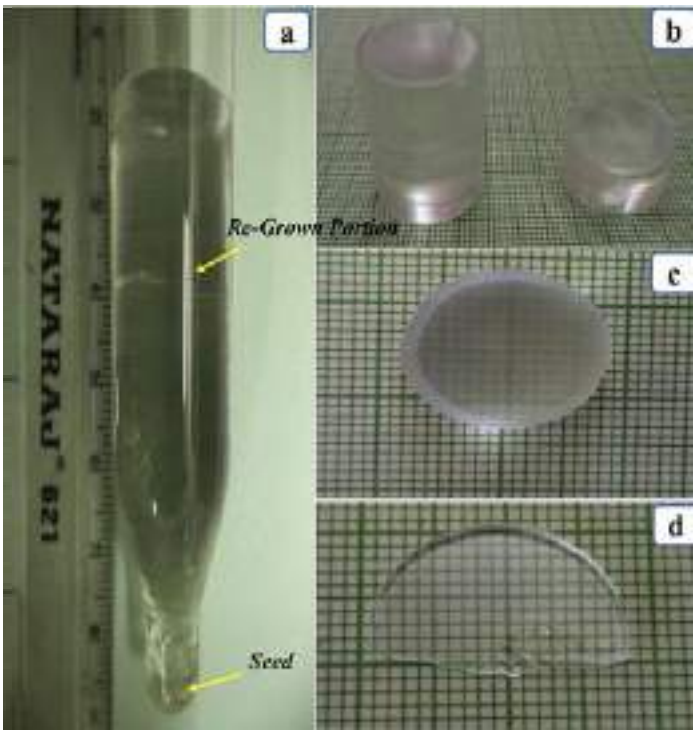


Figure.1 *Schematic representation of the temperature gradient based unidirectional crystal growth setup was employed for the unidirectional growth.* ***Figure.2*** *(a) Unidirectionally grown t-stilbene crystal with ampoule, (b, c and d) cut and polished t-stilbene ingots*

Bulk growth of 1, 3, 5-Triphenylbenzene (3PB) organic Scintillator crystal by SR method for Neutron-Gamma Discrimination and Fast Neutron Detection applications

N. Durairaj, S. Kalainathan*

Centre for Crystal Growth, VIT University, Vellore-632014, Tamilnadu, India

The development of application requires the device fabrication, cylindrical shape scintillator crystals to couple with a photomultiplier tube for signal conversion. The present research is focused on the low-temperature solution growth techniques such as slow cooling, slow solvent evaporation and Sankaranarayanan-Ramasamy (SR) growth technique, using these techniques large size of single crystals with good quality are grown. For the first time, the solubility and metastable zone width of the material 1,3,5-triphenylbenzene (3PB) and bibenzyl was determined to optimize the growth period. Different diameters of unidirectional 3PB crystals were grown by SR growth technique. The grown crystal was subjected to basic characterizations such as structural, optical, thermal and mechanical analysis and then it was reported. Further, gamma response of the 3PB crystal with the different gamma energy sources ranging from 356 keV to 1275 keV was measured. The experimental arrangement of gamma response 3PB detector was demonstrated and energy calibration of the 3PBcrystalwas measured which gives the good approximation of pulse height spectra. It indicates the light output of the detector is linear with increasing energy of the respective incident gamma ray. Time of Flight setup (TOF) was constructed with 3PB single crystal and timing measurement of the system and was carried with gamma source (^{60}Co) and the time resolution of was calibrated as 1.5 ns. TOF^{252} Cf fission source was used to analyze the neutron-gamma discrimination of the crystal. The obtained results reveal that the grown 3PB crystal has good timing property and works reliably as a fast neutron detector with the potential of discriminating against gamma radiation background.

Figure.1 *3PB crystals with diameters of 15 mm, 20 mm, 25 mm and 30 mm.* ***Figure.2*** *Experimental arrangement of TOF Setup for Neutron-Gamma Discrimination by utilizing 3PB as a Neutron Detector*

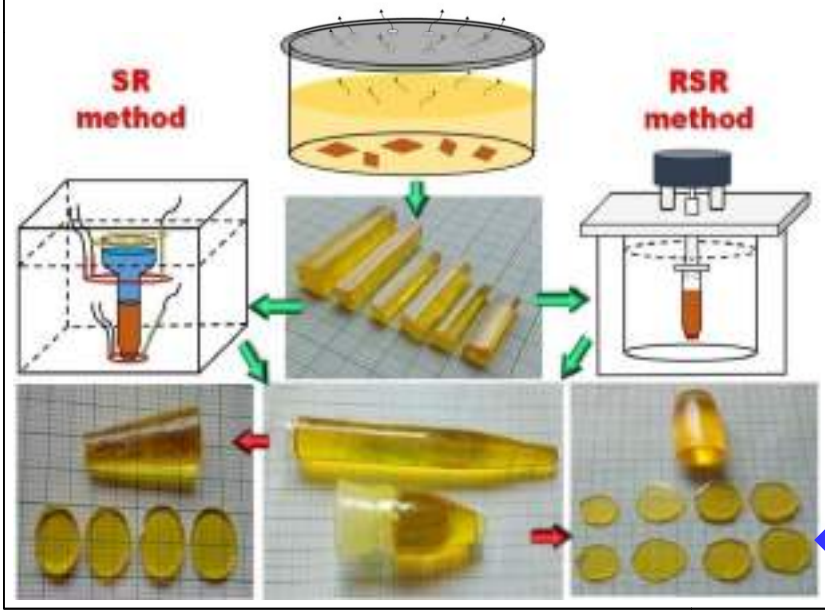
High quality 4-nitrophenol derivative single crystals by a novel Rotational Sankaranarayanan–Ramasamy (RSR) method

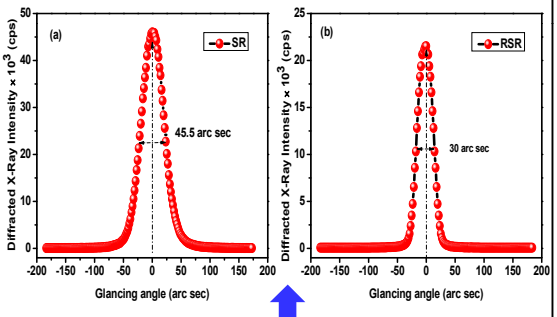
P. Karuppasamy, T. Kamalesh, Muthu Senthil Pandian, P. Ramasamy, S.Verma[a]

SSN Research Centre, SSN Institutions, Chennai-603110, Tamil Nadu, India

[a]Laser Materials Development and Devices Division, RRCAT, Indore-452013, M.P., India

The good quality 2-aminopyridinium 4-nitrophenolate 4-nitrophenol (2AP4N) single crystals have been grown by (i) Sankaranarayanan–Ramasamy (SR) method and (ii) Rotational Sankaranarayanan–Ramasamy (RSR) method. The effect of rotation on unidirectional crystal growth method (RSR) has been reported for the first time. The apparatus was specially designed and developed for the growth of high quality crystals by slow cooling under rotational conditions. The high-quality crystals have been achieved under forced convection and the quality of the crystal is compared to the crystals grown under free convection conditions. The crystal structure was analyzed by single crystal X-ray diffraction (SXRD) measurement. The grown crystal was subjected to the powder X-ray diffraction (PXRD) analysis to confirm the growth direction along (001) plane. The optical quality of the grown crystals has been analyzed by UV-Vis NIR spectrophotometer. It confirms that the grown crystal is highly transparent in the visible and near IR region. The electro-optical properties of the grown crystal were analyzed by photoconductivity measurement and it has a positive photoconductivity nature. The grown crystal has less dislocation densities as confirmed by chemical etching analysis. The mechanical strength was investigated by Vickers microhardness tester. The frequency dependent dielectric properties of the crystals were carried out. The laser damage threshold (LDT) was measured for both SR and RSR method grown crystals. The full-width at half maximum (FWHM) of high-resolution X-ray diffraction (HRXRD) curves indicate that the grown crystal has high crystalline perfection. The results obtained from the SR and RSR method grown 2AP4N crystals were compared. The RSR method grown crystal has higher optical transparency, higher photoluminescence, higher photoconductivity, higher mechanical strength, higher laser damage threshold, higher crystalline perfection, less dislocation density, low dielectric loss and low full with at half maximum (FWHM). The above studies reveal that the RSR method grown crystals are more useful for device applications.





HRXRD curve of (a) SR method (45.5 arc sec) and (b) RSR method (30 arc sec) grown 2AP4N single crystal

2AP4N single crystals grown by (SEST), (b) SR and (c) RSR method

CHARACTERIZATION FACILITIES: AVAILABILITY IN INDIA

Single Crystal X-Ray Diffraction (SXRD)	
Bharathiyar University, Coimbatore, Tamilnadu	Dr. K. Srinivasan, Professor and Head, Department of Physics, Bharathiar University, Coimbatore-641046, TN, Mobile: +91-9443609873 Email: nivas_5@yahoo.com
Madurai Kamaraj (MK) University, Madurai	Dr. K. Anitha, Head (i/c), Department of Physics, MK University, Madurai-625021, TN, Mobile: +91-9965956516; E-mail: anitha.physics@mkuniversity.org
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Sastra University Thanjavur, Tamilnadu	http://www.sastra.edu/index.php/2014-01-29-07-16-29/central-facilities.html
Sathyabama University Chennai, Tamilnadu	http://centrefornanotechnology.com/facilities.html
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SRM University, Chennai, Tamilnadu	http://www.srmuniv.ac.in/content/characterization-form-and-charges
Sri Ramakrishna Engineering College	Department of Nanoscience & Technology, Sri Ramakrishna Engineering College, Coimbatore – 641022, Tamilnadu, Email: nanofacilities@srec.ac.in
St. Joseph College Tiruchirappalli	Dr .S. John Britto, Director, St. Joseph College, Trichy, Tamilnadu http://www.sjctni.edu/Department/achome.jsp?deptCode=AC&id=1
Sastra University Thanjavur, Tamilnadu	http://www.sastra.edu/index.php/2014-01-29-07-16-29/central-facilities.html

Fourier Transform Infrared (FTIR) Analysis	
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SRM University, Chennai, Tamilnadu	http://www.srmuniv.ac.in/content/characterization-form-and-charges
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SSN Research Centre, SSN Institutions	Prof. P. Ramasamy, Dean (Research), SSN Institutions, Chennai-603110, Tamilnadu Mobile: +91-9283105760; Email: ramasamyp@ssn.edu.in
Central University of Tamil Nadu	Department of Physics, Central University of Tamil Nadu, Thiruvarur, Tamilnadu http://cutn.ac.in/department-of-physics/facilities/
Nirmalagiri College Nirmalagiri, Kerala	Dr. Nygil Thomas, Department of Physics, Mobile: +91-9496426939; Email: nygill@gmail.com; sudheeshvd@gmail.com; vseba@yahoo.com
TGA / DTA/ STA / DSC	
IIT Madras, Chennai, Tamilnadu	N.K. Gopinath, Junior Technical Superintendent, IIT Chennai Phone Number: 91-44-22574933, Email: gopiphy@iitm.ac.in
Cochin University of Science & Technology	Sophisticated Test & Instrumentation Centre, Cochin University of Science and Technology, Cochin-682022, Kerala, ttp://www.sticindia.com/saif_instruments.html
Sastra University Thanjavur, Tamilnadu	http://www.sastra.edu/index.php/2014-01-29-07-16-29/central-facilities.html
Saurashtra University Rajkot, Gujarat	Dr. Mihir J. Joshi, Professor, Department of Physics, Saurashtra University, Rajkot-360005, Gujarat, Mobile: +91-90999399431; Email: mshilp24@rediffmail.com
Pondicherry University	Dr. G. Govindaraj, Professor of Physics and Coordinator, Central Instrumentation Facility, Phone: 0413-2654405 (O) & 2654434; E-mail: ggraj_7@yahoo.com
Loyola College, Chennai, Tamilnadu	Dr. S. Jerome Das, Department of Physics, Loyola College, Chennai, Tamilnadu Mobile: +91-9381190314; Email: jeromedas.s@gmail.com
Sastra University Thanjavur, Tamilnadu	http://www.sastra.edu/index.php/2014-01-29-07-16-29/central-facilities.html
NPL New Delhi	Head, NPLONE Program, CSIR-National Physical Laboratory (NPL), New Delhi-110012, Phone: 011-45608385; 45608396; Email: headnplone@nplindia.org
Vickers Microhardness Analysis	
St. Joseph College, Tiruchirappalli	Dr. S. John Britto, Director, St. Joseph College, Tiruchirappalli, Tamilnadu http://www.sjctni.edu/Department/achome.jsp?deptCode=AC&id=1
National College, Tiruchirappalli	Dr. D. Saravanan, National College Instrumentation Facility (NCIF), National College, Trichy, E-mail: ncif@nct.ac.in ; drdsaro@gmail.com
Sastra University, Thanjavur, Tamilnadu	http://www.sastra.edu/index.php/2014-01-29-07-16-29/central-facilities.html
University of Delhi, Delhi	Dr. Binay Kumar, Professor, Crystal Lab, Department of Physics and Astro Physics, Delhi, Mobile: +91-9818168001; Email: b3kumar69@gmail.com
NPL, New Delhi	Head, NPLONE Program, CSIR-National Physical Laboratory (NPL), New Delhi-110012, Phone: 011-45608385; 011-45608396; Email: headnplone@nplindia.org

Dielectrics/ Impedance Analyser/ LCR meter Analysis	
VIT University, Vellore Tamilnadu	Dr. S. Kalainathan, Professor & Director, Centre for Crystal Growth, VIT University, Vellore-632014, Mobile: +91-9442203480; Email: s.kalainathan@gmail.com
St. Joseph College Tiruchirappalli	Dr. S. John Britto, Director, St. Joseph College, Tiruchirappalli, Tamilnadu http://www.sjctni.edu/Department/achome.jsp?deptCode=AC&id=1
University of Delhi Delhi	Dr. Binay Kumar, Professor, Crystal Lab, Department of Physics and Astro Physics, University of Delhi, Mobile: +91-9818168001; Email: b3kumar69@gmail.com
Sacred Heart College Tirupattur	Dr. M. Jose, Dean of Research, Abraham Panampara Research Center (APRC), Sacred Heart College, Tirupattur, Mobile: +91-9944825036; Email: jose@shctpt.edu
Nirmalagiri College Kerala	Dr. Nygil Thomas, Department of Physics, Mobile: +91-9496426939; Email: nygill@gmail.com; sudheeshvd@gmail.com; vseba@yahoo.com
Macro, Micro-Raman/ FT-Raman/ Raman Studies	
IIT Madras, Chennai Tamilnadu	Dr. K. Paranjothi, Technical Officer, IIT Madras, Chennai, Tamilnadu Phone Number: +91-44-22574942, Email: kpjothi@iitm.ac.in
Madurai Kamaraj (MK) University	Dr. K. Anitha, Department of Physics, Madurai Kamaraj (MK) University, Madurai-625021, Mobile: +91-9965956516; E-mail: anitha.physics@mkuniversity.org
NPL New Delhi	Head, NPLONE Program, CSIR-National Physical Laboratory (NPL), New Delhi-110012, Phone: +91-011-45608385; 45608396; Email: headnplone@nplindia.org
Hall Measurement	
SRM University Chennai	http://www.srmuniv.ac.in/content/characterization-form-and-charges
Hindustan University, Chennai	Head, CENCON, Email: cencon@hindustanuniv.ac.in; https://hindustanuniv.ac.in/cencon.php
University of Delhi Delhi	Dr. Binay Kumar, Professor, Crystal Lab, Department of Physics & Astro Physics, University of Delhi, Mobile: +91-9818168001; Email: b3kumar69@gmail.com
Pyroelectric Co-Efficient Analysis	
University of Delhi Delhi	Dr. Binay Kumar, Professor, Crystal Lab, Department of Physics & Astro Physics, University of Delhi, Mobile: +91-9818168001; Email: b3kumar69@gmail.com
Piezoelectric d_{33} Co-efficient Analysis	
University of Delhi Delhi	Dr. Binay Kumar, Professor, Crystal Lab, Department of Physics & Astro Physics, University of Delhi, Mobile: +91-9818168001; Email: b3kumar69@gmail.com
SSN RC, SSN Institutions	Prof. P. Ramasamy, Dean (Research), SSN Research Centre, SSN Institutions, Chennai-603110, Tamilnadu, Mobile: +91-9283105760; Email: ramasamyp@ssn.edu.in
Photo Acoustic (PA) Spectrum	
Sacred Heart College Tirupattur	Dr. S.A. Martin Britto Dhas, Department of Physics, Sacred Heart College, Tirupattur Vellore-635601, Tamil Nadu, Mobile: +91-8903101253; Email: britto25@gmail.com
SSN RC, SSN Institutions	Prof. P. Ramasamy, Dean (Research), SSN Research Centre, SSN Institutions, Chennai-603110, Tamilnadu, Mobile: +91-9283105760; Email: ramasamyp@ssn.edu.in
High Resolution X-Ray Diffraction (HRXRD) Analysis	
NPL New Delhi	Head, NPLONE Program, CSIR-National Physical Laboratory (NPL), New Delhi-110012 Phone Number: +91-011-45608385; 45608396; Email: headnplone@nplindia.org
UGC-DAE CSR Indore, MP	The Centre-Director, UGC-DAE Consortium for Scientific Research, Indore Centre, University Campus, Khandwa Road, Indore-452001, M.P., Email: cd.indore@csr.res.in
Photoconductivity Measurement	
Central University of Tamil Nadu	Department of Physics, http://cutn.ac.in/department-of-physics/facilities/ Department of Chemistry, http://cutn.ac.in/department-of-chemistry/
SSN RC, SSN Institutions	Prof. P. Ramasamy, Dean (Research), SSN Research Centre, SSN Institutions, Chennai-603110, Tamilnadu, Mobile: +91-9283105760; Email: ramasamyp@ssn.edu.in

Photoluminescence (PL) Study	
Pondicherry University	Dr. G. Govindaraj, Professor of Physics and Coordinator, Central Instrumentation Facility, Phone: 0413-2654405(Office) & 2654434, E-mail: ggraj_7@yahoo.com
IIT Madras, Chennai Tamilnadu	Dr. P. K. Sudhadevi Antharjanam, Technical Officer, IIT Chennai Phone Number:+91-91-44-22575926, Email: lifesaifiitm@gmail.com
Sri Ramakrishna Engineering College	Department of Nanoscience & Technology, Sri Ramakrishna Engineering College, Coimbatore – 641022, Tamilnadu, Email: nanofacilities@srec.ac.in
National College, Tiruchirappalli	Dr. D. Saravanan, National College Instrumentation Facility (NCIF), National College, Trichy, E-mail: ncif@nct.ac.in; drdsaro@gmail.com
B. S. Abdur Rahman Crescent University	Dr. G.V. Vijayarhagavan, Assistant Professor, Department of Physics Mobile: +91-9790880065, Email: avvijay20@gmail.com
Nirmalagiri College, Nirmalagiri, Kerala	Dr. Nygil Thomas, Department of Physics, Mobile: +91-9496426939 Email: nygill@gmail.com; sudheeshvd@gmail.com; vseba@yahoo.com;
Powder Second Harmonic Generation (SHG) / NLO Measurement	
IISc, Bangalore, Karnataka	Prof. P. K. Das, Department of Inorganic and Physical Chemistry, Indian Institute of Science (IISC), Bangalore, Karnataka, Email: pkdas@iisc.ac.in
B. S. Abdur Rahman Crescent University	Dr. G. V. Vijayarhagavan, Assistant Professor, Department of Physics Mobile: +91-9790880065, Email: avvijay20@gmail.com
Baba Amravati University	Dr. Gajanan G. Muley, Professor, Department of Physics, Baba Amravati University, Maharastra, Mobile: +91-9850325379; Email: gajananggm@yahoo.co.in
Z-Scan / Third Harmonic Generation (THG) Measurement	
VIT University, Vellore Tamilnadu	Dr. S. Kalainathan, Professor & Director, Centre for Crystal Growth, VIT University, Vellore-632014, TN, Mobile: +91-9442203480; Email: s.kalainathan@gmail.com
VIT University, Chennai	Dr. G. Vinitha, Division of Physics, School of Advanced Sciences, VIT University, Chennai-600127, Mobile: +91-9445601869; Email: vinitha.g@vit.ac.in
Baba Amravati University	Dr. Gajanan G. Muley, Professor, Department of Physics, Baba Amravati University, Maharastra, Mobile: +91-9850325379; Email: gajananggm@yahoo.co.in
Laser Damage Threshold (LDT) Analysis	
VIT University, Vellore Tamilnadu	Dr. S. Kalainathan, Professor & Director, Centre for Crystal Growth, VIT University, Vellore-632014, TN, Mobile: +91-9442203480; Email: s.kalainathan@gmail.com
Baba Amravati University	Dr. Gajanan G. Muley, Professor, Department of Physics, Baba Amravati University, Maharastra, Mobile: +91-9850325379, Email: gajananggm@yahoo.co.in
B. S. Abdur Rahman Crescent University	Dr. G.V. Vijayarhagavan, Assistant Professor, Department of Physics, BSARU Mobile: +91-9790880065, Email: avvijay20@gmail.com
Chemical Etching/ Optical Microscope	
VIT University, Vellore Tamilnadu	Dr. S. Kalainathan, Professor & Director, Centre for Crystal Growth, VIT University, Vellore-632014, TN, Mobile: +91-9442203480; Email: s.kalainathan@gmail.com
St. Joseph College, Tiruchirappalli	Dr. S. John Britto, Director, St. Joseph College, Tiruchirappalli, Tamilnadu http://www.sjctni.edu/Department/achome.jsp?deptCode=AC&id=1
SSN Research Centre, SSN Institutions	Prof. P. Ramasamy, Dean (Research), SSN Research Centre, SSN Institutions, Chennai-603110, Tamilnadu, Mobile: +91-9283105760; Email: ramasamyp@ssn.edu.in
Nuclear Magnetic Resonance (NMR) Analysis	
IIT Madras, Chennai Tamilnadu	Dr. C. Baby, Technical Officer, IIT Chennai, Email: cbaby@iitm.ac.in Phone Number: 91-44-22574944/4939/4917
Pondicherry University	Dr. G. Govindaraj, Professor of Physics and Coordinator, Central Instrumentation Facility, Phone: 0413-2654405 (O) & 2654434; E-mail: ggraj_7@yahoo.com
Cochin Univ. of Science & Technol.	Sophisticated Test & Instrumentation Centre, Cochin University of Science and Technology, Cochin-682022, Kerala, http://www.sticindia.com/saif_instruments.html

INTERNATIONAL CONFERENCE/FELLOWSHIPS/ LAB VISIT

Dr. K. Sankaranarayanan, Dean, Faculty of Science and Professor, Department of Physics, Alagappa University, Karaikudi-630003, Tamilnadu has visited Hebei Semiconductor Research Institute, Shijiazhuang and Institute of Semiconductors, Chinese Academy of Sciences (CAS), Beijing, China for delivering invited lecturers. Duration of Visit is 29th October to 2nd November 2018.

Prof. K. Sankaranarayanan *with* ***Prof. Tongnian Sun****, Hebei Semiconductor Research Institute, Shijiazhuang, China*

Prof. K. Sankaranarayanan *holding VGF grown 4" diameter InP single crystal with* ***Prof. Zhao Youwen****, CAS, Beijing, China*

- **Prof. S. Kalainathan** got Visiting Scientist Fellowship at Research Centre for Engineering Science, Graduate School of Engineering Science, Akita University, Japan. Duration of his visit is April to July 2018.
- **Prof. S. Kalainathan** is worked as a Visiting Professor at University of Tokyo, Japan during 15th November to 15th December 2018.

Prof. S. Kalainathan *with* ***Prof.Nazmul Ahsan*** *at Centre for Advanced Science and Technology, University of Tokyo, Japan*

Prof. S. Kalainathan *with* ***Prof.Satoru Yoshimura*** *at School of Engineering Science, Akita University, Japan*

Dr. K. Srinivasan, Professor and Head, Department of Physics, Bharathiar University, Coimbatore, Tamilnadu presented lectures in the following three international conferences.

- 13th International Workshop on the Crystal Growth of Organic Materials (CGOM-13), 27-30th August 2018 held at Korea University, Seoul, Korea.
- 2nd Southeast Asian Conference on Crystal Engineering (SEACCE-2) during 6-8th August 2018 held at Sunway University, Bandar Sunway, Malaysia.
- Asian Crystallization Technology Symposium 2018 (ACTS-2018) during 20-22nd June 2018 held at A-Star, Institute of Chemical and Engineering Sciences at Biopolis, Singapore.

Dr. Radha Perumal Ramasamy, Assistant Professor, Department of Applied Sciences, Anna University, Chennai-600025, Tamilnadu delivered a Invited Lecture in "12th International Conference on Ceramic Materials and Components for Energy and Environmental Applications (CMCEE-2018)" during 22 – 27th July 2018 held at Institution of Engineers, Singapore.

Prof. Rajni Kant, University of Jammu delivered a lecture in "***Asian Crystallography Conference (AsCA-2018)"*** was held at University of Auckland, New Zealand, during 2-5 December 2018. The program was designed to showcase outstanding science from Asia, Australia and New Zealand, and from around the world. It was presented in various streams covering diverse topics in structural biology, chemical crystallography, crystal engineering, materials science, physics and fundamental science & methods including instrumentation, techniques and computation. He also participated in the council meeting as an Indian delegate, along with Professor Pinak Chakraborty, to decide on various aspects of ASCA.

INTERNATIONAL FELLOWSHIPS / INTERNSHIP/ LAB VISIT

ICC-IMR Visiting Scientist Fellow

Dr. M. Arivanadhan, Associate Professor, Centre for Nanoscience and Technology, Anna University, Chennai got ICC-IMR Visiting Scientist Fellowship in Institute for Materials Research (IMR), Tohoku University, Sendai-980-8577, Japan.

FAPESP Post Doctoral Fellowship

Dr. A. Simabarasan, got FAPESP Post Doctoral Fellowship (PDF) in Laboratory of Nano and Biosystems (LNB) Department of Applied Physics (DFA), "Gleb Wataghin" Institute of Physics, University of Campinas -13083-895 Sao Paulo, Brazil.

Brain Pool Fellowship (BPF)

Dr. Mohit Tyagi, Scientific Officer-F, TPD, BARC, Mumbai received Brain Pool Fellowship for six months by Korean Government. He is working in Institute for High-Energy & Nano-Physics, Kyungpook National University, Daegu 702-701, Korea.

CAS Post Doctoral Fellowship

Dr. K. Tirupugalmani, got Post Doctoral Fellowship (PDF) under Prof. Xiao-Yu Peng, Director, Terahertz Technology Research Center, Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences (CAS), China.

Summer Internship in Taiwan

Mr. S. Karthick, C/o Prof. S. Brahadeeswaran, Head, Department of Physics, BIT - Anna University, Trichy got an Internship under Prof. Chi-Yen-Huang, Graduate Institute of Photonics, National Changhua University of Education, Taiwan.

Post Doctoral Fellowship (PDF)

Dr. P. Vijayakumar, got Post Doctoral Fellowship (PDF) for two years under Prof. Zhengfei Dai, Professor and Head, State Key Laboratory for Mechanical Behaviour of Materials, Xi'an Jiaotong University, Xi'an-710049, China.

13th International Workshop on Crystal Growth of Organic Materials 27-30 August 2018, Korea University, Seoul, South Korea

13th International Workshop on Crystal Growth of Organic Materials was held at Korea University, Korea, during 27-30 August 2018. Eminent scientists from 13 countries participated and shared their research findings. 174 researchers out of which 78 were from other than Korea, took part in the workshop. 163 research papers were presented. 72 oral presentations and 91 poster presentations was part of the workshop. Apart from paper presentations, many plenary sessions were pooled by the scientists exclusively from crystal growth. 5 Indian CG researchers have participated in this workshop among which 4 of us from Tamilnadu. They are

1. Dr. K. Srinivasan
Professor and Head
Department of Physics
Bharathiar University, Coimbatore.

2. Dr. P. Sagunthala
Associate Professor
Department of Physics
Sri Vasavi College, Erode.

3. Dr. P. Yasotha
Assistant Professor
Department of Physics
Sri Vasavi College, Erode.

4. Mr. P. Karuppusamy
SSN College of Engineering, Chennai.

Indian Crystal Growth researchers attending 13CGOM-2018 at Korea University, Korea

Various areas of crystal growth were explored by the experts. New techniques of crystal growth were introduced. Properties and behaviour of many new materials were discussed. Application of various single crystals in multi various fields was the highlight of the workshop.

- Dr. P. Sagunthala, Associate Professor, Department of Physics, Sri Vasavi College

❖ **Dr. S. Jerome Das**, Associate Professor, Department of Physics, Loyola College, Chennai-600034, Tamilnadu delivered invited lecture in City University, Hong Kong on 12th May 2018.

❖ **Dr. S. Jerome Das** delivered invited lecture in Department of Materials Science, Sunchon National University, South Korea on 14th May 2018.

NATIONAL RESEARCH LABORATORY VISIT

Prof. Roberto Fornari, University of Parma is discussing with Ph.D. students in SSN Research Centre, SSN Institutions, Chennai

Prof. K. L. Chopra, IIT Delhi visited the crystal growth activities in SSN Research Centre, SSN Institutions, Chennai

Prof. Shashwati Sen, BARC is interacting with the crystal growth students in SSN Research Centre, SSN Institutions, Chennai

Dr. N. Balamurugan, Manager, GT Solar visited DRDO – Solid State Physics Laboratory (SSPL), New Delhi

Mr. G. Aravindan, SSN CE is working with **Prof. K. L. Narasimhan** and **Prof. B.M. Arora** in NCPRE, IIT Bombay

Mr. P. Aravinth Kumar, SSN CE is working with **Prof. Dhananjai Pandey**, School of Materials Science, IIT Varanasi, Uttar Pradesh

YOUNG / SENIOR RESEARCHERS FORUM

Prof. R. Jayavel, Crystal Growth Centre, Anna University, Chennai-600025, Tamilnadu received **TNSCST - Tamilnadu Scientist Award-2017** on 27th December 2018 for his outstanding contribution in Physical Sciences

Dr. R. Jothi Mani, Assistant Professor, Department of Physics, Sadakathullah Appa College (Autonomus), Tirunelveli-627011, Tamilnadu is conferred a special recognition under ***DKIRF –Young Faculty Researcher Award – 2018.*** This award recognizes the futuristic and outstanding best practices in Research and Education. This programme was held on 27th May 2018.

Dr. M. Srinivasan, Research Scientist, SSN Research Centre, SSN Institutions, Chennai-603110, Tamilnadu received ***ISPA – Dr. Gunasekaran Award – 2018*** for his outstanding contribution in Modeling and Simulation in Materials Sciences. This programme was held on 27-28th September 2018 at Department of Physics, Arignar Anna Government Arts College, Cheyyar-604407, Tamilnadu.

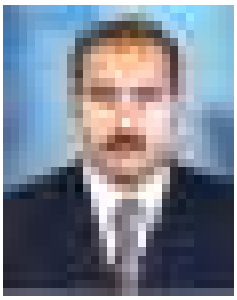
CSIR – OUTSTANDING PERFORMANCE AWARD - 2018

Dr. N. Vijayan, Senior Scientist, CSIR-NPL, New Delhi has received "**Outstanding Performance Award-2018"** *(for group)* for the dissemination of Metrological Traceability through Bharatiya Nirdeshak Dravyas on 27th September 2018.

DAE - SCIENTIFIC AND TECHNICAL EXCELLENCE AWARD - 2018

Dr. Shashwati Sen, Scientific Officer-G, Technical Physics Division (TPD), BARC, Mumbai received the "**DAE- Scientific & Technical Excellence Award-2018"** in the Physical Sciences for her outstanding research in Crystal Growth.

OUTSTANDING YOUNG SCIENTISTS IN PHYSICS AWARD - 2018



Dr. P. Dhanasekaran, Assistant Professor & Head, Department Physics, Bharathiar University Arts and Science College, Erode received "**Outstanding Young Scientist in Physics Award"** from IJRULA for the year 2018.

DKIRF - BEST YOUNG RESEARCHER AWARD - 2018

Dr. L. Jayanthi, Department of Physics, Sri Sarada College for Women, Salem, won the "**Best Young Researcher Award-2018"** nominated by the "DK International Research Foundation, DKIRF Awards 2018" on 27th May 2018.

OUTSTANDING INSTITUTE – INDUSTRY INTERACTION AWARD

Dr. R. Arun Kumar, Associate Professor, GRD Centre for Materials Research, PSG College of Technology, Coimbatore awarded with the "**Outstanding Institute-Industry Interaction Award-2018"** by PSG College of Technology, Coimbatore for the year 2018.

SERB - TRAVEL GRANT - 2018

Mr. P. Karuppasamy, Research Scholar, SSN Research Centre, SSN Institutions got "**SERB-Travel Grant"** for the participation in CGOM-13th International Workshop on Crystal Growth of Organic Materials held at Korea University, Seoul, Korea, during 27-30th August 2018.

Appointed as Dean, Faculty of Science in Alagappa University

Dr.K.Sankaranarayanan, Professor, Crystal Growth Laboratory, Department of Physics, Alagappa University, Karaikudi-630003, Tamilnadu is appointed as "**Dean, Faculty of Science**" in Alagappa University, Karaikudi from 3rd January 2019.

Appointed as a Deputy Director, Centre for Affiliations - Trichy

Dr. S. Brahadeeswaran, Head, Department of Physics, BIT, Anna University, Trichy has been assigned with an additional responsibility of "**Deputy Director of Centre for Affiliations**" for Tiruchirappalli Regional Campus of Anna Univ., Chennai.

ISPA PROF. GUNASEKARAN AWARD - 2018

Dr. N. Vijayan, Senior Scientist, CSIR-NPL was conferred with "**ISPA - Prof. Gunasekaran Award – 2018**" in the area of Spectroscopy during a NLCM-2018 at Department of Physics, AMET University, Chennai on 2nd February 2018.

OUTSTANDING CONTRIBUTION IN REVIEWING AWARD - 2018

Dr. R. Mohankumar, Department of Physics, Presidency College, Chennai, TN received "**Certificate of Outstanding Contribution in Reviewing Award – 2018**" from Journal of Physics and Chemistry of Solids.

AWARD FOR HIGHEST h-INDEX AND CITATIONS - 2018

Dr. S. Jerome Das, Associate Professor, Department of Physics, Loyola College, Chennai has received an "**Award for highest h-index**" from **Prof. M.S. Swaminathan** a renowned scientist of our country at **Loyola Research Day-2018** on 27th February 2018.

OUTSTANDING CONTRIBUTION IN REVIEWING AWARD - 2018

Dr. Joseph Madavan, Associate Professor, Department of Physics, Loyola College, Chennai, Tamilnadu received "**Certificate of Outstanding Contribution in Reviewing Award – 2018**" from Materials Research Bulletin (MRB) journal.

DST – FIST FACILITIES FOR CRYSTAL GROWTH

A proposal was submitted to Department of Science and Technology, New Delhi under DST-FIST scheme by **Dr. P. Ramesh Kumar, Coordinator** from the ***PG and Research Department of Physics, Periyar E.V.R. Government College (Autonomous), Tiruchirappalli-620023, Tamilnadu***. The proposal was shortlisted by the expert committee constituted by DST and on behalf of the Periyar E.V.R. Government College, Dr. P. Ramesh Kumar made a presentation to the expert committee at Alappuzha, Kerala. The DST-FIST is recommended for financial assistance to purchase Equipments (FTIR, UV-Visible Spectrophotometer, HPLC, Fluorescent Microscope and Z-scan analyser setup) and setting up departmental research lab under this scheme. One Crore and Ten Lakhs (Rs.1,10,00,000/-) is sanctioned under this scheme from DST-FIST.

Department of Physics, Chemistry and Mathematics, Sacred Heart College (Autonomous), Tirupattur-635601, Tamilnadu awarded DST-FIST project worth 95.0 lakhs for improving research and infrastructure facilities. **Dr. G. Britto Antony Xavier** was a Coordinator for this programme. Powder X-ray Diffractometer (D2 Phaser) is purchased and added in to the already existing Common Instrumentation Centre along with UV-Vis spectrometer, FTIR spectrometers, Impedance analyzer, Birefringence, water testing unit and indigenously developed Photoacoustic spectrometer. This facility will further boost the confidence of the young research scholars to do better quality research in all thrust areas of science and technology.

RECIPIENTS OF UGC - TRAVEL GRANT FOR PARTICIPATING IN INTERNATIONAL CONFERENCE - 2018

Dr. P. Sagunthala, Associate Professor, Department of Physics, Sri Vasavi College, Erode, Tamilnadu got UGC Travel Grant for the participation in **"13th International Workshop on Crystal Growth of Organic Materials (CGOM-13)"** held at Korea University, Seoul, South Korea, during 27-30 August 2018.

Dr. P. Yasotha, Assistant Professor, Department of Physics, Sri Vasavi College, Erode, Tamilnadu got UGC Travel Grant for the participation in **"13th International Workshop on Crystal Growth of Organic Materials (CGOM-13)"** held at Korea University, Seoul, South Korea, during 27-30 August 2018.

Dr. I. Hubert Joe, Associate Professor, Research Department of Physics, Mar Ivanios College, Thiruananthapuram-695015, Kerala got UGC Travel Grant for the participation in **"26th International Conference on Raman Spectroscopy"** held at Korea during 26-31 August 2018.

NOVEL WORK DONE IN CRYSTAL GROWTH

Effective Separation of *N*-benzyl-2-methyl-4-nitroaniline (BNA) Polymorphs through Antisolvent Crystallization Method

R. Kalaivanan, K. Srinivasan*

Crystal Growth Laboratory, Department of Physics, School of Physical Sciences,
Bharathiar University, Coimbatore-641046, Tamil Nadu, India

The title compound N-benzyl-2-methyl-4-nitroaniline (BNA), identified as a potential nonlinear optical material for terahertz generation, was synthesized through a newer approach using 2-methyl-4-nitro aniline and benzyl chloride instead of benzyl bromide as reported earlier. The obtained BNA material was purified through column chromatography and its purity was confirmed by thin layer chromatography. Further, the material was recrystallized at least four times in methanol and the highly purified BNA was obtained. The Influence of antisolvent water on the polymorphic nucleation BNA during its crystallization from methanol solution was investigated for the first time. The supersaturation dependent polymorphic nucleation of orthorhombic and monoclinic forms and their growth morphologies such as platy-like orthorhombic and needle-like monoclinic are examined through in-situ optical microscopy (Fig. 1). The antisolvent addition generates supersatution of different levels depending upon the concentration of the antisolvent addtion into the methanol solution. Low level of supersaturation $\sigma<0.2$ produces the stable orthorhombic polymorph of BNA, whereas the relative supersaturation σ in the range between 0.2 to 0.5 creates both satble and metastable polymorphs of BNA. At higher level of supersaturation i.e., $\sigma>0.5$ and upto $\sigma=1$, the solution yields pure needle like metastable monoclinic polymorph of BNA. After a definite period of time, the nucleated needle like monoclinic polymorph transform into platy like orthorhombic polymorph in the solution which indicates clearly that there exits the solution mediated polymorphic phase transformation between mono to ortho polymorph of BNA in the solution otherwise the monoclinic form is stable at the room temperature conditions after harvesting them from the mother solution. Single crystals of the grown polymorphs are successfully separated and their structural, thermal, spectroscopic and optical transmittance properties are confirmed through PXRD, DSC, FTIR and UV-Vis-near IR analyses respectively.

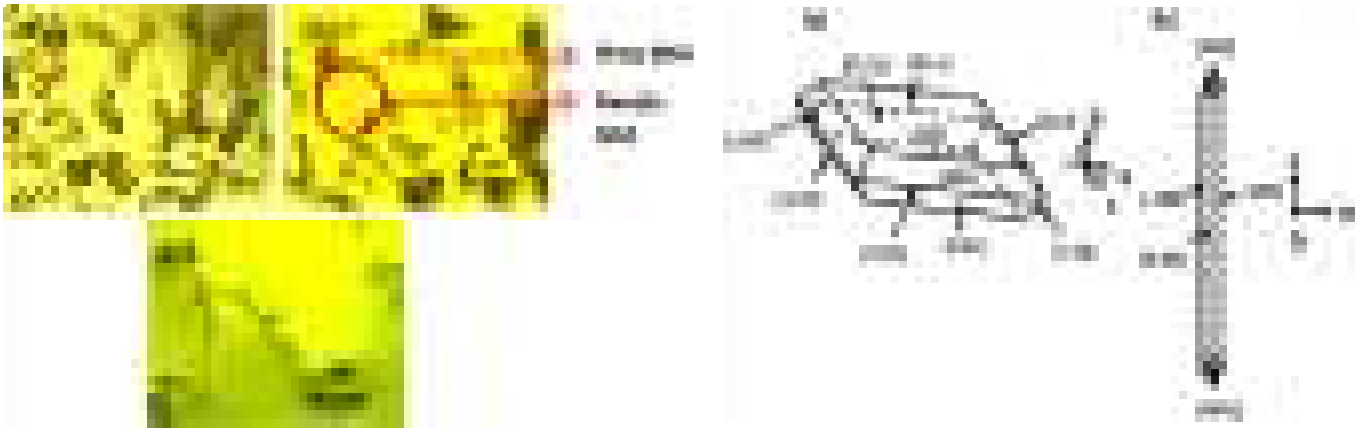


Figure.1 *Microscopic images of a) Platy, b) platy+needle and c) Needle BNA crystals*
Figure.2 *Morphology of the grown a) orthorhombic platy and b) monoclinic needle shaped BNA crystals*

Necessity of Reference Materials for Powder X-ray Diffractometer

Naghma Khan, Ravinder Kumar, R.P. Pant, N. Vijayan*

CSIR-National Physical Laboratory, Dr. K. S. Krishnan Marg, New Delhi-110012, India

CSIR-National Physical Laboratory (CSIR-NPL-India) is mandated to be India's "National Measurement Institute" (NMI) by act of Parliament and is the custodian of "National Standards" with a responsibility of the dissemination of measurements to the needs of country.

CSIR-National Physical Laboratory is the only institute in India which is maintaining standards through traceability of SI unit (Unbroken chain of measurement through traceability). Accurate and precise measurements are essential to drive the growth engines of Indian Science & Industry as it removes chaos and prompts innovations, which in turn, would save precious lives, resources and time". Developing India's measurement standards that are internationally accepted and disseminating the measurement capabilities to industry, government, strategic and academia that underpin the India's prosperity and quality of life. CSIR–CSIR-NPL, owing to its untiring efforts in the establishment, development and maintenance of "Primary Standards" of SI units and its derivatives and their dissemination has occupied a pivotal position in the country. The precise and accurate measurements of various parameters though unbroken chain of traceability (see Fig. 1), to various government, strategic, public and private sectors) have resulted in the overall quality and safety of life in the country as well as international trade.

Figure.1 *Traceability pyramid*

Figure.2 *Logo of Bhartiya Nirdeshak Dravya (BND)*

The rapid advancement in science & technology and globalization of economies poses a strong need for more stringent metrological regulations in trade and commerce. To this end, Legal Metrology Act, 2009 was enforced by government of India (GOI) on April 1, 2011 throughout the country. In this regard, indigenous development of in-house as well as through Reference Material Producers (RMPs), several BNDs in different areas such as sophisticated instrument reference materials, food, fuel, blood serum, ores and minerals etc. are essentials for quality controls of the processes and products in the country. In this regard, CSIR-National Physical Laboratory is strongly involved for the preparation of Indian reference Materials (Bharatiya Nirdeshak Dravya; Trademarked as BND (see the logo, which is given in Fig. 2) in various sectors along with reference materials producers.

Nowadays powder X-ray diffractometer plays an important role for determination of lattice dimensions, phase, stress & strain and crystallite sizes etc. To carry out for such precise measurements in atomic levels, one should need accurate measurements which can reveal the exact property of the material. Powder XRD technique is a non –destructive and easy to determine the lattice parameter of any material. For these precise measurements, we need a reference material to confirm the authenticity of the data which is to be measured from the instrument. Reference materials are uniformly analogous and very well balanced materials which provide property to that material and composition that are reproducible. It is a geological, chemical or some composite that has been analyzed to have specific property. They may have measurable or subjected qualities since there is no document that certifies the amount of uncertainty they have and whether they are traceable or not thus making them less useful. They are used for quantifying measurement system, determination of different synthesis procedures and calibration methods and to gauge whether the reference material is as per its specification. They are either used for quantification of instruments and measurements accurately or set a standard value throughout or we can confirm the result of the same.

In CSIR-NPL, Indian Reference Materials Division (Bharatiya Nirdeshak Dravya:BND®) is actively involved for the preparation and dissemination of the above said materials throughout the country. In India, every year, large number of powder X-ray diffraction machines was imported for various purposes. Measurement data from PXRD is not reliable, if the machine is not standardized by reference material which is certified by the national measurement institute like NPL. In India, many colleges/universities may not be able to afford the cost of imported reference material. The reference material from CSIR-NPL will cost much less and can be used widely by the stake holders. Reference materials play a crucial role in quality assurance of products and contribute to the process of establishing traceability to SI units as per ISO guidelines. Therefore there is an urgent need for the development of indigenous reference materials (Bharatiya Nirdeshak Dravya (BND)) traceable to NPLI. This activity is supposed to bring a paradigm shift in socio-economic fabric of the country through quality control assurance for export, import and domestic consumer products in every sector. BND division is CSIR-National Physical Laboratory is making tireless efforts for preparing various Indian reference materials in the area of X-ray Diffraction (XRD), TEM, Fourier Transform Infrared Spectroscopy (FTIR), Food etc. The detailed list is available in the website link: http://www.nplindia.in/bhartiya-nirdeshak-dravya-bnd-indian-reference-materials.

Large size piezoelectric benzil single crystals grown by Czochralski method for microstrip patch antenna applications

Harsh Yadav, Nidhi Sinha, Binay Kumar*
Crystal Lab, Department of Physics, University of Delhi, Delhi-110007, India

Organic nonlinear optical single crystals of benzil have been grown by Czochralski (Cz) and slow evaporation techniques. The crystal morphology was characterized by computing the growth rates of the planes, which were found to be affected by solvent modification. Intermolecular interactions of the benzil crystal were explored by Hirshfeld surface and 2D fingerplot in a novel visual manner. A linear optical study was carried out by UV-Vis transmission spectroscopy, in which the Cz grown crystal was found to be more transparent with a cut-off wavelength at 406 nm. Photoluminescence emission was observed in the green region with higher intensity in Cz grown crystal. The piezoelectric charge coefficients were found to be 4, 1, 6 and 3 pC N^{-1} along (100), (010), (001) and (1-10) planes of the solution grown crystal. The study of Vickers microhardness and volume of voids in the grown crystals confirmed that the Cz grown crystal has better mechanical strength. Patch antenna based on the substrate of Cz grown benzil crystal was simulated for resonant frequency at 12.6 GHz and fabricated, and is suitable for piezoelectric, sensor and telecommunication applications.

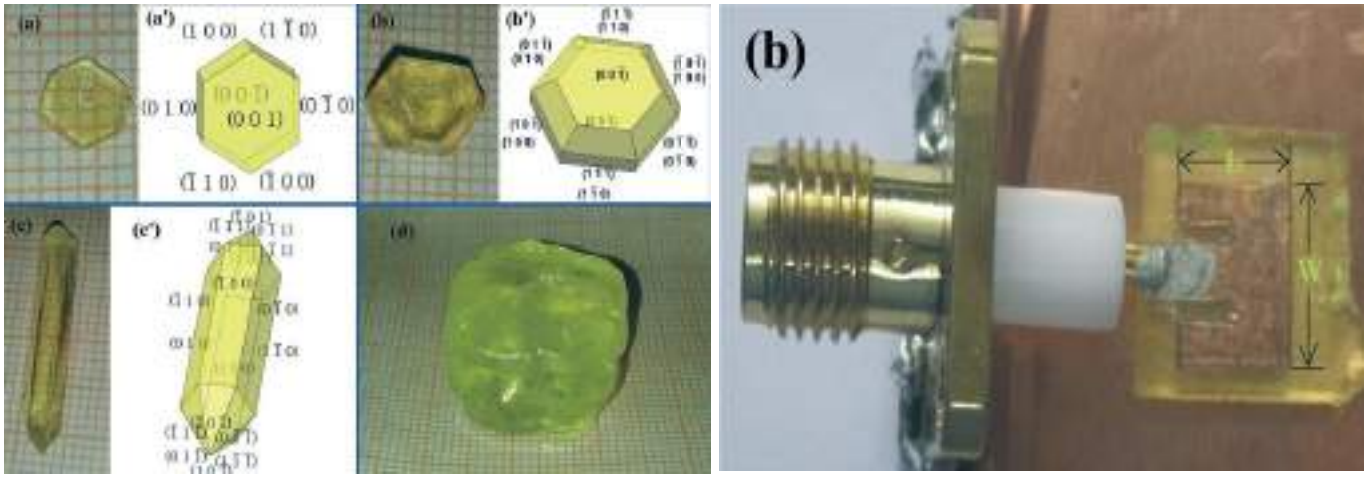


Figure.1 *(a, b) As grown benzil crystals by SEST method, (c) Benzil crystal in the presence of liquid crystal as an additive showing a bipyramidal morphology, (d) Benzil crystal grown by CZ method*
Figure.2 (b) The fabricated patch antenna by using benzil crystal as a dielectric substrate

Transparent benzil crystals were successfully grown by Cz and SEST method. The optical transparency and PL yield are higher in the Cz grown crystal, which is a direct consequence of the higher crystallinity. The piezoelectric coefficient was measured across different directions and found to be highest (6 pC N−1) along the [001] direction. In the hardness studies, the Cz grown crystal was found to be mechanically more stable as compared to that grown with the solution technique. A patch antenna based on the benzil crystal was simulated for a frequency of 12.6 GHz. The desired patch antenna was fabricated using a Cz grown crystal and the resonant frequency was measured as 11.8 GHz. A shift in resonant frequency of 100 MHz by applying DC voltage was also simulated. The patch antenna based on the benzil crystal substrate not only can be used as a communication purpose but also has a potential for various sensor applications.

A phasematchable organic N—H- - -O hydrogen bonded helical chain type Morpholinium 2-chloro-4-nitrobenzoate (M2C4N) nonlinear optical (NLO) single crystal

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Several attempts were made to synthesize and grow N—H- - -O hydrogen bonded helical chain molecule M2C4N to explore its suitability for NLO applications. The simulated and experimental powder XRD patterns confirmed the crystalline phase of M2C4N and it was found to crystallize in the noncentrosymmetric space group of $P2_12_12_1$ and the molecular packing exhibited 21 helical chain arrangements when viewed along c-axis. The smoky patterns, observed especially in the middle region of the grown crystals, were considerably circumvented by purifying both solute and solvent thereby enhancing the optical quality of the crystals, as evidenced from UV-Vis spectrum analysis. Further, the cutoff wavelength and band gap energy of the M2C4N was found to be about 403 nm and 2.81 eV respectively. The SHG efficiency was found to be about 2.21 times that of KDP and 1.43 times that of urea in the particle size range of 120 to 150μm and thus confirmed that the crystal was phasematchable. The quantum chemical investigations performed using the B3LYP/6-311++G (d, p) basis set and the optimized geometry of the isolated gaseous M2C4N molecule provided crucial parameters such as the chemical stability, hardness, charge distribution, HOMO-LUMO energy gap, and nucleophilic and electrophilic related sites. The laser damage studies performed for M2C4N using single shot measurements exhibited that the crystal could withstand the laser fluence of about 4.72GW/cm^2 along (010) plane. Thus, by considering the crucial factors such higher optical quality, phasematchability and better laser damage threshold values, it could be stated that M2C4N could be a suitable candidate for NLO device applications.

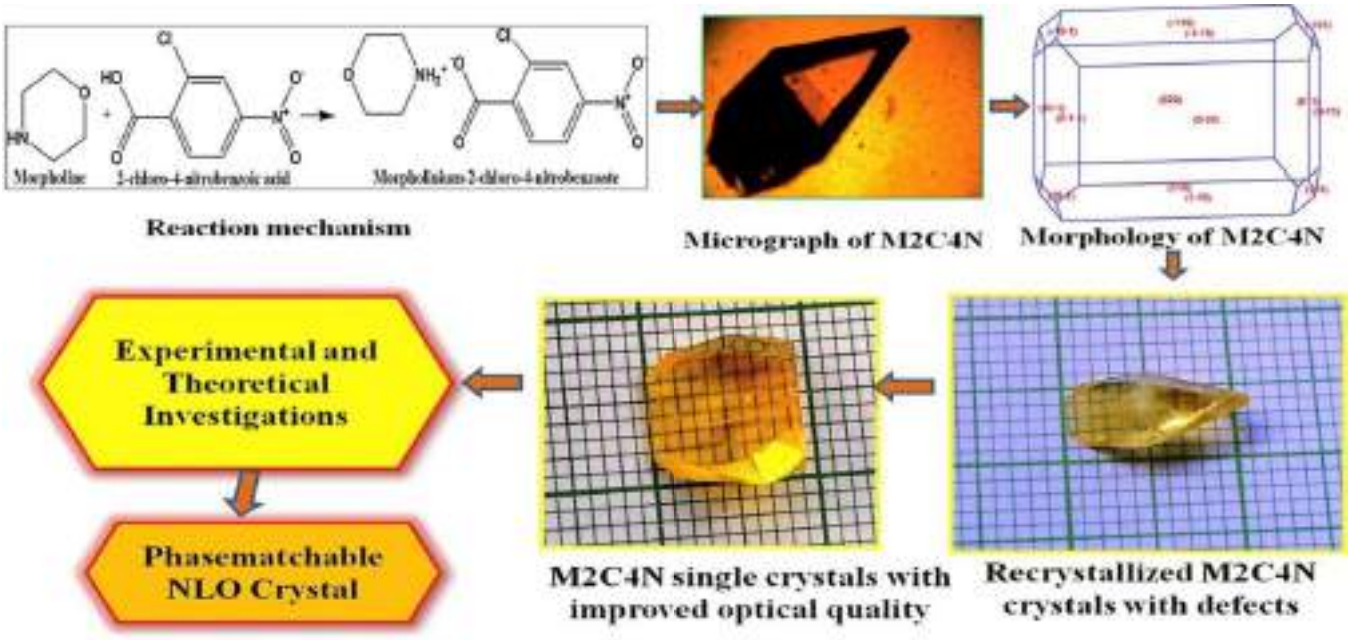

Figure.1 *(a) Reaction mechanism, (b) Micrograph, (c) Morphology of M2C4N single crystal*
Figure.2 *(a) As grown and good quality M2C4N single crystal, (b) Recrystallized crystal with defects*

Z-Scan: A simple technique to determine third order nonlinearity in single crystals

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Nonlinear optics (NLO) is the study of phenomena that occurs as a consequence of the modification of the optical properties of a material system by the presence of light. NLO phenomena are "nonlinear" in the sense that they occur when the response of a material system to an applied optical field depends in a nonlinear manner on the strength of the optical field. NLO deals with various nonlinear effects which take place during the interaction between laser and matter. One of the nonlinear phenomena is the optical or AC Kerr effect in which an intense optical beam at frequency ω_2 modulates the refractive index for a co-propagating weak probe beam at frequency ω_1. Intensity-dependent refractive index (IDRI) is a special case of the optical Kerr effect which occurs when an intense optical beam propagates in a medium thereby changing its refractive index. This self-induced refractive index change is influencing the propagation of the beam. IDRI has important practical relevance whose one consequence is self-focusing. Self-focusing of light is the process in which an intense beam modifies the refractive index of the medium such that the beam is caused to come to a focus within the material. If we assume the nonlinear refractive index to be positive, the laser beam induces a refractive index variation within the material with a larger refractive index at the center of the beam than at its periphery. Thus the material acts as if it were a positive lens, causing the beam to come to a focus within the material.

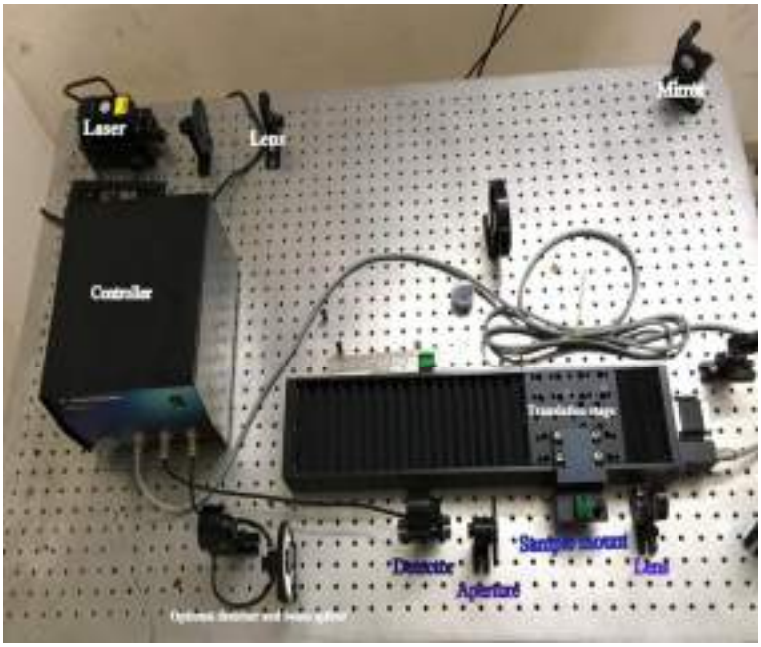


Figure.1 *Photograph of the Z-scan experimental setup*

Third order nonlinearity does not require any symmetric requirements unlike second order where the material has to have non-centro symmetricity. Nonlinear optical (NLO) materials which possess large third order optical nonlinearities with fast response time have become an important requisite for potential applications such as optical limiting, optical data storage, optical switching etc. The third order nonlinear optical parameters can be obtained by several techniques such as nonlinear interferometry, degenerate four wave mixing, ellipse rotation, beam distortion, Z-scan technique etc.

Among all these techniques, Z-scan measurement is a simple and effective method which works on the principle of spatial distortion of Gaussian laser beam arising from nonlinear self-phase modulation (SPM) as the laser beam is passed through the material. The most important aspect of Z-scan method is that sign of nonlinear refraction and its magnitude can be easily determined.

The closed aperture z-scan experiment uses a Gaussian beam from a laser in tight focus geometry to measure the transmittance of a nonlinear medium through a finite aperture in the far field as a function of the sample position z, from the focal plane. The transmittance characteristics of the sample with a finite aperture depend on the nonlinear refractive index. The curve for sample position, Z versus transmittance has a peak followed by a valley for a negative refractive nonlinearity. Such a curve implies that the sample has negative nonlinearity. The curve for a positive refractive nonlinearity will give rise to the opposite effect, i.e. a valley followed by a peak. The Characteristic curves depicting both positive and negative nonlinear refraction as measured by z-scan is as shown below:

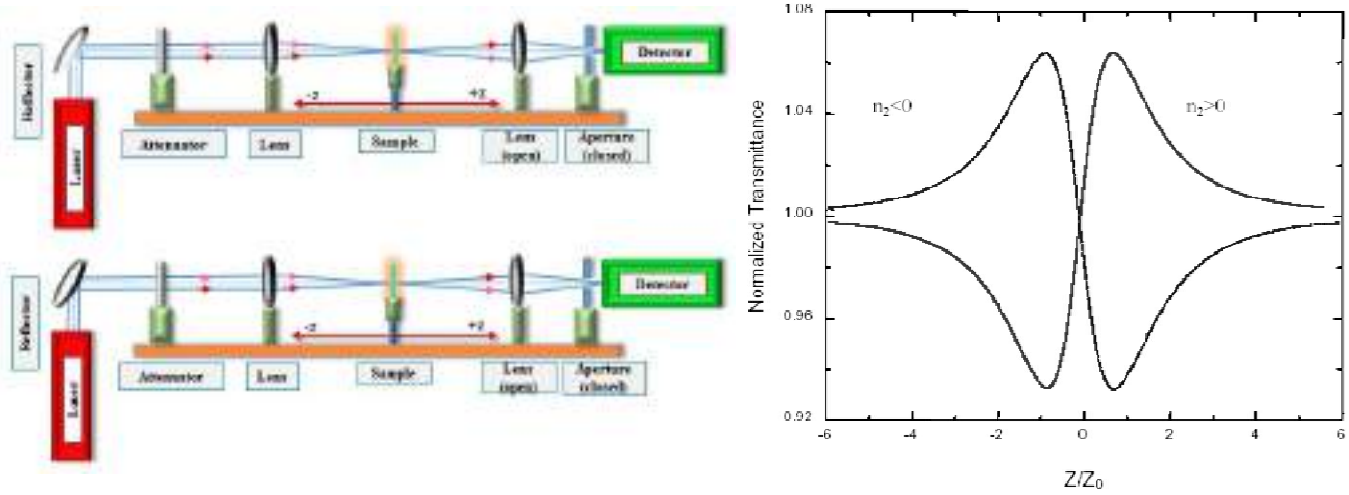
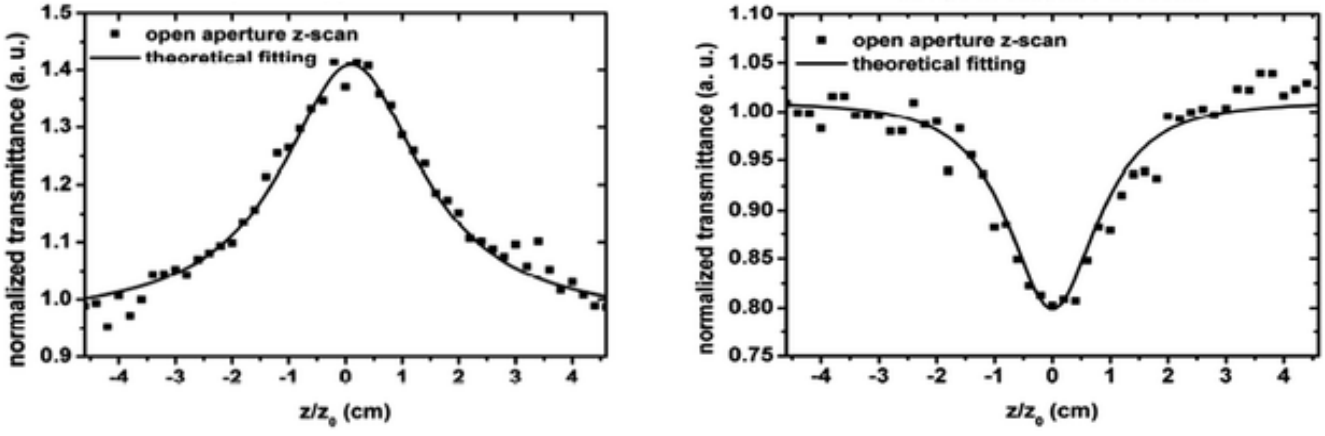


Figure.1 *Schematic diagram of Z-scan setup (a) Open aperture and (b) Closed aperture*

In the above discussion, a purely refractive nonlinearity was considered with an assumption that absorptive nonlinearities were absent. The peak is suppressed and the valley is enhanced due to the presence of multi-photon (two or more) absorption which is called reverse saturable absorption, while opposite effect is observed due to saturation of absorption. The typical open aperture curves are as shown in the figure below.



The aperture is mainly responsible for sensitivity of the experiment to refractive nonlinearities. The removal of the aperture will make the Z-scan sensitive to absorptive nonlinearities alone. By performing Z-scan experiment with and without aperture both the refractive and absorptive nonlinearities of the sample can be studied simultaneously. With a continuous laser, due to localized heating in the sample, thermal nonlinearity can be determined. The nonlinearity exhibited by these samples can be exploited for optoelectronic device applications like optical limiters, switches, bistable devices etc.

Shock wave recovery experiments on single crystals : An overview

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Sacred Heart College (Autonomous), Tirupattur-635601, Tamilnadu, India

Shock wave induced material properties especially in solids are very old technique for material science researches and aerospace space researches to find the stability of the material properties under dynamic high pressure and temperature conditions. Until 1960's, the shock wave research on material was not much explored due to the lack of indoor shock tube facilities and it took take-off only after the invention of table–top shock tubes. Since shock wave provides multiple effects such as high tension, high stress, high pressure and high temperature simultaneously on material through which it passes so that it gives the real time experience as that of while a space graft entering in to the atmosphere and a material falling down accidently. Hence, the materials which are stable against shock waves can be recommended for the aerospace and military applications. Since shock waves can alter the crystalline and domain orientation of a material, the physical as well as chemical changes and even phase transformation may also take place.

Our research group is interested to investigate the material properties of either bulk or nano systems in shock wave loaded conditions so as to enable better understating of the properties of materials in real time applications. In our laboratory, we have shock tubes which can generate different shock waves with Mach numbers varying from 1-5 with which shock wave recovery experiments can be conducted. We have performed the shock wave recovery experiments for nano crystalline materials such as TiO_2, ZnO, CuO, AgO, MnO and Fe_2O_3 and NLO crystals such as ADP, KDP, TGS, GPI and benzil. Among these materials, ZnO and CuO nano crystalline materials are suitable for space applications due to superior shock wave resistance properties. TiO_2 undergoes phase transformation and Fe_2O_3 loses its degree of crystallinity due to the exposure of shock waves. Interestingly, while KDP and TGS crystals show the decreasing trend in transmittance, ADP and benzil crystals show higher optical transmission after the shock exposure. The pre and post shock wave loaded optical transmission of few crystals are shown in Fig.1. We conclude that properties of materials can be tuned without affecting the original crystal system using shock waves with absence of chemical dopants.

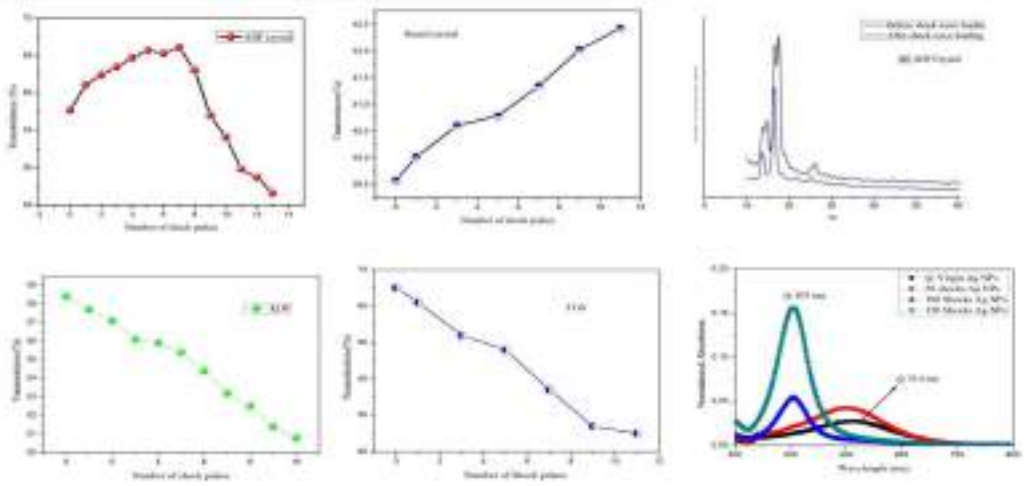


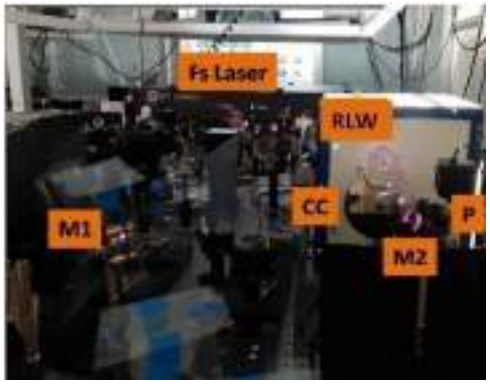
Figure.1 *Optical transmission spectrum and Powder X-Ray Diffraction (PXRD) spectrum of few technologically important good quality nonlinear optical (NLO) and ferroelectric single crystals and nano crystals under shock wave loaded condition*

Reconfigurable laser workstation for generation of uniform micro and nano crystals on surface of semiconductor

Susanta Kumar Das*, P. Chandrakanta Singh, Atal Mundamajhi
Department of Physics, KIIT University, Bhubaneswar-751024, Odisha, India

A reconfigurable Laser Workstation (RLW) has been developed at KIIT Deemed to be University, Bhubaneswar, Odisha for generation of uniform micro/nano crystalline materials on surface of Semiconductor Laser workstation. Unlike the conventional workstation it is very compact, portable, cost effective and has the ability to get interfaced to any kind of laser. The system has been tested to generate very uniform micro/nano crystalline materials on surface various semiconductor materials like Si, ZnO etc. by exploiting the phenomena of laser Induced Periodic Structures (LIPS) generation. This is a phenomenon by which periodic structures can be appeared instantaneously on surface and volume of any kind of solid state material when laser pulses of appropriate energy and number is irradiated on it. This is a kind of top down approach to produce highly reproducible nano/microstructures without going for any sophisticated process of lithography. However, this method is much simpler and cost effective. Depending on the involved physical mechanisms, the process of LIPS formation can be driven by feedback loops leading to self-organization processes. By proper optimization of the laser parameters like wavelength, polarization, pulse duration, pulse number and fluency; the shape, size and orientation of created structures can be controlled very precisely. For these reasons the LIPS and related structures have been used for various applications such as Surface Enhanced Raman Spectroscopy (SERS), colorization of metals, enhancement of emission efficiency of incandescent light sources, tribology, efficient photoelectron emission, realization of efficient photovoltaic cell and LED, optical memory and controlling hydrophobic properties of materials etc. The developed LWA system has already been successfully used by us for LIPS generation.

The Si sample was processed with optimized condition and the repetition rate of the laser pulse was 1 kHz, the scanning velocity and number of overlapping pulses were 20mm/s and 90µm respectively. The optical image of the processed Si containing uniform microcrystalline structures are shown is shown in Figure. 2. Such microcrystalline structures can be used for efficient solar cell junction. The same system has been tested with other lasers like Nanosecond pulses N_2 laser and Nd: YAG laser etc. The system can not only be used for semiconductor materials but also for other materials like metal, ceramic, insulator etc. for all the aforementioned applications. The system can be freely accessed in the collaborative research work.



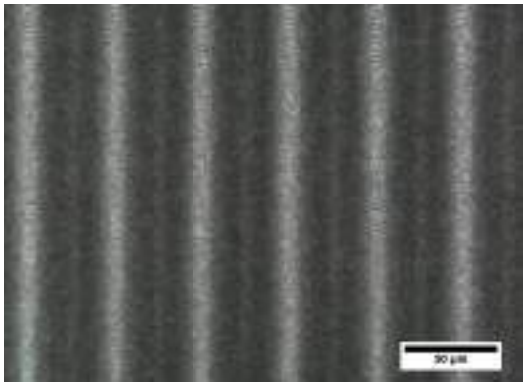


Figure.1. *The RLW interfaced with Fs laser. M1, M2 = Mirror, P = Power meter, C = Collimator*

Figure.2. *Optical image of the processed Si containing uniform micro crystalline structures*

CRYSTAL GROWTH RESEARCHERS RECEIVED NATIONAL FELLOWSHIPS

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Mr. N. Santhsoh
CSIR-Senior Research Fellow (SRF)
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UGC
University Grants Commission

Dr. S. Sadhasivam
UGC-Dr. D. S. Kothari Fellowship
C/o Dr. K. Jeganathan
Centre for Nanoscience & Technology
Bharathidasan University
Tiruchirappalli-620024, Tamilnadu
Email: sadha.phy1@gmail.com

Mr. G. Aravindan
CSIR-Senior Research Fellow (SRF)
C/o Prof. P. Ramasamy
SSN Research Centre
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Email: aravindanvpt@gmail.com

FORTH-COMING EVENTS IN CRYSTAL GROWTH

- 19th International Conference on Crystal Growth & Epitaxy (ICCGE-2019)
  28 July – 2 August 2019, Keystone, Colorado, USA
  Web: *https://www.iccge19.org/*

- The 17th International Summer School on Crystal Growth, 21-26 July 2019
  YMCA of the Rockies, Snow Mountain Ranch, Grandby, Colorado, USA
  Web: *ttps://docs.wixstatic.com/ugd/35f934_494e0a8d574047e9920df6fc289f8711.pdf*

- 3rd German Polish Conference on Crystal Growth, 17-21 March 2019
  Poznan University of Technology, Poznań, Poland
  Web: *http://gpccg2019.put.poznan.pl/*

- International Conference on Mechanisms and Nonlinear Problems of Nucleation and Growth of Crystals and Thin Films, 1-5 July 2019, Saint Petersburg, Russia
  Web: *http://www.mgctf.ru/*

- International Symposium of Modeling of Crystal Growth Processes and Devices
  26-28 February 2019, SSN Research Centre, SSN Institutions, Chennai
  Web: *http://mcgpd.com/index.html*

- 5th International Conference on Crystallography and Novel Materials
  25-26 November 2019, Helsinki, Finland
  Web: *https://crystallography.materialsconferences.com*

- 3rd International Conference on Recent Advances in Materials Chemistry (RAMC), 13-15 February 2019, Department of Chemistry, SRM University, Chennai. **Web:** *www.srmuniv.ac.in/icramc-2019*

- International Conference on Physics and Chemistry of Solids (ICPCS-2019)
  7-8 March 2019, Department of Physics, Hindustan University, Chennai
  Web: *https://www.hindustanuniv.ac.in/*

- Three Days National Workshop on Spectroscopic Techniques, 30 January – 1 February 2019, Centre for Nanoscience and Technology, Sathyabama University. **Web:** *https://sites.google.com/view/wost2019/home*

- International Conference on Recent Advances in Materials Science (ICRAMS-2019), 4-6 February 2019, Department of Physics, National College, Trichy
  Web: *http://nct.ac.in/icrams/*

- Second International Conference on Advanced Materials for Energy Applications
  4-6 February 2019, Department of Physics, Bishop Heber College, Trichy
  Web: *http://bhc.edu.in/ANEH2019/*

BEST PAPER PRESENTATION AWARDS IN XXII NSCGA-2018

Dr. R. Govindaraj, SSN CE received **Dr. RG National Award for BEST THESIS** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

Dr. RO. MU. Jauhar, VIT Chennai received **Dr. RG National Award for BEST THESIS** in the XXII National Seminar on Crystal Growth (XXII NSCGA) held at Sacred Heart College during 29-31 January 2018

Dr. N. Sivakumar, Anna University received **Dr. RG National Award for BEST THESIS** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

C. Balakrishnan, Annamalai University, Chithambaram received **BEST POSTER AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

B. Valarmathi, Presidency College, Chennai received **BEST POSTER AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

P. Eniya, Department of Physics, Periyar University, Salem received **BEST POSTER AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

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M. Dhivya Bharathi, Presidency College, Chennai received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

Vikash Kumar, Barkatullah University received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

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S. Kalaiarasi, Sacred Heart College received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

Bibin John, Christ University received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

P.N. Musfir, Cochin University, Kerala received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

D. Karthikraja, Periyar University, Salem received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

S. Sakthy Priya, Periyar EVR College, Trichy received **BEST ORAL AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

BEST CRYSTAL DISPLAY AWARDS IN XXII NSCGA-2018

P. Dhivya & **N. Ravikumar**, PSG College of Technology received **BEST CRYSTAL DISPLAY AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

S.G. Nagarajan, SSN Institutions received **BEST CRYSTAL DISPLAY AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

S. Sanmugavel, SSN Institutions received **BEST CRYSTAL DISPLAY AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

J. Thirupathy, Sacred Heart College received **BEST CRYSTAL DISPLAY AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

T. Kamalesh, SSN Institutions received **BEST CRYSTAL DISPLAY AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

K. Ramachandran, SSN Institutions received **BEST CRYSTAL DISPLAY AWARD** in the XXII National Seminar on Crystal Growth (XXII NSCGA-2018) held at Sacred Heart College during 29-31 January 2018

BEST PAPER PRESENTATION AWARDS IN ICRTMS-2018

R.V. Kavinila, Karpagam University received **BEST ORAL PRESENTATIONAWARD** in the ICRTMST-2018 held at Sri Vijay Vidyala College of Arts & Science during 19-20 January 2018

C. Sakthivel, Bharathiar University received **BEST ORAL PRESENTATIONAWARD** in the ICRTMST-2018 held at Sri Vijay Vidyala College of Arts & Science during 19-20 January 2018

R. Anbarasan, Periyar University, Salem received **BEST ORAL PRESENTATIONAWARD** in the ICRTMST-2018 held at Sri Vijay Vidyala College of Arts & Science during 19-20 January 2018

N. Santhosh, SSN Institutions, Chennai received **BEST ORAL PRESENTATIONAWARD** in the ICRTMST-2018 held at Sri Vijay Vidyala College of Arts & Science during 19-20 January 2018

J. Thirupathy, Sacred Heart College received **BEST CRYSTAL DISPLAY AWARD** in the ICRTMST-2018 held at Sri Vijay Vidyala College of Arts & Science during 19-20 January 2018

Dr. L. Jayanthi, Sri Sarada College for Women received **BEST CRYSTAL DISPLAY AWARD** in the ICRTMST-2018 held at Sri Vijay Vidyala College of Arts & Science during 19-20 January 2018

BEST PAPER PRESENTATION AWARDS IN NCPFAM-2018

G. Subalakshmi, SSN Institutions, Chennai received **BEST ORAL PRESENTATION AWARD** in the NCPFAM-2018 held at Department of Physics, SSN Institutions during 1-2 March 2018

T. Joseph Mebelson, S. T. Hindu College received **BEST ORAL PRESENTATION AWARD** in the NCPFAM-2018 held at Department of Physics, SSN Institutions during 1-2 March 2018

T. Subashini, University of Madras received **BEST ORAL PRESENTATION AWARD** in the NCPFAM-2018 held at Department of Physics, SSN Institutions during 1-2 March 2018

M. Mohammed Ismail, Anna University received **BEST ORAL PRESENTATION AWARD** in the NCPFAM-2018 held at Department of Physics, SSN Institutions during 1-2 March 2018

G. Iyappan, SSN Institutions, Chennai received **BEST ORAL PRESENTATION AWARD** in the NCPFAM-2018 held at Department of Physics, SSN Institutions during 1-2 March 2018

N. Sarala, Alagappa University received **BEST ORAL PRESENTATION AWARD** in the NCPFAM-2018 held at Department of Physics, SSN Institutions during 1-2 March 2018

U. Rajesh Kannan, Aditanar College of Arts and Science received **BEST ORAL PRESENTATION AWARD** in the ISTAM-2018 held at Department of Physics, Muslim Arts College, Kanyakumari during 29 September 2018

T. Solaiyammal, Pachayappa's College received **BEST ORAL PRESENTATION AWARD** in the ICMS-2018 held at Department of Physics, Saveetha Engineering College, Chennai during 11-12 December 2018

Dr. C. Senthil Kumar, SSN Institutions received **BEST ORAL PRESENTATION AWARD** in the ICEMM-2018 held at Department of Physics, KSR College of Arts and Science during 7-9 January 2019

Dr. S. Kotteswarn, SSN Institutions received **BEST ORAL PRESENTATION AWARD** in the ICEMM-2018 held at Department of Physics, KSR College of Arts and Science during 7-9 January 2019

D. Shanthi, Aditanar College of Arts and Science received **BEST ORAL PRESENTATION AWARD** in the NSETP-2018 held at Department of Physics, Sadakathullah Appa College, Tirunelveli during 6-8 March 2018

U. Rajesh Kannan, Aditanar College of Arts and Science received **BEST ORAL PRESENTATION AWARD** in the ISMST-2018 held at Department of Physics, A.P.C. Mahalakshmi College during 23 September 2018

Ph.D. THESES IN CRYSTAL GROWTH (2018)

S. No	Name of the Student	Title of the Ph.D. Thesis	Supervisor & Affiliation
1	**Aarthi. J**	Studies on Crystal Growth, Optical and Biological Applications of L-glutamic Acid Polymorphs and Its Derivatives	Dr. P. Dhanasekaran Bharathiar University Arts and Science College, Erode-638104
2	**Anuj Krishna**	Crystallization and detailed Investigations on Characteristics Features of organic single crystals for nonlinear optical Applications	Dr. N. Vijayan Senior Scientist CSIR-NPL, New Delhi-110012
3	**Akilan. M**	Synthesis, Growth and characterization of thiosemicarbazide (TSC) family of crystals for photonic applications	Dr. S. Jerome Das Loyola College Chennai-600034
4	**Arputha Latha. A**	Synthesis and characterization of organic nonlinear optical crystal for optoelectronic and Photonic Applications	Dr. M. Anbuchezhiyan Valliammai Engineering College, Kanchipuram-603203
5	**Attralarasan. S**	Computational and experimental characterizations of BLZC, BNA, LARM, LAM and LPB nonlinear optical single crystals	Dr. J. Madhavan Loyola College Chennai-600034
6	**Andiappan. M**	Growth and studies of some cadmium sulfate based nonlinear optical crystals	Dr.P.Selvarajan Aditanar College of Arts and Science, Tiruchendur-628216
7	**Bhavani. K**	Crystallization and Characterisation of Some Biologically Essential Drug Materials	Dr. K. Sankaranarayanan Alagappa University Karaikudi-630003
8	**Brahmaji. B**	Optical Investigations On Bulk Grown Sulfamic Acid Single crystals With Cerium, Terbium, Europium As Dopants	Dr. K. Ramachandra Rao Government Arts College Rajamundry, A.P.
9	**Deepa. K**	Crystal growth and theoretical insight on selected organic nonlinear optical single crystals	Dr. J. Madhavan Loyola College Chennai-600034
10	**Durairaj. N**	Investigation on Organic Scintillator Crystal for Neutron-Gamma Discrimination and Fast Neutron Detection Application	Dr. S. Kalainathan Centre for Crystal Growth VIT, Vellore, Vellore-632014
11	**Dennis Raj. A**	Synthesis Growth and Characterization of Organic NLO Single Crystals for Electro-Optic Applications	Dr. I. Vetha Potheher Dept. of Physics, BIT-Anna University, Trichy-620024
12	**Eunice Jerusha**	Growth and Characterisation of ATD, Ammonium Hydrogen Oxalate Hemihydrate and L-lysine p-Nitrophenolate Monohydrate Single Crystals	Dr. Shahil Kirupavathy Velammal Engineering College Chennai-600066
13	**Gracelin Juliana. S**	Nucleation kinetics, growth and studies of some undoped and doped nonlinear optical and ferroelectric crystals	Dr. P. Selvarajan Aditanar College of Arts and Science, Tiruchendur-628216
14	**Goldy Slathia**	Growth, characterization and properties of rare earth coordinated crystals	Prof. K.K. Bamzai University of Jammu Jammu-180006
15	**Govindhan. V**	Unidirectional Growth And Characterization Of Organic Single Crystals For Scintillator Application	Dr. K. Sankaranarayanan Alagappa University Karaikudi-630003
16	**Jayanthi. L**	The comparative study of some nonlinear optical single crystals grown by conventional and Sankaranarayanan-Ramasamy (SR) method	Dr. N. Prabavathi Sri Sarada College for Women Salem-636016
17	**Kesavamoorthi. R**	Synthesis and characterization of some ferrite single crystalline materials	Dr. C. Ramachandra Raja Government Arts College (A) Kumbakonam-612002

18	**Kalaivanan. R**	Synthesis, growth and characterization of BNA & KDP single crystals from solutions with different chemical environments for NLO application	Prof. K. Srinivasan Bharathiar University Coimbatore-641046
19	**Prabu. P**	Growth and characterization of some organic and semiorganic nonlinear optical crystals	Dr. C. Ramachandra Raja Government Arts College (A) Kumbakonam-612002
20	**Priyadharshini. A**	Growth and Characterization of Third Order Non-Linear optical single crystal	Dr. S. Kalainathan VIT, Vellore, Vellore-632014
21	**Raja. A**	Investigation on luminescence properties of lanthanide ions activated fluroperovskite phosphors crystals for radiation dosimetry and white LEDs	Dr. P. Ramasamy SSN RC, SSN Institutions Chennai-603110
22	**Ragu. R**	Third Order Investigations on Dilithium Succinate (DLis), Potassium Tri-Hydrogen Succinate (PTHS), Sodium Acid Phthalate and Anthracene single crystals for photonic device applications	Dr. S. Jerome Das Department of Physics Loyola College Chennai-600034
23	**Ravikumar. N**	Growth and characterization of borate single crystals with near-biological tissue equivalency for dosimetric applications	Dr. R. Arun Kumar PSG College of Technology Coimbatore-641004
24	**Saiadali Fathima. K**	Synthesis, Structure Elucidation and Characterization of New Heterocyclic Compounds for Biological Application	Dr. K. Anitha School of Physics, MK University, Madurai-625021
25	**Sampathkumar. P**	Crystal growth and investigation of TGS family single crystals for the fabrication of Pyroelectric Infrared detrectors	Prof. K. Srinivasan Bharathiar University Coimbatore-641046
26	**Satchidhanandha-m. P**	Synthesis, crystal growth and characterization of certain aminopyridine based organic nonlinear optical single crystals	Dr. S. Brahadeeswaran BIT-Anna University Tiruchirappalli-620024
27	**Sundaram. S**	Experimental and Theoretical Studies on hydrogen Bonded Liquid Crystals derived from Citric acid and Alkoxybenzoic acids	Dr. T. Senthil Erode Sengunthar College Erode-638057
28	**Singh. A.K**	Crystal growth and characterization of $Li_6R(BO_3)_3$:R (R: Rare Earth ions): Promising Neutron Detector	Dr. S. C. Gadkari Technical Physics Division BARC, Mumbai-400085
29	**Sivasubramani. V**	Synthesis, growth and physicochemical investigations on Pyridinium based single crystals for nonlinear optical (NLO) applications	Dr. Muthu Senthil Pandian SSN RC, SSN Institutions Chennai-603110
30	**Sonu Kumar**	Growth of Organic and Inorganic Single Crystals by Cz & Solution Techniques and their Structural, Electrical and Mechanical Characterization	Prof. Binay Kumar University of Delhi Delhi-110021
31	**Shiny Febena. S**	Investigations on NLO active glycine based single crystals: A DFT and spectroscopic approach	Dr. J. Madhavan Loyola College, Chennai
32	**Thairiyaraja. M**	Growth and characterization of organic and semiorganic single crystals	Dr. K. Selvaraju Govt. Arts College, Ariyalur
33	**Vandana**	Studies on preparation, characterization and properties of some rare earth containing manganite crystals	Prof. K.K. Bamzai University of Jammu Jammu-180006
34	**Vinodhini. K**	The effect of various crystallization processes on the control of Nucleation, Shape, Size and Single Crystalline Growth of Alpha-Lactose Monohydrate (α-LM) and its Polymorphism	Prof. K. Srinivasan Department of Physics Bharathiar University Coimbatore-641 046
35	**Vijayalakshmi. V**	Influence of Various Metal Ions on the Growth and Characterization of Glycine crystals and Their Nonlinear Optical and Biological Applications	Dr. P. Dhanasekaran Bharathiar University Arts and Science College, Erode
36	**Yasotha. P**	A study on growth and physicochemical characterization of single crystals of salts of potassium added with amino acids	Dr. R. Thiyagarajan Chikkainaiah Naicker College Erode-638316

CONFERENCE HIGHLIGHTS

XXII National Seminar on Crystal Growth and Applications (XXII NSCGA-2018) in association with Indian Association for Crystal Growth (IACG), 29-31 January 2018, Department of Physics, Sacred Heart College, Tirupattur-635601, Tamilnadu

The Department of Physics, Sacred Heart College (Autonomous), Tirupattur and Indian Association of crystal growth (IACG) jointly organized a three days conference on 22nd National seminar on Crystal Growth and Applications (NSCGA - XXII) funded by BRNS and SERB during 29th -31st January at Sacred Heart College, Tirupattur in view of the Golden jubilee celebration of Physics department. The **Prof. P. Ramasamy**, Chairman of Indian Association of crystal growth (IACG) inaugurated the workshop along with **Dr. P. K. Das**, Chairman of chemical science division, IISc, Bangalore, Dr. G. Bhagavannarayana, IIT Rk Valley, RGUKT-AP, Rev. Dr. C. Antony Raj, the rector of sacred heart college, Dr. A. Albert Irudayaraj, Head, department of Physics, **Dr. S.A Martin Britto Dhas**, the convener and the co-conveners **Dr. M. Jose** and **Dr. Muthu Senthil Pandian**. During the inauguration Dr. M. Jose, Dean of Research, Sacred Heart College, announced the release of 22nd NSCGA Proceeding followed by ICGA Newsletter and Photoacoustic Spectrometer (PAS) Manual. All the dignitaries' on the dais received a copy each. After the inaugural function Prof. P. Ramasamy, IACG Chairman, Research Dean, SSN college, cehnnai, delivered a plenary lecture on Silicon crystal growth and solar cell applications and Prof. P.K. Das delivered second plenary lecture on Second order nonlinear optical properties of noble metal nanoparticles at carreno hall.

The valedictory function held at Carreno Hall, Prof. P. Ramasamy, Rev. Dr. D. Antony Raj, Principal, Sacred Heart Colleg, Rev. Dr. K.A. Maria Arockiaraj, Dr. K. Srinivasan, Head, Dept. of Physics, Bharathidasan University, Trichy, Rev. Dr. G. Theophil Anand, Dr. Martin Britto Dhas, Convener NSCGA-22, Dr. Jose, Co-Convener NSCGA-22, Dr. Muthu Senthil Pandiyan Co-Convener and Editor of IACG newsletter and Mr. C. Thirupathy, UG Head, Shift 2, Sacred Heart college were been presented of the valedictory function. Awards were given for 10 best oral presentations, 10 best poster presentations, 3 best thesis presentations and 4 best crystal displays. Dr. Martin Britto Dhas, Convener NSCGA-22, gave the vote thanks by thanking all the people who involved in successful completion of the seminar. A total of 250 researchers from 120 institutions including seven different states of the country participated in the seminar.

Dr. S. A. Martin Britto Dhas, Assistant Professor
Department of Physics, Sacred Heart College, Tirupattur-635601, Tamilnadu

International Workshop of Materials Technology and Applications (IWMTA-2018), 11-12 October 2018

Centre for Crystal Growth, VIT University, Vellore-632014, Tamilnadu

Centre for Crystal Growth, VIT, Vellore, Tamil Nadu organizes a Two Day Workshop entitled "International Workshop of Materials Technology and Applications (IWMTA-2018) from 11th and 12th October 2018. As a chairman of this workshop, **Dr. S. Kalainathan** deeply touches by the collective efforts with their colleagues in organizing a mega scientific event in which about 150 papers including Poster and Invited talks was presented. There are 10 International invited talks and 5 national invited talks participated in this workshop. Around 250 participants from various places participated in this workshop. The scientific deliberations at the workshop is covered a wide range of topics in Crystal Growth, thin films and nano particles. Accepted contributory abstracts are presented as poster presentation. The workshop covered various aspects of crystal growth and also focused on the synthesis and characterization to a great extent. As the crystal growth is an interdisciplinary subject of research, it was conducted with the aim of making this workshop as a common platform for the research scholars and the students working in different areas of research to meet and discuss on the recent trends in the various advanced fields of research.

The participants interacted enthusiastically with advisory members and raised intellectual questions which is used to found the way to more interesting and fruitful outcomes to the participants. The two day lectures gave idea to explore the materials for possible applications, thrust areas of ongoing science and technology research, production of highly efficient new materials to accelerate multidimensional applications. Definitely, this workshop will make the students, research scholars and participants move forward towards effective scientific research and make them to be innovators, producers of new innovations for benefits of the world and modern society. Speaking on the occasion, **Dr. S. Kalainathan** delivered his vote of thanks to invited speakers for their whole hearted support and contribution, participants, research scholars and student of this department. He highlighted and mentioned that the participants are privileged to have attended the well structured training workshop with the best faculty. He believes that outcome of the workshop should reflect in the scientific output of the organizations and institutions from where the participants came, in the coming years. Finally, the participation and poster presentation certificates was distributed to all the participants of the workshop.

Prof. S. Kalainathan, Director

Centre for Crystal Growth, VIT University, Vellore-632014, Tamilnadu

International Conference on Emerging Materials and Modelling (ICEMM-2019) in association with Indian Science and Technology Association (ISTA), 7-9 January 2019, Department of Physics, KSR College of Arts & Science, Tiruchengode-637215, Tamilnadu

The International Conference on Emerging Materials and Modelling (ICEMM - 2019) was organized by K.S. Rangasamy College of Arts and Science (Autonomous), Tiruchengode-637215, Namakkal District, Tamil Nadu in association with Indian Science and Technology Association (ISTA) and Elavenil Organization, Chennai during 7-9 January 2019 at KSR Campus. The theme of the conference was focused on the latest developments in materials research and their technological applications. **Prof. R. Jayavel**, President, ISTA, Chennai was the conference chair of ICEMM 2019 with **Dr. M. Venkatesh** and **Dr. G. Suresh Kumar** as the conveners and **Dr. M. Srinivasan**, President, Elavenil Organization, Chennai and **Dr. N. Karunagaran**, SRM Institute of Science and Technology, Chennai as the organizing secretaries. The conference was felicitated by Dr. V. Radhakrishnan, K.S. Rangasamy College of Arts and Science and inaugurated by Prof. P. Kolandaivel, Vice Chancellor, Periyar University with his inspirational inaugural address. Mr. R. Srinivasan, Vice Chairman, KSR Educational Institutions unveiled the abstract book of the conference. Key note address was given by Dr. Kentaro TASHIRO, NIMS, Japan and Prof. Jiban Podder, Bangladesh University, Bangladesh.

Totally 150 abstracts were received from all over globe working on materials science and related fields. Around 350 participants from all over the country attended the conference. There were 20 invited talks was given by eminent scientist coming from across the globe as well as throughout the country. ICEMM-2019 conference series has taken the chances to provide a common platform to scientific experts from various countries of academic and industry. The scientific mission of this conference was offered a great platform to the research scholars from various disciplines to come together, present their recent finding and develop professional skills and links pointed at collaborative research. Many novel and innovative ideas to reform the field of Material science and its applications were evolved The students participated from various education and research institutes interacted with the experts working in the areas of crystal growth, thin films and material science and enriched their knowledge in these areas. The seminar as a whole motivated and guided the participants to carry out their research in their respective fields and to produce many novel results. Thus the ICEMM-2019 successfully ended by fulfilling the aim for which the seminar was organized.

Dr. M. Venkatesh, Head
Department of Physics, KSR College of Arts and Science, Tiruchengode-637215, Tamilnadu

International Conference on Recent Advances in Materials (ICRAM-2018), Sponsored by UGC and TNSCST

22-23 March 2018, PG and Research Department of Physics,
National College (Autonomous), Tiruchirappalli-620001, Tamilnadu

The UGC and TNSCST sponsored International Conference on Recent Advances in Materials, organized by PG & Research Department of Physics during 22-23 March 2018. **Dr. M. LAKSHMANAN**, Bharathidasan University, Tiruchirappali inaugurated the conference. In his address he highlighted the importance of quality research and encouraged the youngsters to take up research in basic sciences. He introduced new materials and its important applications. **Dr.R.R.SUMATHI**, Ludwig-Maximillan University, Germany delivered the Keynote address on smart materials and sensors. Dr. S.Pari, Head of the department, delivered the welcome address; Principal Dr.R.SUNDARARAMAN delivered the presidential address, Secretary Shri. K.RAGHUNATHAN released the Book of Abstracts. **Dr. E. MANIKANDAN**, Thiruvalluvar University offered felicitations. **Dr.A.T.RAVICHANDRAN**, Convener of the Conference explained the Theme of the Conference. Dr.T.V.SUNDAR proposed the Vote of Thanks.

In this conference, scientists and researchers from various countries delivered invited talks. **Dr.R. R. Sumathi,** Ludwig-Maximilians-University. **Dr.A. Pandikumar,** Scientist, CSIR-CECRI, Karaikudi. **Dr.M. Kumaresavanji,** University of Porta, Portugal. **Dr.T. Arun,** University of Chile, Chile. **Dr.S. Nagamuthu,** University of Ulsan, Republic of Korea. **Dr.S.Tamil Selvan,** Myongji University, Republic of Korea. **Dr.J.Ramkumar,** University of Concepcion delivered invited talks and interacted with the participants.

The Valedictory function was held on 23/03/2018 at College Auditorium. Dr. S.RAVI Associate Professor of Physics, delivered the welcome address. **Dr.R.CHANDRAMOHAN**, Principal, Sree Sevugan Annamalai College delivered the Valedictory address, Principal Dr.R.SUNDARARAMAN, delivered the presidential address. **DR.TAMILSELVAN SUBRAMANIAN,** Myongji University, Republic of Korea offered felicitations and distributed the best presentations awards. **Dr.A.T.RAVICHANDRAN**, Convener of the Conference delivered the report of the conference and proposed the Vote of Thanks. 125 research articles were discussed in the two days conference. More than 150 Scientists, Research Scholars and Students from 36 colleges participated in this conference and best presentation awards were given to best oral and poster presentations.

Dr. A. T. Ravichandran, Vice Principal & Associate Professor
Department of Physics, National College (Autonomous), Tiruchirappalli-620001, Tamilnadu

CRYSTAL GROWTH PROJECTS-2018

PI: Dr. Anil Kottantharayil, Professor
Department of Electrical Engineering, IIT Bombay
Mumbai-400 076, Maharastra
Phone : +91-022-25767438; anilkg@ee.iitb.ac.in

Collaborator: Dr. Martin Bellmann, Senior Department of Solar Cell, Silicon SINTEF Materials Technology,
Alfred Getz vei 2b–7465 Trondheim, Norway

Project Title : Czochralski Growth of Low Oxygen Silicon Single Crystals for High-efficiency solar cell Applications

Funding Agency : DST (Indo-Norway) **Year :** 2018-2021
Amount : Rs. 75.0 lakhs

PI: Dr. K. Boopathi, DST INSPIRE Faculty
Department of Inorganic Chemistry
School of Chemical Sciences, University of Madras
Guindy Campus, Chennai-600025, Tamilnadu
Phone: +91-9940714175 Email: boopathi.chemist@gmail.com

Project Title : Supramolecular Architecture and tuning of the NLO properties of metal-organic single crystals for nonlinear optical device applications

Funding Agency : DST **Year :** 2018-2022
Amount : Rs. 40.0 lakhs

PI: Dr. S. K. Das, Associate Professor
Department of Physics
Kalinga Institute of Industrial Technology (KIIT) University
Bhubaneswar-751024, Odisha
Phone : +91-9658039777 Email: skdasfpy@kiit.ac.in

Project Title : Realization of cost effective second harmonic generation frequency resolved optical gating (SHG-FROG) using crystalline and nano materials for diagnostics of ultrafast laser pulses in broad wavelength range of 400-2200 nm

Funding Agency : SERB **Year :** 2018-2020
Amount : Rs. 10.2 lakhs

CRYSTAL GROWTH PROJECTS-2018

PI: Dr. Muthu Senthil Pandian, Research Scientist
Department of Physics & SSN Research Centre
SSN Institutions, Chennai-603110, Tamilnadu
Phone: +91-9944294169
Email: senthilpandianm@ssn.edu.in

Project Title : Device quality and bulk size high performance thermoelectric silver bismuth sulfide ($AgBiS_2$) and silver bismuth selenide ($AgBiSe_2$) single crystals for thermoelectric (TE) applications

Funding Agency : SERB **Year :** 2019-2021
Amount : Rs. 37.0 lakhs

PI: Dr. K. Sangeetha, Assistant Professor
Department of Physics, School of Electrical and Electronics Engineering, SASTRA Deemed University
Tirumalaisamudram, Thanjavur-613401, Tamilnadu
Phone : +91-9894041778
Email: sangeetha.bdu.physics@gmail.com

Project Title : Investigations on nonlinear optical properties of 4-methoxybenzylamine metal complexes

Funding Agency : SERB **Year :** 2018-2021
Amount : Rs. 20.2 lakhs

PI: Dr. K. Sethuraman, Assistant Professor
School of Physics, Madurai Kamaraj University
Madurai-625021, Tamilnadu
Phone : +91-9445252309 Email: sethuraman_33@yahoo.com

Co-PI: Dr. K. Anitha, Assistant Professor
School of Physics, Madurai Kamaraj University
Madurai-625021, Tamilnadu
Phone : +91-9965956516
Email: anitha.physics@mkuniversity.org

Project Title : Growth of pure and doped organic single crystals for scintillator applications

Funding Agency : BRNS **Year :** 2018-2021
Amount : Rs. 34.6 lakhs

INDIAN ASSOCIATION FOR CRYSTAL GROWTH

Centre for Crystal Growth, SSN Institutions
Chennai-603110, Tamilnadu, INDIA
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Email: iacgind@gmail.com
Website: http://www.ia-cg.com/

IACG "PROF.P.RAMASAMY NATIONAL AWARD FOR CRYSTAL GROWTH"

Norms for the Award

1. Any Indian Scientist who has contributed to the field of crystal growth is eligible for the award.
2. Any foreign scientist who has contributed to the development of crystal growth activities in India is eligible for the award.
3. Individual or Institution/Laboratory can be considered for the award.
4. Preference will be given to the crystal growth research carried out in India.
5. The research works carried out in the preceding five years of the year of award to be considered primarily for the award.
6. There is no age limit.
7. Self nomination/Nomination by the member of IACG/Nomination by an Institution can be accepted.
8. Scientist/Institution awarded once will be eligible for this award again only after five years from the date of previous award.
9. Award will be given once in two years, initially. Any more donation from any donor under same title is to be additive to the sum already donated and the award can be given annually.
10. The President, IACG may take the advice of the committee constituted by him for the purpose of selecting suitable awardee (s) and the decision of the President will be final.

Recipients of Indian Association for Crystal Growth (IACG) "Prof. P. RAMASAMY National Award for Crystal Growth"

Year	Name of the Recipients and Institutional Details
2000	**Dr. P. Santhana Raghavan**, *Managing Director,* GT Solar Corporation Limited, USA **Dr. G. Dhanaraj**, *Scientist,* Department of Materials Sciences and Engineering, Stony Brook University, USA
2002	**Prof. R. Dhanasekaran**, *Emeritus Professor,* Crystal Growth Centre, Anna University, Chennai
2003	**Prof. M. Ichimura**, *Head,* Dept. of Electrical & Electronic Engg, Nagoya Institute of Technology, Japan
2004	**Prof. K. Sankaranarayanan**, *Professor*, Department of Physics, Alagappa University, Karaikudi
2005	**Dr. R. Gopalakrishnan**, Crystal Research Laboratory, Department of Physics, Anna University, Chennai
2006	**Prof. C. K. Mahadevan**, Physics Research Centre, Department of Physics, S.T. Hindu College, Nagercoil
2007	**Dr. N. Vijayan**, *Scientist*, X-ray analysis & Crystal Growth Section, National Physical Laboratory, New Delhi
2008	**Prof. S. Moorthy Babu**, *Director*, Centre for Nanoscience and Technology, Anna University, Chennai
2009	**Prof. K. Ramamurthi**, *Professor & Head*, Department of Physics, Bharathidasan University, Tiruchirappalli **Dr. S. Ganesamoorthy**, *Scientific Officer-F*, LMDDD, RRCAT, Indore, Madhya Pradesh (M.P.)
2010	**Prof. G. Bhagavannarayana**, *Chief Scientist & Head,* Crystal Growth & X-ray Section, NPL, New Delhi **Prof. S. Kalainathan**, *Director,* Centre for Crystal Growth, VIT University, Vellore
2012	**Dr. S. C. Gadkari**, *Outstanding Scientist and Head,* Crystal Technology Section, TPD, BARC, Mumbai
2015	**Prof. K. Byrappa**, *Vice-Chancellor,* Mangalore University, Karnataka **Dr. A. K. Karnal**, *Scientific Officer-G, Crystal Growth Section,* LMDDD, RRCAT, Indore, Madhya Pradesh
2017	**Prof. Suja Elizabeth**, *Principal Research Scientist*, Crystal Growth Section, IISc, Bangalore, Karnataka

SOME OF THE CRYSTAL GROWTH RESEARCH GROUPS

Dr. K.K. Bamzai and his Ph.D. students in Department of Physics, University of Jammu, Jammu Tawi-180006, Jammu

Dr. Rajni Kant and his Ph.D. Scholars in Department of Physics, University of Jammu, Jammu Tawi-180006, Jammu

Dr. S.C. Gadkari and his team in the Crystal Technology Section (TDT), Technical Physics Division, BARC, Mumbai-400085, Maharastra

Dr. G. Vinitha and her Ph.D. students in Department of Physics, School of Advanced Sciences, VIT, Chennai-600127, Tamilnadu

Dr. S. K. Das and his Ph.D. scholars at the Department of Physics, KIIT University, Bhubaneswar-751024, Odisha

Dr. Mihir. J. Joshi and his Crystal Growth Group in Department of Physics, Saurashtra University, Rajkot-360005, Gujarat

INTERNATIONAL POST DOCTORAL FELLOWSHIP OPPORTUNITIES

1. **Commonwealth Rutherford Fellowship** - Up to 50 fellowships is available for highly-skilled Commonwealth citizens who are doing one- to two-year postdocs the UK. http://cscuk.dfid.gov.uk/apply/rutherford-fellowships/
   **** Call opens during August of every year***
2. **Schmidt Science Fellowship** - Applicants are nominated by their PhD institution to complete 11-month postdocs in the natural sciences, engineering, math and computing in the US or UK. https://schmidtsciencefellows.org/
   **** Call opens during August of every year***
3. **The Gen Foundation**- The Gen Foundation provides grants of £500-£5,000 to applicants from any country studying natural sciences, particularly good sciences/technology in any country. http://www.genfoundation.org.uk/index.html
   **** Call opens during January of every year***
4. **The Newton International Fellowship**- The Newton Fund aims to support the best postdoc researchers from around the world by providing funding for them to work at a UK research institution for two years.
   http://www.newtonfellowships.org/the-fellowships/
   **** Call opens between October – March of every year***
5. **Fulbright-Nehru Postdoctoral Research Fellowship -**These fellowships are designed for Indian faculty and researchers who are in the early stages of their research careers in India.
   http://www.usief.org.in/Fulbright-Nehru-Postdoctoral-Research-Fellowship.aspx
   **** Call opens during January of every year***
6. **IVADO Postdoctoral Scholarship Program**- This program supports researchers from all over the world who are coming to Canada for postdoctoral work.
   https://ivado.ca/en/ivado-scholarships/postdoctoral-scholarships
   **** Call opens twice a year (July and January)***
7. **TWAS-CONACYT Postdoctoral Fellowship**- A fellowship that enables students from developing countries to work at a Mexican institution for up to three years, are hosted in Brazil, India, Malaysia, Pakistan and Thailand.
   https://twas.org/opportunities/fellowships/postdoc
   **** Call opens twice a year (August and March)***
8. **FAPESP Postdoctoral Fellowship** - This fellowship provides two years of funding to researchers of any nationality working at a Brazilian institution in the state of São Paolo. http://www.fapesp.br/en/5427
   **** Accepts application throughout the year***
9. **TWAS-CNPq Postdoctoral Fellowship**- A fellowship that enables students from developing countries (other than Brazil) to pursue postdoctoral work in the natural sciences in Brazil.
   https://twas.org/opportunity/twas-cnpq-postdoctoral-fellowship-programme
   **** Call opens during September of every year***
10. **German Academic Exchange Service (DAAD)**- DAAD is the world's largest funding body for international exchange. They provide scholarships for international postdocs coming to Germany. https://www.daad.de/en/
    **** Call opens twice a year (July and January)***

11. **Alexander von Humboldt Foundation**- Students who have completed their doctorate in the last four years are eligible to apply to carry out up to two years. https://www.humboldt-foundation.de/web/humboldt-fellowship-postdoc.html
12. **Marie Sklodowska-Curie European Fellowship**- Junior researchers of any nationality can apply for funding to carry out a research project for 1-2 years. https://ec.europa.eu/research/mariecurieactions/actions/individual-fellowships_en
13. **Swiss Government Excellence Scholarship for Foreign Scholars**- These scholarships are awarded to researchers in any discipline planning to come to Switzerland for postdoc work. https://www.sbfi.admin.ch/sbfi/en/home/bildung/scholarships-and-grants/swiss-government-excellence-scholarships-for-foreign-scholars-an.html#-1994108998
    * ***Call opens during August of every year***
14. **Emmy Noether Programme**- This programme is for postdocs with at least two years of previous experience. Successful applicants will lead a junior research group in Germany for six years. http://www.dfg.de/en/research_funding/programmes/individual/emmy_noether
    * ***Accepts application throughout the year***
15. **The Government of Ireland Postdoctoral Fellowship**- This program allows highly qualified applicants from any discipline to pursue a postdoc in Ireland http://research.ie/funding/goipd/
    * ***Call opens during August of every year***
16. **Innovation Research Incentives Scheme Veni**- This grant from the Netherlands Organisation for Scientific Research is aimed at researchers have recently earned their PhD. It provides three years of funding for researchers from all fields https://www.nwo.nl/en/funding/our-funding-instruments/nwo/innovational-research-incentives-scheme/veni/index.html
    * ***Call opens during January of every year***
17. **Japan Society for the Promotion of Science- JSPS** offer five different postdoc programs to bring researchers from all disciplines to Japan. https://www.jsps.go.jp/english/e-fellow/
    * ***Call opens between April and July of every year***
18. **J. N. Tata Endowment**- This is a one-time loan scholarship of Rs. 1,000,000-10,000,000 to Indian students at the start of their full-time postdoc. http://www.jntataendowment.org/loan-scholarship-process
    * ***Call opens during January of every year***
19. **Türkiye Research Fellowship Program**- This research fellowship is open to international researchers working on collaborative research projects in Turkey. https://www.turkiyeburslari.gov.tr/en/arastirma-burs-programi-basvurulari-yil-boyu-acik/
    * ***Call opens four times every year***
20. **Discovery Early Career Researcher Award**- Awarded by the Australian Research Council, this scheme provides funding for upto 200 researchers each year. https://www.arc.gov.au/grants/discovery-program/discovery-early-career-researcher-award-decra
    * ***Call opens during January of every year***

GOVERNMENT FUNDING FOR EXTERNAL PROJECTS

1. **BRNS**- Regular Research Project (RP) (https://brns.res.in)
2. **BRNS**- Young Scientist's Research Award (YSRA) (https://brns.res.in)
3. **CSIR**- Research Grants (http://csirhrdg.res.in/resg/Res_grants.htm)
4. **DST**- Women Scientist Scheme- A (WOS-A) (www. online-wosa.gov.in)
5. **DST**- Women Scientist Scheme- B (WOS-B) /Societal Research Fellowship (SoRF) (www.dst.gov.in/scientific-programmes/scientific-engineering-research/women-scientists-programs)
6. **DST**- Women Scientist Scheme- C (WOS-C) (www.dst.gov.in/scientific-programmes/scientific-engineering-research/women-scientists-programs)
7. **DST**- Scheme for Young Scientists and Technologists (www.dst.gov.in/callforproposals/call-proposals-scheme-young-scientists-and-technologists)
8. **DST**- INSPIRE FACULTY Scheme (www.inspire-dst.gov.in)
9. **DST**- Science for Equity, Empowerment & Development (SEED) Division (http://www.scienceandsociety-dst.org/Aboutscheme.htm)
10. **DST**- International Science & Technology co-operation (Indo-French, Indo-US, Indo-German, Indo-China, Indo-Norway) (http://www.dst.gov.in/international-st-cooperation)
11. **DST**- Oriented Research & Technology Development Proposals on Materials for Energy Storage (MES) (http://www.dst.gov.in/)
12. **DST**- Water Technology Initiative (WTI-2017) for Water Technology Research and Innovation Centres (WATER-IC) (http://www.dst.gov.in/)
13. **DST**- **FIST** Program (www.fist-dst.org)
14. **DST**- Partnership for International Research and Education (PIRE) (https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12819)
15. **DSIR**- Technology Development and Utilization Programme for Women (TDUPW) (www.dsir.gov.in)
16. **DRDO**- Extramural Research Grant (http://www.drdo.gov.in)
17. **ISRO**- Submission of Research proposal (http://isro.gov.in/sponsored-research-respond/submission-of-research-proposal)
18. **IUAC** – Summer Projects for Materials Characterization (http://www.iuac.res.in/)
19. **MNRE**- Ministry of New and Renewable Energy (http://mnre.gov.in/schemes/solar-rd-projects/)
20. **NRB**- Naval Research Board (nrbdrdo.res.in)
21. **SERB**- Core Research Grant (CRG) (http://www.serb.gov.in/emr.php)
22. **SERB**- Early Career Research (ECR) Award (http://serbonline.in/SERB/ecr?HomePage=New)
23. **SERB**- High Risk High Reward (http://www.serb.gov.in/hrhrr.php)
24. **SERB**- Women Excellence Award (www.serb.gov.in/women.php)
25. **SERB**- Empowerment and Equity Opportunities for Excellence in Science for SC/ST Faculties (http://www.serb.gov.in/emeq.php)
26. **SERB**- Industry relevant Research and Development (http://serbonline.in/SERB/IRR?HomePage=New)
27. **SERB** - Impacting Research Innovation and Technology (IMPRINT)
28. **TNSCST**- Science & Technology Projects (http://www.tanscst.nic.in/stp.html)
29. **UGC**- Start-up Grant for Young Scientist (www.ugcfrps.ac.in)
30. **UGC**- Major and Minor Research Projects (www.ugcfrp.ac.in)
31. **UGC**- Mid-Career Award (www.ugcfrps.ac.in)
32. **UGC**- BSR Faculty Fellowships (www.ugcfrps.ac.in)
33. **UGC-DAE CSR** (http://www.csr.res.in/csr_indore_collaborative_research.html)

NATIONAL FELLOWSHIP OPPORTUNITIES

1. **CSIR** - Senior Research Fellowship and RA (http://www.csirhrdg.res.in/jrfsrfra2.htm)
2. **CSIR** - Nehru Science Post Doctoral Research Fellowship (http://www.csirhrdg.res.in/npdf.htm)
3. **DAE** - Dr. K. S. Krishnan Research Associateship (KSKRA) (http://www.barc.ernet.in/)
4. **DST** - Ramanujan Fellowships (http://www.dst.gov.in/scientific-programme/nsti/ramanujanfellowship.pdf)
5. **DST** - JC Bose National Fellowships (http://www.dst.gov.in/scientific-programme/nsti/jc bosefellowship.pdf)
6. **DST**- Science, Technology & Innovation Policy Fellowship Programme (http://dst.gov.in/news/announcement-dst-science-technology-and-innovation-policy-fellowships)
7. **DST**-Bhaskara Advanced Solar Energy Fellowship Programme (http://indousstf.org/base-program/index.html)
8. **INSA** - Science Academies Summer Research Fellowship (http://www.insaindia.res.in/)
9. **INSA** - Visiting Fellowship (http://www.insaindia.res.in/)
10. **INSA**- Indo-Australia Early and Mid-Career Researchers (EMCR) Fellowship Programme (http://www.insaindia.res.in/)
11. **JNMF** - Jawaharlal Nehru Memorial fellowship (http://www.jnmf.in/fabout.html)
12. **JNCASR** - Summer Research Fellowship Programme (http://www.jncasr.ac.in/fe/srfp.php)
13. **Lady Tata Memorial Trust** - Junior Scholarship and Post Doctoral Fellowship (PDF) (https://www.ladytatatrust.org/StaticPageIndia/Awards/7)
14. **MNRE** - National Solar Science Fellowship Programme (NSSFP) (www.mnre.gov.in)
15. **Raman Charpak Fellowship** (http://www.inde.campusfrance.org/en/news/charpak-scholarship-awardees-20132014)
16. **SERB** - Distinguished Fellowship (http://www.serb.gov.in/sdf.php)
17. **SERB** - Women Excellence Award (http://www.serb.gov.in/wea.php)
18. **SERB** - Overseas Post Doctoral Fellowship (http://www.serb.gov.in/opf.php)
19. **SERB** - National Post Doctoral Fellowship (http://www.serb.gov.in/npdf.php)
20. **SERB** - Indo - US Fellowship Program (http://serbonline.in/SERB/indous?HomePage=New)
21. **SERB** - SN Bose Scholar Program (http://serbonline.in/SERB/snbose?HomePage=New)
22. **SERB** - Graduate Student Exchange Programme (http://serbonline.in/SERB/gsep?HomePage=New)
23. **SERB** - Prime Minister's Fellowship Scheme for Doctoral Research (http://primeministerfellowshipscheme.in/Home.aspx)
24. **SERC** – Swarnajayanti Fellowships (http://www.dst.gov.in/scientific-programmes/scientific-engineering-research)
25. **TNSCST** - Young Scientist Fellowship Scheme (http://www.tanscst.nic.in/ysf.html)
26. **TIFR** - ICTS - Simons Post Doctoral Fellowship (PDF) (https://www.icts.res.in/opportunities/simons-pdf-sept-2016)
27. **UGC** -Post Doctoral Fellowship for Women Candidates (http://www.ugc.ac.in/pdfw/)
28. **UGC** -Post Doctoral Fellowship for SC/ST candidates (http://www.ugc.ac.in/pdfss/)
29. **UGC** - Rajiv Gandhi National Fellowship (RGNF) for SC/ST candidates (http://www.ugc.ac.in/rgnf/)
30. **UGC** - Dr. S. Kothari Post Doctoral Fellowship (http://www.ugc.ac.in/)
31. **UGC** - Raman Fellowship for Post Doctoral Research for Indian Scholars in USA (http://www.ugc.ac.in/ramanpdf/)
32. **UGC** - Maulana Azad National Fellowship for Minority Students (http://www.ugc.ac.in/)

CRYSTAL GROWTH (CG) RELATED JOURNALS WITH THOMSON REUTERS IMPACT FACTOR – JANUARY 2019

Journal Name	IF
Applied Surface Science	4.4
Applied Physics A : Materials Science and Processing	1.6
Arabian Journal of Chemistry	2.9
Bulletin of Materials Science	0.8
Chinese Science Bulletin	4.0
Chemical Physics Letters	1.8
Crystal Growth and Design	3.9
Crystal Engineering Communication	3.3
Crystal Research and Technology	1.0
Current Applied Physics	2.0
Ferroelectrics	0.7
Japanese Journal of Applied Physics	1.4
Journal of Crystal Growth	1.7
Journal of Applied Crystallography	2.5
Journal of Alloys and Compounds	3.7
Journal of Physics and Chemistry of Solids	2.0
Journal of Solid State Chemistry	2.1
Journal of Physics: Condensed Matter	2.6
Journal of Materials Chemistry	9.9
Journal of Materials Science and Technology	3.6
Journal of Materials Science: Materials in Electronics	2.0

Journal Name	IF
Journal of Thermal Analysis and Calorimetry	2.0
Materials Letters	2.6
Materials Chemistry and Physics	2.2
Materials Research and Bulletin	2.8
Materials Characterizations	2.8
New Journal of Chemistry	3.2
Optical Materials	2.0
Optics Communications	1.8
Optics and Laser Technology	2.5
Optik- International Journal for Light and Electron Optics	1.1
Progress in Crystal Growth and Characterization of Materials	3.1
Physica B:Condensed Matter	1.4
RSC Advances	2.9
Results in Physics	2.1
Science of Advanced Materials	4.1
Solid State Communications	1.4
Solid State Science	1.8
Spectrochimica Acta Part A: Molecular and Biomolecular Spectro.	2.0
Surface Science Letters	2.0
Synthetic Metals	2.5
The European Physical Journal of Applied Physics	0.6

PAST CONFERENCES/SEMINARS/WORKSHOPS

Prof. P. K. Das receiving Memento from **Prof. P. Ramasamy** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. S. A. Martin Britto Dhas in the Inaugural Function of XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. V.N. Mani receiving Memento from **Prof. P. Ramasamy** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Prof. C. K. Mahadevan receiving Memento from **Prof. G. Ravi** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Prof. I. Hubert Joe receiving Memento from **Prof. S.P. Meenakshisundaram** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. P. Murugakoothan delivering Invited Lecture in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Prof. P. Ramasamy receiving Memento from **Dr. S.A. Martin Britto Dhas** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. K. Sethuraman delivering Invited Lecture in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. S.C. Gadkari, TPD, BARC, Mumbai delivering Invited Lecture in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College, Tirupattur during 29-31 January 2018

Dr. R. Arun Kumar receiving Memento from **Prof. P. Ramasamy** and **Prof. G. Bhagavannarayana** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Prof. Narayana Kalkura delivering Valedictory address in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. N. Balamurugan receiving Memento from **Prof. P. Ramasamy** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Dr. N. Vijayan, CSIR-NPL, New Delhi addressing the audience during the Special Seminar Arranged by Department of Science and Humanities, Kumaraguru College of Technology, Coimbatore on 10th October 2018

Dr. P. Selvapandiyan handing over the Memento to **Prof. S. Sittaraman** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. Binay Kumar addressing the audience in the NCPFAM-2018 held at Department of Physics, SSN Institutions, Chennai during 1-2 March 2018

Prof. R. Jayavel receiving Memento from the organizers in the ICEMM-2019 held at Department of Physics, KSR College of Arts and Science, Namakkal during 7-9 January 2019

Dr. N. Balamurugan receiving Memento from **Dr. S. Mugundan** in the ICRTMST-2018 held at Department of Physics, Sri Vijay Vidyalaya College of Arts and Science, Dharmapuri during 8-9th September 2018

Prof. A. Poiyamozhi receiving Memento from **Dr. T. Elangovan** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. R. Ramesh Babu delivered Invited Lecture in the NCMSD-2019 organised by Department of Chemistry, Ramco Institute of Technology, Rajapalayam during 11-12 January 2019

Dr. N. Vijayan was honoured during INSPIRE camp which was organized by Department of Physics, REVA University, Bangalore, Karnataka during 21st December 2018

Dr. Rita John receiving Memento from **Prof. V. Krishna Kumar** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. K. K. Maurya receiving shawl and Bouquet from **Dr. S. M. Kennedy** in the NCPFAM-2018 held at Department of Physics, SSN Institutions, Chennai during 1-2 March 2018

Prof. P. Aruli receiving Memento from **Prof. P. Ramasamy** and **Prof. P. Kulandaivel** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. Muthu Senthil Pandian receiving Memento from the organizer in the ICRTMST-2018 held at Department of Physics, Sri Vijay Vidyalaya College of Arts and Science during 8-9th September 2018

Dr. K. K. Bamzai receiving Memento from the student for his Invited Lecture in the 12th Science Internship Camp held at Department of Physics, Shri Mata Vaishno Devi University during July 09 - 13, 2018

Prof. G. Bhagavannarayana in the Valedictory Function of RACE-2018 organized by **Dr. K. Ramachandra Rao** held at Department of Physics, Government Arts and Science College, Rajamundry, A.P. on 27 December 2018

The release of abstract book by **Dr. P. Rajesh** and **Dr. V. P. Mahadevan Pillai** in the REDEEMS-2018 held at Department of Physics, Sara Thakkar College, Tirunelveli on 15 January 2018

Prof. S. P. Meenakshisundaram receiving Memento from the organizers in the ICMTCS-2018 held at Department of Chemistry, SRM University, Chennai during 27-29 December 2018

Dr. K. Ramachandra Rao receiving Memento from the from organizer in the NSRACGT-2018 held at Department of Physics, Jawaharlal Nehru Technological University- Hyderabad on 5 November 2018

Dr. M. Srinivasan, SSN Research Centre receiving Memento from **Dr. J. Kalyana Sundar** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. S. P. Meenakshisundaram receiving Memento from the organizers in the ICMAM-2018 held at Department of Physics, Kamla Nehru Mahavidyalaya, Nagpur during 5-7 October 2018

Dr. G. Vinitha, Associate Professor, VIT Chennai delivering Invited Lecture in the NCNP-2018 held at Department of Physics, PSGR Krishnammal College for Women, Coimbatore during 16 October 2018

Dr. Radha Perumal Ramasamy delivering Invited Lecture in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. P. Selvarajan delivering Invited Lecture in the NSETP-2018 held at Department of Physics, Sadakathullah Appa College, Tirunelveli during 10-11 January 2019

Dr. S. Jerome Das, Loyola College receiving Memento from the organizers in the NCRTPM-2018 held at Department of Physics, Pachaiyappa's College, Chennai during 9-10 February 2018

Dr. K. Tirupugalmani receiving Memento from **Dr. S. Mugundan** in the ICRTMST-2018 held at Department of Physics, Sri Vijay Vidyalaya College of Arts and Science, Dharmapuri during 8-9th September 2018

Dr. K. Srinivasan delivering
Invited Lecture
in the ICRTAST-2018 held at
Department of Physics, Periyar University,
Salem during 23-25 August 2018

Dr. N. Vijayan receiving Memento from
Dr. A.V. Arunakumari, Principal in the NSRTMS-2018
held at Department of Physics, Theivanai Ammal
College for Women, Villupuram on
2 February 2018

Dr. K. Sethuraman receiving Memento from
the organizer in the ICAMA-2018 held at PG & Research
Department of Physics, Thanthai Hans Rover College,
Perambalur, Trichy during
13-14 August 2018

Prof. S. P. Meenakshisundaram receiving
Memento in the CMPA-2018 held at
Department of Physics, Manipal Institute of Technology,
Manipal during
10-11 September 2018

Prof. Venkatachalam, Principal, Annai College, Harur
honored **Dr. M. Selvapandiyan**, Department of Physics,
Periyar University PG Extension Centre, Dharmapuri in
National Level Seminar on Material Science
held on 6 July 2018

The release of Abstract Book in the ICMAST-2018
organized by **Dr. K. Gnanamoorthi** held at PG and
Research Department of Physics, Pachamuthu College of
Arts and Science For Women, Dharmapuri
during 27-28 August 2018

Dr. M. Arivanandhan receiving Memento from **Prof. P. Ramasamy** in the NCPFAM-2018 held at Department of Physics, SSN Institutions, Chennai during 1-2 March 2018

Prof. M. Karthikeyan, Principal, KSR College of Arts and Science felicitating **Dr. M. Srinivasan** in the ICEMM-2019 held at Department of Physics, KSR College of Arts and Science, Namakkal during 7-9 January 2019

Prof. K. Srinivasan receiving Memento from **Rev. Dr. C. Antony Raj** in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College during 29-31 January 2018

Prof. P. Venuvanalingam receiving Memento from **Prof. P. Ramasamy** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Inaugural Function in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. M. Arivanandhan receiving Memento from **Dr. A. Poiyamozhi** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Prof. G. Ravi delivering Invited Lecture in the XXII NSCGA-2018 held at Department of Physics, Sacred Heart College, Tirupattur during 29-31 January 2018

Prof. P. Ramasamy receiving Memento from the organizer in the ICRTMST-2018 held at Department of Physics, Sri Vijay Vidyalaya College of Arts and Science, Dharmapuri during 8-9th September 2018

The release of Abstract Book in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Prof. S. P. Meenakshisundaram receiving Memento from **Prof. K. Srinivasan** in the IWMTA-2018 held at Centre for Crystal Growth, VIT Vellore during 11-12 October 2018

Dr. N. Karunagaran, SRM University, Chennai receiving Memento from **Prof. P. Kulandivel,** Vice Chancellor, Periyar University in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

Dr. D. Velmurugan, Madras University, Chennai receiving Memento from **Prof. P. Ramasamy** in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25 August 2018

INDIAN ASSOCIATION FOR CRYSTAL GROWTH

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SSN College of Engineering
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President

Prof. S. Moorthy Babu
Director
Centre for Nanoscience & Technology
Anna University, Chennai
Treasurer

Dr. Muthu Senthil Pandian
Department of Physics
SSN Research Centre, SSN CE
Chennai
Editor, IACG News Letter

EXECUTIVE COMMITTEE MEMBERS

- **Dr. Bansi Lal**, Professor, IIT Kanpur, Uttar Pradesh (U.P.)
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- **Dr. Binay Kumar**, Professor, Crystal Lab, University of Delhi, New Delhi
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- **Dr. Ganesamoorthy. S**, Scientific Officer-G, X-Ray and Crystal Growth Section, IGCAR
- **Dr. Gadkari. S.C**, Scientist & Head, Crystal Technology Section, BARC, Mumbai
- **Dr. Jayavel. R**, Director (Research), Crystal Growth Centre, Anna University, Chennai
- **Dr. Karnal. A.K**, Scientific Officer-G & Head, Crystal Growth Section, RRCAT, Indore, M.P.
- **Dr. Kalainathan. S**, Director, Centre for Crystal Growth, VIT University, Vellore
- **Dr. Mihir. J. Joshi**, Crystal Growth Laboratory, Professor, Saurashtra University, Gujarat
- **Dr. Suja Elizabeth**, Principal Scientist, Crystal Growth Lab, IISc, Bangalore
- **Dr. Sunil Verma**, Scientific Officer-G, Crystal Growth Section, LMDDD, RRCAT, Indore, M.P.
- **Dr. Sankaranarayanan. K**, Professor, Crystal Growth Lab, Alagappa University, Karaikudi
- **Dr. Thamizhavel. A**, Principal Scientist, Crystal Growth Laboratory, TIFR, Mumbai
- **Dr. Vijayan. N**, Scientist, Crystal Growth Section, National Physical Laboratory, New Delhi

HONORS/AWARDS

Prof. G. Amarendra receiving Memento from Prof. P. Ramasamy in the NCPFAM-2018 organized by Dr. P. Rajesh held at Department of Physics, SSN Institutions, Chennai during 1-2nd March 2018

Prof. P. Ramasamy receiving Memento from Prof. P. Kulandivel, Vice-Chancellor, Periyar University in the ICRTAST-2018 held at Department of Physics, Periyar University, Salem during 23-25th August 2018

Prof. R. Jayavel receiving Memento from Prof. P. Ramasamy in the XXII NSCGA-2018 organized by Dr. S. A. Martin Britto Dhas held at Department of Physics, Sacred Heart College during 29-31st January 2018

Dr. R. Ramesh Babu delivered Special lecture in a Physics Association Lecture series 2018 conducted by Department of Physics, Selvamm Arts and Science College, Namakkal, Tamilnadu on 10th August 2018

Dr. N. Vijayan receiving Memento from the organizer in the NMSE-2018 held at Department of Physics, Sri Ramakrishna Engineering College, Coimbatore during 18-20th July 2018

Dr. K. Sethuraman receiving Memento from the HOD, Physics in the ICRTMST-2018 held at Department of Physics, Sri Vijay Vidyalaya College of Arts and Science, Dharmapuri during 8-9th September 2018

The release of IACG News Letter-2018, Issue-30 in XXII National Seminar on Crystal Growth and Applications (XXII NSCGA-2018) held at Department of Physics, Sacred Heart College (Autonomous), Tirupattur, Tamilnadu during 29-31st January 2018

The release of Abstract Book in the National Conference on Processing and Fabrication of Advanced Materials (NCPFAM-2018) held at Department of Physics, SSN Institutions, Chennai, Tamilnadu during 1-2nd March 2018

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