

***Dr. Jyoti Prakash Kar***

Assistant Professor  
Department of Physics  
National Institute of Technology (NIT) Rourkela  
Odisha, India, 769008  
Email: [karjp@nitrkl.ac.in](mailto:karjp@nitrkl.ac.in), [jpkar@hotmail.com](mailto:jpkar@hotmail.com)  
Phone (O):+91-6612462732

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**Research Interests:**

Thin Electronic Films, High-k Dielectrics, Microelectronics and Semiconductor Technology, Solid State Sensors and Devices, MEMS, Non-Destructive Testing, Surface Engineering, Nanotechnology

**Educational Profile:**

M. Sc. (Utkal University), M. Tech (IIT Delhi), Ph. D. (IIT Delhi)

**Course Offered:**

- \* Vacuum Science and Applications (PH 462)
- \* Physics-I (PH 101)

**Teaching/Research Experiences:**

- \* Assistant Professor, (Dec 2011-Continuing), Dept. of Physics, National Institute of Technology, Rourkela, India
- \* Marie Curie researcher (June 2011-Dec 2011), Dept. of Electronics Engineering, University of Tor Vergata, Rome, Italy
- \* Postdoctoral researcher (July 2010-June 2011), Dept. of Electronics Engineering, University of Tor Vergata, Rome, Italy
- \* Postdoctoral researcher (July 2007-June 2010), Dept. of Materials Sci. and Eng., Yonsei University, Seoul, S. Korea
- \* Visiting researcher (Nov 2006-Apr 2007), Dept. of Electrical and Computer Eng., University of Oklahoma, Norman, USA

**Research Fellowship/Scholarships:**

- \* Marie Curie fellowship (June 2011-Dec 2011)
- \* Research fellowship, University of Tor Vergata, Rome, Italy (July 2010-June 2011)
- \* Brain Korea (BK) 21 fellowship, S. Korea (July 2007-June 2010)
- \* Research fellowship, University of Oklahoma, USA (Nov 2006-Apr 2007)
- \* MHRD, India scholarship during M. Tech and Research

### Awards/Honours:

- \* Brain Korea 21 Annual Research Prize 2009, Dept. of Materials Science and Engineering, Yonsei University, S. Korea
- \* Brain Korea 21 Annual Research Prize 2008, Dept. of Materials Science and Engineering, Yonsei University, S. Korea
- \* Gold prize 2008 (Brain Korea 21), Dept. of Materials Science and Engineering, Yonsei University, S. Korea

### Recognition:

- \* America's **Marquis Who's Who in the world** for 2010 edition
- \* International Biographical Centre, Cambridge, UK (2010 edition)

### Membership:

- \* Materials Research Society (MRS), 2007-2010, South Korea
- \* Materials Research Society (MRS), 2005-2007, Singapore

### Reviewer of International Journals:

Materials Science and Engineering B, Applied surface science, IEEE Sensors Journal, Surface Engineering, Sensor Letters, Current Nanoscience, Physica E, Materials Science in Semiconductor Processing

### Patent Filed:

"Method for Patterning nanowires on substrate using novel sacrificial layer material", J. M. Myoung and **J. P. Kar** [(United States: US20100116780), (Japanese: 2009-007622), and (Korean Appl. No: 10-2008-0112055)].

### Book/Book chapters:

- \* Book: Acoustic Waves - From Microdevices to Helioseismology, Chapter: "Aluminum nitride (AlN) film based acoustic devices: Material synthesis and device fabrication", **J. P. Kar** and G. Bose. (Intech publication 2011, ISBN: 978-953-307-572-3)
- \* Book: Nanowires Fundamental Research, Chapter: "Junction properties and applications of ZnO single nanowire based Schottky diode", S. N. Das, **J. P. Kar** and J. M. Myoung. (Intech publication 2010, ISBN: 978-953-307-327-9)
- \* "Lead salt thin film semiconductors for microelectronic applications", S. Mukherjee, D. Li, A. Gautam, **J. P. Kar** and Z. Shi. (Transworld Research Network 2010, ISBN: 978-81-7895-501-8)

## Publications:

### Journals:

1. "Fabrication and characterization of vertically aligned long ZnO nanorods on transparent substrate", **J. P. Kar**, J. H. Choi, S. N. Das, J. Xiong, M. J. Lee, T. I. Lee and J. M. Myoung, *Journal of Nanoscience and Nanotechnology*, 11 (2011) 2185.
2. "Investigation of optical and compositional properties of thin SiN<sub>x</sub>:H films with an enhanced growth rate by high frequency PECVD method", M. J. Lee, **J. P. Kar**, T. I. Lee, D. Lee, D. K. Choi, J. H. Cho and J. M. Myoung, *Vacuum*, 85 (2011) 1032.
3. "Growth, modulation and Photoresponse characteristics of vertically aligned ZnO nanowires", **J. P. Kar**, S. N. Das, J. H. Choi, T. I. Lee, J. Seo, T. Lee and J. M. Myoung, *Applied Surface Science*, 257 (2011) 4973.
4. "One-dimensional semiconductor nanostructure based thin-film partial composite formed by transfer implantation for high-performance flexible and printable electronics at low temperature", K. J. Moon, T. I. Lee, J. H. Choi, J. Jeon, Y. H. Kang, **J. P. Kar**, J. H. Kang, I. Yun, J. M. Myoung, *ACS Nano*, 5 (2011) 159.
5. "Performance enhanced carbon nanotube films by mechanical pressure for a transparent metal oxide thin film field effect transistor", J. Jeon, T. I. Lee, J. H. Choi, **J. P. Kar**, W. J. Choi, H. K. Baik and J. M. Myoung, *Electrochemical and Solid-State Letters*, 14 (2011) H76.
6. "Self-regulating pseudo-monolayer printing of percolating networks of ZnO nanostructures for macroelectronics", J. H. Choi, **J. P. Kar**, S. N. Das, T. I. Lee, D. Y. Khang and J. M. Myoung, *Journal of Materials Chemistry*. 21 (2011) 2303.
7. "Effect of deposition power on structural and electrical properties of Al-doped ZnO films using pulsed direct-current magnetron sputtering with single cylindrical target", B. K. Shin, T. I. Lee, **J. P. Kar**, M. J. Lee, K. I. Park, K. J. Ahn, K. Y. Yeom, J. H. Cho, and Jae-Min Myoung, *Materials Science in Semiconductor Processing*, 14 (2011) 23.
8. "Growth of p-type ZnO thin film on n-type silicon substrate and its application as hybrid homojunction", M. Kumar, **J. P. Kar**, I. S. Kim, S. Y. Choi and J. M. Myoung, *Current Applied Physics*, 11 (2011) 65.

9. "Influence of sputtering pressure on morphological, mechanical and electrical properties of Al-doped ZnO films", **J. P. Kar**, S. Kim, B. Shin, K. I. Park, K. J. Ahn, W. Lee, J. H. Cho and J. M. Myoung, *Solid State Electronics*, 54 (2010) 1447.
10. "Enhancement in electrical performance of indium gallium zinc oxide-based thin film transistors by low temperature thermal annealing", S. J. Jeon, J. W. Chang, K. S. Choi, **J. P. Kar**, T. I. Lee and J. M. Myoung, *Materials Science in Semiconductor Processing*, 13 (2010) 320.
11. "A multifunctional nanoporous layer created on glass through a simple alkali corrosion process", J. Xiong, S. N. Das, **J. P. Kar**, J. H. Choi and J. M. Myoung, *Journal of Materials Chemistry*, 20 (2010) 10246.
12. "Junction properties of Au/ZnO single nanowire Schottky diode", S. N. Das, J. H. Choi, **J. P. Kar**, K. J. Moon, T. I. Lee and J. M. Myoung, *Applied Physics Letters*, 96 (2010) 092111.
13. "Electrical contact tunable direct printing route for a ZnO nanowire Schottky diode", T. I. Lee, W. J. Choi, **J. P. Kar**, Y. Kang, J. Jeon, J. Park, Y. S. Kim, H. K. Baik and J. M. Myoung, *Nano Letters*, 10 (2010) 3517.
14. "Biomimetic hierarchical ZnO structure with superhydrophobic and antireflective properties", J. Xiong, S. N. Das, B. Shin, **J. P. Kar**, J. H. Choi, and J. M. Myoung, *Journal of Colloids and Interface Science*, 350 (2010) 344.
15. "Random network transistor arrays of embedded ZnO nanorods in ion-gel gate dielectric", J. H. Choi, S. Lee, **J. P. Kar**, S. N. Das, J. Jeon, T. Lee, U. Jeong and J. M. Myoung, *Journal of Materials Chemistry*, 20 (2010) 7393.
16. "Programmable direct-printing nanowire electronic components", T. I. Lee, W. J. Choi, K. J. Moon, J. H. Choi, **J. P. Kar**, S. N. Das, Y. S. Kim, H. K. Baik and J. M. Myoung, *Nano Letters*, 10 (2010) 1016.
17. "ZnO single nanowires-based UV detector", S. N. Das, K. J. Moon, **J. P. Kar**, J. H. Choi, J. Xiong, T. I. Lee and J. M. Myoung, *Applied Physics Letters*, 97 (2010) 022103.
18. "Fabrication and characterization of ZnO single nanowire-based hydrogen sensor", S. N. Das, **J. P. Kar**, J. H. Choi, T. I. Lee, K. J. Moon and J. M. Myoung, *Journal of Physical Chemistry C*, 114 (2010) 1689.

19. “Study of morphological evolution of ZnO nanostructures on various sapphire substrates”, **J. P. Kar**, S. N. Das, J. H. Choi, T. I. Lee and J. M. Myoung, *Applied Surface Science*, 256 (2010) 4995.
20. “Fabrication and characterization of p-Si nanowires/ZnO film heterojunction diode”, J. H. Choi, S. N. Das, K. J. Moon, **J. P. Kar** and J. M. Myoung, *Solid State Electronics*, 54 (2010) 1582.
21. “Selective alignment of a ZnO nanowire in a magnetic field for the fabrication of an air-gap field-effect transistor”, S. W. Lee, M. H. Ham, **J. P. Kar**, W. Lee and J. M. Myoung, *Microelectronic Engineering*, 87 (2010) 10.
22. “Fabrication of p-ZnO nanowires based heterojunction diodes”, S. N. Das, J. H. Choi, **J. P. Kar**, T. I. Lee and J. M. Myoung, *Materials Chemistry and Physics*, 121 (2010) 472.
23. “Influence of surface morphology on the optical property of vertically aligned ZnO nanorods”, S. N. Das, **J. P. Kar**, J. H. Choi, S. Byeon, Y. D. Jho and J. M. Myoung, *Applied Physics Letters*, 95 (2009) 111909.
24. “Growth and characterization of vertically aligned ZnO microtubes on silicon substrate”, **J. P. Kar**, S. N. Das, J. H. Choi and J. M. Myoung, *Materials Letters*, 63 (2009) 2327.
25. “Electrical characteristics of PbSe nanoparticle/Si heterojunctions”, A. Bhardwaj, **J. P. Kar**, O. P. Thakur, P. Srivastava, and H. K. Sehgal, *Journal of Nanoscience and Nanotechnology*, 9 (2009) 5953.
26. “ZnO nanowires and P3HT polymer composite TFT device”, K. J. Moon, J. H. Choi, **J. P. Kar** and J. M. Myoung, *Korean Journal of Materials Research*, 19 (2009) 33.
27. “Fabrication of UV detectors based on ZnO nanowires using silicon microchannel”, **J. P. Kar**, S. N. Das, J. H. Choi, Y. A. Lee, T. Y. Lee and J. M. Myoung, *Journal of Crystal Growth*, 311 (2009) 3305.
28. “Tunable and reversible surface wettability transition of vertically aligned zinc oxide nanorods arrays”, S. N. Das, J. H. Choi, **J. P. Kar** and J. M. Myoung, *Applied Surface Science*, 255 (2009) 7319.

29. "Feasibility study of barium fluoride films as a sacrificial layer for patterning of ZnO nanowire arrays", **J. P. Kar**, J. H. Choi, and J. M. Myoung, *Journal of Crystal Growth*, 311 (2009) 2372.
30. "Fabrication of ZnO thin film nanowires hybrid homojunction on silicon substrate", **J. P. Kar**, M. Kumar, J. H. Choi, S. Y. Choi, and J. M. Myoung, *Solid State Communications*, 149 (2009) 1337.
31. "Enhanced performance of ZnO nanocomposite transistor by simple mechanical compression", J. H. Choi, **J. P. Kar**, D. Y. Khang and J. M. Myoung, *Journal of Physical Chemistry C*, 113 (2009) 5010.
32. "Fabrication of As-doped p-type ZnO thin film and ZnO nanowire inserted p-n homojunction structure", M. Kumar, **J. P. Kar**, I. S. Kim, S. Y. Choi and J. M. Myoung, *Applied Physics A: Materials Science and Processing*, 97 (2009) 689.
33. "Impact of post-deposition annealing on the surface, bulk and interface properties of RF sputtered AlN films", **J. P. Kar**, S. Mukherjee, G. Bose, S. Tuli and J. M. Myoung, *Materials Science and Technology*, 25 (2009) 1023.
34. "Fabrication of ZnO nanostructures of various dimensions using patterned substrates", **J. P. Kar**, M. H. Ham, S. W. Lee and J. M. Myoung, *Applied Surface Science*, 255 (2009) 4087.
35. "Fabrication and surface modification of micro/nano porous silicon", **J. P. Kar**, S. K. Mohanta, G. Bose, S. Tuli, A. Kamra and V. Mathur, *Journal of Optoelectronics and Advanced Materials*, 11 (2009) 238.
36. "Two-dimensional numerical analysis on mid-infrared emission from IV-VI lead salt photonic crystal microcavity", S. Mukherjee, G. Bi, **J. P. Kar**, and Z. Shi, *Optica Applicata*, 39 (2009) 499.
37. "Surface modification of hydrothermal grown ZnO nanostructures with process parameters", **J. P. Kar**, S. N. Das, S. W. Lee, M. H. Ham, J. H. Choi and J. M. Myoung, *Chemical Engineering Communications*, 196 (2009) 1130.
38. "Opto-electrical properties of sputtered AlN films", **J. P. Kar**, G. Bose, S. Tuli, S. Mukherjee, and J. M. Myoung, *Optoelectronics and Advanced Materials-Rapid Communications*, 3 (2009) 631.

39. "Morphological investigation of AlN films on various substrates for MEMS applications", **J. P. Kar**, G. Bose, S. Tuli, J. M. Myoung and S. Mukherjee, *Surface Engineering*, 25 (2009) 526.
40. "Growth of AlN films and its process development for the fabrication of acoustic devices and micromachined structures", **J. P. Kar**, G. Bose, S. Tuli, A. Dangwal and S. Mukherjee, *Journal of Materials Engineering and Performance*, 18 (2009) 1046.
41. "Fabrication and characterization of vertically aligned ZnMgO/ZnO nanowire arrays", **J. P. Kar**, M. C. Jeong, W. K. Lee and J. M. Myoung, *Materials Science and Engineering: B*, 147 (2008) 74.
42. "Dielectric charge screening of dislocations and ionized impurities in PbSe and MCT", S. Elizondo, F. Zhao, **J. P. Kar**, J. Ma, J. Smart, D. Li, S. Mukherjee and Z. Shi, *Journal of Electronic Materials*, 37 (2008) 1411.
43. "Enhanced photoluminescence from free-standing microstructures fabricated on MBE grown PbSe-PbSrSe MQW structure", S. Mukherjee, S. Jain, F. Zhao, **J. P. Kar**, D. Li and Z. Shi, *Microelectronic Engineering*, 85 (2008) 665.
44. "Effect of sputtered films on morphology of vertical aligned ZnO nanowires", **J. P. Kar**, S. W. Lee, W. Lee and J. M. Myoung, *Applied Surface Science*, 254 (2008) 6677.
45. "Effect of inter-electrode spacing on structural and electrical properties of AlN films", **J. P. Kar**, S. Mukherjee, G. Bose and S. Tuli, *Journal of Materials Science: Materials in Electronics*, 19 (2008) 261.
46. "Strain oriented microstructural change during fabrication of free-standing PbSe micro-rods", S. Mukherjee, S. Jain, D. Ray, F. Zhao, **J. P. Kar**, D. Li and Z. Shi, *Journal of Materials Science: Materials in Electronics*, 19 (2008) 237.
47. "Photoluminescence studies from micropillars fabricated on IV–VI multiple quantum-well semiconductor structure", S. Mukherjee, S. Jain, F. Zhao, **J. P. Kar** and Z. Shi, *Microelectronics Journal*, 38 (2007) 1181.
48. "A study on the interface and bulk charge density of AlN films with sputtering pressure", **J. P. Kar**, G. Bose and S. Tuli, *Vacuum*, 81 (2006) 494.

49. "Correlation of electrical and morphological properties of sputtered aluminum nitride films with deposition temperature", **J. P. Kar**, G. Bose and S. Tuli, *Current Applied Physics*, 6 (2006) 873.
50. "Influence of nitrogen concentration on grain growth, structural and electrical properties of sputtered aluminum nitride films", **J. P. Kar**, G. Bose and S. Tuli, *Scripta Materialia*, 54 (2006) 1755.
51. "Influence of rapid thermal annealing on morphological and electrical properties of RF sputtered AlN films", **J. P. Kar**, G. Bose and S. Tuli, *Materials Science in Semiconductor Processing*, 8 (2005) 646.
52. "Effect of annealing on DC sputtered aluminum nitride films", **J. P. Kar**, G. Bose and S. Tuli, *Surface and Coatings Technology*, 198 (2005) 64.
53. "DC stress effect on charge distribution in sputtered AlN films", **J. P. Kar**, G. Bose and S. Tuli, *Journal of Electron Devices*, 2 (2003) 57.

**International Conferences:**

1. "Synthesis of c-axis oriented AlN films for the fabrication of micro/nanostructures", G. Bose, **J. P. Kar** and S. Tuli, The 2<sup>nd</sup> International Conference on Structure, Processing and Properties of Materials (SPPM), 24<sup>th</sup>-26<sup>th</sup> Feb. 2010, Dhaka.
2. "Photoresponse characteristics of vertically aligned ZnO nanowires", **J.P. Kar**, S. N. Das, J. H. Choi, T. I. Lee and J. M. Myoung, IEEE 3<sup>rd</sup> International Nanoelectronic Conference (INEC), 3<sup>rd</sup> -8<sup>th</sup> Jan. 2010, Hong Kong, p. 951.
3. "Electrical characterization of single nanowire based ZnO schottky diodes", S. N. Das, **J. P. Kar**, J. H. Choi, K. J. Moon, T. I. Lee and J. M. Myoung, IEEE 3<sup>rd</sup> International Nanoelectronic Conference (INEC), 3<sup>rd</sup> -8<sup>th</sup> Jan. 2010, Hong Kong, p.1197.
4. "Enhanced performance of ZnO nanocomposite transistor by external mechanical force", J. H. Choi, K. J. Moon, J. Jeon, **J. P. Kar**, D. Y. Khang, T. I. Lee, J. M. Myoung, IEEE 3<sup>rd</sup> International Nanoelectronic Conference (INEC), 3<sup>rd</sup> -8<sup>th</sup> Jan. 2010, Hong Kong, p. 1183.
5. "Superior performances from fabricated microstructures on MBE-grown IV-VI lead salt materials for mid-infrared applications", S. Mukherjee, S. Jain, **J. P. Kar** and Z.



- Shi, IEEE, 14<sup>th</sup> International Workshop on The Physics of Semiconductor Devices, 17<sup>th</sup>-20<sup>th</sup> Dec. 2007, IIT Bombay, p. 413.
6. "Theoretical Design of  $Pb_{1-x}Sn_xSe$  p-n junction Photodetectors", S. Elizondo, F. Zhao, **J. P. Kar**, J. Ma, J. Smart, D. Li, S. Mukherjee and Z. Shi, U. S. workshop on the physics and chemistry of II-VI Materials, 30<sup>th</sup> Oct.-1<sup>st</sup> Nov. 2007, Maryland, USA.
  7. "Structural and morphological investigations of electrochemically etched micro/nanoporous silicon surface", **J. P. Kar**, S. K. Mohanta, G. Bose, A. Kamra and B. Mathur, 4<sup>th</sup> International Conference on Materials for Advanced Technologies (ICMAT), 1<sup>st</sup>-6<sup>th</sup> July 2007, Singapore.
  8. "IV-VI lead salt materials for opto-electronic applications", Z. Shi, F. Zhao, D. Ray, D. Li, S. Mukherjee, S. Jain and **J. P. Kar**, 14<sup>th</sup> Semiconducting and Insulating Materials Conference (SIMC-XIV), 15<sup>th</sup>-20<sup>th</sup> May 2007, Arkansas, USA.
  9. "Morphological study of sputtered AlN films on metallic electrodes", **J. P. Kar**, G. Bose and S. Tuli, Indo-Chinese Workshop on MEMS Devices and Related Technologies, 5<sup>th</sup>-7<sup>th</sup> April 2006, New Delhi.
  10. "Growth and Morphology of AlN Films on Si, GaAs and InP Substrates", **J. P. Kar**, S. K. Mohanta, G. Bose and S. Tuli, XIII<sup>th</sup> International Workshop on Physics of Semiconductor Devices (IWPSD), 13<sup>th</sup>-17<sup>th</sup> Dec. 2005, New Delhi, p. 1386.
  11. "Comparative Study of Furnace and Rapid Thermal Annealing on Electrical Properties of RF sputtered AlN Films", **J. P. Kar**, G. Bose, S. Tuli and S. P. Behera, XIII<sup>th</sup> International Workshop on Physics of Semiconductor Devices (IWPSD), 13<sup>th</sup>-17<sup>th</sup> Dec. 2005, New Delhi, p. 1382.
  12. "Annealing temperature dependence of morphological and electrical properties of RF sputtered AlN films", **J. P. Kar**, G. Bose and S. Tuli, 1<sup>st</sup> International Symposium on Functional Materials (ISFM), 6<sup>th</sup>-8<sup>th</sup> Dec. 2005, Kuala Lumpur, p. 15.
  13. "Effect of rapid thermal annealing on morphological properties of AlN films", **J. P. Kar**, S. P. Behera, G. Bose and S. Tuli, 3<sup>rd</sup> International Conference on Materials for Advanced Technologies (ICMAT), 3<sup>rd</sup>-8<sup>th</sup> July 2005, Singapore, p. 23.
  14. "Pressure dependence of morphological and electrical properties of AlN films deposited by reactive sputtering", **J. P. Kar**, G. Bose and S. Tuli, 3<sup>rd</sup> International

- Conference on Materials for Advanced Technologies (ICMAT), 3<sup>rd</sup>-8<sup>th</sup> July 2005, Singapore, p. 6.
15. "Deposition and characterization of high electronic quality AlN films for surface acoustic wave devices", G. Bose, A. Dangwal, **J. P. Kar**, S. Tuli, A. Kumar, A. Basu and D. K. Pandya, Asia Pacific Microwave Conference (APMC), 15<sup>th</sup>-18<sup>th</sup> Dec. 2004, New Delhi, p. 958.
  16. "Surface morphology of sputter deposited AlN films as a function of RF power", **J. P. Kar**, G. Bose and S. Tuli, International Symposium on Advanced Materials and Processing (ISAMAP2K4), 6<sup>th</sup>-8<sup>th</sup> Dec. 2004, I.I.T. Kharagpur, p. 1061.
  17. "Dielectric reliability of rapid thermally grown and mercury-sensitized photo-CVD deposited silicon oxide/nitride stack layer", B. S. Sahu, P. Srivastava, **J. P. Kar** and O. P. Agnihotri, International Symposium on Advanced Materials and Processing (ISAMAP2K4), 6<sup>th</sup>-8<sup>th</sup> Dec. 2004, I.I.T. Kharagpur, p. 1594.
  18. "Effect of annealing on DC sputtered aluminum nitride films", **J. P. Kar**, G. Bose and S. Tuli, The 2<sup>nd</sup> International Conference on Technological Advances of Thin Films & Surface Coatings, 13<sup>th</sup>-17<sup>th</sup> July 2004, Singapore.
  19. "Influence of sputtering power on structural and electrical properties of AlN films", **J. P. Kar**, G. Bose and S. Tuli, The 2<sup>nd</sup> International Conference on Technological Advances of Thin Films & Surface Coatings, 13<sup>th</sup>-17<sup>th</sup> July 2004, Singapore.
  20. "Improvement of rapid thermal thin SiO<sub>2</sub>-Si interface characteristics by backsurface argon ion implantation", S. P. Dash, **J. P. Kar**, V. K. Srivastava, G. Bose and R. Chatterjee, The 2<sup>nd</sup> International Conference on Technological Advances of Thin Films & Surface Coatings, 13<sup>th</sup>-17<sup>th</sup> July 2004, Singapore.
  21. "Electrical characterization of post metalization annealed Al/AlN/Si structure under UV exposure", **J. P. Kar** and G. Bose, The 2<sup>nd</sup> International Conference on Structure, Processing and Properties of Materials (SPPM), 25<sup>th</sup>-27<sup>th</sup> Feb. 2004, Dhaka, p. 755.
  22. "Temperature dependent charge behaviour of DC sputtered aluminum nitride film", **J. P. Kar**, G. Bose and S. Tuli, 12<sup>th</sup> International Workshop on The Physics of Semiconductor Devices (IWPSD, 16<sup>th</sup>-20<sup>th</sup> Dec., 2003, I. I. T. Madras, p. 283.

**National Conferences:**

1. “Selective fabrication and etching of vertically aligned Si nanowires for MEMS”, **J. P. Kar**, K. J. Moon, S. N. Das, S. Kim, J. Xiong, J. H. Choi, T. I. Lee and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 13-14<sup>th</sup> May 2010, Samcheok, South Korea, p. 27.
2. “Direct printable nanowire schottky junction device”, T. I. Lee, W. J. Choi, **J. P. Kar**, K. J. Moon, M. J. Lee, J. J. Jun, H. K. Baik and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 13-14<sup>th</sup> May 2010, Samcheok, South Korea, p. 30.
3. “Facile fabrication of ZnO nanostructure network transistor by printing method”, J. H. Choi, K. J. Moon, J. Jeon, **J. P. Kar**, S. N. Das, D. Y. Khang, T. I. Lee and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 13-14<sup>th</sup> May 2010, Samcheok, South Korea, p. 31.
4. “Hierarchical nanostructure on glass for self cleaning and antireflective properties”, J. Xiong, S. N. Das, **J. P. Kar**, J. H. Choi and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 13-14<sup>th</sup> May 2010, Samcheok, South Korea, p. 24.
5. “Improvement of electrical properties of IGZO films by low temperature annealing”, S. J. Jeon, J. W. Chang, K. S. Choi, **J. P. Kar**, T. I. Lee and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 13-14<sup>th</sup> May 2010, Samcheok, South Korea, p. 199.
6. “Morphological evolution of ZnO nanowires using various substrates”, **J. P. Kar**, S. N. Das, J. H. Choi, and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 5-6<sup>th</sup> Nov. 2009, Pohang, South Korea, p. 27.
7. “Photoluminescence property of vertically aligned ZnO nanorods”, S. N. Das, **J. P. Kar**, J. H. Choi, and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 5-6<sup>th</sup> Nov. 2009, Pohang, South Korea, p. 25.
8. “Press induced enhancement of contact resistance in nanocomposite FET based on ZnO nanowires/polymer”, J. H. Choi, K. J. Moon, J. Jeon, **J. P. Kar**, S. N. Das, D. Khang, T. I. Lee and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 5-6<sup>th</sup> Nov. 2009, Pohang, South Korea, p. 26.

9. "Aspect ratio enhancement of ZnO nanowires using silicon microcavity", **J. P. Kar**, S. N. Das, J. H. Choi, Y. A. Lee, T. Y. Lee and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 21<sup>st</sup>-22<sup>nd</sup> May 2009, Muju, South Korea, p. 34.
10. "Growth and characterization of vertically aligned ZnO nanowires with different surface morphology", S. N. Das, J. H. Choi, **J. P. Kar** and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 21<sup>st</sup>-22<sup>nd</sup> May 2009, Muju, South Korea, p. 35.
11. "Micro-patterning of ZnO nanowire arrays", **J. P. Kar**, J. H. Choi and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 7<sup>th</sup> Nov. 2008, Suwon, South Korea, p. 24.
12. "Fabrication and characterization of aqueous-grown ZnO nanowire network transistor", J. H. Choi, **J. P. Kar**, K. J. Moon and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 7<sup>th</sup> Nov. 2008, Suwon, South Korea, p. 25.
13. "Surface treatments of Si, ZnO nanowires and P3HT polymer composite TFT device", K. J. Moon, J. H. Choi, M. Jeong, **J. P. Kar** and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 7<sup>th</sup> Nov. 2008, Suwon, South Korea, p. 58.
14. "ZnO nanowires with high aspect ratios grown by MOCVD using AlN/Si substrate", **J. P. Kar**, J. H. Choi and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 22<sup>nd</sup>-23<sup>rd</sup> May 2008, Chungnam, South Korea, p. 38.
15. "Influence of substrate alignment on the density of hydrothermal grown ZnO nanowires", **J. P. Kar**, K. J. Moon and J. M. Myoung, Korean Institute of Electrical and Electronic Materials Engineers (KIEEME) conference, 11<sup>th</sup> April 2008, Seoul, South Korea.
16. "Aqueous chemical growth (ACG): A low temperature approach for the fabrication of ZnO nanostructures", **J. P. Kar**, S. Kim, S. W. Lee, M. H. Ham and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 2<sup>nd</sup> Nov. 2007, Suwon, South Korea, p. 20.
17. "Development of ZnO nanowire air-gap FETs by using magnetic alignment", S. W. Lee, M. H. Ham, **J. P. Kar** and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 2<sup>nd</sup> Nov. 2007, Suwon, South Korea, p. 17.

18. "Assembly of GaN nanowires based on electric fields for nanowire device applications", J. W. Lee, K. J. Moon, **J. P. Kar**, M. H. Ham and J. M. Myoung, Materials Research Society (MRS) of Korea Conference, 2<sup>nd</sup> Nov. 2007, Suwon, South Korea, p. 20.
19. "Silicon micromachining by doped TMAH solution for AlN, Al, SiO<sub>2</sub> based MEMS", **J. P. Kar**, S. Sharma, P. Joshi, G. Bose and S. Tuli, Indian Microelectronics Society (IMS) Conference, 17<sup>th</sup>-18<sup>th</sup> Feb. 2006, Kurukshetra University, p. 36.
20. "Realization of SiO<sub>2</sub> microstructures by two-step etching", **J. P. Kar**, P. Joshi, S. Sharma, G. Bose and S. Tuli, Indian Microelectronics Society (IMS) Conference, 17<sup>th</sup>-18<sup>th</sup> Feb. 2006, Kurukshetra University, p. 24.
21. "Structural and morphological characterization of AlN films deposited on Si and SiO<sub>2</sub>/Si substrates", **J. P. Kar**, G. Bose, S. Tuli and S. P. Behera, National Seminar on Ferroelectrics and Dielectrics, 23<sup>rd</sup>-25<sup>th</sup> Nov. 2004, University of Delhi, p. 127.
22. "Aluminum nitride: A novel material for microelectronic devices", G. Bose, **J. P. Kar** and S. Tuli, National Symposium on Recent Advances in Electroceramics, 8<sup>th</sup> April 2004, Meerut University.
23. "Study of optical and electrical properties of DC sputtered aluminum nitride films", **J. P. Kar**, G. Bose and S. Tuli, 3<sup>rd</sup> National Symposium and Conference on Solid State Chemistry and Allied Areas (NCSCA), 4<sup>th</sup>-6<sup>th</sup> Dec. 2003, I. I. T. Delhi, p. 93.
24. "Effect of post metalization annealing on the electrical properties of sputtered AlN film", **J. P. Kar**, G. Bose and S. Tuli, National Conference on Materials and Related Technologies (NCMRT), 19<sup>th</sup>-20<sup>th</sup> Sept. 2003, T.I.E.T. Patiala, p. 80.

#### Invited Talks:

1. "Sputtering: A key technology for fabrication, characterization of low-dimensional materials and devices", **J. P. Kar**, Indo-US Workshop on Functional Materials Processing and Characterizations" 3<sup>rd</sup> -6<sup>th</sup> Jan. 2012, NIT Rourkela, India.
2. "Thin film fabrication technology", **J. P. Kar**, Indo-US Workshop on Functional Materials Processing and Characterizations" 3<sup>rd</sup> -6<sup>th</sup> Jan. 2012, NIT Rourkela, India.
3. "Fabrication of ZnO nanowires and their applications in electronic devices", 14<sup>th</sup> Oct. 2010, Istituto di Fotonica e Nanotecnologie del CNR, Via Cineto Romano, Italy.