

Objective	Actively seeking for a postdoc position emphasis on solid state device physics, device fabrication, characterization and electronic material processing.
Summary	Proficient in fabrication, characterization and analysis of semiconductor devices such as MOSFETs, flash memories, TFTs, LEDs, Solar Cells along with solution processed dielectrics: ALPO, ZrO ₂ , TiO ₂ , HfO ₂ , AlHfO ₂ , TiHfO ₂ , ZrTiO ₂ , PDDA and solution processed printable semiconductors: IGZO, IZO, In ₂ O ₃ , ZnO ₂ , Graphene, P3HT, MEH-PPV, CdTe-NP, HgCdTe-NP (core shell), Pt-NP, Au-NP materials processing.
Positions	Jan, 2018 – : Staff Engineer, Device Research R & D Engineering, SanDisk , Bangalore 560 103, Karnataka, India
Education	2011 – 2018 : PhD – Physics, Indian Institute of Science (IISc), Bangalore, India 2009 – 2011 : M.S. – Physics, IISc, Bangalore, India, CGPA : 6/8 (Distinction) 2004 – 2009 : B.Sc.(Honours) – Physics, University of Calcutta (CU), Kolkata, India
Awards	2017 : Foreign Travel Grant Award for USA by CSIR, Govt. of India 2016 : International Travel Award for USA by ITS, SERB, DST, Govt. of India 2011 – 2016 : Rajiv Gandhi National Fellowship by UGC, Govt. of India 2015 : International Travel Award for USA by CeNSE, IISc, Bangalore 2012 : National Eligibility Test (NET), conducted by HRD-CSIR, Govt. of India 2009 – 2011 : Integrated PhD Scholarship (2009 – 11), Dept. of Physics, IISc, India 1999 – 2008 : National Scholarship Awards, Government of India 1999 – 2000 : Science Talent Research Test by Jatiya Vigyan Parishad, India 2001 : Achievement cum Diagnostic test in Mathematics by Centre for Pedagogical Studies in Mathematics, India
Leadership	2015 : Chairman & Chief Coordinator of SPECTRUM 2015 – The Mega Cultural, Sports, Literary, Science & Tech Festival of IISc, Bangalore, India 2014 – 2015 : Chairman of Gymkhana (2014 – 15), IISc, Bangalore, India 2012 – 2015 : Convener of Gymnasium (2012 – 15), Gymkhana, IISc, Bangalore, India 2012 : Exam Coordinator: PH 101 (Aug–Dec) 2:1 Introductory Physics I – Mechanics, Oscillations and waves (2:1), UG, IISc, Bangalore, India 2012 – 2013 : Organizing Volunteer: KVPY VIJYOSHI Camp – 2012 (Dec 1–3) & 2013 (Dec 7–9) conducted by DST, Govt. of India at IISc, Bangalore, India
Teaching	2013 : ➤ TA: PH 101(Aug–Dec) 2:1 Introductory Physics I – Mechanics, oscillations and waves (2:1), Under Graduate, IISc, India ➤ TA: PH 102 (Jan–Apr) 2:1 PH 102: Introductory Physics II – Electricity, Magnetism and Optics (2:1), Under Graduate, IISc, India ➤ Student’s Project Guide (UG Level): “Quantum Dot Memory Device & Its Temperature Assay” by Diptaparna Biswas (April–July) 2012 : ➤ Teaching Assistant (TA): ESc 102 (Jan–Apr) 2:1 Introduction to Electrical and Electronics Engineering, UG, IISc, Bangalore, India 2011 : ➤ Student’s Project Guide (Post–Graduate Level): “Fabrication of Metal–Semiconductor diode and MIS Capacitor and Analysis of I–V characteristics of the Diodes” by A. Bhattacharyya & K. Sen (Aug–Dec)
Membership	➤ Indian Physical Society (IPS) – Life Member ➤ Indian Physics Association (IPA) – Life Member
Services	Reviewer : Materials Letters & Indian Journal of Pure & Applied Physics (IJPAP)
Courses	Semiconductor Physics and Technology, Nanoelectronics Device Fabrication and Characterization, Micromachining and MEMS Technology, Introduction to Photonic Devices, Advanced Experiments in Condensed Matter Physics, etc.
Skills	Software Proficiency : C, C++, MATLAB, HTML, Mathematica, Auto CAD, CAM 350, Cle Win, Origin, Nova AFM, CasaXPS, Corel DRAW, Inkscape, LaTeX, ImageJ, Lab View, CompleteEASE and Multisim.

Growth & Fabrication Proficiency :

Growth: Sol-gel process, inkjet printable 2D materials, Hydrothermal for nanoparticles (CdTe & core-shell, Au, Pt), Oxidation; **PVD:** Sputtering, Thermal evaporation; **Lithography:** Resists, Optical; **Etching Process:** Wet chemical; Material Modification: Implantation, Annealing, Plasma & wafer bonding.

Characterization Proficiency :

HP/Keithley I-V and C-V measurement systems, High Speed CV (HSCV) measurement system. Optical Microscopes, Inverted, Fluorescence, UV), FTIR and UV Visible, LASER writer, PL measurement, Surface Profilometer, Double Sided Lithography Mask Aligner, Scanning Electron Beam (SEM, TEM), Scanning Probe Microscopy (AFM, STM).

Research

Doctoral Research [PhD, Aug 2011 – Mar 2018]

Dissertation: Fully Solution Processed Flash Memory,

Thesis Advisor: Prof. V. Venkataraman, Department of Physics., IISc, Bangalore, India

- Developed Low temperature (< 200°C) solution processed tunable flash memory device without tunnelling and blocking layer.
- Developed all inorganic fully solution processed, spin-coated CdTe nanoparticle based capacitive memory technology.
- Developed an Ultra-high speed Capacitance-Voltage (UCV) measurement technique (Electrical Instrumentation) for two terminal memory device applications.
- Developed fully solution processed inorganic precursor based spin-coated, ultra-high performance flexible floating gate flash memory TFTs.
- Discovered electronic deep trap and transport mechanism in oxide for memory application. Currently working on fabrication of non-volatile array of Memory tech.

Masters Project [MS, Aug 2009 – July 2011]

Project: Bistability (Memory) of CdTe quantum dots,

Project advisor: Prof. V. Venkataraman, Department of Physics., IISc, Bangalore, India

- Growth of hydrothermal CdTe-NP and developed a new material with the mixture of CdTe QDs and ALPO for the two terminal non-volatile memory applications.
- Growth solution processes dielectrics: ALPO, ZrO₂, TiO₂, and HfO₂ and semiconductor: IGZO, IZO, In₂O₃, and ZnO₂ for fully solution processed TFT and memory applications.
- Shown the performance comparison between inorganic with organic dielectric (ALPO vs PDDA) & semiconductors (IGZO vs MEH-PPV) for nanoelectronic device applications.
- Observed the bistability on CdTe-NP and P3HT/MEH-PPV composite device.

Patents

1. **Sandip Mondal** & V Venkataraman, A memory device comprising Aluminium oxide phosphate tunable traps,
Indian Patent Application no - 201741035172
2. **Sandip Mondal**, Gopu S, Sainath Viswasarai, Swaroop Kaza, David Rozman, Alon Eyal, Jun Wan, Enhancement of Read Retry feature to counteract Cross Temperature degradation in NAND technology by modulating the read related parameters,
US Patent Application Filled through Western Digital
3. **Sandip Mondal**, An Ultrafast Capacitive Voltage (UCV) System,
US Patent Application Filled through Western Digital

Publications > **30 Publications** | **Citations: 132** | **h-index: 7** | **i-10 index: 6** | [Google Scholar link](#)

2019

16. **Sandip Mondal** and V. Venkataraman, Graphene Based High-mobility Memory-TFT,
Advanced Materials (Under Review)
15. **Sandip Mondal** and V. Venkataraman, Graphene Based High-mobility Memory-TFT,
Nano Letters (Under Review)
14. **Sandip Mondal** and V. Venkataraman, Low temperature below 200°C solution processed tunable flash memory device without tunneling and blocking layer,
Nature Communications 10:2043 (2019)
13. **Sandip Mondal** and V. Venkataraman, All inorganic solution processed three terminal charge trapping memory device,
Applied Physics Letters 114(17), 173502(1-5) (2019)

2018

12. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, Experimental evidences of charge transition levels in ZrO₂ and at the Si: ZrO₂ interface by Deep Level Transient Spectroscopy,
Journal of Electronic Materials 47(2), 955-960 (2018)

2017

11. **Sandip Mondal** and V. Venkataraman, Tunable electron affinity with electronic band alignment of solution processed dielectric,
Applied Physics Letters 111(4), 041602(1-4) (2017)
10. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, Experimental evidences of charge transition levels in ZrO₂ and at the Si: ZrO₂ interface by Deep Level Transient Spectroscopy,
Applied Physics Letters 110(13), 132904 (2017)
9. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, Tunable band alignment and dielectric constant of solution route fabricated Al/HfO₂/Si gate stack for CMOS applications,
Journal Applied Physics 121, 085301 (2017)
8. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, DLTS Analysis and Interface Engineering of Solution Route Fabricated Zirconia Based MIS Devices Using Plasma Treatment,
Journal of Electronic Materials 1-6 (2017)

2016

7. **Sandip Mondal** and V. Venkataraman, All Inorganic Spin-coated Nanoparticle Based Capacitive Memory Devices,
IEEE Electron Device Lett. 37(4), 396 – 399 (2016)
6. Gyanan, **Sandip Mondal** and Arvind Kumar, Tunable dielectric properties of TiO₂ thin film based MOS systems for application in microelectronics,
Superlatt. Microst. 100, 876 – 885 (2016)
5. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, Structural, electrical, band alignment and charge tapping analysis of nitrogen annealed Pt/HfO₂/p-Si (100) MIS devices,
Applied Physics A, 122, 1027 (2016)
4. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, “Low temperature solution processed high-k ZrO₂ gate dielectric for nanoelectronics”,
Applied Surface Science, 370, 373–379 (2016)

2015

3. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, Critical investigation of high performance spin-coated high-κ titania thin films based MOS capacitor,
J. Mat. Science: Mat. Elec. 27(5), 5264–5270 (2015)
2. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, DLTS Analysis of Amphoteric Interface Defects in High-k TiO₂ MOS Structures Prepared by Sol-Gel Spin-Coating,
AIP Advances 5, 117122 (2015)
1. A. Kumar, **S. Mondal**, S. G. Kumar and K. S. R. K. Rao, High performance sol-gel spin-coated titanium dioxide dielectric based MOS structures,
Mat. Science in Sem. Proc. 40, 77–83 (2015)

Conferences & Invited Talk

16. **Sandip Mondal**, *Fully Solution Processed Flash Memory* at SanDisk India Device Design Center, Survey No.143/1 Amani Bellandur Khane Village, Varthur Hobli, Bangalore East Taluk, Bengaluru, Karnataka 560103, **India** (Sep 6, 2017)
– **Invited Talk in SanDisk**
15. **Sandip Mondal**, *Electrical Behaviour of Fully Solution Processed HfO₂ (MOS) in Presence of Different Light Illumination*, *62th DAE Solid State Physics Symposium (SSPS)* at BARC, Mumbai, **India** (Dec 26-30, 2017)
– **Best Poster Award**

14. **Sandip Mondal** and V. Venkataraman, *Tunable Traps in Solution Processed Spin-coated Aluminium Oxide Phosphate*, *59th Electronic Materials Conference (EMC)* at University of Notre Dame, Notre Dame, IN 46556, **USA** (June 28 –30, 2017)
– **Oral**
13. **Sandip Mondal** and V. Venkataraman, *Flash Memory TFT Based on Fully Solution Processed Oxide*, *75th Device Research Conf. (DRC)* at University of Notre Dame, Notre Dame, IN 46556, **USA** (June 25 –28, 2017)
– **Oral**
12. Arvind Kumar, **Sandip Mondal** and K.S.R. Koteswara Rao, *DLTS analysis and interface engineering of solution route fabricated Zirconia based MIS devices using plasma treatment*, *59th Electronic Materials Conference (EMC)* at University of Notre Dame, Notre Dame, IN 46556, **USA** (June 28 –30, 2017)
– **Oral**
11. **Sandip Mondal** and V. Venkataraman, *Band structure of a sol-gel spin-coated dielectric: Aluminum Oxide Phosphate*, *58th Electronic Materials Conference (EMC)* at University of Delaware, Newark, DE 19716, **USA** (June 22–24, 2016)
– **Oral**
10. **Sandip Mondal** and V. Venkataraman, *Fully Spin-coated Memory TFT*, *74th Device Research Conf. (DRC)* at University of Delaware, DE 19716, **USA** (June 19 –22, 2016)
– **Poster**
9. Arvind Kumar, **Sandip Mondal**, K.S.R. Koteswara Rao, *Interface investigation of solution processed high- κ ZrO₂/Si MOS structure by DLTS*, *APS March Meeting 2016* at Baltimore, Maryland, **USA** (March 14–18, 2016)
– **Oral**
8. **Sandip Mondal**, Arvind Kumar, K.S.R. Koteswara Rao, V. Venkataraman, *Highly Reliable Spin-coated Titanium Dioxide Dielectric*, *60th DAE Solid State Physics Symposium (SSPS)* at Amity University, Noida, UP, **India** (Dec 21–25, 2015)
– **Poster**
7. **Sandip Mondal**, Arvind Kumar, K.S.R. Koteswara Rao, V. Venkataraman, *Highly Reliable Spin-coated Low Temperature Processed Zirconium dioxide*, *18th International Conf. on Phys. and Semicon. Dev. (IWPSD)* at IISc, Bangalore, **India** (Dec 7–10, 2015)
– **Poster**
6. Arvind Kumar, **Sandip Mondal**, K.S.R. Koteswara Rao, *Electrical Study of Al/HfO₂/p-Si (100) Gate Stack*, *60th DAE Solid State Physics Symposium (SSPS)* at Amity University, Noida, UP, **India** (Dec 21–25, 2015)
– **Poster**
5. Arvind Kumar, **Sandip Mondal**, K.S.R. Koteswara Rao, *Low temperature solution processed high – k ZrO₂ gate dielectric for nanoelectronics*, *18th International Conf. on Phys. and Semicon. Dev. (IWPSD)* at IISc, Bangalore, **India** (Dec 7–10, 2015)
– **Poster**
4. Arvind Kumar, **Sandip Mondal**, K.S.R. Koteswara Rao, *Zirconium doped TiO₂ thin films: A promising dielectric layer*, *International Conference on Condensed Matter and Applied Physics (ICC)* at Bikaner ,Rajasthan, **India** (Oct 30–31, 2015)
– **Poster**
3. **Sandip Mondal** and V. Venkataraman, *All inorganic spin-coated nanoparticle memory device*, *73rd Device Research Conference (DRC)* at Ohio State University, Ohio, **USA** (June 21–24, 2015)
– **Poster**
2. Arvind Kumar, **Sandip Mondal** and K. S. R. Koteswara Rao, *Critical investigation of spin-coated high-k titania thin films based MOS capacitor*, *The 5th International Symposium on Organic and Inorganic Electronic Materials and Related Nanotechnologies (EM – NANO 2015)* at TOKI MESSE, Niigata Convention Center, Niigata, **JAPAN** (June 16 – 19, 2015)
– **Poster**

1. Arvind Kumar, **Sandip Mondal**, and K. S. R. Koteswara Rao, *High- κ TiO₂ thin film prepared by sol-gel spin-coating method*, *59th DAE Solid State Physics Symposium (SSPS)* at VIT University, Vellore, Tamilnadu, **India** (Dec. 16–20, 2014)
– **Poster**

References

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