



Dr. Aatish S. Daryapurkar

Assistant Professor

Head of the Department

Department of Basic Sciences Engineering

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Academic Background

- Ph.D. - 2014: Indian Institute of Technology Bombay, Mumbai, Maharashtra, India.
- M.Sc. - 2006: Sant Gadgebaba Amravati University, Amravati, Maharashtra, India.

Work Experience

- **Assistant Professor:** Jan 2017 to Present: Department of Basic Sciences Engineering, Indian Institute of Information Technology (IIIT) Nagpur, Nagpur. Maharashtra, India
- **Adjunct Assistant Professor of Practice:** July 2016 to Dec. 2016: Department of Basic Sciences Engineering, Indian Institute of Information Technology (IIIT) Nagpur, Nagpur. Maharashtra, India
- **Project Scientist:** Feb 2015 to May 2016: Department of Materials Science and Engineering, Indian Institute of Technology Kanpur, Uttar Pradesh, India.
- **Project Research Scientist:** May 2014 to October 2014: Department of Metallurgical Engineering and Materials Science, Indian Institute of Technology Bombay, Mumbai, Maharashtra, India.
- **Research Assistant & JRF:** May 2007 to Jan 2009: Department of Metallurgical Engineering and Materials Science, Indian Institute of Technology Bombay, Mumbai, Maharashtra, India.
- **Contributory Lecturer:** July 2006 – Feb 2007: Department of Physics, Government Vidarbha Institute of Science & Humanities, Amravati, Maharashtra, India.

Subject Areas

Applied/Engineering Physics, Materials Science, Nanoscience and Nanotechnology

Courses Taught

ASL 101 - Applied Sciences and ASP 101 - Applied Sciences Laboratory

Awards

Early Career Research Award – 2017- Science & Engineering Research Board (SERB), Department of Science and Technology, Government of India.

Research Projects worked on

- ✓ **DST sponsored project** “Investigations into compositionally modulated magnetoelectric gallium ferrite (Bulk and thin films) for sensor and transducer applications”
 - ✓ **DRDO sponsored project** “Development of barium titanate based ferroelectric materials for microelectronic applications (Bulk and thin films)”
 - ✓ **PhD Thesis:** Growth and characterization of optimized pulsed laser ablated $\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3$ thin films using the Taguchi approach.
 - ✓ **Master's Thesis:** Size dependent electrical and optical properties of Bi_2S_3 thin films deposited by Successive Ionic Layer Adsorption and Reaction (SILAR) method.
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Research Interests

- Investigation of multifunctional oxide thin films including multiferroic, dielectric, ferroelectric and piezoelectric thin films grown using various PVD and CVD techniques for various nanoelectronic applications.
- Explore the perovskite materials for Resistive Switching Devices.
- Piezoelectric and magnetoelectric energy harvesting possibly for battery materials.

Area of Expertise

- Synthesis of ceramic materials using Solid state reaction and Sol-Gel Methods and develop microstructure-property correlation
- Hands-on experiences with Pulsed Laser Deposition, Thermal evaporation, DC and RF Magnetron Sputtering
- Competence in the use of XRD, SEM, AFM, and PFM technique and analysis
- Electrical characterization of bulk/thin films related to dielectric, ferroelectric, piezoelectric, multiferroic and magnetoelectric properties
- Systematic planning and analysis of experiments using Taguchi Design of experiment (DoE)
- Study of nanomechanical properties using Nanoindentation technique

Selected Journal publications

- 1) Vijay Singh, **Aatish Daryapurkar**, Shailendra S. Rajput, Somdutta Mukherjee, Ashish Garg, Rajeev Gupta "Effect of annealing atmosphere on leakage and dielectric characteristics of multiferroic gallium ferrite" *J Am Ceram Soc.* 100 (2017) 5226–5238.
- 2) Jayant Kolte, **A.S. Daryapurkar**, Mohit Agarwal, D.D. Gulwade, P. Gopalan "Magnetoelectric properties of microwave sintered BiFeO₃ and Bi_{0.90}La_{0.10}Fe_{0.95}Mn_{0.05}O₃ nanoceramics" **Materials Chemistry and Physics** 193 (2017) 253-259.
- 3) Jayant Kolte, **A.S. Daryapurkar**, Mohit Agarwal, D.D. Gulwade, P. Gopalan "Effect of substrate temperature on the structural and electrical properties of La and Mn co-doped BiFeO₃ thin films" **Thin Solid Films** 619 (2016) 308–316
- 4) Jayant Kolte, **A.S. Daryapurkar**, D.D. Gulwade, P. Gopalan "Microwave sintered Bi_{0.90}La_{0.10}Fe_{0.95}Mn_{0.05}O₃ nanocrystalline ceramics: Impedance and modulus spectroscopy" **Ceramics International** 42 (2016) 12914-12921.
- 5) J. T. Kolte, Paresh H. Salame, **A. S. Daryapurkar**, P. Gopalan "Impedance and AC conductivity study of nano crystalline, fine grained multiferroic bismuth ferrite (BiFeO₃), synthesized by microwave sintering" **AIP ADVANCES** 5 (2015) 097164-097175.
- 6) **A.S. Daryapurkar**, J.T. Kolte, P. Gopalan "Influence of oxygen gas pressure on phase, microstructure, and electrical properties of Sodium Bismuth Titanate thin films grown using pulsed laser deposition" **Thin Solid Films**, 579 (2015) 44-49.
- 7) **A.S. Daryapurkar**, J.T. Kolte, P.R. Apte, P. Gopalan "Structural and electrical properties of sodium bismuth titanate (Na_{0.5}Bi_{0.5}TiO₃) thin films optimized using the Taguchi approach" **Ceramics International**, 40 (2014) 2441–2450.
- 8) **A.S. Daryapurkar**, J.T. Kolte, P. Gopalan "Growth of Pseudocubic Perovskite-Type SrRuO₃ thin films on quartz substrate using pulsed laser deposition method" **J. Mater Sci: Mater. Electron**, 24 (2013) 4698-4703.
- 9) **A S. Daryapurkar**, J. T. Kolte and P. Gopalan "Growth and Characterization of Na_{0.5}Bi_{0.5}TiO₃ Thin Films with BaTiO₃ Buffer Layer (Study of Au/Na_{0.5}Bi_{0.5}TiO₃/BaTiO₃/Pt Capacitor)" **Ferroelectrics**, 447 (1) (2013) 46–55.
- 10) J. T. Kolte, **A. S. Daryapurkar**, P. Apte and P. Gopalan "Structural and Electrical Characterization of La and Mn Co-Substituted Bismuth Ferrite Thin Films" **Ferroelectrics**, 448 (1) (2013) 42–49.

- 11) A.U. Ubale, **A.S. Daryapurkar**, R.B. Mankar, R.R. Raut, V.S. Sangawar & C.H. Bhosale "Electrical and optical properties of Bi₂S₃ thin films deposited by Successive Ionic Layer Adsorption and Reaction (SILAR) method" **Materials Chemistry and Physics**, 110 (1) (2008) 180-185.
 - 12) A.U. Ubale, R. B. Mankar, **A. S. Daryapurkar**, R.R. Raut and V.S. Sangawar "Structural and optical properties of nanostructure PbS thin films chemically deposited at room temperature" **Indian Journal Physics**, 81(5) (2007) 555 – 565.
 - 13) A. U. Ubale, N. A. Wadibhasme, **A. S. Daryapurkar**, R. B. Mankar & V. S. Sangawar "Thickness dependent structural, electrical and optical properties of chemically deposited nanoparticle PbS thin films" **Turkish Journal of Phys** 31 (2007) 279 – 286.
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Selected Conference Proceedings

- 1) **A S. Daryapurkar**, J. T. Kolte and P. Gopalan "Effect of Barium Titanate buffer layer on dielectric properties of Sodium Bismuth Titanate thin films grown using Pulsed Laser Deposition" **ISAF-ECAPD-PFM 2012**, 9th – 13th July 2012 at **Aveiro Portugal**, ISSN No.- 0885-3010.
 - 2) J. T. Kolte, **A. S. Daryapurkar**, P. Apte and P. Gopalan "Effect of oxygen pressure on the structural, electrical properties of Bi_{0.90}La_{0.10}Fe_{0.95}Mn_{0.05}O₃ thin films and characterization for memory applications" **ISAF-ECAPD-PFM 2012**, 9th – 13th July 2012 at **Aveiro Portugal**, ISSN No.- 0885-3010
 - 3) J. T. Kolte, D. Gulwade, **A. S. Daryapurkar**, P. Gopalan "Microstructural characterization of ferroelectric Bismuth Ferrite (BiFeO₃) ceramic by Electron Backscattered Diffraction" **Materials Science Forum** 702-703 (2012) Pg. No. 1011-1014. Presented at 16th **International conference on textures of materials (ICOTOM 16)**, 12th – 17th Dec. 2011 at **Mumbai India**, ISBN No.- 978-3-03785-294-1.
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Papers presented in Conferences national and international conference

1. Vijay Singh, **A. S. Daryapurkar**, S. Rajput, S. Mukherjee, Ashish Garg, Rajeev Gupta "Controlling Leakage in Magnetoelectric Gallium Ferrite by Aliovalent Doping" **ICMAT & IUMRS-ICA 2015 at Suntec, Singapore**, 28th June – 3rd July 2015.
2. **A. S. Daryapurkar**, J. T. Kolte, A. Mangal, P. Gopalan "Effect of substrate on microstructure and electrical properties of SrRuO₃ and LaNiO₃ thin films grown using PLD" **5th National Symposium for Materials Research Scholars (MR 13) IIT Bombay**, May 8-10th, 2013
3. J. T. Kolte, **A. S. Daryapurkar**, P. Gopalan "Structural and interfacial analysis of Bismuth Ferrite (BiFeO₃) thin films deposited by pulsed laser deposition" **Conference on Frontiers in Materials Science**, 25–26th Nov, 2011 at VES College, **Mumbai India** (ISBN 978-81-923044-0-3).
4. **A.S.Daryapurkar**, J.T.Kolte, P.R.Apte, P.Gopalan "Optimization of Laser Ablation Parameters to simultaneously improve dielectric and ferroelectric properties of Na_{0.5}Bi_{0.5}TiO₃ (NBT) thin films using Taguchi method" **International Conference on Materials for Advanced Technologies at Suntec, Singapore**, 26th June-2nd July 2011 (ICMAT 2011), ISSN No. – 1793-3609.
5. P. Vidya, J.T. Kolte, **A. S. Daryapurkar** and P. Gopalan "Synthesis and characterization of SrRuO₃ thin films for buffer layer applications" **TMS 2011 Annual Meeting in San Diego, California**, June 2011, ISBN 978-1-11802-935-0 (1st Place Poster Award).
6. **A.S.Daryapurkar**, J.T.Kolte, D.D.Gulwade and P.Gopalan "Synthesis of high density NBT ceramics by solid state reaction" **National Symposium for Material Research Scholars (MR 10) IIT Bombay**, May 6-8th, 2010
7. **A.S.Daryapurkar**, J.T.Kolte, D.D.Gulwade and P.Gopalan "Effect of oxygen pressure on surface morphology and electrical properties of pulsed laser deposited BaTiO₃ thin films" **National Symposium for Material Research Scholars (MR 08) IIT Bombay**, May 17-18th, 2008
8. A.U. Ubale, **A.S.Daryapurkar**, V.P. Deshpande, V.S. Thool, V.S. Sangawar, P.S. More "Effect of deposition temperature on electrical, optical and structural properties of Sb₂S₃ thin films deposited by

CBD technique” *International Conference on Advanced Materials and Applications-2007 (ICAMA-2007)*, Shivaji University Kolhapur, Nov 15-17th, 2007

9. A.U. Ubale, N. Wadibhasme, **A.S. Daryapurkar**, R.B. Mankar, V.S. Sangawar, D.K. Kulkarni “Preparation and characterization of chemically deposited PbS thin films” *National Conference on current trends in Materials Research for Advanced Technology, BAMU, Aurangabad*, Jan 29-31st, 2007

Conferences/Workshops Attended

Title	Organizer	Year
2 Day India-Trento Program for Advanced research (ITPAR) workshop on Nano/Micro mechanical Sensing Systems for Chem, Bio and Agriculture Applications	DST-IIT Bombay, India	2014
Atom Probe Tomography	IIT Madras- -DMRL Hyderabad, India CoSMIC, Iowa State University, USA	2012
X-ray techniques for Materials Research	Research Scholar’s Forum, IIT Bombay, Mumbai, India	2009
DAE-BRNS 4 th National Symposium on PLD of thin films and Nanostructured Materials	Saurashtra University, Rejkot, Gujrat, India	2007

Invited talk/ as Judge

- ✓ **Judge** to judge Science Models on sustainable development in science exhibition held on 28th September 2017 at Montfort Sr. Secondary School, Nagpur, India.
 - ✓ **External Examiner** for practical examination of final year project of B. E. Electronic Engineering held on 17th May 2017 at Shree Ramdevbaba College of Engineering & Management, Nagpur, India.
 - ✓ **Chief Guest and Evaluator** for Scientific Model and Poster Competition for UG and PG Physics students held on 1st March 2017 on the occasion of “National Science Day” organized by Department of Physics, Institute of Science, Nagpur, India.
 - ✓ **Judge** in Science Exhibition held on 20th November 2014, E & F South Wards Secondary and Higher Secondary Schools, Rosary High school, Mazgaon, Mumbai, India.
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Institute / Department level responsibilities

Indian Institute of Information Technology (IIIT), Nagpur

- ✓ **Head of the Department of Basic Sciences Engineering:**
To lead, manage and develop the department to ensure it achieves the highest possible standards of excellence in all its activities.
- ✓ **Student Affair Council In-charge:**
Supervising institute level technical event (Tantra-Fiesta), Cultural event (Abhivyakti), various campus programs and workshops. Supervise a team of council and serving as a liaison between institute administrators and student council.
Responsible for publishing various press notes regarding institute.